

**VMC2**

## **Software Description**

**Revision 2.0**

**VMC Version 4.9**

**July 2012**

**rofin**  
LASER MARKING

THE MARK OF EXCELLENCE

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## Document Information

### Scope

This software description gives information on the functionality, configuration and usage of the software.

### Notation

The following notations are used in this manual:



**Caution**

Notation for safety notes. Indicates a situation which, if not avoided, can lead to data loss.



Notation for additional information and hints



**Introduces a procedure**

1. Notation used for procedures
- [...] Notation used for software buttons
- » *Notation used for references*

### Additional Documentation

Read the following documentation:

Document	Company
VisualLaserMarker User's Manual Version 4.x	Rofin-Sinar Laser GmbH
VLMReleaseHistory.htm	Rofin-Sinar Laser GmbH
Online Help installed with VLM (available via [F1])	Rofin-Sinar Laser GmbH

## Revision History

Revision	Date	Description of Changes	Valid for SW version
2.0	July 2012	<p>Added multi-port information to section “Host Communication with MJC”</p> <p>Added description of MJC commands ALARMCLEAR, TERMMACHINE, INITMACHINE, ADDALLVARS, GETVARLIST, VARMAP2, and CREATEPREVIEW</p> <p>Updated section “External Layout Selection”</p> <p>Updated graphic and added information on MJC_GetHostData in section “Script Files”</p>	4.9, build-level 16.101.17 or higher
1.1	February 2012	<p>Renamed section 1 to “Product Information and Safety” and added training information</p> <p>Added screenshot to section “Software Configurations”</p> <p>Added description of checksum calculation to section “MJC Communication Settings”</p> <p>Added section “MJC Command Overview”</p> <p>Updated description in section “Symbolic Replacement”</p> <p>Renamed section “Zip File Commands” to “Recipe File Commands” and added description of ZipIDs.txt file</p> <p>Renamed section “Machine Configuration” to “Equipment Status Variables” and updated description.</p> <p>Updated description of Input Variable type FUNCTION in section “Input Variable Types”</p> <p>Updated description of Format Wizard in section “Format Wizard”</p> <p>Updated graphic and description for DSE Type SEQ in section “DSE Files”</p> <p>Added information on return of “true” and “false” in section “Script Functions for Input Variables”</p> <p>Moved all information on password protection to new section “Password Protection” and added additional information</p> <p>Added information on what happens when the button [Set all to default values] is clicked in sections 2.1.7, 2.6, 4.1, 4.7, 4.8, 4.14</p> <p>Restructured chapter 4 and split into two chapters (4 and 5)</p>	4.7, build-level 15.123.45 or higher
1.0	August 2011	Initial version	4.7, build-level 15.123.45 or higher

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## 1 Product Information and Safety

The product has been developed to control a laser marking system and may only be used for this intended purpose.

The software description is intended for persons who configure and/or operate the software. Configurators need a laser security training and a VMC2 software training. Operators also need a VMC2 software training. The product may only be operated by qualified personnel.

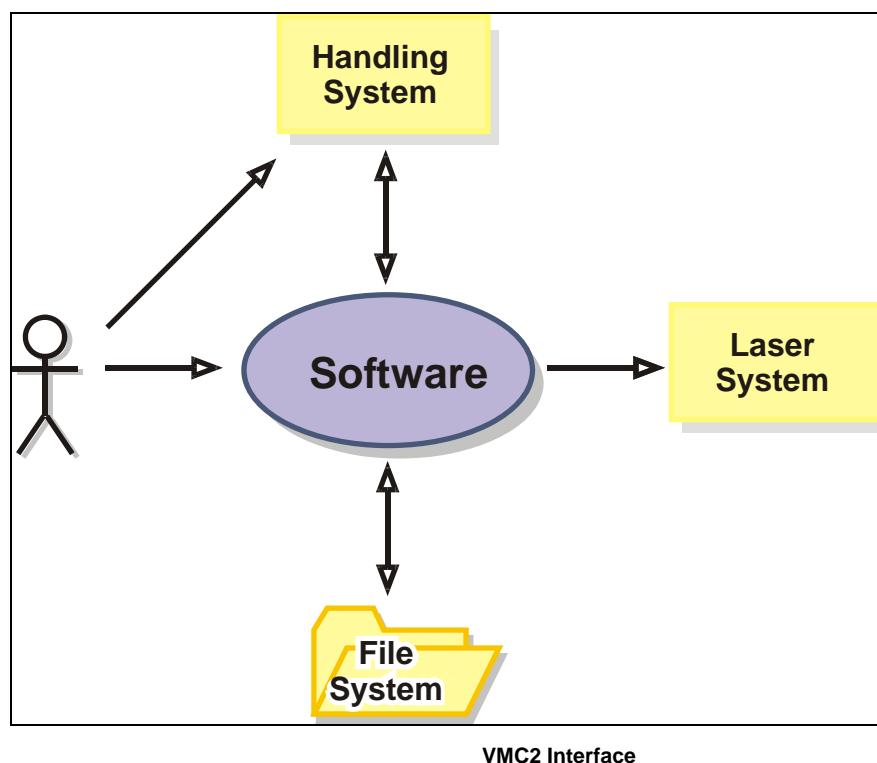
For information on available trainings contact your Rofin sales department.

For safety-relevant information refer to the documentation for the system and system components.

## 2 Functional Description

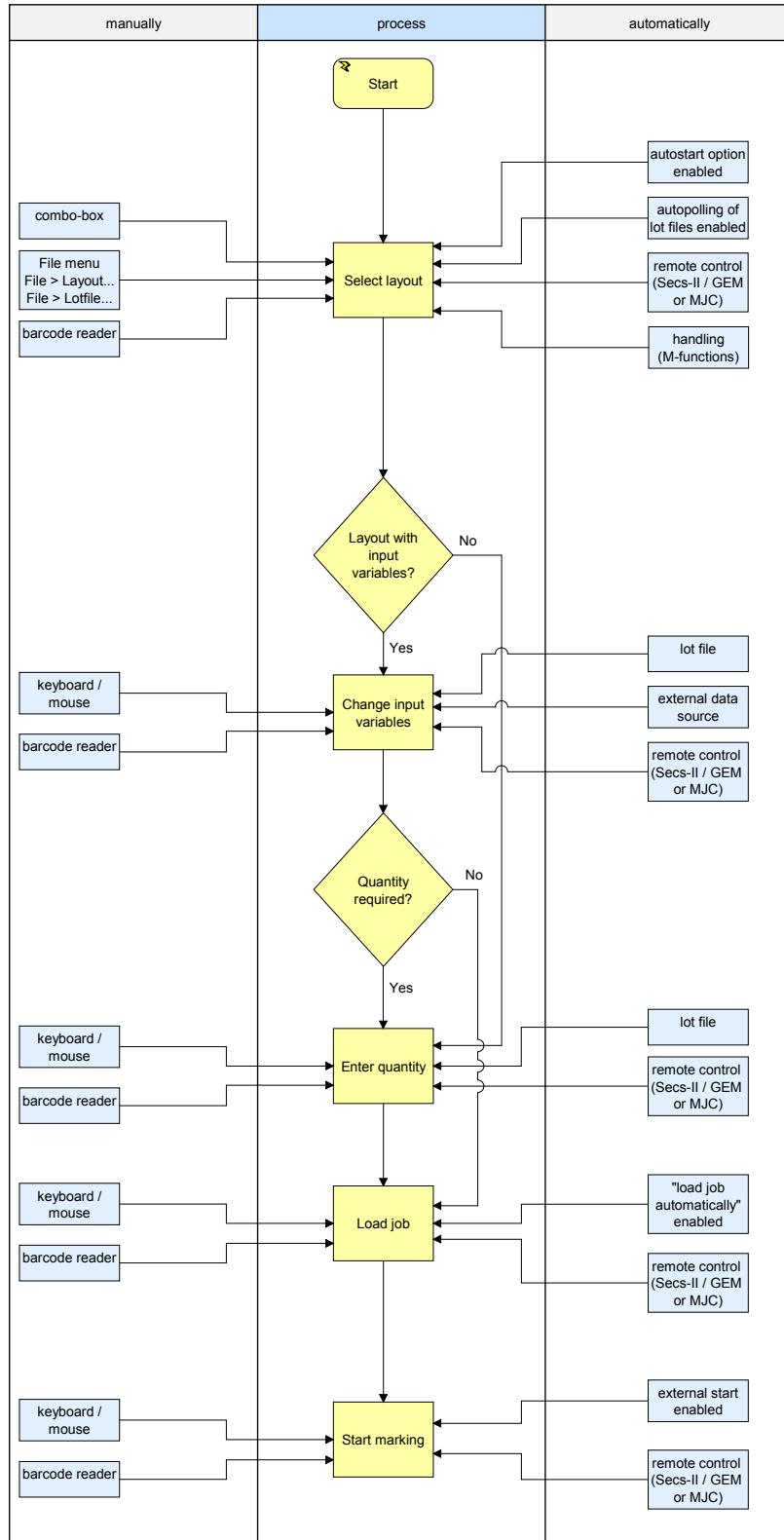
The VMC2 software allows control of the Laser Marking System. The Laser Marking System consists of:

- **File system** to save layout, database, logo and log files
- **Laser system** for the marking process
- **Handling system** to integrate the marking process with material and workpiece handling



## 2.1 General Marking Process

Depending on machine and software configuration, some or all of the steps of the general marking process can be carried out either manually or automatically.



### 2.1.1 Select Layout

A layout file tells the machine where the marking should be positioned on the workpiece. Layouts can be defined and edited in the VisualLaserMarker software and saved as VLM files.

There are several possibilities to select a layout file from the file system:

- Manual selection via file menu
  - Define standard layout to be used
  - Autostart option: select last layout
  - Autopolling for lot files: use layout that is defined in the first lot file in a defined folder
  - External layout selection via PIO
  - Host communication via MJC (remote control)
  - Host communication via Secs-II / GEM (remote control)
- » *For further information on how to select a layout, refer to section 5.2.1.*

### 2.1.2 Change Values of Input Variables

Input variables offer a way to change values of an object defined in the layout. If the selected layout file contains input variables (dynamic data), modify the values for these input variables. This step is skipped if the layout does not contain any input variables.

There are several possibilities to modify input variables:

- Enter the values for the input variables manually
  - Take the values for the input variables from the lot file
  - Data Extern enabled: modify the values according to the defined external data source, for example, a text file or a database file.
  - Remote control: modify the values for the input variables via host communication commands.
- » *For further information on input variables refer to section 2.6.*

### 2.1.3 Enter Quantity

In some cases it is necessary to enter the quantity of pieces that are supposed to be marked in the process. If the checkbox for "Quantity Required" is not checked on the Job Control options page, this field can be left empty. In this case, the job remains loaded until the operator clicks on the [Cancel Job] button. If a quantity is specified, the job is automatically cancelled after the quantity has been marked.

When using a lot file, the information on the quantity is taken from this file. In case of host communication via MJC or Secs-II / GEM, the information is also entered automatically.

» *For further information on how to enter the quantity, refer to section 5.2.3.*

### 2.1.4 Load Job

After entering all of the necessary information, the operator needs to load the job by clicking on the button [Load Job]. As soon as the job has been loaded, the buttons for [Start] and [Cancel Job] are enabled and the laser is ready for marking.

The job is cancelled automatically after the whole amount of the pieces has been marked (if a quantity has been specified).

» *For further information on how to load a job, refer to section 5.2.4.*

### 2.1.5 Start Marking

After loading the job the operator can start the marking process by clicking on the button [Start]. The button for [Stop] is enabled. If the External Start is enabled, the marking process is started via the external start signal. In case of host communication via MJC or Secs-II / GEM, the marking can be started via remote host commands.

» *For further information on how to start marking, refer to section 5.2.6.*

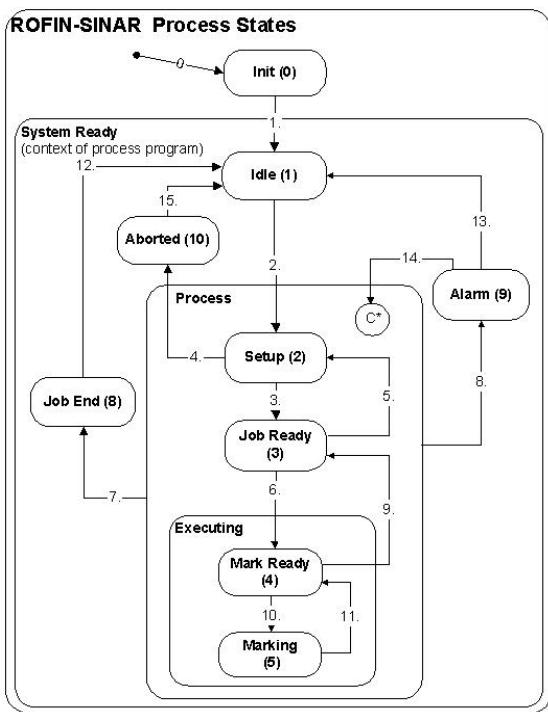
### 2.1.6 Process States

The different process states are displayed in the status line of the GUI:

Process State	Description
Init	Initialization of hardware and preparation of the user interface
Idle	Waiting for user action; no file has been selected
Setup	File is being selected, values for input variables can be entered
Aborted	Selection of the layout and/or input variables has failed
JobReady	Layout file is selected
JobLoaded (=MarkReady)	Job has been loaded, laser is ready to mark
JobEnd	Clean up of job information
Marking	Marking has been started, laser is marking
Alarm	An exception has occurred, program returns to a different state (depending on the alarm)

#### Process State Diagram

The state model is a collection of states and state transitions that describe the behavior of the system. The model includes definition of the actions possible within a state, the events that trigger transitions to other states and the process of transitioning between states. The current process state is displayed in the status bar of the main window.



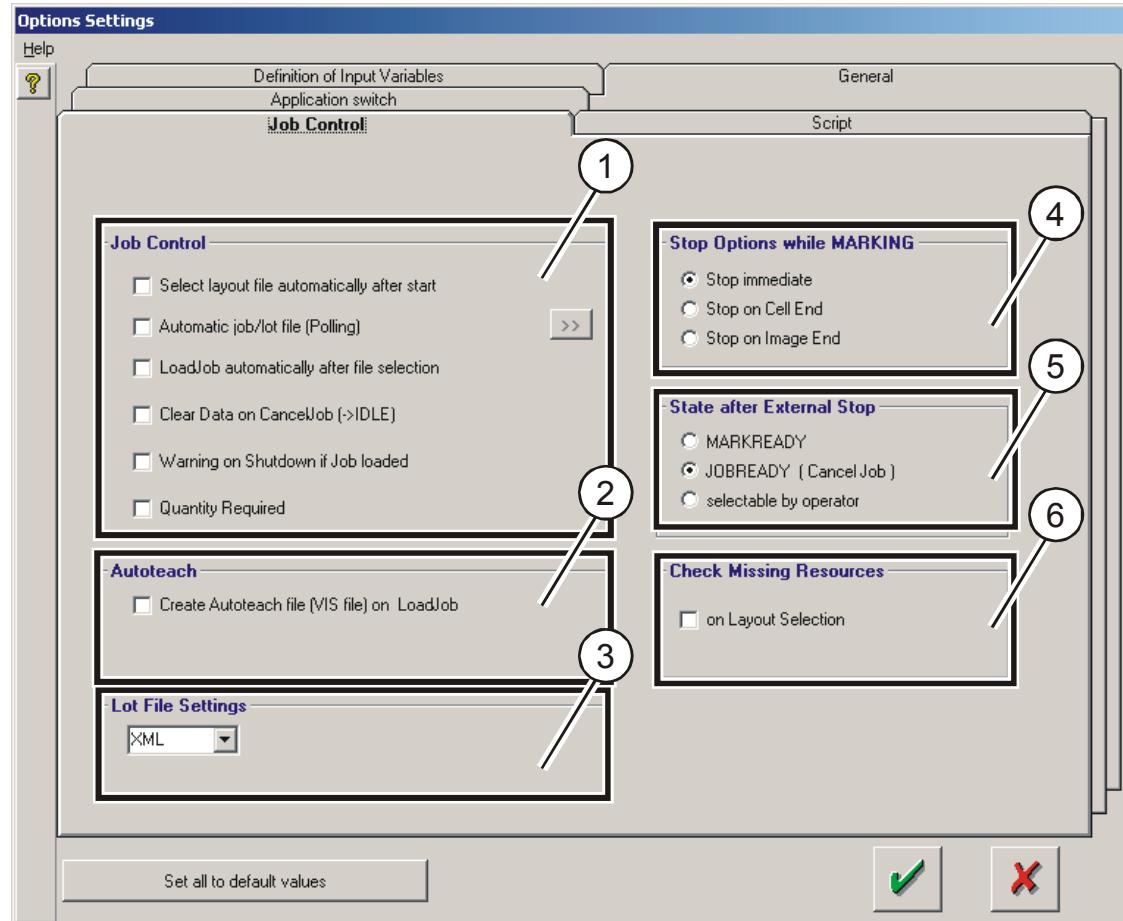
#### Trigger for State Changes

No	Previous Process State	Trigger	Next Process State	Description
0	-	On	Init	VMC2 started
1	Init	Init_done	Idle	System initialized
2	Idle	Process_Start	Setup	Layout selected
3	Setup	Setup_Done	JobReady	Layout and input variables loaded
4	Setup	Setup_Aborted	Aborted	Loading of layout and/or input variables failed
5	JobReady	New_Job	Setup	New layout selected
6	JobReady	Job_Loaded	MarkReady	Job loaded
7	JobReady	Stop_Process	JobEnd	Options changed, for example
	MarkReady	Stop_Process	JobEnd	External stop (optional)
8	Any state	Alarm_Set	Alarm	Alarm occurred
9	MarkReady	Job_Canceled	JobReady	Job canceled
10	MarkReady	Start_Marking	Marking	Marking started
11	Marking	Marking_End	MarkReady	Marking finished
12	JobEnd	Process_Stopped	Idle	Job data are cleared
13	Alarm	Alarm_Abort	Idle	Clicked "STOP" in message box
14	Alarm	Alarm_Clear	Previous process state	Clicked "CLEAR" in message box
15	Aborted	Process_Stopped	Idle	Job data are cleared

## 2.1.7 Job Control

It is possible to customize the default process flow from startup until canceling and deleting of the job data:

- via Options > Settings > Job Control
  - by providing a user-defined script file,  
for example created to give the operator a hint, ask for input etc.
- » For information on script files refer to section 2.9.

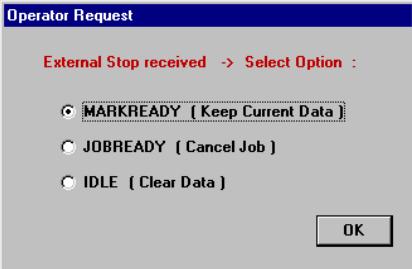


(1)

### Job Control

Defines whether:

- the last selected layout shall be selected automatically as soon as the application is started
- the software shall automatically look for one or more lot files in a certain file folder
- a job shall be loaded automatically as soon as a valid layout has been selected
- the selected layout file shall be unloaded and the input variables shall be cleared as soon as a job has been canceled

	<ul style="list-style-type: none"> <li>• a message box shall appear as soon as the application is closed (by operator or remote shutdown) and a job is still loaded. The operator can then decide, whether he wants to close the application although a job is loaded. In case of remote shutdown (with no operator present) this option should not be selected.</li> <li>• the operator must enter a quantity in the main window or not. If this option is disabled, it is possible to start marking jobs without entering a quantity and the marking will continue until the job is cancelled. If this option is enabled, it is not possible to start a marking job without entering a quantity.</li> </ul>
(2)	<p><b>Autoteach</b>  If checked, an autoteach file with the extension .vis is created automatically as soon as a job is loaded. An autoteach file saves certain information to allow a vision system to check whether the correct data has been marked. For further information on autoteach files contact your Rofin sales representative.</p>
(3)	<p><b>Lot File Settings</b>  Defines whether a lot file shall be an XML file or a customized file. "CUSTOM" requires a script file that contains the parse function for the custom-defined format.</p>
(4)	<p><b>Stop Options while MARKING</b>  Defines the behaviour after the [Stop] button has been clicked or a Stop command has been received.</p> <p><u>Stop immediate</u>: Stops marking immediately (like external stop).</p> <p><u>Stop on Cell End</u>: When marking a matrix object, the marking is not stopped until the marking of the current cell has been completed. The index of the last marked cell is displayed in the status line.</p> <p><u>Stop on Image End</u>: The marking is continued until the whole layout has been marked and the job is cancelled after marking end.</p>
(5)	<p><b>State after External Stop</b>  Defines the behaviour after an external stop in the state MARKREADY, that is a job has been loaded.</p> <p><u>MARKREADY</u>: remain in current state; keep current data</p> <p><u>JOBREADY</u>: job is canceled</p> <p>If "Clear Data On CancelJob" is selected in the Job Control part of the window, the data is cleared and the next state is IDLE.</p> <p><u>Operator Request</u>: a form is displayed and the operator must select what to do.</p> 
(6)	<p><b>Check Missing Resources</b>  If checked, the application checks whether all resources are available as soon as a layout file has been selected.</p>
	<p><b>Buttons</b>  [OK]: Save changes and exit</p>

[Cancel]: Exit without saving changes  
[Set all to default values]: Restore factory settings for Options > Settings and Options > Configuration



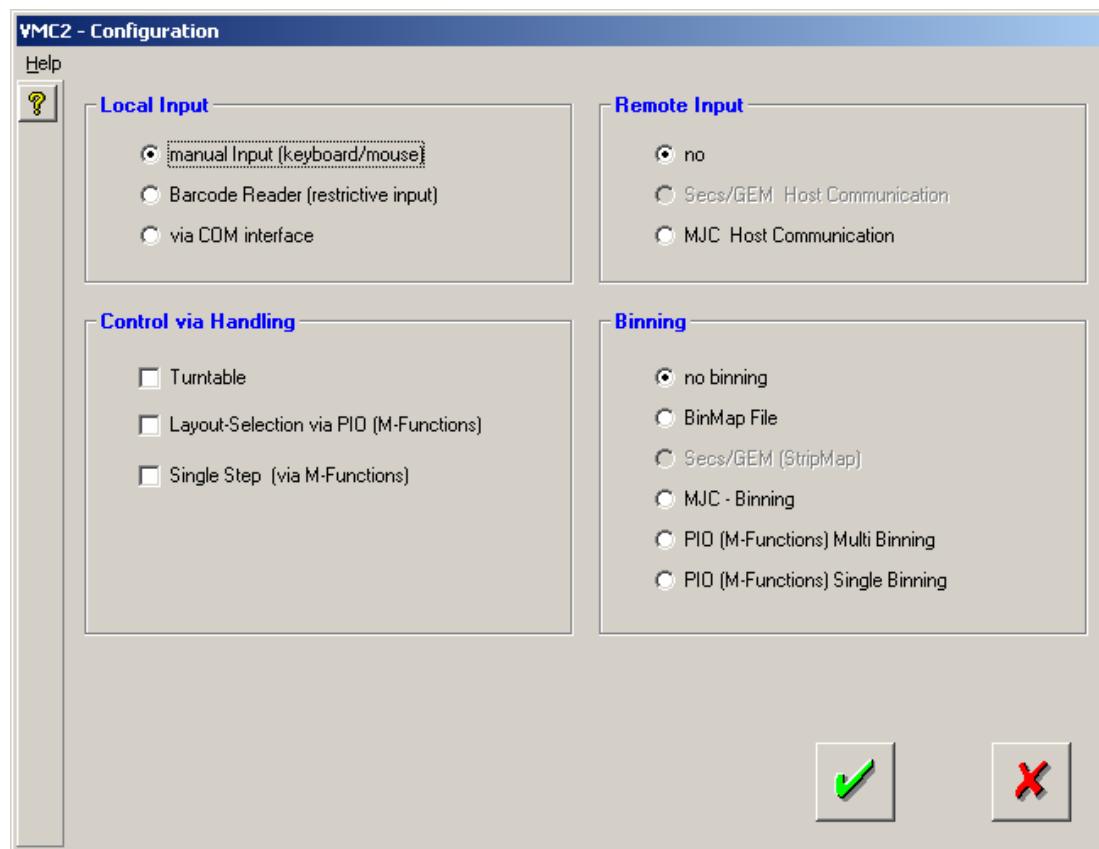
The button **[Set all to default values]** restores all factory settings in Options > Settings and Options > Configuration.

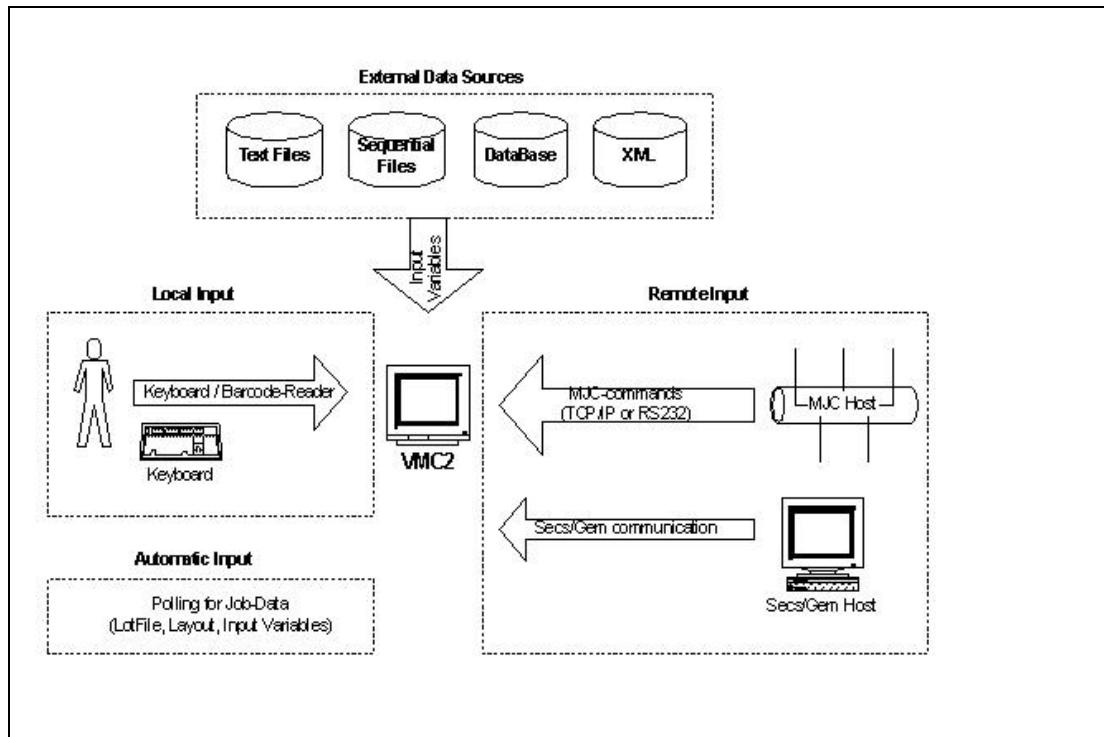
- » For information on how to configure job control options, refer to section 4.8.

## 2.2 Software Configurations

The following software configurations are possible via Options>Configuration.

- Local input
- Remote input via MJC
- Remote input via Secs / GEM
- Control via Handling





### 2.2.1 Local Input

It is possible to enter the necessary data via

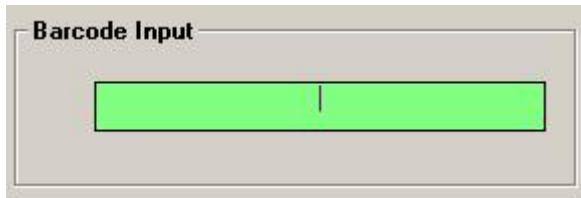
- keyboard/mouse
- barcode reader or
- via the COM interface RS-232.

The default mode for Local Input is **Manual Input**, that means a keyboard, a mouse or optionally a keyboard-connected barcode reader are available for the operator.

The **Barcode Reader** mode only allows the operator to make inputs via the barcode reader. It is a very restrictive mode, because the operator can only load layouts, change values of input values and start marking.

The main window changes if the Barcode Reader mode is selected. In addition, a new tab called "Barcode Settings" appears under Options > Settings. In this window it is possible to determine which value or text is used for the input of the commands LoadJob, CancelJob, Start, Stop, and Change.

The user interface offers an entry field for barcodes. The barcode is scanned with the barcode reader and the data is displayed in the field "Barcode Input". The corresponding layout called <barcode data>.vlm is loaded from the file system.



Only keyboard-connected barcode readers are supported.

When the **COM interface** is configured for layout selection, an additional option page called "COM interface for input" is available to configure the interface under Options > Settings. This mode is for barcode readers connected to a COM port.

» *For further information on how to configure local input, refer to section 4.9.*

## 2.2.2 Remote Input via MJC

The MJC configuration provides a command interface for host communication via the serial port RS-232 or TCP/IP interface.

The process can be completely or partially remote controlled by a host system.

» *For further information on MJC refer to section 2.3.*

## 2.2.3 Remote Input via Secs / GEM

VMC2 supports the SEMI-Standard for Equipment Automation. The interface implementation is compliant to:

- SEMI E37 for HSMS implementations
- SEMI E4 for SECS I implementations
- SEMI E5 for SECS II implementations
- SEMI E30 for GEM implementations
- SEMI E142 for substrate mapping

The process can be completely or partially remote controlled via a Secs / GEM host.

» *For further information and documentation on the Secs / GEM configuration and interface, contact your sales department.*

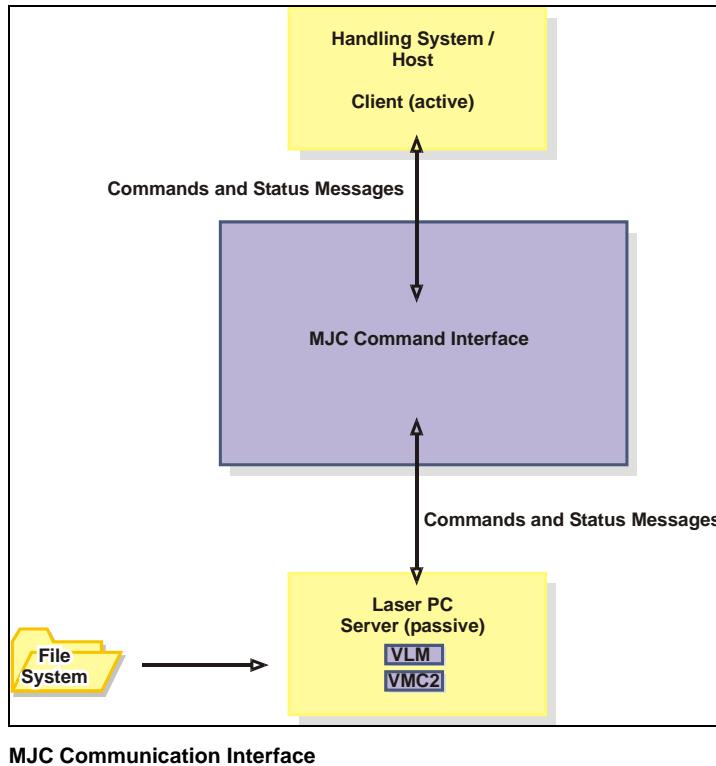
## 2.2.4 Control via Handling

The process can be controlled via M-functions (= I/O signals) sent by the handling.  
Supported control functions are:

- layout selection (see section 2.4)
- selection of turntable positions (see section 2.5)
- marking of large objects in several steps (Single Step, for further information ask your Rofin sales department)
  - » *For further information on how to configure control via handling, refer to section 4.11.*

## 2.3 Host Communication with MJC

The configuration with MJC (Matrix Job Control) provides a host communication between the handling system / host (only the term "host" will be used in this documentation) and the laser PC via TCP/IP or RS-232.

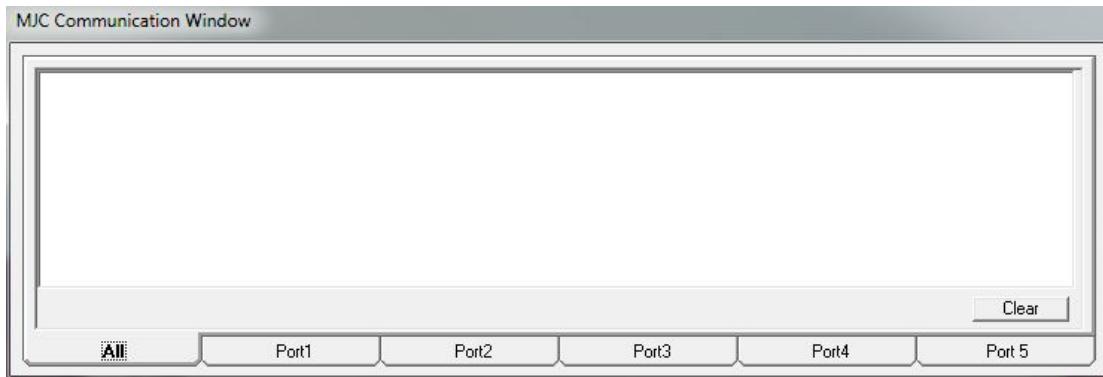


The MJC interface includes commands for:

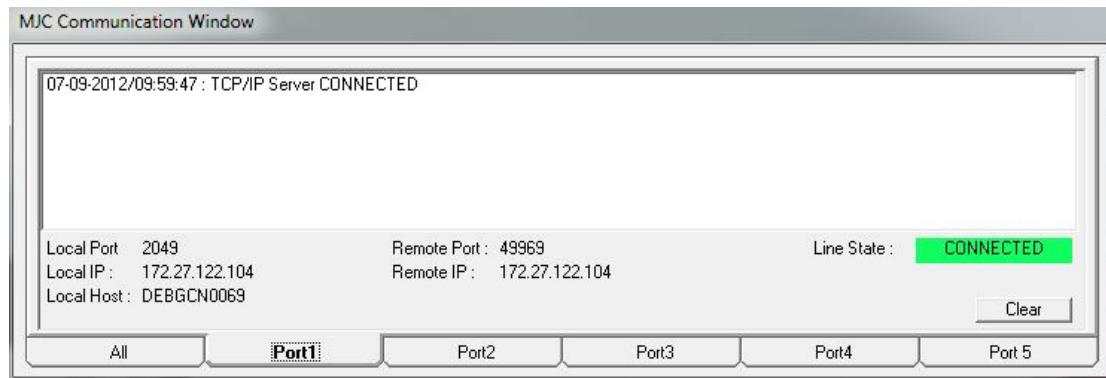
- VMC2 process control,
- status request,
- modification of laser parameters,
- power measurement, and
- matrix-related commands.

If there is no reaction from the host or laser PC within a specified time limit, a timeout error occurs.

The communication status is displayed in a separate window. This window opens automatically as soon as there is a communication between host and laser PC. The tab "All" shows all MJC communication messages.



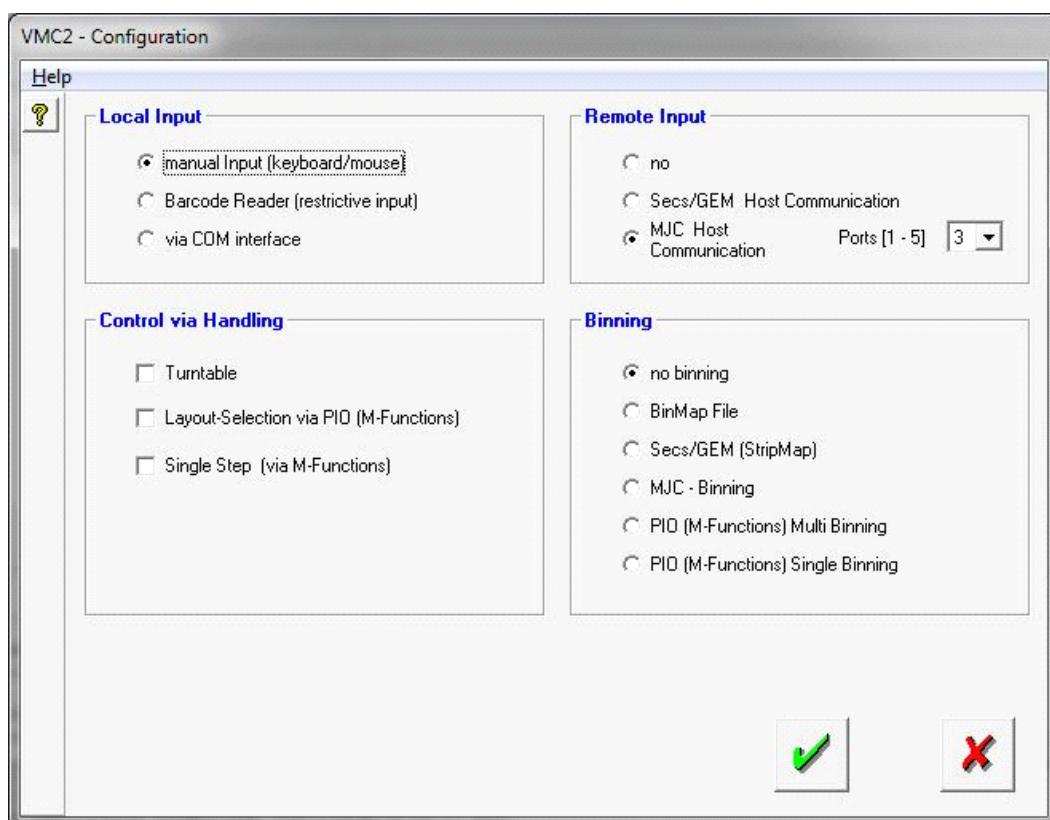
The rest of the tabs are activated depending on the number of configured ports. For example, if only Port1 is configured, the tabs for the other ports are not activated. The tab for the respective port shows messages and information only relevant for that specific port:



- selected interface (port or serial settings)
- connection state between laser and connected host
- communication (commands and status messages to and from the laser)

### 2.3.1 MJC Communication Settings

To use MJC commands, configure VMC2 for “MJC Host Communication” in the Remote Input frame in Options > Configuration and set the number of ports to be used.



After configuration, a new tab called “MJC-Host Communication” is available in Options > Settings. Use this tab to configure the TCP/IP or RS-232 interface and details about the communication.

» For further information on how to configure remote input via MJC, refer to section 4.10.

#### Interface Frame

TCP/IP:



In case MJC is configured for the use with more than one port, the settings in the interface frame must be set for each port.

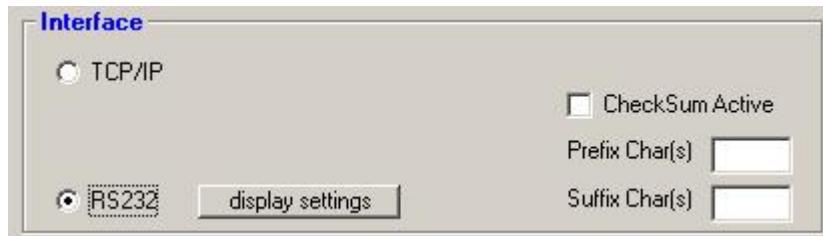
Configuration Part	Description
TCP/IP	Select in case of Ethernet connection
IP	Enter the respective IP address for the TCP/IP connection. Per default, the first IP address found in the system is chosen.
Test button	Click to test the TCP/IP connection
Port	Enter the port number for the TCP/IP connection. The default port number is 2049.

delimiter = CrLf	Checked: all commands must be delimited with CR and LF (Chr\$(13) and Chr\$(10)).
CheckSum Active	<p>Checked: Activates checksum calculation for the data stream.</p> <p>The checksum is added at the end of the data stream:  <code>{Prefix}&lt;command&gt;{Suffix}{Checksum}{delimiter}</code></p> <p>Checksum calculation:</p> <p>All characters (except for prefix and suffix) are converted to hexadecimal numbers and the cross sum is calculated. The lower two characters of the result are again converted to hexadecimal numbers. This number is the checksum.</p>
Prefix Char(s)	Allows the definition of a prefix (one character) for the data stream in ASCII format (for example, STX = 2)
Suffix Char(s)	Allows the definition of a suffix (one character) for the data stream in ASCII format (for example, ETX = 3)
Encoding	<p>Select the encoding type for data and telegrams.</p> <p>Possible values:</p> <p>Default (Ansi)      UTF16-LE      UTF16-BE      UTF8</p> <p>A BOM (Byte Order Mark) precedes the telegram when UTF16-LE, UTF16-BE, or UTF8 encodings are used.</p>



It is possible to define either prefix or suffix characters, not both at the same time.

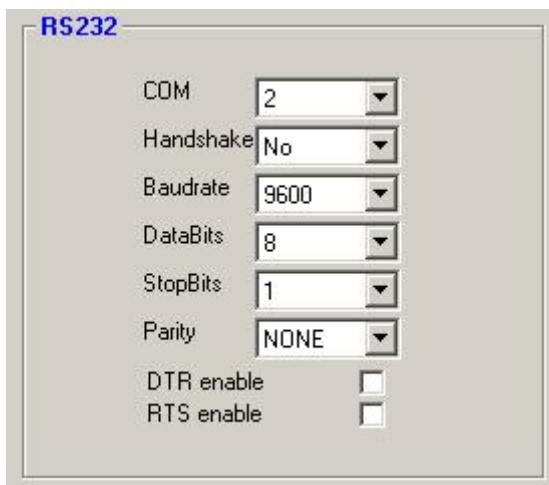
RS-232:



Configuration Part	Description
RS232	Select in case of RS-232 connection
display settings button	Click to display and configure the RS-232 settings. The settings are displayed in a separate frame.
CheckSum Active	<p>Checked: Activates checksum calculation for the data stream. The checksum is added at the end of the data stream:</p> <p><code>{Prefix}&lt;command&gt;{Suffix}{Checksum}{delimiter}</code></p> <p>Checksum calculation:</p> <p>All characters (except for prefix and suffix) are converted to hexadecimal numbers and the cross sum is calculated. The lower two characters of the result are again converted to hexadecimal numbers. This number is the checksum.</p>
Prefix Char(s)	Allows the definition of a prefix (one character) for the data stream in ASCII format (for example, STX = 2)
Suffix Char(s)	Allows the definition of a suffix (one character) for the data stream in ASCII format (for example, ETX = 3)



It is possible to define either prefix or suffix characters, not both at the same time.



Configuration Part	Description
COM	Port number, default: 2
Handshake	Default: No
Baudrate	Default: 9600
DataBits	Default: 8
StopBits	Default: 1
Parity	Default: NONE
DTR enable	Default: not checked
RTS enable	Default: not checked

### Occupation Frame

This frame is only available in Matrix-Mode. If Matrix-Mode is disabled, the Occupation frame is disabled.



Configuration Part	Description
Old Version	Checked: occupation over the RS-232 port is excepted without header. The part information must be sent via m-functions. Example: The occupation for a matrix with 6 cells is: 110111 (cell 3)

Configuration Part	Description
ASCII	is not occupied). CRLF must be sent at the end of the command.
Binary	Checked: ASCII coding is used for old occupation mode Checkbox is disabled if "Old Version" is not checked.
	Checked: Binary coding is used for old occupation mode Checkbox is disabled if "Old Version" is not checked.

### Host / Handler Frame

If MJC is configured for the use with more than one port, all of the checkboxes are available for port 1.

**Host / Handler**

<input type="radio"/> Local
<input checked="" type="radio"/> Remote
<input checked="" type="checkbox"/> User interface enabled for Operator
<input type="checkbox"/> Lot Request Mode
<input checked="" type="checkbox"/> Matrix-Mode
<input checked="" type="checkbox"/> Send Messages
<input checked="" type="checkbox"/> Send Status Change
<input type="checkbox"/> Send Type Info to Handler
<input type="checkbox"/> Single Step Mode

For all other ports, some of the checkboxes are disabled:

**Host / Handler**

<input type="radio"/> Local
<input checked="" type="radio"/> Remote
<input checked="" type="checkbox"/> User interface enabled for Operator
<input type="checkbox"/> Lot Request Mode
<input checked="" type="checkbox"/> Matrix-Mode
<input type="checkbox"/> Send Messages
<input type="checkbox"/> Send Status Change
<input type="checkbox"/> Send Type Info to Handler
<input type="checkbox"/> Single Step Mode

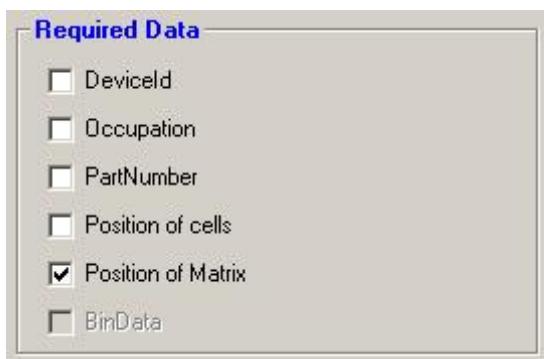
Configuration Part	Description
Local	Checked: Only manual commands are accepted. The fields "User interface enabled for Operator", "Lot Request Mode", and "Matrix-Mode" disappear.
Remote	Checked: Commands from handler are accepted.
User interface enabled for Operator	Checked: User interface for manual input is enabled.
Lot Request Mode	The input (manual or via barcode) in the combo box

Configuration Part	Description
	"Layout" in the main window is interpreted as lot number. A lot request LOTREQUEST;<lot number> is sent to the host.
Matrix-Mode	Checked: all commands of the matrix interface are available. The layout must contain a matrix object called "Matrix1". Not checked: Matrix-related commands are not available. The checkboxes for "Send Type Info to Handler" and "Single Step Mode" and the frames "Occupation", "Required Data", and "Timeout Waiting for Required Data" are disabled.
send Status Change	Checked: Each change of the status signals SYSTEMREADY, JOBEND, and MARKINGEND is sent to the handler.
Send Type Info to Handler	Only available if Matrix-Mode is enabled. Checked: VMC2 sends the information found in the Custom Type of matrix objects and waits for AK or OK from the handler. TYPE;<custom type info>
Single Step Mode	Only available if Matrix-Mode is enabled. Checked: The marking process runs in single-step mode; the layout is larger than the galvo field and must be marked in several steps. Set the machine configuration accordingly. Use the PART command to define the part to be marked next before starting the marking. Send a start command for each part or set the external start signal.
Send Messages	All of the information displayed in the status line (status information, warnings, error messages) are additionally sent to the MJC client. The format is: MESSAGE;<text> This option can be used if the computer on which VMC2 is running does not have a monitor.

### Required Data Frame

This frame is only available in Matrix-Mode. If Matrix-Mode is disabled, the Required Data frame is disabled. If MJC is configured for the use with more than one port, the Required Data frame is only available for port 1. It is disabled for the other ports.

The operator can define which commands must be sent from the host before marking is started. If "Old Version" is checked in the Occupation frame, only "Occupation" is selectable.



Configuration Part	Description
DeviceID	Checked: DEVICEID command must be sent before marking start
Occupation	Checked: OCCUPATION command must be sent before marking start
PartNumber	Checked: PART command must be sent before marking start
Position of cells	Checked: POS command must be sent before marking start
Position of Matrix	Checked: POSMATRIX command must be sent before marking start
BinData	Only available if MJC – Binning is configured in the Binning frame in Options > Configuration Checked: BIN command for binning data must be sent before marking start

### Timeout Waiting for Required Data Frame

This frame is only available in Matrix-Mode. If Matrix-Mode is disabled, the Timeout Waiting for Required Data frame is disabled. If MJC is configured for the use with more than one port, the Timeout Waiting frame is only available for port 1. It is disabled for the other ports.



Configuration Part	Description
enable	Checked: Operator can define how long the program waits for the required data. After this time has elapsed, the program gives a warning to the operator.
drop-down box	Select a value for the timeout in minutes. Possible values: 1, 5, 10, 20

### Show GUI from Host Communication Frame

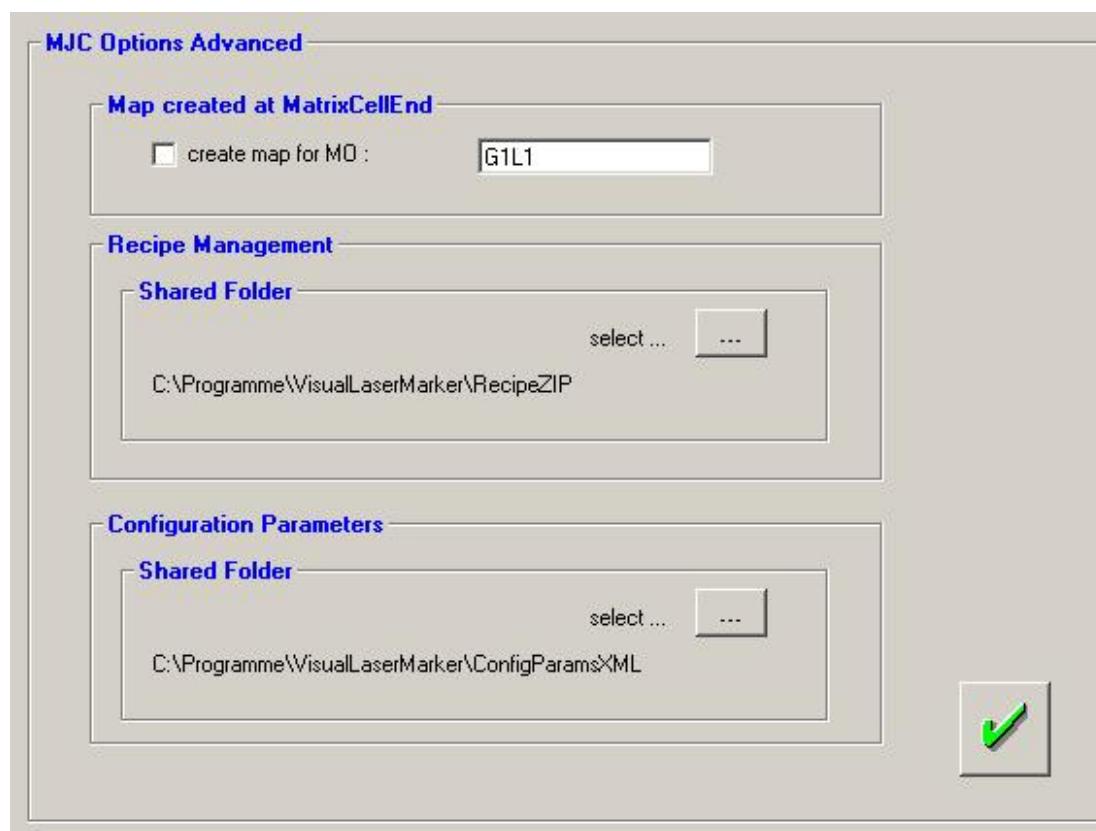
If MJC is configured for the use with more than one port, the Show GUI from Host Communication frame is only available for port 1. It is disabled for the other ports.



Configuration Part	Description
always show host communication	Checked: Communication GUI is always displayed Not checked: Mouse-click on “Remote” field in status line to view Communication GUI

### MJC Options Advanced Frame

Click on the [Advanced] button to view this frame.



Configuration Part	Description
create map for MO	Checked: Enables creation of variable map. The variable map is created for the specified variable name if the variable is an object of a matrix cell layout. It is possible to enter a list of MO names. They have to be separated by ",". The marked value is added to the list at CellEnd. After the matrix has been marked, all marked values (one value per cell) are listed in the map. The host can request this map via the VARMAP command.
Recipe Management: select shared folder	Select a folder from the file system for the file ZipIDs.txt and the zip files.
Configuration Parameters: select shared folder	Select a folder from the file system for the xml file containing configuration parameters.

### 2.3.2 MJC Command Overview

The following table lists all available MJC commands.

MJC Command	Used to	Direction	Description
ADDALLVARS	make all marking objects of a drawing available as input variables	Handler to laser	on page 70
ALARM	send alarm status, alarm number, and alarm text to host	Laser to handler	on page 62
ALARMCLEAR	reset active alarm	Handler to laser	on page 37
BIN	download a bin map	Handler to laser	on page 57
CANCELJOB	cancel a loaded job	Handler to laser	on page 36
CELL	send values of last marked cells	Laser to handler	on page 63
CREATEPREVIEW	create an image file of the current preview	Handler to laser	on page 71
DEVICEID	assign device IDs	Handler to laser	on page 58
EC_LIST_REQUEST	request an xml file containing configuration parameters	Handler to laser	on page 68
GETPOSDRAWING	request current position data of drawing	Handler to laser	on page 56
GETPOSMATRIX	request current position data of matrix	Handler to laser	on page 53
GETPWAUTOMODE	display settings for automode	Handler to laser	on page 47
GETPWOLEVEL	display operation level values	Handler to laser	on page 45
GETPWREGULATION	display values for power regulation	Handler to laser	on page 46
GETPWVALIDATION	display values for power validation	Handler to laser	on page 45
GETVARLIST	request variables from a marking object database	Handler to laser	on page 70
INITMACHINE	retrieve the laser hardware	Handler to laser	on page 69
JOBEND	send job status to the host	Laser to handler	on page 61
LOADJOB	load a job	Handler to laser	on page 36
LOT	select layout file and set values for input variables	Handler to laser	on page 33
LOT2	select layout file and set values for specified input variables	Handler to laser	on page 34
LOT3	specify number of marking cycles, select layout file and set values for input variables	Handler to laser	on page 34
LOTFILE	load data from a lot file	Handler to laser	on page 35
MARKINGEND	send marking status to the host	Laser to handler	on page 62
OCC	provide occupation data for cells	Handler to laser	on page 48

PART	set the active part in case of singel-step handling	Handler to laser	on page 49
POS	set the position and occupation data for cells	Handler to laser	on page 50
POSDRAWING	set offsets and angle of drawing	Handler to laser	on page 54
POSDRAWING2	set offsets and angle of drawing	Handler to laser	on page 55
POSMATRIX	set offsets and angle of matrix	Handler to laser	on page 51
POSMATRIX2	set offsets and angle of matrix	Handler to laser	on page 52
PWCHECK;MEASURE	make a new power measurement	Handler to laser	on page 44
PWCHECK;STATUS	carry out power measurement	Handler to laser	on page 43
RECIPE_DELETE	delete specified files from file system	Handler to laser	on page 67
RECIPE_REQUEST	put files into a zip file	Handler to laser	on page 64
RECIPE_SEND	unzip files in a zip file	Handler to laser	on page 66
REQUIRED_DATA_GENERAL	send required data	Handler to laser	on page 63
SETQPSET	modify laser parameters	Handler to laser	on page 42
SETTING	specify behaviour for matrix-related commands	Handler to laser	on page 59
START	start marking	Handler to laser	on page 37
STATUS	ask for status information	Handler to laser	on page 38
STATUSLIST	send several or all status information IDs to laser system	Handler to laser	on page 40
STOP	stop marking	Handler to laser	on page 37
SYSTEMREADY	send system status to host	Laser to handler	on page 61
TERMMACHINE	allow access to the hardware	Handler to laser	on page 69
VAR	specify values for input variables	Handler to laser	on page 35

### 2.3.3 Process Control Commands

The commands below can be used with any layout.

#### LOT

Description:

This command selects the layout file from the file system and sets the values for the input variables in the given order. All specified variables must be defined as Input Variables in Options > Settings > Definition of Input Variables.

Synopsis:

LOT;<LotNo>;<Filename>[;<value for Text1>;<value for Text2>;...<value for TextN>]

Parameters:

<LotNo>	Lot number; has no specific function and is displayed in the user interface
<Filename>	Name of the layout file to be selected
<value for TextN>	Assigns a value to the input variable called TextN. All variable names must be defined in Options > Settings > Definition of Input Variables in this order and must exist in the layout.

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Examples:

LOT;lot1;test.vlm

LOT;;test.vlm

LOT;lot1;test.vlm;textABC;textDEF

## LOT2

Description:

This command selects the layout file from the file system and sets the values for the specified marking objects. All variable names must be defined in Options > Settings > Definition of Input Variables.

Synopsis:

LOT2;<LotNo>;<Filename>[;<MObjectName1>;<MOValue1>;...;<MObjectNameN>;<MOValueN>]

Parameters:

<LotNo>	Lot number; has no specific function and is displayed in the user interface
<Filename>	Name of the layout file to be selected
<MObjectNameN>	Specifies the name of the marking object MObjectNameN. The value <MOValueN> will be assigned to this marking object.
<MOValueN>	Specifies the value for the marking object MObjectNameN.

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Example:

LOT2;test-lot;test.vlm;Text2;ABC;Logo1;anker.log;Var1;12345

## LOT3

Description:

This command specifies the number of marking cycles, selects the layout file from the file system and sets the values for the specified marking objects. All variable names must be defined in Options > Settings > Definition of Input Variables.

Synopsis:

LOT3;<LotNo>;<LotQuantity><Filename>[;<MObjectName1>;<MOValue1>;...;<MObjectNameN>;<MOValueN>]

Parameters:

<LotNo>	Lot number; has no specific function and is displayed in the user interface
<LotQuantity>	Specifies the number of marking cycles. After the amount specified has been marked, the job is cancelled. (LotQuantity = 0 --> piece count = infinite)
<Filename>	Name of the layout file to be selected
<MObjectNameN>	Specifies the name of the marking object MObjectNameN. The value <MOValueN> will be assigned to this marking object.
<MOValueN>	Specifies the value for the marking object MObjectNameN.

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Example:

LOT3;test-lot;100;test.vlm;Text2;ABC;Logo1;anker.log;Var1;12345

## LOTFILE

Description:

This command loads the data from a lot file.

Synopsis:

LOTFILE;<LotFilename>

Parameters:

<LotFilename>	Specifies the file name for the lot file. The file can also be a bin definition file.
---------------	---

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Examples:

LOTFILE;LOT12345.lot

LOTFILE;LOT54321.xml

## VAR

Description:

This command specifies the values for input variables of marking objects. All variable names must be defined in Options > Settings > Definition of Input Variables.

Synopsis:

VAR;<MOName1>;<MOWert1>;...;<MONameN>;<MOWertN>

Parameters:

<MOName>	Specifies the name of the marking object MONameN. The value <MOValueN> will be assigned to this marking object
<MOWert>	Specifies the value for the marking object MONameN.

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Example:

VAR;PieceCount;49;DatumsCode;XYZ\_2011;DataMatrix1;12345670001;DataMatrix2;12345670002

**LOADJOB**Description:

This command loads the job. The system is ready to mark.

Synopsis:

LOADJOB

Parameters:

none

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

**CANCELJOB**Description:

This command cancels the processing of the loaded job.

Synopsis:

CANCELJOB

Parameters:

none

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

**START**Description:

This command starts the marking (same function as external start).

Synopsis:

START

Parameters:

none

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

**STOP**Description:

This command stops the marking (same function as external stop).

Synopsis:

STOP

Parameters:

none

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

**ALARMCLEAR**Description:

This command resets the active alarm and closes the VMC2 alarm dialog.

Synopsis:

ALARMCLEAR

Parameters:

none

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Example:

ALARMCLEAR

### 2.3.4 Status Request Commands

With the commands below, the host asks the laser system for current status information

#### STATUS

Description:

This command sends the ID of the status information to the laser system. The laser system returns the value of the requested status.

Synopsis:

STATUS;<SVID>

Parameter:

The parameter <SVID> contains the status name. Possible values for <SVID>:

SVID	Description
SYSTEMREADY	Status of SystemReady signal Possible return values: 0 / 1
JOBEND	Status of JobEnd signal Possible return values: 0 / 1
MARKINGEND	Status of MarkingEnd signal Possible return values: 0 / 1
PROCSTATE	Current process state Possible return values: any process state
PREVPROCSTATE	Previous process state Possible return values: any process state
TRIGGER	Trigger that has caused the last process state change Possible return values: any trigger name
ALARMSTATE	Possible return values: 1: Alarm set 0: Alarm reset
ALARMCODE	Number of last alarm that has occurred Possible return values: any alarm code
ALARMDESCRIPTION	Description of last alarm that has occurred
LOTID	Lot ID of last job that has been loaded
LOTQUANTITY	Specified quantity of last job that has been loaded
FILENAME	Path and file name of selected layout
EXECTIME	Execution time of last marking cycle
CURRENT	Actual current (set during last marking cycle)
SPEED	Speed from last marking cycle
FREQUENCY	Frequency from last marking cycle
MARKINGCOUNTER	Number of marking cycles of loaded job
GOODBINS	Counter for good marked bins of loaded job
BADBINS	Counter for bad marked bins of loaded job
POWER	Last measured power value
POWERRESULT	Result of last power measurement Possible return values: ERROR OK
POWERDESCR	Description in case of measurement error
POWERCURRENTOFFSET	Current offset in case of power regulation
POWERCURRENTPLEVEL	Current operation level defined in power configuration
POWERAUTOMODE	Status of automode Possible return values: 0: OFF 1: ON
GLOBAL;<name>	Next value to be marked of the global counter <name>

SVID	Description
LOCAL;<name>	Next value to be marked of the local counter <name>
REQUIRED_DATA_GENERAL	Information, which data are expected to be sent by the handler (set in Options > Settings > MJC-Host Communication)
OPERATIONHOURS	System operation hours [hh:mm]
WATERTEMP	Actual water temperature [°C]
WATERFLOW	Actual water flow [l/min]
CABINETTEMP	Actual cabinet temperature [°C]
VALVELEVEL	Valve level [%]
SHUTTER	Shutter state Possible return values: 0: shutter closed 1: shutter open 2: error
SHG	For SHG laser only SHG state Possible return values: INSTABLE, WARMUP, STABLE, CONSERVATION
NEST	RTX Configuration only: Nest ID of last selected nest
CELL	For matrix-related status only: Get information of last marked cell: CellIndex;PartNumber;Occupation;BinNumber;DeviceID
DEVICEIDMAP	For matrix-related status only: Get the map for marked device IDs. The map is valid at MarkingEnd.
VARMAP	Get the map of the contents of the specified variable. The map is created during the marking and updated at every CellEnd with the marking value of the specified variable. In case of more than one MO name, the value for the first MO is returned.
VARMAP2	Get the map of the contents of the specified variables. The map is created during the marking and updated at every CellEnd with the marking value of the specified variable. The laser returns the map data in VLM execution order.

**Returns:**

<SVID>;N/A	Requested value is currently not available
<SVID>;<value>	Requested SVID followed by the current status. For possible return values for the different SVID values, see the table above.

**Examples:**

STATUS;JOBEND  
Returns: JOBEND;1

STATUS;OPERATIONHOURS  
Returns: OPERATIONHOURS;456;16

STATUS;VARMAP2;1;<name1>  
Returns: VARMAP2;<name1>;Unit1Content;Unit2Content;...

## STATUSLIST

Description:

This command sends several or all of the status information IDs to the laser system. The laser system returns the values of the respective (or all of the) IDs.

Synopsis:

STATUSLIST;SVID1;...;SVIDn

Parameters:

The parameter <SVID> contains the status name. Possible values for <SVID>:

SVID	Description
SYSTEMREADY	Status of SystemReady signal Possible return values: 0 / 1
JOBEND	Status of JobEnd signal Possible return values: 0 / 1
MARKINGEND	Status of MarkingEnd signal Possible return values: 0 / 1
PROCSTATE	Current process state Possible return values: any process state
PREVPROCSTATE	Previous process state Possible return values: any process state
TRIGGER	Trigger that has caused the last process state change Possible return values: any trigger name
ALARMSTATE	Possible return values: 1: Alarm set 0: Alarm reset
ALARMCODE	Number of last alarm that has occurred Possible return values: any alarm code
ALARMDESCRIPTION	Description of last alarm that has occurred
LOTID	Lot ID of last job that has been loaded
LOTQUANTITY	Specified quantity of last job that has been loaded
FILENAME	Path and file name of selected layout
EXECTIME	Execution time of last marking cycle
CURRENT	Actual current (set during last marking cycle)
SPEED	Speed from last marking cycle
FREQUENCY	Frequency from last marking cycle
MARKINGCOUNTER	Number of marking cycles of loaded job
GOODBINS	Counter for good marked bins of loaded job
BADBINS	Counter for bad marked bins of loaded job
POWER	Last measured power value
POWERRESULT	Result of last power measurement
POWERDESCR	Description in case of measurement error
POWERCURRENTOFFSET	Current offset in case of power regulation
POWERCURRENTPLEVEL	Current operation level defined in power configuration
POWERAUTOMODE	Status of automode Possible return values: 0: OFF 1: ON
GLOBAL;<name>	Next value to be marked of the global counter <name>
LOCAL;<name>	Next value to be marked of the local counter <name>
REQUIRED_DATA_GENERAL	Information, which data are expected to be sent by the handler (set in Options > Settings > MJC-Host Communication)
OPERATIONHOURS	System operation hours [hh:mm]
WATERTEMP	Actual water temperature [°C]

SVID	Description
WATERFLOW	Actual water flow [l/min]
CABINETTEMP	Actual cabinet temperature [°C]
VALVELEVEL	Valve level [%]
SHUTTER	Shutter state Possible return values: 0: shutter closed 1: shutter open 2: error
SHG	For SHG laser only SHG state Possible return values: INSTABLE, WARMUP, STABLE, CONSERVATION
NEST	RTX Configuration only: Nest ID of last selected nest
CELL	For matrix-related status only: Get information of last marked cell: CellIndex;PartNumber;Occupation;BinNumber;DeviceID
DEVICEIDMAP	For matrix-related status only: Get the map for marked device IDs. The map is valid at MarkingEnd.
VARMAP	Get the map of the contents of the specified variable. The map is created during the marking and updated at every CellEnd with the marking value of the specified variable. In case of more than one MO name, the value for the first MO is returned.
VARMAP2	Get the map of the contents of the specified variables. The map is created during the marking and updated at every CellEnd with the marking value of the specified variable. The laser returns the map data in VLM execution order.

Returns:

<SVIDn>;N/A	Requested value is currently not available
<SVID1>;<value1>;...;<SVIDn>;<valueN>	Requested SVID followed by the current status.

Examples:

STATUSLIST;ALARMCODE;ALARMDESCRIPTION

Returns: STATUSLIST;ALARMCODE;1013;ALARMDESCRIPTION;Execution of the layout was stopped

STATUSLIST;CURRENT;WATERTEMP

Returns: STATUSLIST;CURRENT;12.0;WATERTEMP;25.6

STATUSLIST;POWER;CURRENT

Returns: STATUSLIST;POWER;5.46;CURRENT;N/A

### 2.3.5 Modification of Laser Parameters Commands

MJC provides commands to modify the laser parameters.

#### **SETQPSET**

Description:

This command allows you to modify the laser parameters. The changes may or may not be saved.

Synopsis:

SETQPSET;<name>;<type>;<current>;<frequency>;<speed>;<Y/N>

Parameters:

<name>	name of laser parameter set
<type>	type of laser parameter set GLOBAL or LOCAL
<current>	new current
<frequency>	new frequency
<speed>	new speed
<Y/N>	Y: save new values N: do not save new values

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Examples:

Modify the frequency and save:

SETQPSET;Standard;GLOBAL;;20000;;Y

Modify the frequency and current and save:

SETQPSET;Standard;GLOBAL;24;20000;Y

Modify only the current and save:

SETQPSET;Standard;GLOBAL;24;;;;Y

### 2.3.6 Power Measurement Commands

MJC provides commands to carry out the power measurement and display the result. There are also several commands available to get the values of the active power configuration.

#### PWCHECK;STATUS

Description:

This command gets the results from the last power measurement.

Synopsis:

PWCHECK;STATUS

Parameters:

None

Returns:

PWCHECK;<Result-of-measurement>;<Automode>;<power value>;<current offset>	
N/A	Requested value is currently not available

Parameters for return values:

<Result-of-measurement>	OK: result is OK ERROR: error during measurement
<Automode>	AUTO_OFF: automode is off AUTO_ON: automode is on
<power value>	Gets the power value
<current offset>	Gets the current offset value

Example:

PWCHECK;STATUS;

Result:

Not OK: PWCHECK;ERROR;AUTO\_OFF;0;N/A

OK: PWCHECK;OK;AUTO\_OFF;5.46;0.00

## PWCHECK;MEASURE

### Description:

This command makes a new power measurement and displays the results.

### Synopsis:

PWCHECK;MEASURE

### Parameters:

None

### Returns:

PWCHECK;<Result-of-measurement>;<Autemode>;<power value>;<current offset>	
N/A	Requested value is currently not available

Parameters for return values:

<Result-of-measurement>	OK: result is OK ERROR: error during measurement
<Autemode>	AUTO_OFF: automode is off AUTO_ON: automode is on
<power value>	Gets the power value
<current offset>	Gets the current offset value

### Example:

Not OK: PWCHECK;ERROR;AUTO\_OFF;0;N/A

OK: PWCHECK;OK;AUTO\_OFF;5.46;0.00



The power measurement may take up to 90 seconds.

## **GETPWOPLEVEL**

Description:

This command displays the values for the operation level.

Synopsis:

GETPWOPLEVEL

Parameters:

none

Returns:

GETPWOPLEVEL;<current>;<frequency>;<lead time>;<repeat count>	
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Parameters for return values:

<current>	Gets current of active power configuration [A]
<frequency>	Gets frequency of active power configuration [Hz]
<lead time>	Gets lead time of active power configuration [s]
<repeat count>	Gets repeat count or active power configuration

Example:

GETPWOPLEVEL

Result: GETPWOPLEVEL;35.0;10000;5;8

## **GETPWVALIDATION**

Description:

This command displays the values for the power validation.

Synopsis:

GETPWVALIDATION

Parameters:

None

Returns:

GETPWVALIDATION;<high limit>;<low limit>	
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Parameters for return values:

<high limit>	Gets the settings of the high limit [%]
<low limit>	Gets the settings of the low limit [%]

Example:

GETPWVALIDATION

Result: GETPWVALIDATION;20.0;20.0

## GETPWREGULATION

### Description:

This command displays the values for the power regulation.

### Synopsis:

GETPWREGULATION

### Parameters:

None

### Returns:

GETPWREGULATION;<MS>;<MCorr>;<Int>	
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Parameters for return values:

<MS>	Maximum number of steps
<MCorr>	Maximum correction [A]
<Int>	Interval [%]

### Example:

GETPWREGULATION

Result: GETPWREGULATION;8;10.0;2.0

**GETPWAUTOMODE**Description:

This command displays the settings for automode.

Synopsis:

GETPWAUTOMODE

Parameters:

None

Returns:

GETPWAUTOMODE;<Act>;<Sx>;<Jx>;<Px>	
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Parameters for return values:

<Act>	Settings for action V: Validation R: Regulation
<Sx>	System start 0: not activated 1: activated
<Jx>	Job load 0: not activated 1: activated
<Px>	Piece count 0: not activated 1: activated and piece count is set to "1" n: activated and piece count is set to "n"

Example:

GETPWAUTOMODE

Result: GETPWAUTOMODE;V;S0;L1;P5

### 2.3.7 Matrix-Related Commands

MJC provides several matrix-related commands that are only available if “Matrix-Mode” is selected in Options > Settings > MJC-Host Communication and the matrix object must be named “Matrix1”.

#### OCC

##### Description:

This command provides the occupation data (= cell status). The command is typically used with tray handlers.

The occupation data must be sent in the VLM execution order.

```
matrix object    cell 1  cell 3  cell 5
                  cell 0  cell 2  cell 4
```

##### Synopsis:

OCC;<Partnumber>;<Occ1>;<Occ2>;...;<OccN>

##### Parameters:

<Partnumber>	Specifies the part number 0: occupation data is valid for the complete matrix object n: occupation data is valid for part “n” in the matrix object (only used with single-step handling)
<OccN>	Specifies the cell status for Cell N 0: no device 1: device available

##### Returns:

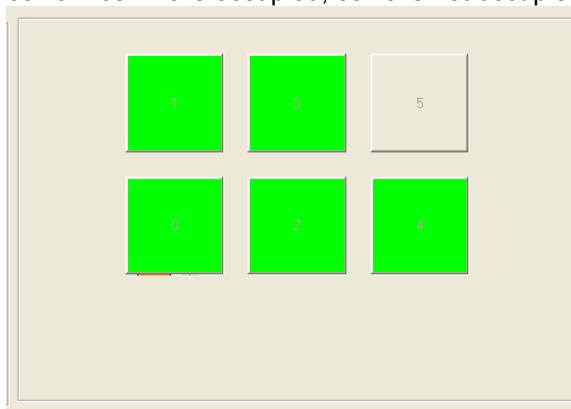
AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

##### Example for a matrix with 6 cells:

OCC;0;1;1;1;1;1;0

##### Result:

cell 0 – cell 4 are occupied, cell 5 is not occupied.



To view the occupation data select View > Layout > DrawCellOccupation.

**PART****Description:**

This command sets the active part in case of single-step handling. The part number is 1-based. The part numbers are displayed in the VLM editor.

**Synopsis:**

PART;<Partnumber>

**Parameters:**

<Partnumber>	1 – n: Specifies the part number
--------------	----------------------------------

**Returns:**

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

## POS

### Description:

This command sets the position and occupation data for cells. The reference point for the rotation is the center of the cell. The position data are floating-point numbers formatted with three digits after decimal point.

### Synopsis:

POS;<Partnumber>;<Occ1>;<Xoff1>;<Yoff1>;<Angle1>...;<OccN>;<XoffN>;<YoffN>;<AngleN>

### Parameters:

<Partnumber>	Specifies the part number 0: position and occupation data is valid for the complete matrix object n: position and occupation data is valid for part "n" in the matrix object (only used with single-step handling)
<OccN>	Specifies the cell status for Cell N 0: no device 1: device available
<XoffN>	X position in [mm] relative to the parent node
<YoffN>	Y position in [mm] relative to the parent node
<AngleN>	Angle in [°] relative to the parent node. The reference point is the center of the cell

### Returns:

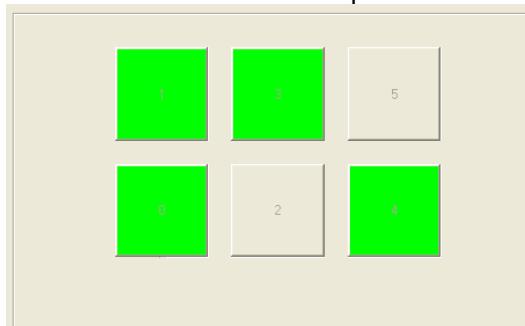
AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

### Example for matrix with 6 cells:

POS;0;1;2;2;20;1;2;2;20;**0**;2;2;20;1;2;2;20;1;2;2;20;**0**;2;2;20

### Result:

Cell 2 and cell 5 are not occupied.



To view the occupation data select View > Layout > DrawCellOccupation.

## POSMATRIX

### Description:

This command sets offsets and angle of the matrix. The position data of the matrix are reset on CancelJob and LoadJob. The position data are floating-point numbers formatted with three digits after decimal point.

### Synopsis:

POSMATRIX;<Xoff>;<Yoff>;<Angle>

### Parameters:

<Xoff>	X position in [mm] relative to the parent node
<Yoff>	Y position in [mm] relative to the parent node
<Angle>	Angle in [°] relative to the parent node. The reference point is the center of the cell.

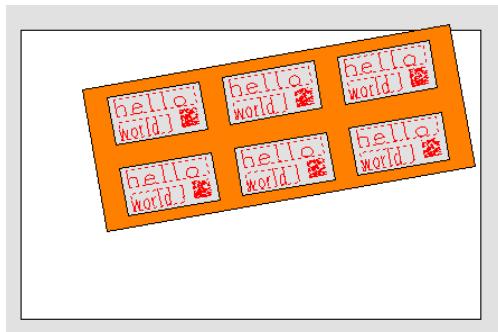
### Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

### Example:

POSMATRIX;5;5;10

### Result:



The layout preview is updated.

## POSMATRIX2

### Description:

Like the POSMATRIX command this command sets offsets and angle of the matrix. The position data are floating point numbers formatted with three digits after decimal point. After setting the new position data, the execution list is updated:

- Update assignment of the cells to the galvo heads (load balancing) in case of double-head system
- Update part information (for example, for single-step mode)
- Check if any objects are outside of the galvo field(s)

If objects are outside of the galvo field, an alarm occurs. This avoids a failure during marking.

This command takes longer than the POSMATRIX command.

### Synopsis:

POSMATRIX2;<Xoff>;<Yoff>;<Angle>

### Parameters:

<Xoff>	X position in [mm] relative to the parent node
<Yoff>	Y position in [mm] relative to the parent node
<Angle>	Angle in [°] relative to the parent node. The reference point is the center of the cell.

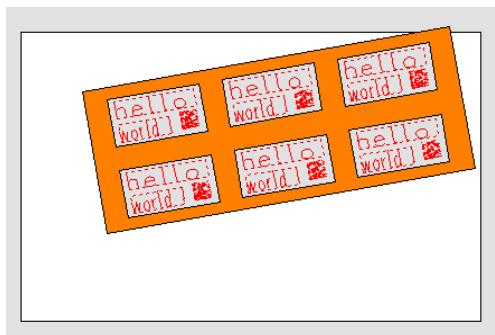
### Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

### Example:

POSMATRIX2;5;5;10

### Result:



The layout preview is updated.

## GETPOSMATRIX

Description:

This command requests the current position data of the matrix. The position data are floating-point numbers formatted with three digits after decimal point.

Synopsis:

GETPOSMATRIX

Parameters:

None

Returns:

GETPOSMATRIX;<X-OFFSET>;<Y-OFFSET>;<Angle>;<Reference Point>	
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Parameters for Returns

<X-OFFSET>	X position in [mm] relative to the parent node
<Y-OFFSET>	Y position in [mm] relative to the parent node
<Angle>	Angle in [°] relative to the parent node. The reference point is the center of the cell.
<Reference Point>	Possible values: CenterBottom, CenterCenter, CenterTop, LeftBottom, LeftCenter, LeftTop, RightBottom, RightCenter, RightTop

Example:

GETPOSMATRIX

Return:

GETPOSMATRIX;10,000;10,000;0,000;LeftBottom

## POSDRAWING

### Description:

This command sets offsets and angle of the drawing relative to the marking area. The position data are floating-point numbers formatted with three digits after decimal point (see also POSDRAWING2).

### Synopsis:

POSDRAWING;<Xoff>;<Yoff>;<Angle>

### Parameters:

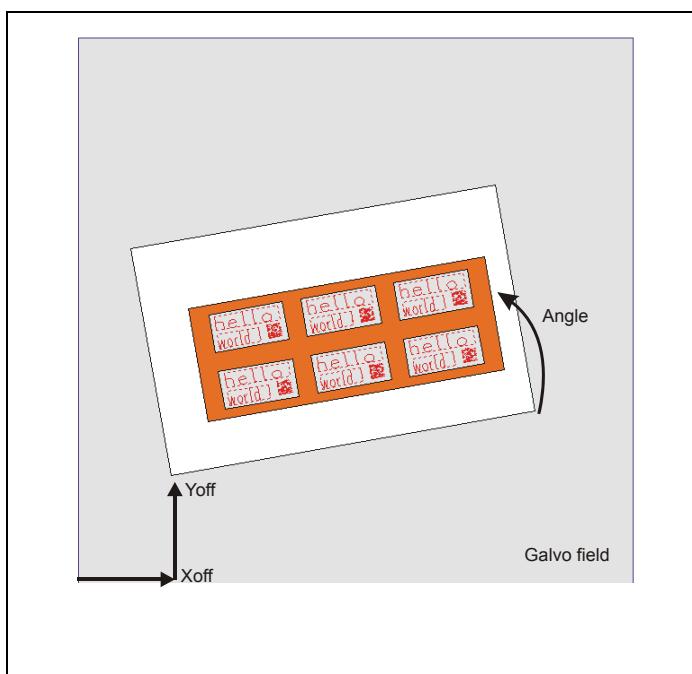
<Xoff>	X position in [mm] relative to the parent node
<Yoff>	Y position in [mm] relative to the parent node
<Angle>	Angle in [°] relative to the parent node. The center of rotation is the lower left corner of the drawing.

### Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

### Example:

POSDRAWING;5;5;10



The layout preview is updated.

## POSDRAWING2

### Description:

Like the POSDRAWING command this command sets offsets and angle of the drawing relative to the marking area. The position data are floating point numbers formatted with three digits after decimal point.

### Difference to POSDRAWING command:

After setting the new position data, the execution list is updated, i.e. it is checked whether any objects are outside of the galvo field(s). If objects are outside of the galvo field, an alarm occurs. This avoids a failure during marking.

This command takes longer than the POSDRAWING command.

### Synopsis:

POSDRAWING2;<Xoff>;<Yoff>;<Angle>

### Parameters:

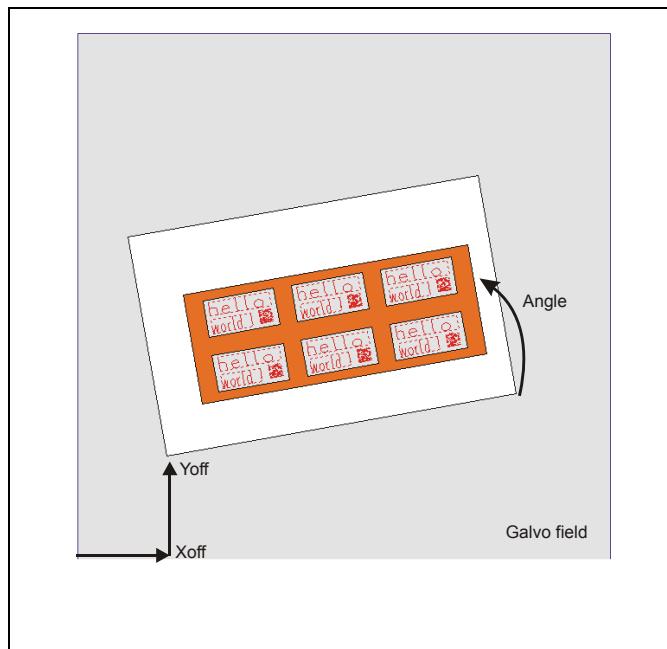
<Xoff>	X position in [mm] relative to the parent node
<Yoff>	Y position in [mm] relative to the parent node
<Angle>	Angle in [°] relative to the parent node. The center of rotation is the lower left corner of the drawing.

### Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

### Example:

POSDRAWING2;5;5;10



The layout preview is updated.

## GETPOSDRAWING

### Description:

This command requests the current position data of the drawing. The position data are floating-point numbers formatted with three digits after decimal point.

### Synopsis:

GETPOSDRAWING

### Parameters:

None

### Returns:

GETPOSDRAWING;<X-OFFSET>;<Y-OFFSET>;<Angle>	
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

### Parameters for Returns

<X-OFFSET>	X position in [mm] relative to the parent node
<Y-OFFSET>	Y position in [mm] relative to the parent node
<Angle>	Angle in [°] relative to the parent node. The center of rotation is the lower left corner of the drawing.

### Example:

GETPOSDRAWING

### Result:

GETPOSDRAWING;15,000;20,000;0,000

**BIN**Description:

This command downloads a bin map for a processing matrix job.

Synopsis:

**BIN;<OriginLocation>;<Bin1>;<Bin2>;...;<BinN>**

Parameters:

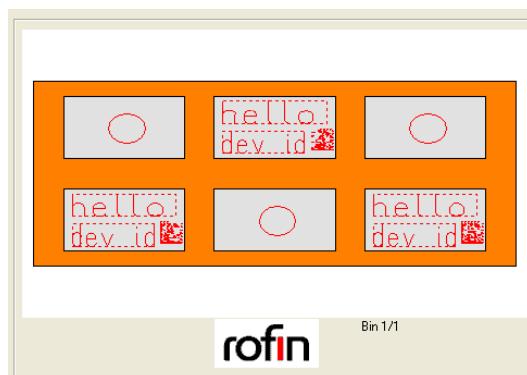
<OriginLocation>	Specifies the order in which the values are assigned to the cells.
0: data needs to be sent in VLM-internal order (column wise)	1 3 5 0 2 4
1: UpperRight Top (row wise)	2 1 0 5 4 3
2: UpperLeft Top (row wise)	0 1 2 3 4 5
3: LowerLeft Top (row wise)	3 4 5 0 1 2
4: LowerRight Top (row wise)	5 4 3 2 1 0
9: UpperRight Top (column wise)	4 2 0 5 3 1
10: UpperLeft Top (column wise)	0 2 4 1 3 5
11: LowerLeft Top (column wise)	1 3 5 0 2 4
12: LowerRight Top (column wise)	5 3 1 4 2 0
<BinN>	Specifies the bin number of the layout to be used

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Example:

**BIN;0;1;0;0;1;1;0**

Result:

**Cell 0, cell 3, and cell 4 use layout 1.  
Cell 1, cell 2, and cell 5 use layout 0.**

## DEVICEID

### Description:

This command assigns device IDs according to the specified OriginLocation. The device ID is assigned to a marking object with the name DeviceID.

### Synopsis:

DEVICEID;<OriginLocation>;<Dev1>;<Dev2>;...;<DevN>

### Parameters:

<OriginLocation>	Specifies the order in which the values are assigned to the cells.
0: data needs to be sent in VLM-internal order (column wise)	1 3 5 0 2 4
1: UpperRight Top (row wise)	2 1 0 5 4 3
2: UpperLeft Top (row wise)	0 1 2 3 4 5
3: LowerLeft Top (row wise)	3 4 5 0 1 2
4: LowerRight Top (row wise)	5 4 3 2 1 0
9: UpperRight Top (column wise)	4 2 0 5 3 1
10: UpperLeft Top (column wise)	0 2 4 1 3 5
11: LowerLeft Top (column wise)	1 3 5 0 2 4
12: LowerRight Top (column wise)	5 3 1 4 2 0
<DevN>	Specifies the device ID for cell N.

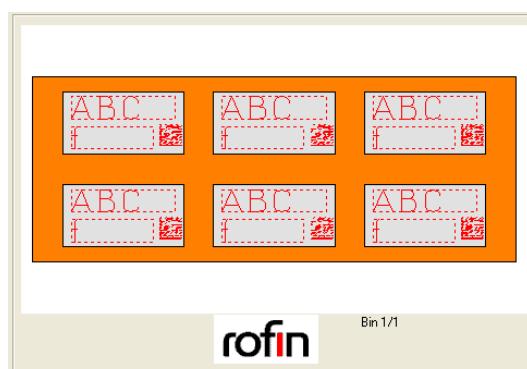
### Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

### Example:

DEVICEID;0;a;b;c;d;e;f

### Result:



The device ID "f" is assigned to cell 5. Since individual cell data cannot be displayed, all cells show the device ID that has been assigned last.

## SETTING

Description:

This command specifies the behaviour for some of the other matrix-related commands. It corresponds to the settings via Options > Settings > MJC-Host Communication in the "Required Data" frame.

Synopsis:

SETTING;<required data>;<value>

Parameters:

<required data>	Name of the command the setting applies to. Possible values: DEVICEID OCC PART (only single-step handling) POS POSMATRIX BIN VARMAP
<value>	0: not required 1: required

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Example:

SETTING;OCC;0

Result: do not wait for occupation data

SETTING;DEVICEID;1

Result: deviceID required

SETTING;VARMAP;1;<Var1>

SETTING;VARMAP;1;<name1>;<name2>;...<namex>

### 2.3.8 Symbolic Replacement

In the following MJC commands, it is possible to replace symbols that are part of the definition of Input Variables with dynamic data:

- LOT
- LOT2
- LOT3
- VAR

The dynamic data is not received from the handling, but created dynamically during the marking process. It is the content or part of the content of Input Variables and changes with each new marking start.

The following symbols are replaced on StartMarking on each Matrix Cell Begin:

Symbol	Description
\$V<varname>\$	Replacement of the symbol with the contents of the specified input variable
\$SID_X\$	Replace with row number
\$SID_Y\$	Replace with column number
\$SINDEX\$	Replace with cell index

For example:

An Input Variable is defined as "PartNo\$SINDEX\$". During the marking process, \$SINDEX\$ is replaced by the respective cell index for each piece. The piece that lies in the cell with index 5 would then be marked with "PartNo5".

The values for row, column and index are assigned according to the VLM-internal order. The values are zero-based, e.g. index for a 2x5 matrix runs from 0 to 9.

Sample for a 2x3 matrix:

Index:  
1 3 5  
0 2 4

row(Y) – column(X)  
Y1X0 Y1X1 Y1X2  
Y0X0 Y0X1 Y0X2

Examples:

LOT;;test.vlm;G1L1;123\$VStripID\$;StripID;ABC  
Result: assigns 123ABC to G1L1

LOT;;test.vlm;G1L1;ABC-\$SID\_Y\$-\$SID\_X\$  
Result: assigns ABC-1-2 to G1L1 (row1, column2)

### 2.3.9 Commands from Laser to Handler

If the option “Send Status Change“ is set under Options > Settings > MJC-Host Communication, VMC2 sends the status information for SYSTEMREADY, JOBEND, and MARKINGEND on each change.

#### SYSTEMREADY

Description:

This command sends the system status to the host. It can also be a reply to the command STATUS;SYSTEMREADY.

Synopsis:

SYSTEMREADY;<status>

Parameters:

<status>	0: System not working 1: System working
----------	--

Returns:

none

Example:

SYSTEMREADY;0

#### JOBEND

Description:

This command sends the job status to the host. It can also be a reply to the command STATUS;JOBEND.

Synopsis:

JOBEND;<status>

Parameters:

<status>	0: Job loaded 1: Job not loaded
----------	------------------------------------

Returns:

none

Example:

JOBEND;0

## MARKINGEND

Description:

This command sends the marking status to the host. It can also be a reply to the command STATUS;MARKINGEND.

Synopsis:

MARKINGEND;<status>

Parameters:

<status>	0: VMC2 is marking 1: VMC2 is not marking
----------	--

Returns:

none

Example:

MARKINGEND;0

## ALARM

Description:

This command sends the alarm status and, if applicable, the alarm number and alarm text to the host.

Synopsis:

ALARM;<status>;<Alarmnumber>;<AlarmMsg>

Parameters:

<status>	0: Alarm reset 1: Alarm set
<Alarmnumber>	Applicable alarm number
<AlarmMsg>	Applicable alarm message

Returns:

none

Example:

ALARM;1;1006;Power Measurement failed

**CELL**Description:

This command sends the values of the last marked cell to the host. It is a reply to the STATUS;CELL request from the host. This command is only available in matrix-mode.

Synopsis:

CELL;<CellIndex>;<PartNumber>;<Occupation>;<Bin>;<DeviceID>

Parameters:

<CellIndex>	Cell index of last marked cell or N/A
<PartNumber>	Part number of last marked cell or N/A
<Occupation>	Occupation of last marked cell 0: no device 1: device available or N/A
<Bin>	Bin number of last marked cell or N/A
<DeviceID>	Device ID of last marked cell or N/A

Returns:

none

Example:

CELL;N/A;N/A;N/A;N/A;N/A

**REQUIRED\_DATA\_GENERAL**Description:

This command sends the selected required data to the host. It is a reply to the STATUS;REQUIRED\_DATA\_GENERAL request from the host. This command is only available in matrix-mode.

Synopsis:

REQUIRED\_DATA\_GENERAL;<Required Data 1>;<Required Data 2>;...;<Required Data n>

Parameters:

<Required Data>	OCC DEVICEID PART POS POSMATRIX BIN VARMAP
-----------------	--

Returns:

none

Example:

REQUIRED\_DATA\_GENERAL;REQUIRED\_DATA\_GENERAL;OCC;DEVICEID

### 2.3.10 Recipe File Commands

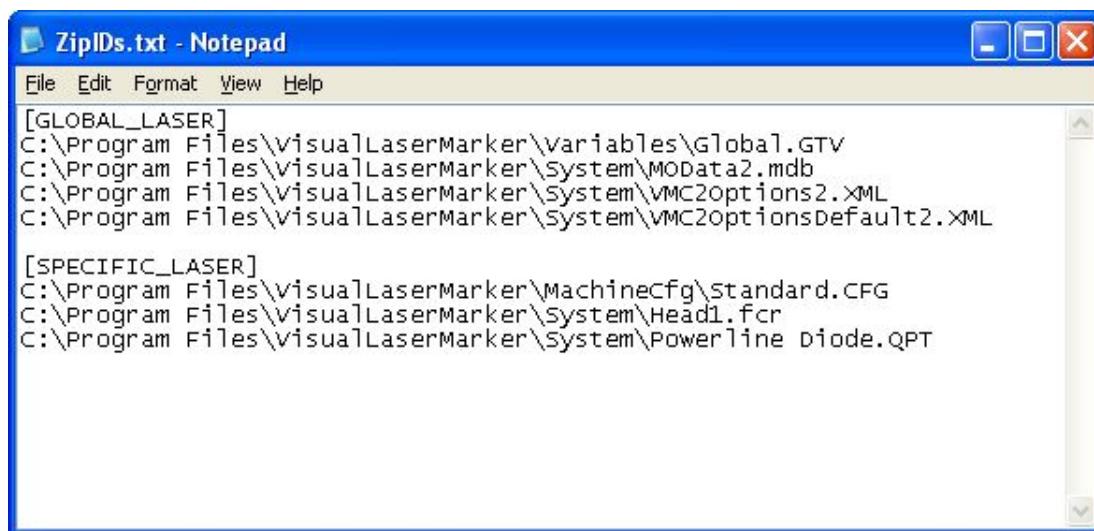
The host can send commands to VMC2 to zip, unzip, or delete zip files which can be used to exchange files for production or configuration.

In the MJC Recipe file commands, there are two fixed filenames that can be used for ZIP files:

- GLOBAL\_LASER
- SPECIFIC\_LASER

The list of files they contain is specified in the file ZipIDs.txt and can be edited in a text editor. In the text file ZipIDs.txt, all files must be listed with their path. They are separated with carriage return.

Example for ZipIDs.txt:



A screenshot of a Windows Notepad window titled "ZipIDs.txt - Notepad". The window shows the following text content:

```
[GLOBAL_LASER]
C:\Program Files\visualLaserMarker\variables\Global.GTV
C:\Program Files\visualLaserMarker\System\MOData2.mdb
C:\Program Files\visualLaserMarker\System\VMC2Options2.XML
C:\Program Files\visualLaserMarker\System\VMC2OptionsDefault2.XML

[SPECIFIC_LASER]
C:\Program Files\visualLaserMarker\MachineCfg\standard.CFG
C:\Program Files\visualLaserMarker\System\Head1.fcr
C:\Program Files\visualLaserMarker\System\Powerline Diode.QPT
```

Any other filename used in the Recipe file commands must also contain the ending \_LASER.zip. Such a ZIP file contains one VLM layout file which is copied to/from or deleted in the folder that contains all marking files.

0

## **RECIPE\_REQUEST**

Description:

This command zips the files listed in the file ZipIDs.txt and saves them in the same directory as the text file. The folder for the text and zip files is defined as the “Recipe Management Shared Folder” in Options > Settings > MJC-Host Communication > Advanced.

Synopsis:

RECIPE\_REQUEST;PPID;<filename>

Parameters:

<filename>	Specifies the file name of the zip file. Predefined zip file names are GLOBAL_LASER.ZIP and SPECIFIC_LASER.ZIP. For VLM files, the file name of the zip file must be <layout>_LASER.zip.
------------	--

Return:

RECIPE_REQUEST_DONE;PPID;<filename>;RESULT;<Result>
---

Parameters for Returns:

<filename>	Specifies the file name of the zip file. Predefined zip file names are GLOBAL_LASER.ZIP and SPECIFIC_LASER.ZIP. For VLM files, the file name of the zip file must be <layout>_LASER.zip.
<Result>	Specifies the result 0: OK 1: error

Example:

RECIPE\_REQUEST;PPID;example.zip

Result:

Not OK: RECIPE\_REQUEST\_DONE;PPID;example.zip;RESULT;1  
OK: RECIPE\_REQUEST\_DONE;PPID;example.zip;RESULT;0

## RECIPE\_SEND

### Description:

This command unzips the specified file and saves the files contained in this zip file in the same directories specified in ZipIDs.txt. The folder for the text and zip files is defined as the “Recipe Management Shared Folder” in Options > Settings > MJC-Host Communication > Advanced.

### Synopsis:

RECIPE\_SEND;PPID;<filename>

### Parameters:

<filename>	Specifies the file name of the zip file. Predefined zip file names are GLOBAL_LASER.ZIP and SPECIFIC_LASER.ZIP.
------------	--

### Return:

RECIPE_SEND_DONE;PPID;<filename>;RESULT;<Result>
--

### Parameters for Returns:

<filename>	Specifies the file name of the zip file. Predefined zip file names are GLOBAL_LASER.ZIP and SPECIFIC_LASER.ZIP.
<Result>	Specifies the result 0: OK 1: error

### Example:

RECIPE\_SEND;PPID;example.zip

### Result:

Not OK: RECIPE\_SEND\_DONE;PPID;example.zip;RESULT;1  
OK: RECIPE\_SEND\_DONE;PPID;example.zip;RESULT;0

## **RECIPE\_DELETE**

### **Description:**

This command deletes the specified file(s) from the file system. The folder for the zip files is defined as the “Recipe Management Shared Folder” in Options > Settings > MJC-Host Communication > Advanced.

### **Synopsis:**

RECIPE\_DELETE;PPID;<filename>

### **Parameters:**

<filename>	Specifies the file name of the zip file to be deleted. Predefined zip file names are GLOBAL_LASER.ZIP and SPECIFIC_LASER.ZIP.
------------	--

### **Return:**

RECIPE_DELETE_DONE;PPID;<filename>;RESULT;<Result>
--

### Parameters for Returns:

<filename>	Specifies the file name of the zip file. Predefined zip file names are GLOBAL_LASER.ZIP and SPECIFIC_LASER.ZIP.
<Result>	Specifies the result 0: OK 1: error

### **Example:**

RECIPE\_DELETE;PPID;example.zip

### **Result:**

Not OK: RECIPE\_DELETE\_DONE;PPID;example.zip;RESULT;1  
OK: RECIPE\_DELETE\_DONE;PPID;example.zip;RESULT;0

### 2.3.11 Equipment Status Variables

The host can request a file that contains the overall information on the laser configuration parameters including, for example, software and machine configuration. VMC2 collects the information and saves it in an XML file.

The following types of configuration lists can be requested:

- Software configuration
- Power curves configuration
- LCP configuration
- Laser parameters
- PC configuration parameters
- Power configuration parameters
- VMC2 configuration parameters
- Machine configuration parameters

The XML file lists all parameters with

- Name: name of the parameter in the specific configuration
- Value: content of the equipment constant
- Type: ‘string’, ‘boolean’, ‘float’ or ‘integer’
- Unit: optional, used if the value has a physical unit

#### **EC\_LIST\_REQUEST**

Description:

This command request an xml file containing configuration parameters from VMC2. The folder is defined as the “Configuration Parameters Shared Folder” in Options > Settings > MJC-Host Communication > Advanced.

Synopsis:

EC\_LIST\_REQUEST;<filename>

Parameters:

<filename>	Specifies the file name of the xml file to be created
------------	---

Return:

EC_LIST_REQUEST_DONE;<filename>;RESULT;<Result>
---

Parameters for Returns:

<filename>	Specifies the file name of the xml file
<Result>	Specifies the result 0: OK 1: error

Example:

EC\_LIST\_REQUEST;example.xml

Result:

Not OK: EC\_LIST\_REQUEST\_DONE;example.xml;RESULT;1

OK: EC\_LIST\_REQUEST\_DONE;example.xml;RESULT;0

### 2.3.12 Hardware Commands

The commands below can only be used in the process states Idle or JobReady.

**TERMMACHINE**Description:

This command allows access to the hardware. It can only be used in the process states Idle or JobReady.

Synopsis:

TERMMACHINE

Parameters:

none

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

**INITMACHINE**Description:

This command retrieves the laser hardware.

Synopsis:

INITMACHINE

Parameters:

none

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

### 2.3.13 Input Variables Command

#### ADDALLVARS

Description:

This command makes all marking objects of the specified drawing available as input variables in VMC2. It can only be used in the process states Idle or JobReady.

Synopsis:

ADDALLVARS;<name of drawing>

Parameters:

<name of drawing>	Name of the drawing that contains the marking objects that should be made available as input variables
-------------------	--

Returns:

AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

#### GETVARLIST

Description:

This command requests all variables from the marking object database that are relevant for the selected layout.

Synopsis:

GETVARLIST;<LayoutName>

Parameters:

<LayoutName>	Defines the layout for which the variable definitions are requested
--------------	---

Returns:

VARLIST;<VariableName>;<VariableContent>	Variable list containing all relevant variable names and their content
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Example:

GETVARLIST;MyAddress.vlm

Return:

VARLIST;city;Bergkirchen;street;Dieselstrasse

### 2.3.14 Image File Command

#### CREATEPREVIEW

Description:

This command requests VMC2 to create a new image file that equals the currently displayed preview. The file is stored in ..\VisualLaserMarkerMarkingFiles\preview.png.

Synopsis:

CREATEPREVIEW;<image size in x in pixel>;<image size in y in pixel>

Parameters:

<image size in x in pixel>	Defines width of image in pixel
<image size in y in pixel>	Defines hight of image in pixel

Returns:

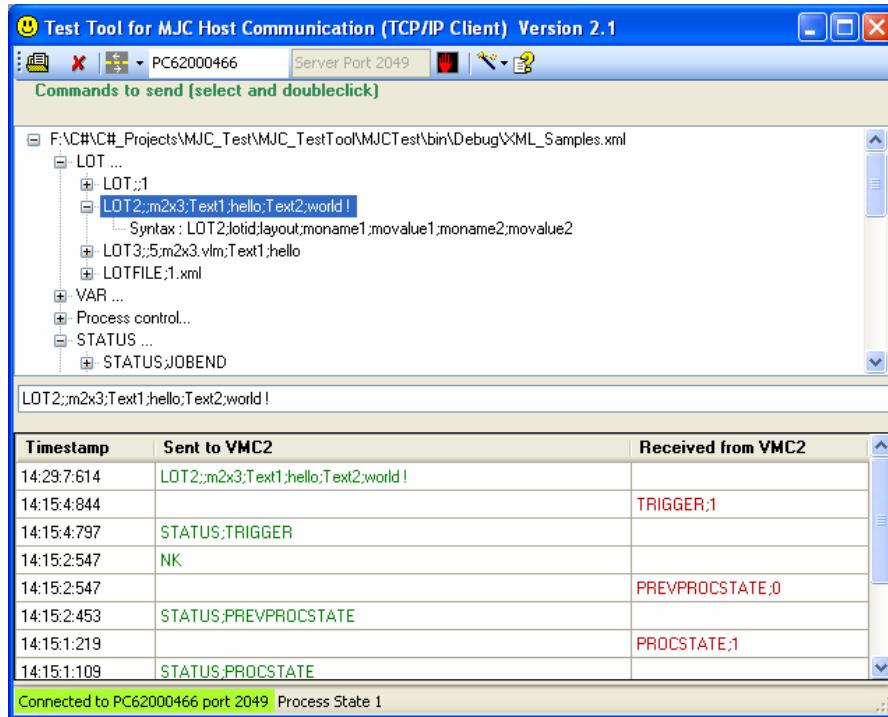
AK	Command accepted and successfully executed
NK	An error occurred during the execution of the command. An error description is displayed in the status line in the main window.

Example:

CREATEPREVIEW;150;150

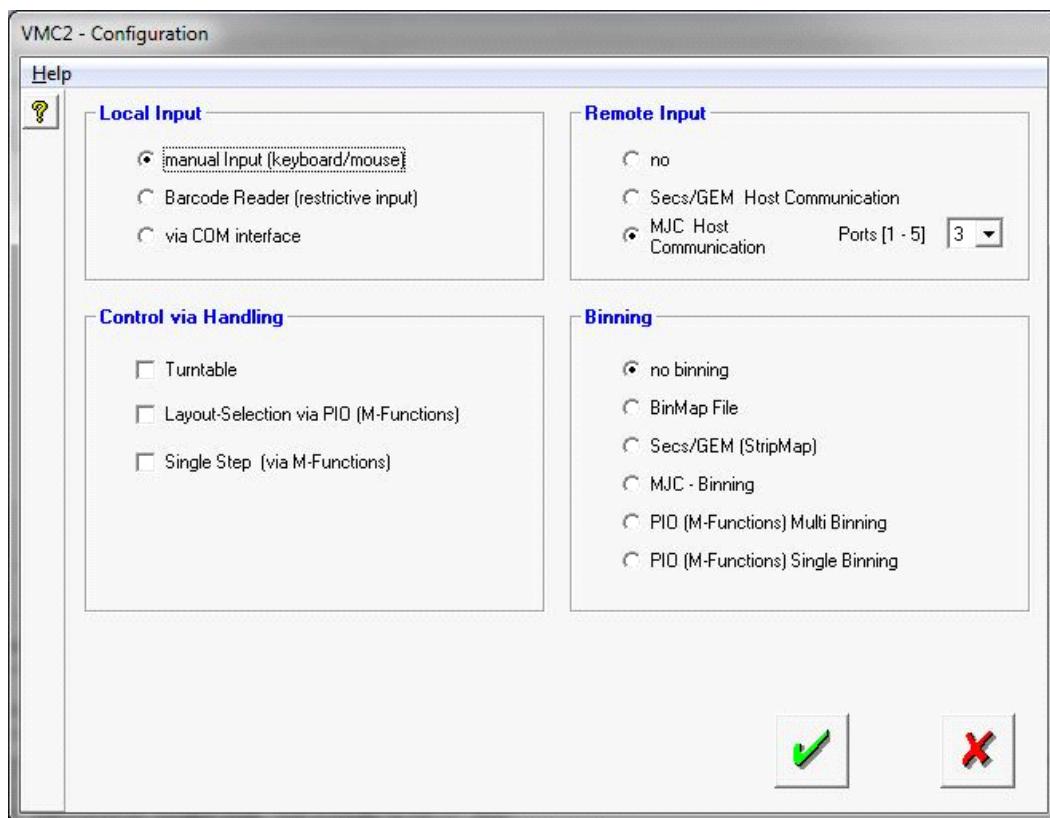
### 2.3.15 MJC Test Tool

A test tool called MJC\_Test.EXE is available to test the command interface and simulate host communication. For further information and to obtain this tool, contact your Rofin sales department.



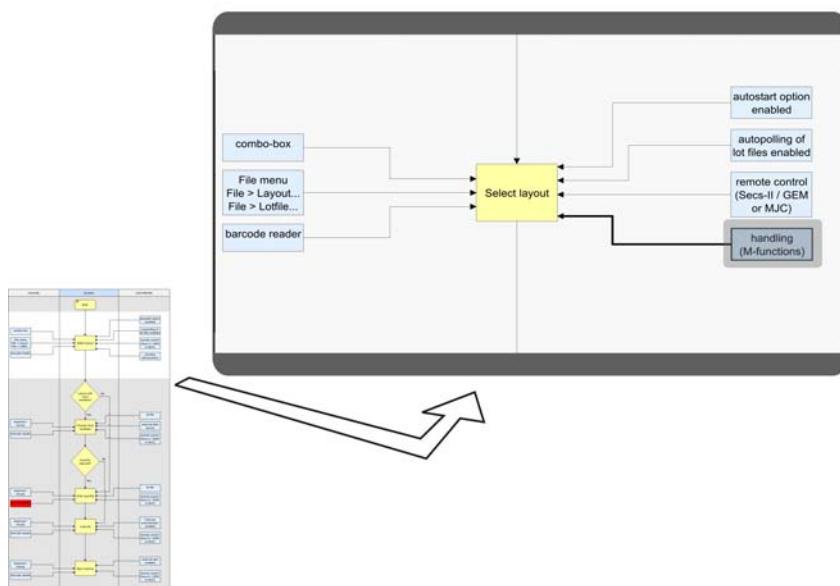
## 2.4 External Layout Selection

External Layout Selection can be enabled via Options > Configuration. Select “Layout-Selection via PIO (M-Functions) in the “Control via Handling” frame.



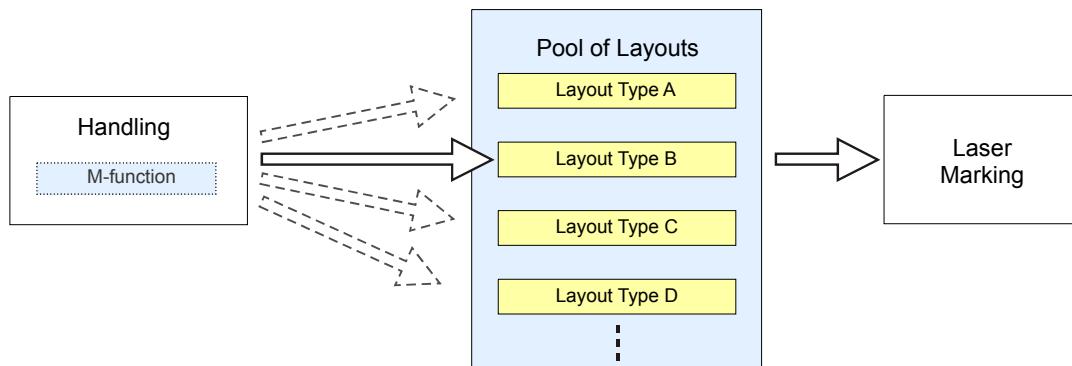
» For information on how to setup external layout selection, refer to section 4.13.

In this configuration, the handling system sends the information on the layout file to be used on input trigger of the start marking signal.



Process View: Select Layout

VMC2 reads the external I/O signals from the parallel I/O interface (PIO) and selects the layout file accordingly. The PIO readings are supplied as bit patterns referred to as M-functions.



### Defining M-functions

M-function definitions depend on the actual laser type in use. They are made in the Machine Configuration or by using the configurator of the LaserConsole. The customization of M-functions is subject to customer specifications.



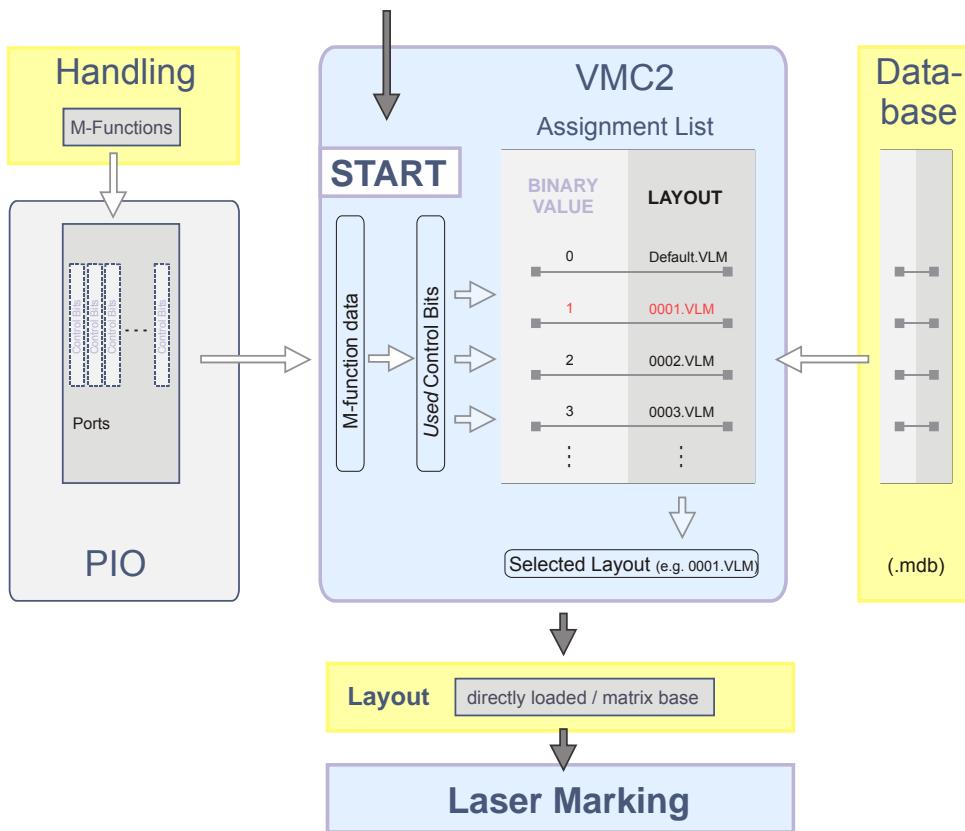
During the installation of the handling system, a set of standard M-functions are made available. If the M-functions need adaptation, the corresponding I/O signal definitions must be changed.

The M-functions may only be changed by trained personnel. Please contact your Rofin Service department.

#### 2.4.1 Layout Assignment

VMC2 interprets the data bits of each M-function as binary value being the equivalent of a decimal number. Each of these numbers is assigned to a layout file. After the software detects a start signal, the layout file assigned to the number is loaded.

M-function (two-bit)		Binary Value	Layout Name	Description
INPUTBIT0	INPUTBIT1			
0	0	0	Default.vlm	loads layout "Default.vlm" assigned to "0"
1	0	1	0001.vlm	loads "0001.vlm" assigned to "1"
0	1	2	0002.vlm	loads "0002.vlm" assigned to "2"
1	1	3	0003.vlm	loads "0003.vlm" assigned to "3"



An .mdb database file contains the assignment list. The default database is PIOList.mdb.

While the database maintains the assignments of layouts to binary values, it does not store their file locations

### Organizing Layouts

There are two different ways to organize layout assignment if different products have to be marked:

- Deploy several databases, each one containing a product-specific assignment list.
- Use a single database and group the layouts that belong to a particular product together in a respective folder.

Organizing layouts into folders in the file system avoids exchanging assignments. In this case, renaming of the layout files is not necessary even if they have different contents.

Both options can be chosen simultaneously. It is possible to vary the coupling of layout and binary value and at the same time switch layout folders in accordance with the product.

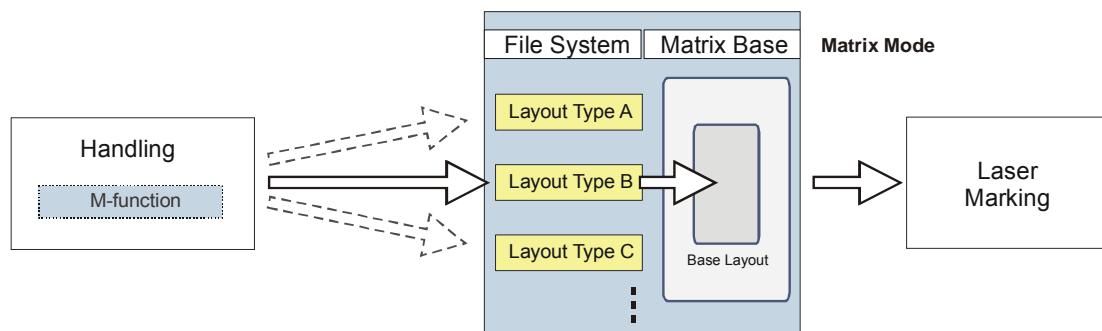
## 2.4.2 Layout Allocation

VMC2 provides two external layout selection modes:

- via matrix base layout
- directly

### Matrix Mode

In Matrix mode (“via matrix base layout”) it is possible to dynamically assign layouts that have been loaded in advance. It requires a layout with a drawing object of type “matrix”. Like any other matrix object, a “matrix base” must contain at least one cell. The MO name must be Matrix1. The matrix options must be set for Active Binning on Load Time. The bin number corresponds to the value of the selected bits (M-Functions). The dynamically loaded layouts are assigned to all cells of the matrix.



At runtime one of the predefined layouts is selected and passed to the matrix cells together with the marking data.



In matrix mode job canceling and reloading is not necessary on each new start. For this reason the matrix mode is more efficient than the direct mode in terms of performance. The matrix base and selectable layouts are only loaded once in this mode.

### Preparing Drawing Objects for Matrix Mode in VLM Editor

Ensure that the matrix base objects in the VLM can be used for the external selection of cell layouts by assigning the appropriate assignment method. There are two options to choose from:

- static assignment: stores bin layouts with the base layout file
- dynamic assignment: stores bin layouts as a separate files

Only the dynamic assignment (separate files) is appropriate for external layout selection. This option is bound to the VLM setting “Activate binning/Assign layouts at load time”. VMC2 cannot select a cell layout unless the binning is activated on the matrix base.

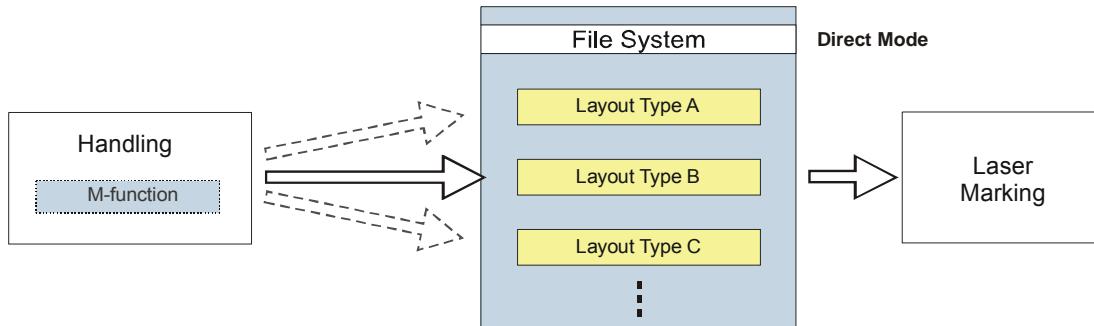
» Refer to the VLM user manual for details on how to create matrix layouts.



Initially, the default bin number for the cell layout of the matrix base is 1.

### Direct Mode

In the mode “directly” the layout files are directly loaded from the file system as soon as a start signal is detected. The direct mode does not require a separately created matrix object to act as a “container”. Therefore, the user is not prompted to select a base layout.



If the selectable layouts contain a VLM script, only this mode can be used.

The direct mode simplifies the setup but requires reloading the job on every marking cycle. In case you do not need a matrix layout and short load times are not an issue (for example, when the time for marking exceeds the load time considerably) the direct mode is recommended.

## 2.5 Adjusting Turntable Positions

If the handling system includes a turntable, it may be necessary to correct linear or angular offsets of workpieces during the marking. This can be done by specifying a position value for each position.

When the marking starts, the handling system initiates the correction of the layout position. The following steps are necessary to set up the system:

- Measurement of the differences (offsets) between real and expected workpiece positions (part of the handling installation procedure)
- VMC2 configuration for (corrective) turntable control
- Turntable setup: type and options
- Definition of position values, based on measured offsets

The turntable layout control is driven by I/O signals (M-functions). The handling system sends the M-functions. Once a start signal is detected, VMC2 reads the data and applies the linear and/or angular offsets to ensure correct layout positioning.

M-function definitions depend on the actual laser type in use. They are made in the Machine Configuration or by using the configurator of the LaserConsole. The customization of M-functions is subject to customer specifications.



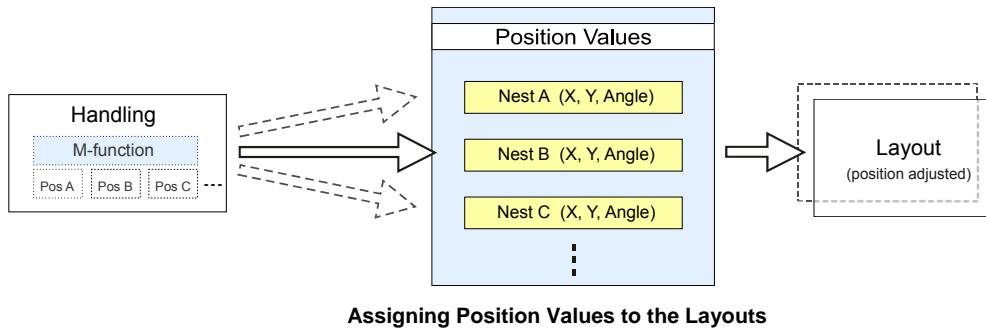
During the installation of the handling system, a set of standard M-functions are made available. If the M-functions need adaptation, the corresponding I/O signal definitions must be changed.

The M-functions may only be changed by trained personnel. Please contact your Rofin Service department.

» *For information on how to set up turntable control, refer to section 4.12.*

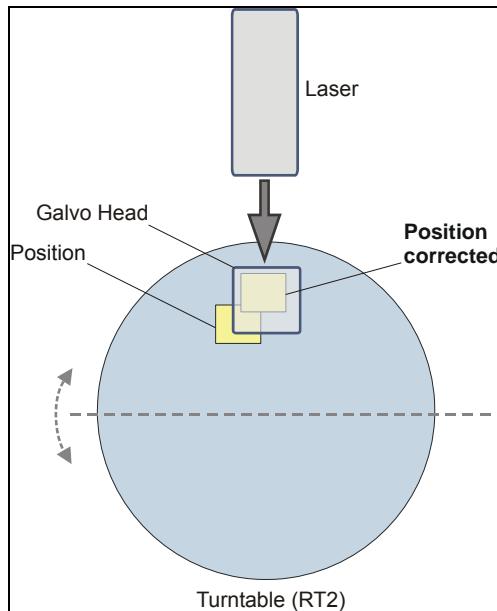
## 2.5.1 Conventions

- For every worktable position there is a set of three possible position values: X, Y, and angle.
- The triplet [X, Y, angle] is called a “nest”.
- The number of nests is equivalent to the number of worktable positions.  
The actual configuration can be specified via the VMC2 user interface.
- RTx indicates the number of worktable positions that are available.  
 (“x” refers to 2, 3, ... 16)
- Turntable M-functions are supplied in bit coded or binary coded form. VMC2 takes account of the encoding when assigning the nests.



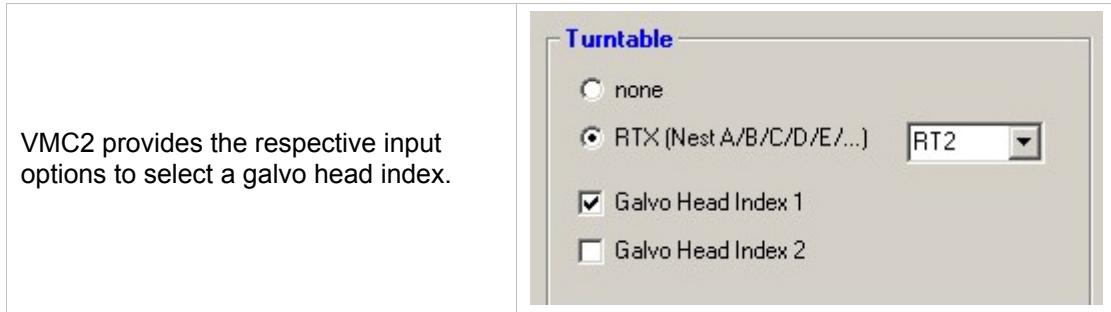
Assigning Position Values to the Layouts

Result:



## 2.5.2 Turntable with Double Galvo Head

Turntable handling can be used with marking units that consist of two galvo heads instead of one. In this configuration, the position values may be applicable to one head only. If this is the case, the relevant galvo head must be specified:



The Galvo head indices used by VMC2 are set in the Machine Configuration. Refer to the Machine Configuration for information about which head index relates to which physical Galvo head.

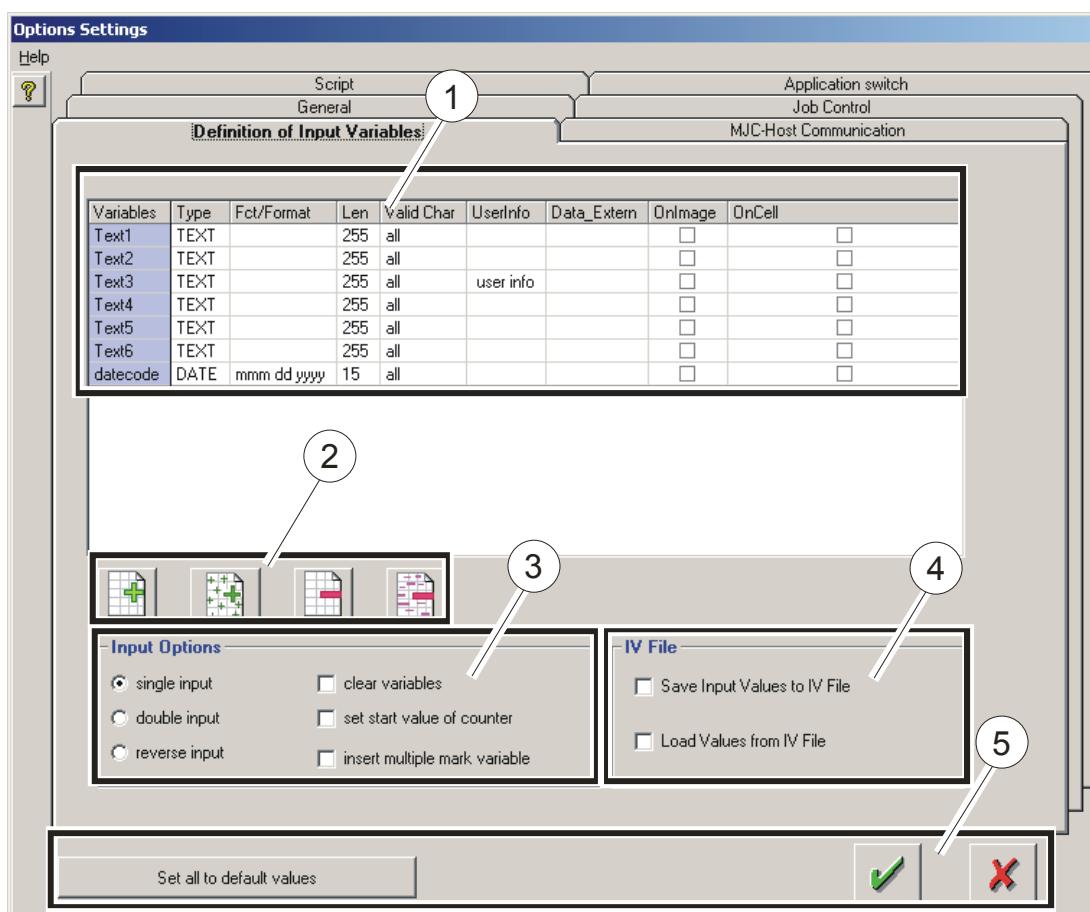
If the checkboxes for both Galvo heads are checked, the position values apply to both Galvo heads.

It is also possible to mark workpieces on two sides (from the top and from the side, for example). This application only allows the assignment of the X-offset and Y-offset. The angle will be ignored.

## 2.6 Input Variables

Input Variables (IVs) provide the possibility to interact with Marking Objects (MOs) of a layout before and during laser marking. They allow assigning marking data in various ways.

Input Variables are defined via Options > Settings > Definition of Input Variables:



(1)	<b>Input Variable Definitions</b> Entry fields to define input variables
(2)	<b>Buttons</b> to add one or more or to delete one or all input variables
(3)	<b>Input Options</b> for a description, see section 2.6.3
(4)	<b>IV File</b> to save values to or load values from an IV file
(5)	<b>Buttons</b> [OK]: Save changes and exit [Cancel]: Exit without saving changes [Set all to default values]: Restore factory settings for Options > Settings and Options > Configuration



**The button [Set all to default values] restores all factory settings in Options > Settings and Options > Configuration.**

» For further information on how to define input variables, refer to section 4.14 For information on how input variables are interpreted, validated, and assigned to layouts, refer to section .4.15.

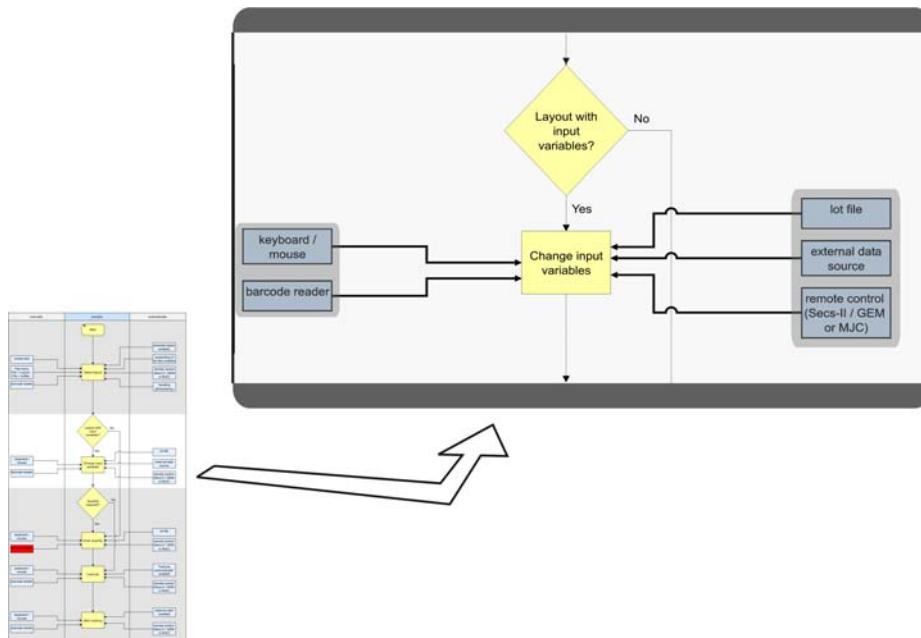
Input Variables let the user:

- interactively enter/change values before the marking process starts
- assign dynamic marking data during the marking process

In addition, Input Variables give control over:

- the validation and formatting of input values
- script-based operations (evaluate, convert etc.)
- the use of non-laserable data

Assigning non-laserable data can be used, for example, to change laser parameters such as current, frequency or speed, the position of drawings and the number of marking executions.



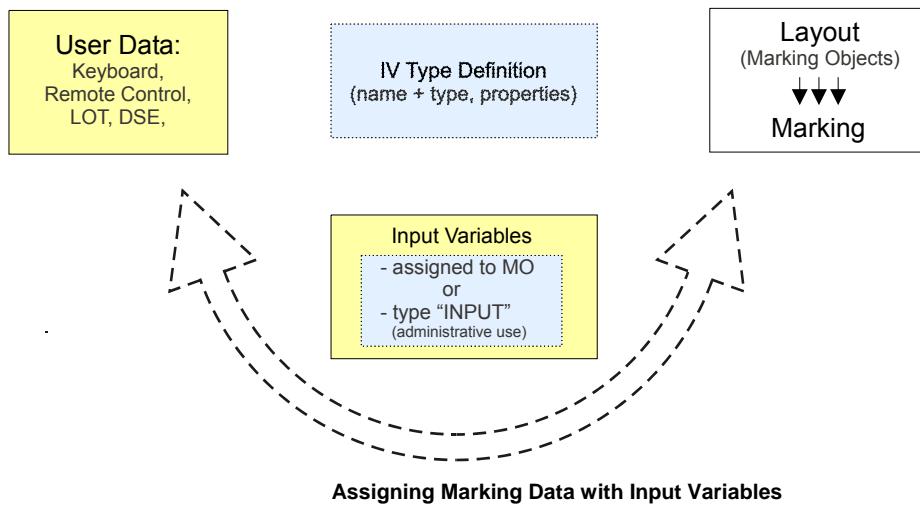
Process View: Change Input Variables

#### Available Functions

- Import values from an existing layout
- Save the values last assigned to the Input Variables to a file.  
When the layout is selected again the values can be reloaded automatically from the file.
- Clear all input values when loading a layout
- Compose variable-text combinations ("Format Wizard")

Conventions:

- An Input Variable is defined by its name, type and properties.
- The variable name is unique. It must be used in an identical (case-sensitive) form across VMC2, the layout and/or any external data source, Lot file, GEM database.
- An Input Variable refers to a Marking Object in a layout file (of type Text, Logo VLM-Reference, Barcode, IDMatrix).
- An Input Variable not assigned to a MO must be of type INPUT.



VMC2's variable definition table contains columns representing the variable properties. The Columns "Fct/Format" and "Valid Char" accept multiform attributes:

Property	Possible Entry	Description
Fct/Format	function name	function from a script file (e.g. Script_VMC2.txt)
	format string	expression to format and/or filter the input
	mask	selectively delete, replace or keep characters
Valid Char	- "all"	no restriction imposed
	- "alpha"	permits: A-Z, a-z
	- "alphanumeric"	permits: A-Z, a-z, 0-9 (integer)
	- "numeric"	permits: 0-9 (integer)
	- "real"	permits: any real number (floating point)
	defined by user	permits: only characters in brackets (e.g. "[xyz]")
	function name	input is validated by means of VB scripting language
Len	0 ... 255	maximum length for the input (number of characters)
UserInfo	string	for comments only; not evaluated
Data_Extern	data field name	input comes from a field in an external Data Source
OnImage	yes / no	marking variables are actualized for each cycle
OnCell	yes / no	Marking variables are actualized for each cell (only for matrix objects)

## 2.6.1 Input Variable Types

When defining a new Input Variable, it is necessary to define a type. The type determines which properties the variable can have.

The Input Variable types determine the different ways to create and manipulate input:

Variable Type	Description
TEXT	returns the plain input value without a change
DATE	current date/time in specified format (no manual input possible)
LCOUNTER	echoes the value of a local counter defined in a VLM layout
G COUNTER	echoes the value of a global counter defined in the VLM environment
FUNCTION	specifies a VB-Script function (in "Fct/Format") to perform an operation
FORMAT	changes the appearance of input according to property ("Fct/Format")
CONSTANT	contains a mere string (fixed value; no manual input possible)
MASK	acts as a character mask (according to a pattern, set in "Fct/Format")
INPUT	a specialized type holding non-marking data for several purposes

### Type FORMAT:

The property of FORMAT is expressed by specific definition symbols that are typed in under "Fct/Format". The symbols indicate the changes made to all or part of the input string.

Format Symbol	Description
!	Reverse direction of placeholder filling: If the "Fct/Format" string contains the placeholders "@" or "&", these are filled from right to left by default. An exclamation point "!", specified in the string changes the behaviour so that placeholders are filled from left to right.
@	Placeholder for a character or a <space>. Displays one or the other: if the input string includes a character at the position where the "@" appears in the format string, that character will be displayed. Otherwise a <space> takes the "@" position.
&	Placeholder for a character only. Displays a character: if the input string includes a character at the "&" position, that character will be displayed. Otherwise nothing happens.
<	Renders all characters in lowercase format.
<	Renders all characters in uppercase format.

Examples:

Format String	Input	Output (Marking Value)
\X&&\-1\2	sss	Xsss-12
	ss	Xss-12
	ssss	Xsss-12s
>&&&\-1\x\y	sss	SSS-xy
<&&&\-1\x\y	SSS	sss-xy

**Type MASK:**

This property is specified under “Fct/Format” using a character mask. The length must match the length of the input string.

Mask Symbol	Description
m or M	no change; character is retained
x or X	deletes a character
<space>	replaces a character with a space

Examples:

Mask	Input	Output (Marking Value)
xxmm	0021	21
mmxx m	123456	12 6

**Type DATE:**

The property of the DATE type is specified under “Fct/Format” using a variety of identifiers to change date/ time values. The desired format is generated based on the system clock. Manual input of a value is not possible.

The table below shows different formatting possibilities according to the VisualBasic programming standard.

Identifier	Output Description
:	Time separator. In some locales, other characters may be used to represent the time separator. The time separator separates hours, minutes and seconds when time values are formatted.
/	Date separator. In some locales, other characters may be used to represent the date separator. The date separator separates the day, month, and year when date values are formatted.
c	The date as dddd and the time as tttt, in that order. Displays only date information if there is no fractional part to the date serial number. Displays only time information if there is no integer portion.
d	The day as a number without a leading zero (1 – 31).
dd	The day as a number with a leading zero (01 – 31).
ddd	The day as an abbreviation (Sun – Sat).
dddd	The day as full name (Sunday – Saturday).
ddddd	The date as a complete date (including day, month, and year), formatted according to the user system's short date format setting. The default short date format is m/d/yy.
ddddd	A date serial number as a complete date (including day, month, and year) formatted according to the long date setting recognized by your system. The default long date format is mmmm dd, yyyy.
aaaa	The localized version of the string. Otherwise the same as dddd.
w	The day of the week as a number: "1" through "7" (Sunday to Saturday).
ww	The week of the year as a number: "1" through "54".
m	The month as a number without a leading zero: "1" through "12". If m directly follows h or hh, the minute is displayed rather than the month.
mm	The month as a number with a leading zero: "01" through "12". If m directly follows h or hh, the minute is displayed rather than the month.
mmm	The month as an abbreviation: "Jan" through "Dec".
mmmm	The month as a full month name: "January" through "December".
oooo	The localized version of the string. Otherwise the same as mmmm.
q	The quarter of the year as a number: "1" through "4".
y	The day of the year as a number: "1" through "366".
yy	The year as a 2-digit number: "00" through "99".
yyyy	The year as a 4-digit number: "100" through "9999".
h	The year as a 4-digit number: "100" through "9999".
Hh	The hour as a number with leading zeros: "00" through "23".
N	The minute as a number without leading zeros: "0" through "59".
Nn	The minute as a number with leading zeros: "00" through "59".
S	The second as a number without leading zeros: "0" through "59".
Ss	The second as a number with leading zeros: "00" through "59".
tttt	A time as a complete time (including hour, minute, and second), formatted using the time separator recognized from the time setting of the user's system. A leading zero is displayed if the leading zero option is selected and the time is before 10:00 A.M. or P.M. The default time format is h:mm:ss.
AM/PM	Use the 12-hour clock and display an uppercase AM with any hour before noon. Display an uppercase PM with any hour between noon and 11:59 P.M.
am/pm	Use the 12-hour clock and display a lowercase AM with any hour before noon. Display a lowercase PM with any hour between noon and 11:59 P.M.
A/P	Use the 12-hour clock and display an uppercase A with any hour before noon. Display an uppercase P with any hour between noon and 11:59 P.M.
a/p	Use the 12-hour clock and display a lowercase A with any hour before noon. Display a lowercase P with any hour between noon and 11:59 P.M.
AMPM	Use the 12-hour clock with the AM and PM string literals as defined by the user's system: Display AM with any hour before noon and PM with any hour between noon and 11:59 P.M. Depending on the user's system settings AMPM appears in uppercase or lowercase. The default format is AM/PM.

### Type TEXT

The TEXT type is the most general one. It provides input data to Marking Objects without any formatting or filtering.



If a Marking Object of type logo is defined as a variable of type TEXT, VMC2 expects the name of the associated logo file as input value.

The properties “Len” and “Valid Char” are used to distinguish between valid and invalid input:

- “Len”: defines the maximum number of characters
- “Valid Char”: defines the type of character allowed

It is possible to connect an external data source via the property “Data\_Extern”.

» *For details, refer to section 2.7.*

### Type L COUNTER and G COUNTER

Global or local counter must be defined via the VLM software. Variables of these types are assigned and controlled according to the properties specified in VLM.

It is possible to set a start value for both counters from within VMC2.

» *Refer to the VLM documentation for a complete description of global and local counters.*

### Type INPUT

This type is usually used together with a script function under “Fct/Format”, e.g. to facilitate the adjustment of laser or drawing parameters.

- There is no link between a Marking Object and an Input Variable of type INPUT.
  - INPUT variables can get their values from the operator or through remote input.
- » *For information on scripting refer to section 2.9 and contact your Rofin sales department.*

### Type FUNCTION

This type uses the return data of a function to define the value of an Input Variable. It can be used to evaluate, change, format, convert, encode, or validate the values of input variables.

- Any operation is implemented as script function specified under “Fct/Format”.
  - The script function is defined in a script file.
- » *For information on scripting refer to section 2.9 and contact your Rofin sales department.*

### Type CONSTANT

Variables of type CONSTANT contain a mere string, i.e. a fixed value. No manual input is possible.

## 2.6.2 Using VB-Scripts with Input Variables

Script functions are used with these variable properties:

- Fct/Format --> with the types FUNCTION, INPUT
- Valid Char --> with the type TEXT

A script function intended for validation under “Valid Char” is supposed to return one of the Booleans “true” or “false”. Script functions in “Fct/Format” can serve multiple purposes, for example, the generation of marking data from variable input.

“Script\_VMC2.txt” is a sample script file installed with VMC2.

» *See section 2.9 for a full description of scripting techniques with VMC2.*

## 2.6.3 Options for Input and Output

The following options can be set via the user interface:

Input Option	Description
single input	The default option “single” requests normal input.
double input	The other two options define precautionary measures: the operator needs to type in a value twice (“double”) or twice, reversing his input the second time (“reverse input”).
reverse input	
clear variables	removes all initial input values to start from scratch
set start value of counter	enables the user to change/reset VLM counter values
insert multiple mark variable	defines the number of marking executions per start signal

Output Option	Description
Save Input Values to IV File	Saves the input values last used to a file named <layoutname>.IV in the directory of the layout.
Load Values from IV File	Loads the values from an .IV file (if present) when a layout is selected.

## 2.6.4 Format Wizard

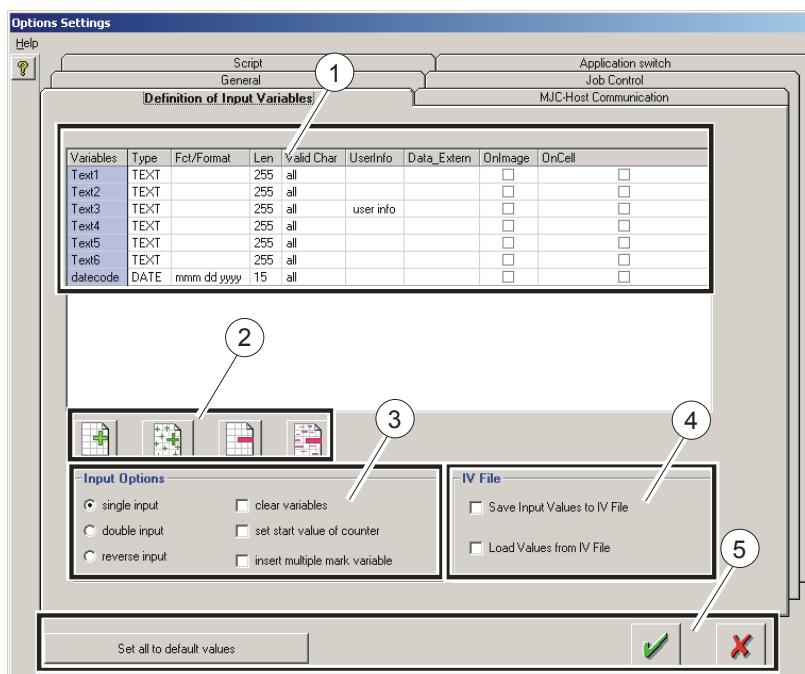
The Format Wizard is a tool to compose marking values from the combination of variables and texts without having to program a script file. To be able to use the Format Wizard, a layout file must be loaded.

For example, use the Format Wizard to form strings defined as character chains containing fixed and variable parts from several input sources. The strings are saved within the layout files.

» For further information on the Format Wizard refer to section 4.16.

## 2.6.5 Changing Values of Input Variables

As soon as a layout file containing Input Variables has been loaded, the input frame to modify the Input Variables opens. All variables contained in the layout file must be defined in Options > Settings > Definition of Input Variables.



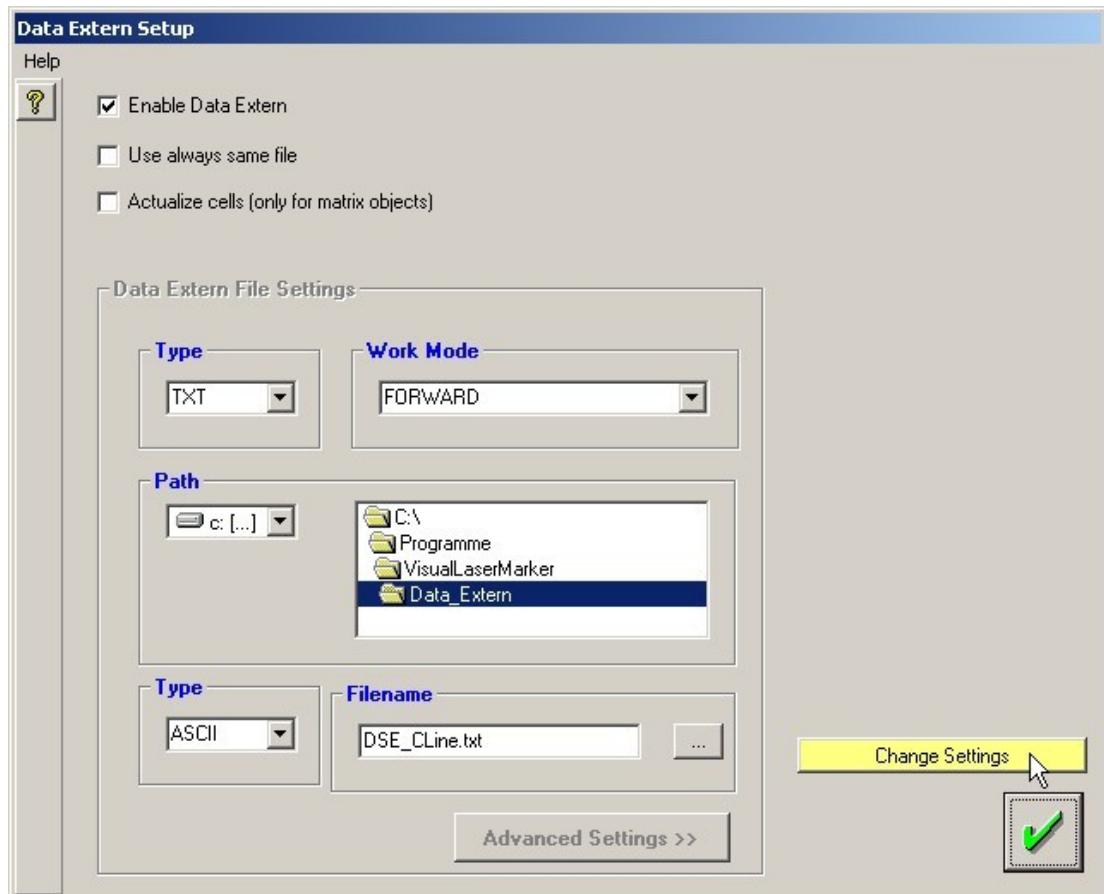
VMC2 provides four options for data input:

Mode	Source	Description
manual	Keyboard, Mouse	Operator enters values.
automatic	host command via MJC or Secs / GEM	Input via remote control.
	LOT file	LOT file provides values.
	DSE	Values come from an external data source.

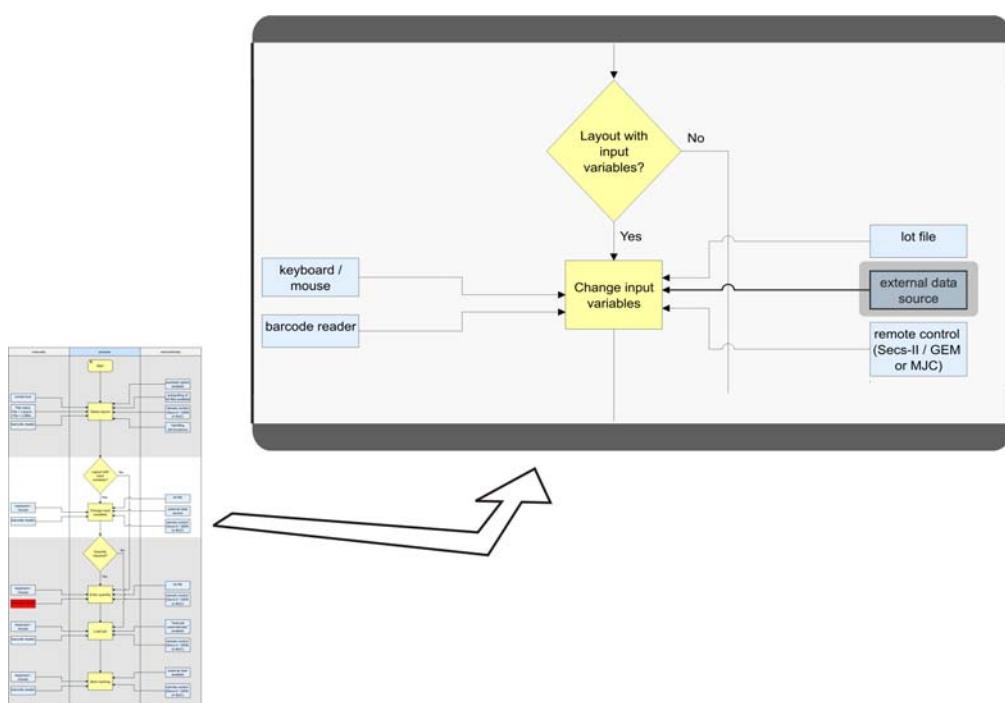
## 2.7 Data Extern

If “Data Extern” is enabled, laser marking data is assigned to variables from an external source referred to as DSE (Data Source Extern). A DSE is an ASCII or Unicode file with a defined structure.

It can be enabled via Options > Data Extern > Setup:



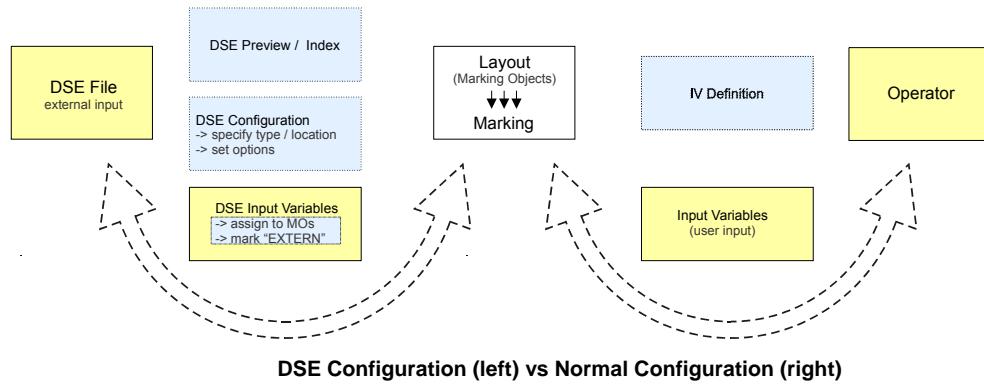
The external data source contains a number of data sets with input values for selected variables to serve the laser marking. The input values are assigned to the layout without intervention by the operator throughout various marking cycles.



Process View: Data Extern

Data Extern functions enable users to:

- assign dynamic marking data sourced from an external file
- deliver some or all of the marking data in an automated fashion
- configure DSE processing (e.g. through different Work Modes)
- set the number of marking cycles for individual data sets (PieceCount)
- preview the DSE before marking



External data sources are characterized as follows:

- A DSE selection is valid for the job currently loaded.
- Although a layout cannot be connected to more than one DSE at a time, a DSE may be used by multiple layouts.

### 2.7.1 DSE Files

VMC2 currently supports two types of DSE files: TXT and SEQ.



Use a word processor or spreadsheet software to create TXT and SEQ files. The software needs to be capable of ASCII and/or Unicode output.

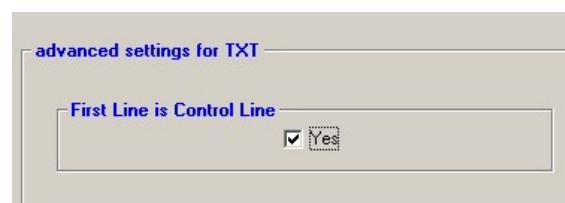
#### Type TXT

A DSE type TXT contains a control line followed by data lines. The use of a control line is optional. It can be defined in the respective option in the Data Extern setup. The data lines all have the same structure:

DSE\_CLine.txt - Notepad

Text204	Text233	Text999
A	D	G
B	E	H
C	F	I

DSE TXT file – control line specified



Corresponding VMC2 setting.

The control line header assigns each column to an Input Variable. Field separator is the character <Tab> (09 Hex). If a field is supposed to be empty, enter only a <Tab>.

If no control line is specified, VMC2 uses default variable names: "Text1", "Text2", ...

It is possible to add a PieceCount in the first column:

DSE TXT file – PieceCount = 3, 4, 2.

advanced settings for TXT

First Line is Control Line  Yes

First Column is PieceCount  Yes

Settings: PieceCount conflicts with Control Line.

In the example above, the data in the first row is used for three marking cycles, the data in the second row for four marking cycles, and the data in the last row for two marking cycles.

### Type SEQ

In a DSE of type SEQ, the marking data appears as sequential data and is not separated into columns. Therefore, additional control information is necessary to define the end of one data set.

The number of lines in a SEQ file must be a multiple of the number of fields defined in "Number of Fields per Dataset". This number specifies the length of the data sets:

DSE SEQ file – control information specified.

advanced settings for SEQ

First Dataset is Control Information  Yes

Number of Fields per Dataset 3

Corresponding VMC2 settings.

In the example above, the value "A" is assigned to variable "Text204", "D" is assigned to variable "Text233", and "G" is assigned to variable "Text999" in the first marking cycle. In the second marking cycle, the value "B" is assigned to variable "Text204", "E" is assigned to variable "Text233", and "H" is assigned to variable "Text999". In the third marking cycle, the value "C" is assigned to variable "Text204", "F" is assigned to variable "Text233", and "I" is assigned to variable "Text999".

If there is no control information, VMC2 uses the default variable names "Text1", "Text2", ... depending on the number defined in "Number of Fields per Dataset".

Adding a PieceCount increases the “Number of Fields per Dataset” by one:

```
DSE_PCount.seq - Notepad
Datei Bearbeiten Format Ansicht ?
3
A
D
G
4
B
E
H
2
C
F
I
```

DSE SEQ file – PieceCount = 3, 4, 2.



Corresponding settings (PieceCount/4 data fields).

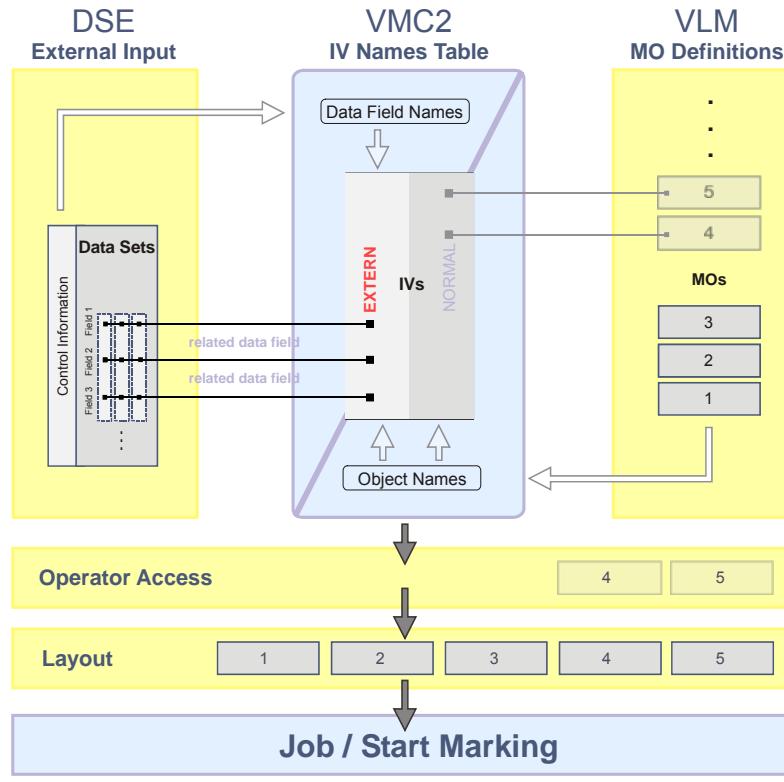
In the example above, the values “A”, “D”, and “G” are assigned to the variables for three marking cycles. The values “B”, “E”, and “H” are assigned for four marking cycles and the values “C”, “F”, and “I” are assigned for two marking cycles.

## 2.7.2 Configuration

VMC2 maintains a table with Input Variable definitions. This table keeps variable names along with their properties.

### Property “EXTERN”

By declaring an Input Variable to be “EXTERN”, the user assigns a DSE data field name to it. The value of the Input Variable is then taken from the related data field:



The values for Input Variables setup as “EXTERN” are replaced with the first data set from the external file as soon as the layout has been loaded. The operator cannot modify the values for input variables setup as EXTERN.

### PieceCount

The first data fields in a DSE can each contain a parameter “PieceCount” that precedes the actual marking data. If a “PieceCount” is specified, VMC2 uses the same data set <PieceCount> times in a row.

### Work Modes

There are five processing methods available for DSEs:

DSE Processing Method	Effect
“Work Mode” Setting	FORWARD
	Makes data sets available for reprocessing (in FORWARD MODE) after reaching end of file.
	Operator can manually select the first data set to be processed. Otherwise same as FORWARD.
	Operator is able to manually select a single data set to be used throughout several marking cycles. PieceCount values will be ignored.
	Deletes a data set after it has been written to the layout. Otherwise same as FORWARD.

### 2.7.3 Data Extern Viewing and Index

The DSE currently loaded can be displayed in a data table in

- the main VMC2 window (View > DataExtern)
- a separate pop-up window ()

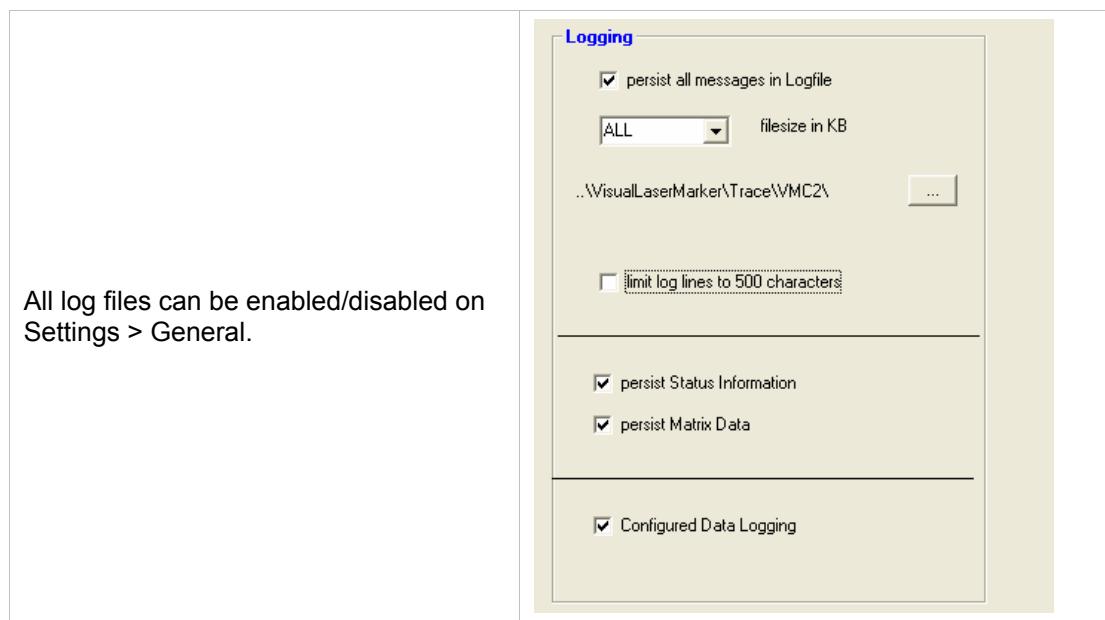
In the work modes “INDEX” and “INDEX-FIX”, the operator can set a pointer by clicking on one of the displayed data sets or by using buttons.

- INDEX: the pointer indicates the first data set to start with.  
The marking continues with the next data sets until the end of the file or piece count is reached.
- INDEX-FIX: the pointer indicates the data set to be used for all marking cycles.  
» *For further information, refer to section 4.17.*

## 2.8 Logging

VMC2 provides several log files for testing purposes or error evaluation:

Name	Path	Update	Contents
VMC2_Log_yyyymmdd.txt	Configurable	On message On ImageEnd	Messages, errors, status on marking end
StatusLog.txt	<VLM>\System	On any status change	Current process data
MatrixLog.txt	<VLM>\System	On ImageEnd	Status of the last marked cell
Configurable	Configurable	Configurable	Configurable



» For a detailed description on how to enable/disable logging and on how to configure path settings and file size, refer to section 4.6.



If logging is used in production mode, the cycle time slows down because of the hard disk access when log data is written.

## 2.8.1 Status and Error Message Logging

Status and error messages can be saved in a log file called VMC2\_Log\_yyyymmdd.txt. The default path for is \VisualLaserMarker\Trace\VMC2. The default maximum file size is 500 kB. If the file size exceeds the defined limit, a new log file is created in the same directory. The name of the new log file is VMC2\_Log\_yyyymmdd\_hh.txt.

The default path and file size can be changed in Options > Settings > General.

## 2.8.2 Customized Log Files

An XML file allows the configuration of one or more customized log files. The DTD file and an example XML file are available after software installation.

The files VMC2Logging.DTD and VMC2Logging.XML are installed in \VisualLaserMarker\System.

VMCLogging.XML contains samples for all configurable categories and for customized log files. The DTD file contains the rules for XML files. The following elements and attributes are defined in the DTD:

Element	Attribute	Description
LOGFILE	NAME	must be specified; can contain %Y%, %M%, %D% for year, month and day part in the name; the specification of year, month and/or day determines the time of new creation
	PATH	Default: .\VisualLaserMarker\Trace can contain %VLMDIR% as installation path of VLM
	SIZE	Default = 0 and means endless logging any size in KB as maximum file size
CATEGORY	NAME	name of category: LOT, POWER, PROCESS, PROCSTATE
COLUMN	SPEC	name of the values to be logged (see available columns) or custom name to generate an empty column used as column name, if no TITLE is specified
	TITLE	Optional; if specified, it is used as column title
TRIGGER	NAME	Name of trigger (event) when data are written to log file

The following categories are available:

Category	Columns	Trigger
LOT	LotName(LotId), lot quantity, Layout (with path), marking counter	On setup of a new lot and on CancelJob
PROCESS	Layout, execution time, Marking counter	After each marking
PROCSTATE	Previous process state, Trigger, Current process state	On process state change
POWER	Power, current offset, power result (error,OK), power description (in case of result is not OK), power automode, water temperature, cabinet temperature	After power measurement

Each of these categories can also be configured via columns and triggers. The column and trigger names are case-sensitive.

Columns	Trigger
<!-- 'Power' -->	<!-- 'INIT_DONE' -->
<!-- 'PowerResult' -->	<!-- 'PROCESS_STARTED' -->
<!-- 'PowerDescr' -->	<!-- 'SETUP_DONE' -->
<!-- 'PowerCurrentOffset' -->	<!-- 'JOB_LOADED' -->
<!-- 'PowerAutomode' -->	<!-- 'START_MARKING' -->
<!-- 'ExecTime' -->	<!-- 'MARKING_END' -->
<!-- 'Current' -->	<!-- 'JOB_CANCELED' -->
<!-- 'Frequency' -->	<!-- 'STOP_PROCESS' -->
<!-- 'Speed' -->	<!-- 'PROCESS_STOPPED' -->
<!-- 'FileName' -->	<!-- 'ALARM_SET' -->
<!-- 'LotId' -->	<!-- 'ALARM_ABORT' -->
<!-- 'LotQuantity' -->	<!-- 'ALARM_CLEAR' -->
<!-- 'PrevProcState' -->	<!-- 'NEW_JOB' -->
<!-- 'ProcState' -->	<!-- 'JOB_COMPLETE' -->
<!-- 'Trigger' -->	<!-- 'SETUP_ABORTED' -->
<!-- 'MarkingCounter' -->	<!-- 'ON_POWER' -->
<!-- 'GoodBins' -->	
<!-- 'BadBins' -->	

The columns are tab-delimited and can be evaluated via Excel. The first column is a date/time stamp.

### 2.8.3 GEM Log File

If Secs/GEM host communication is configured, all GEM messages can be logged into the file VMC2\_GEM\_yyyymmdd.txt. The file size and path settings configured for the status and error message log file VMC2\_Log\_yyyymmdd.txt are used. Therefore, status and error message logging must be enabled. If status and error message logging is disabled, no GEM messages are logged.

» *For a detailed description on how to configure Secs/GEM refer the Secs / GEM documentation.*

## 2.9 Script Files

This section gives an overview of what can be done with script files. A separate training on script files is available from Rofin. For information on the training contact your Rofin sales department.

It is possible to extend the functionality of VMC2 or to change its default behaviour using VB Script. Users can create their own script code based on sample script functions that come with the standard VMC2 installation.

User-defined script functions are stored in text files on the file system. There are different applications that script files can be used for:

- customizing process control
- validating values of Input Variables
- changing/converting input values before assigning them as marking values

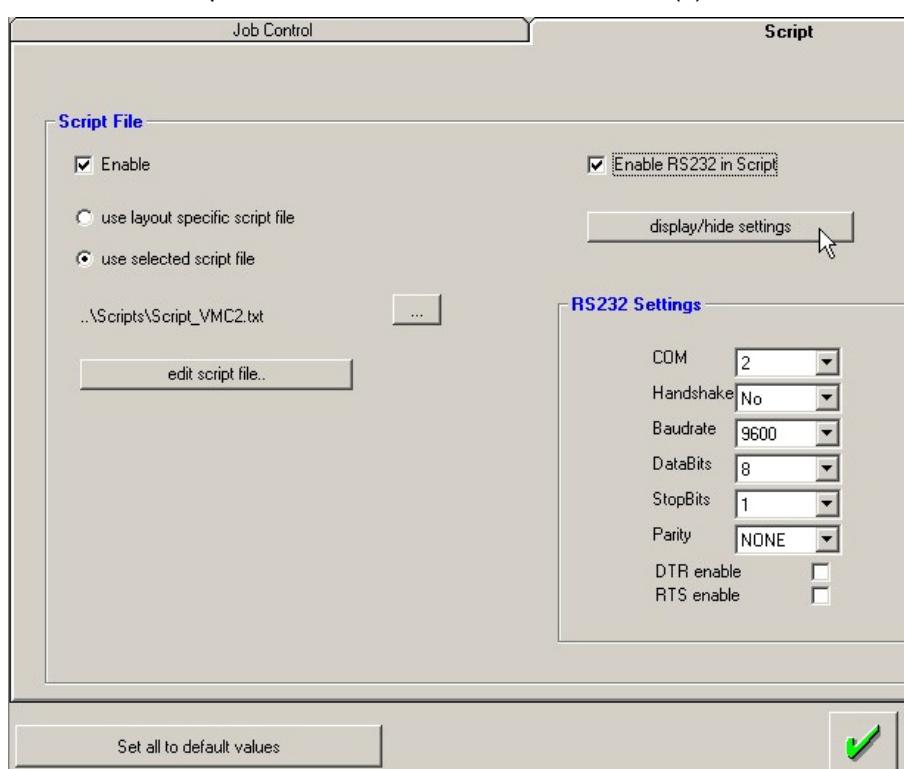


The script file “Script\_VMC2.txt” contains sample script code. It can be adapted for customization. The file is installed under “...\\VisualLaserMarker\\Scripts”.

### 2.9.1 Script File Selection

To make a script function accessible, the operator needs to:

- enable the use of script files in VMC2 via Options > Settings > Script
- select the script file that contains the desired function(s)



» For further information on how to setup script files, refer to section 4.7.

There are two alternative methods to put scripts to work:

- specification of one (global) script file
- use of script files/scripts that are incorporated in a layout

## 2.9.2 Script Syntax for Programming

In any script file the VB Script syntax must be applied for programming. Depending on their use with VMC2, the coding of script functions has to follow special conventions.

- » *For the VB Script Language Reference see the VBScript Documentation.*
- » *See the sections below for examples demonstrating some features.*

### LMOSActX

The LMOSActX interface provides functions that can be used to customize the laser marking.



CAUTION

As a number of functions affect the VMC2 process control, it is important to make sure that no conflicts arise from script execution: functions like LoadJob, CancelJob, Start and Stop should always be used with special care.

### 2.9.3 Customize Process Control

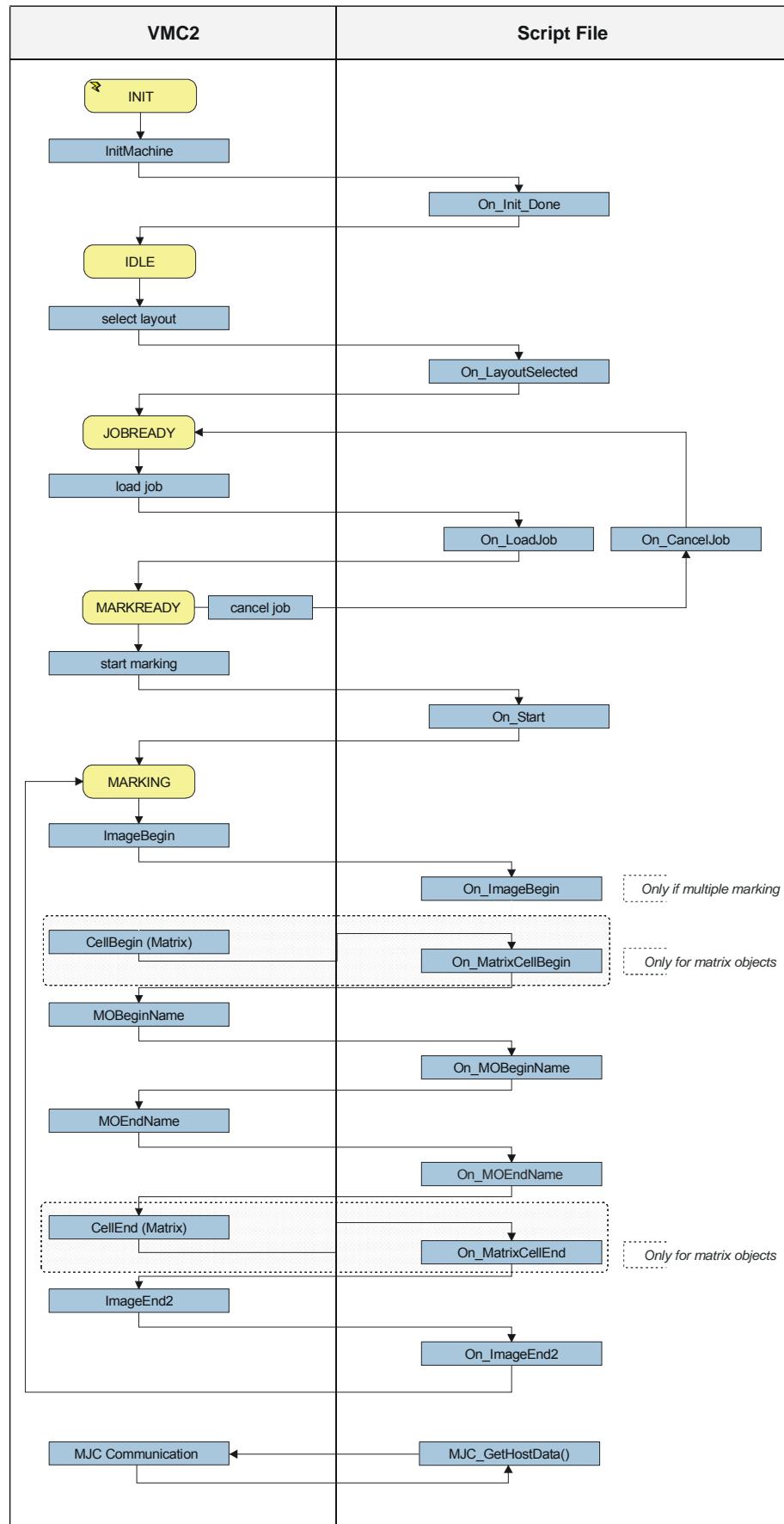
The user can react on some events in the process by adding code to the procedures below. It is possible, for example, to ask for input values or to give the operator hints.

Supported events are:

- Laser-Initialization (after init machine)
  - Load Job (before job is loaded)
  - PLC Event
  - Start Marking (before marking is started)
  - Image Begin (if multiple marking is enabled)
  - Cell Begin
  - MO Begin
  - MO End
  - Cell End
  - Image End (End of marking process)
  - Cancel Job (before job is canceled)
  - Terminate machine
- » See “*Script\_VMC2.txt*” for details on how to use these functions.

The events “Cell Begin” and “Cell End” are only available with matrix objects. These events are fired for each cell.

The events “MO Begin” and “MO End” are fired for each marking object.



## 2.9.4 Script Functions for Input Variables

The operator can specify script functions for variables of type TEXT, FUNCTION and INPUT.

To validate the values of Input Variables, the operator must assign a function to the field "Valid Char" when defining the Input Variables. These functions must always return "true" or "false". If "false" is returned, the operator needs to enter a valid value for the input variable. If the value is valid, "true" is returned and the marking process can be started.

The example below on the left shows the function ValidateLotNo which returns "false" if the value for the Input Variable "Text1" is either "5" or larger than "8".

Functions can also be used to evaluate, change, format or encode Input Variables. A function must be assigned to the field "Fct/Format" for these Input Variables. These functions return the respective value (see example below on the right).

Sample script functions:

Definition of Input Variables					
Variables	Type	Fct/Format	Len	Valid Char	User
Text1	TEXT		255	ValidateLotNo	
Text2	FUNCTION	BuildYear	255	all	
Text3	TEXT		255	all	user
Text4	TEXT		255	all	
Text5	TEXT		255	all	

Definition of Input Variables					
Variables	Type	Fct/Format	Len	Valid Char	User
Text1	TEXT		255	ValidateLotNo	
Text2	FUNCTION	BuildYear	255	all	
Text3	TEXT		255	all	user
Text4	TEXT		255	all	
Text5	TEXT		255	all	

Returns "true" or "false":

```
function ValidateLotNo (InputVal)
    dim test
    test = Left(InputVal,1)
    If (test < "5") or (test > "8") then
        msgbox "Error in Text1: " & InputVal, 48,
        "Attention"
        ValidateLotNo = false
    else
        ValidateLotNo = true
    end if
end function
```

Returns a marking value:

```
function BuildYear (InputVal)
    BuildYear = InputVal & "-" &
    Right(Year(Now),1)
end function
```

(The function "BuildYear" has one parameter containing the input value of "Text2". The result (marking value) must be assigned to the function name.)

## 2.9.5 Implemented Objects

Some objects are already implemented in the script control. For that reason they do not have to be defined via "CreateObject".

Object	Description
fso	FileSystemObject
VLMActX	LMOSActX methods
VMCFct	This object supports functions that cannot directly be used with VLMActX (i.e. ReadByte).
M0Items	Object for accessing the Input Variables included in the loaded layout.
AllM0Items	Object for accessing all defined Input Variables.

» "M0Items" and "AllM0Items" are described in more detail below.

## RS-232 Communication:

Object	Description
COMPort	Messages from a script can be sent through the serial (COM) port of the PC, if properly configured. The script file can also receive messages through the COM port.

To enable RS-232 (COM) communication, include the following in the script:

Output command for sending messages via COM interface:

```
ComPort.Output = "text_for_serial_port" & vbCRLF
```

The script function “On\_Comm” is used for reading a series of input characters via the COM interface:

```
' ****
' FUNCTION: On_Comm
' PARAMETER: ReadChar
' RETURN: -
' DESCRIPTION: Reads Input characters
' ****
Sub On_Comm (ReadChar)
    MsgBox ReadChar & " received on COM-Port"
end sub
```

**Object VMCFct (Wrapper)**

LMOSActX functions do not work correctly within the script control if they return a result via the argument list. The object VMCFct wraps these LMOSActX functions.

» See the LMOSActX documentation for a detailed description.

Function	Parameter
ReadByte	(pPort As Variant, pMask As Variant, plnByte As Variant) As Boolean
GetGlobalQPSet	(ByVal pQPSet As String, pCurrent As Variant, _ pSpeed As Variant, pFrequency As Variant) As Boolean
GetDimension	(ByVal pObjectName As String, pWidth As Variant, pHeight As Variant) As Boolean
DrawingGetDimension	(pWidth As Variant, pHeight As Variant) As Boolean
GetPosValues	(ByVal pObjectName As String, pX As Variant, _ pY As Variant, pAngle As Variant) As Boolean
DrawingGetPosValues	(pX As Variant, pY As Variant, pAngle As Variant) As Boolean
GetMatrixRowsAndColsC nt	(pName As Variant, pRows As Variant, pCols As Variant) As Boolean
ClearLayout	
GetMONames	(MONames As Variant) <i>Returns a table with all object names of the loaded layout.</i> <i>Sample code:</i> <pre>VMCFct.GetMONames MONames For i = 1 To MONames.count     msgbox monames(i) Next</pre>
GetMOType	(ByVal pObjectName As String, pType As Variant) <i>Returns the type of the specified object.</i> <i>Sample code:</i> <pre>VMCFct.GetMOType "Text1", MOType msgbox "GetMOType Text1 = " &amp; MOType</pre>
MJC_GetHostData	(sendData,PortIndex) PortIndex is an optional parameter. If it is not specified, port

	<p>1 will be used.</p> <p>Calling syntax in VMC2 Script:</p> <pre>"receivedData=VMCFct.MJC_GetHostData(sendData,PortIndex)"</pre> <p>Wait timeout for host data can be adjusted in XML Configuration -&gt; "SCRIPT_DATA_REQUEST_TIMEOUT", timeout range = 100 - 60000 ms</p> <p><i>Sample code:</i></p> <pre>VMCFct.AddToList "Host Anfrage: &gt;" &amp; strrequestData &amp; "&lt;"</pre> <pre>strHostData = VMCFct.MJC_GetHostData(strrequestData)</pre> <pre>VMCFct.AddToList "Host Antwort: &gt;" &amp; strHostData &amp; "&lt;"</pre>
--	--

#### Other Implemented Functions:

Function	Parameter
AddToList	(msg As String) <i>This function displays the message in the status line of VMC2.</i>
SleepMS	(ms As long) <i>Wait for a specified period of time (ms).</i>
LastSelectedLayout	(filename) <i>Sample code:</i> <pre>Sub On_LayoutSelected()     VMCFct.LastSelectedLayout Filename     msgbox "Selected Layout : " &amp; Filename End Sub</pre>

#### Objects MOItems and AllMOItems

AllMOItems and MOItems are collections which provide access to all Input Variables.

- AllMOItems provides access to the entire collection of Input Variables.
- MOItems is limited to Input Variables that are contained in the loaded layout.

Both collections contain all properties. The operator defines the properties in Options > Settings > "Definition of Input Variables". In addition, their definitions can be set using InputVal. InputVal represents the latest value assigned to an Input Variable.

Properties:

Property	Valid for Collection	Description
	MOItems	AllMOItems
MOName	X	X
MOType	X	X
FctFormat	X	X
InputVal	X	-
Status	X	X
MarkingVal	X	-
		latest value assigned to the IV
IsInVLM	X	X
MaxLengthInput	X	X
ValidCharacter	X	X
UserLevel	X	X
UserInfo	X	X
FreeDefined	X	X
ActualOnImageBegin	X	X
ActualOnCellBegin	X	X

The following lines can be included in the Script Function "On\_LoadJob" to demonstrate the functionality of MOItems and AllMOItems:

```
Dim MOItem
msgbox "MOItems"
for each MOItem in MOItems
    msgbox MOItem.MOName & " = " & MOItem.InputVal &
        " = " & MOItem.MOType & " = " & MOItem.MarkingVal
next

msgbox "AllMOItems"
for each MOItem in AllMOItems
    msgbox MOItem.MOName & " = " & MOItem.MOType
next
```

Append this code to the function "On\_LoadJob"

## 2.9.6 Include Script File

A script file can contain an include command in which case it is possible to insert program code from a separate file. The separate include script file provides script functions or constant definitions that other script files will frequently make use of.

Working with an include file can reduce the customization effort for the user who only needs to define and test the relevant script functions on one occasion.

Syntax:

'<INCLUDE filename.txt>

If no path is specified for the included script file, the path of the script file containing the include command is used. The example below shows an excerpt of a sample script file.

Sample:

```
' ****
' filename : Script_VMC2.txt
' directory : ...\\VisualLaserMarker\\Scripts
' description: VB-Script-functions used in VMC2 to convert input values
' ****
'<INCLUDE script_include.txt>
' the user can react on some events in the VMC2 process by adding
' code in the procedures below.
' supported events are :
' ****
' FUNCTION: On_Init_Done
' PARAMETER: -
' RETURN: -
' DESCRIPTION: initialization of hardware finished
' ****

Sub On_Init_Done()
    'msgbox "test On-Init-Done"
end sub
```

## 3 Installation

### 3.1 System Requirements

The VMC2 software is installed together with the VLM software. Therefore, the system requirements for VMC and VLM software are identical.

- » Refer to the *VisualLaserMarker documentation, version 4.x*.
- » For appropriate VLM and VMC2 versions, refer to the *VLM Release History*.

### 3.2 Installation Procedure

The VMC2 software is installed together with the VLM software. Therefore, there is no separate installation procedure for the VMC2 software.

- » Refer to the *VisualLaserMarker documentation for installation instructions*.

The following files will be installed:

File Name	Path	Description
VMC2.exe	<VisualLaserMarker>\Bin	VMC2 application
VMC2Languages.xls	<VisualLaserMarker>\System	Language file for VMC2
VMC2Options2.dtd	<VisualLaserMarker>\System	Document type definition file for VMC2 XML options

### 3.3 Software Updates

For Software updates please contact your Rofin sales department.

## 4 Software Configuration

This section describes the settings that can be changed or viewed in the VMC2 software.

The following configuration is possible:

Configuration	Menu	Described in
Change password for password-protected settings	-	User Manager documentation
Enable/Disable External Start	Options>Settings>General	4.3
Set error bit in case of alarm	Options>Settings>General	4.4
Define start delay time	Options>Settings>General	4.5
Enable logging	Options>Settings>General	4.6
Enable VB Script file	Options>Settings>Script	4.7
Configure job control options	Options>Settings>Job Control	4.8
Define input variables	Options>Settings>Definition of Input Variables	4.14
Define how input values are interpreted, validated and assigned to the layout	Options>Settings>Definition of Input Variables	4.15
Add a button to the user interface to switch to another application	Options>Settings>Application switch	4.20
Configure local input	Options>Configuration	4.9
Configure remote input via MJC	Options>Configuration Options>Settings	4.10
Configure control via handling	Options>Configuration	4.11
Set up Turntable Control	Options>Settings>Turntable	4.12
Set up External Layout Selection	Options>Settings>PIO Layout Selection	4.13
Enable assigning data from an external data file	Options>Data Extern>Setup	4.17
View and select Data Extern	Options>Data Extern> Data Selection	5.2.2
Change VMC language	Options>Language	4.18
Change view for the preview window	View>Layout	4.21
View external data in the layout display	View>Data Extern	4.22
Customize the user interface	View>Customize...	4.19
Update the preview window	View>Redraw Layout	4.23
Display power measurement	Tools>Power	4.24
Start or stop position help	Tools>PositionHelp	4.25
Compose user-defined format for marking objects	Tools>Format Wizard	4.16
Change global laser parameters	Tools>Global Laser Parameters	4.26
Configure laser output signal	Tools>Laser	4.27
View IO definitions	Tools>IO definitions	4.28
Monitor operation hours	Tools>ActivateOHM	4.29

Configuration	Menu	Described in
Change limits for operation hours	Tools>OHM>Change	4.29
Reset operation hours	Tools>OHM>Change	4.29
Open online help	Help>Contents Help>Searchf or Help On...	4.30
Make a screenshot	Help>Make Screenshot	4.31
Get information on software version	Help>About	4.32

## 4.1 Function Keys and Buttons

The following function keys are available in VMC2:

Function Key	Description
F1	Opens online help
F2	Request for lot file polling
F3	Opens Options > Settings
F4	Opens Options > Configuration
F5	Opens Options > Data Extern > Setup
F6	Opens Tools > Format Wizard
F7	Opens Tools > PositionHelp
F8	Opens Tools > Show Drawing Position (in aktueller Version nicht drin)
F9	Opens Tools > Global Laser Parameters
F12	Redraws the preview window (View > Redraw Layout)
Ctrl+F1	Makes a screenshot of the current window (Help > Make Screenshot)
Ctrl+O	Opens Tools > ActivateOHM

The following buttons are used in different windows for software configuration and use and are therefore only explained once in this manual:

Button	Description
	Restores all factory settings in Options > Settings and Options > Configuration This button can be password-protected via the User Manager.
	OK: Saves the changes and closes the window This button can be password-protected via the User Manager.
	Cancel: Discards all changes and closes the window.
	Apply: Applies all changes without closing the window

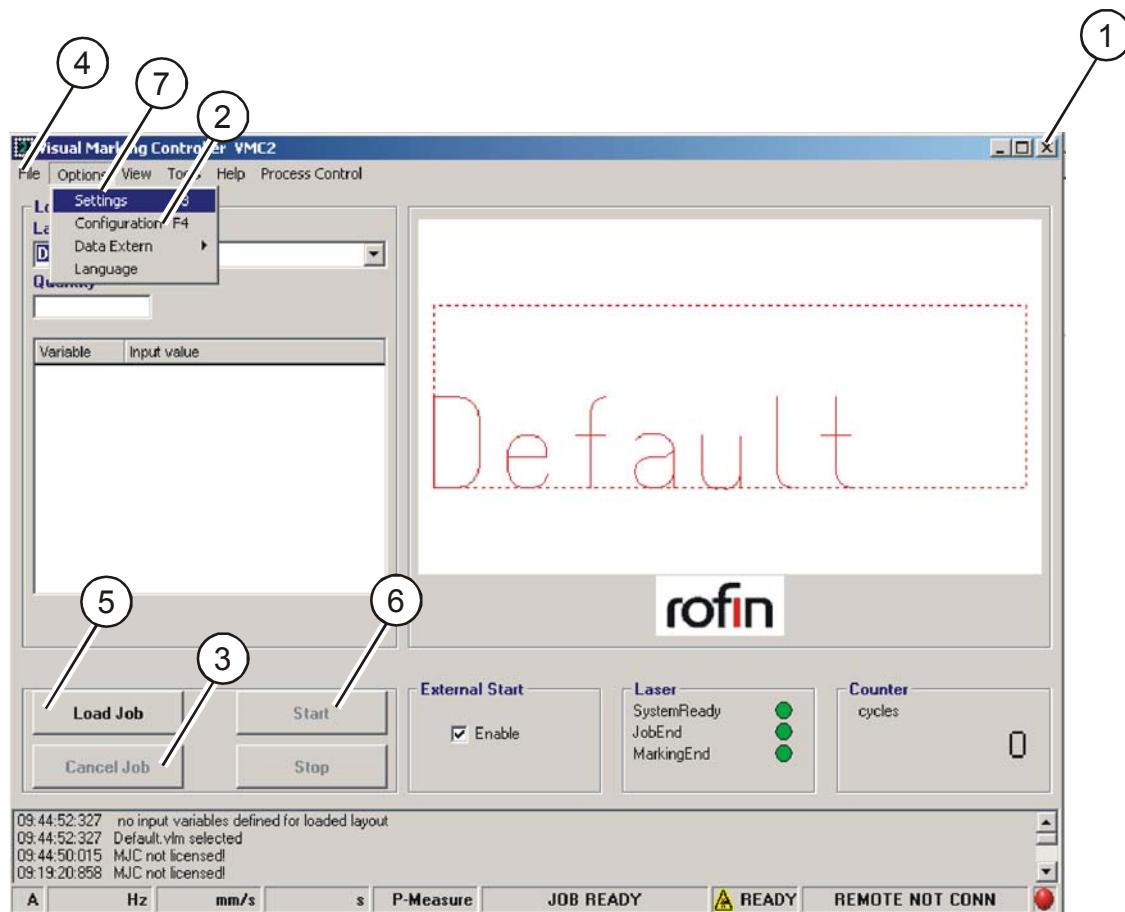
## 4.2 Password Protection

Some of the settings changeable in the Options or Tools menus may only be changed by qualified personnel and are therefore password-protected. After clicking on the respective menu item, the window to enter the password appears:



The default password is Rofin and can be changed with the User Manager.

It is possible to add password protection to buttons/menu items or to remove it from buttons/menu items with the User Manager. The following table shows the relation between the buttons/menu items and their corresponding name in the User Manager. It also shows which buttons/menu items are protected per default.



Button / Menu Item	Protection Item in User Manager	Password-protected per default?
Start > VisualLaserMarker > Production Tools > VMC2	V2_START	No
1	V2_CLOSE	No
2	V2_CONF	Yes
3	V2_C_JOB	No
4	V2_FILE	No
5	V2_L_JOB	No
6	V2_MARK	No
7	V2_OPT	Yes
Tools > ActivateOHM	V2_OPT	Yes
Tools > OHM > Change	V2_OPT	Yes
Button [OK] in Options > Configuration	V2_CONF_OK	No
Button [OK] in Options > Settings	V2_OPT_OK	No
Button [Set all to default values]	V2_DEFAULT	No
Tools > Global Laser Parameters (F9)	V2_LP	No
Button [OK] in Tools > Global Laser Parameters	V2_LP_SAVE	No
Buttons [Disable Comm], [Go Offline], [Go Remote] available if VMC2 is configured for Secs/GEM Host Communication	V2_GEM	Yes

» Refer to the User Manager documentation for information on how to change the password or add or remove password protection.

## 4.3 Configure External Start

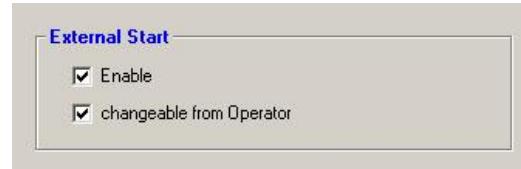
If external start is enabled, the marking process is started automatically (for example, by the handling system) after the job has been loaded.

Depending on the configuration, the external start can be enabled or disabled by the configurator and the operator, or only by the configurator.



**The configurator can enable or disable the external start via Settings > General. This page is password-protected and cannot be accessed by the operator. On this page, the configurator also defines whether the operator should be allowed to enable or disable the external start in the main window.**

1. Select Options > Settings.
2. Enter the password.
3. Click [OK].
4. Select the tab “General”.
5. Check “Enable”  
to enable the external start. Deactivate the checkbox to disable the external start.
6. Check the checkbox “changeable from Operator”  
to allow the operator to enable and disable the external start in the main window.
7. Click OK – SAVE.



**The operator can only enable or disable the external start if the checkbox “changeable from Operator“ is checked under Options > Settings > General. If there is no checkbox for external start in the main window, the operator is not allowed to change this setting. .**

1. Check the checkbox “Enable” in the main window to enable the external start. Deactivate the checkbox to disable the external start.

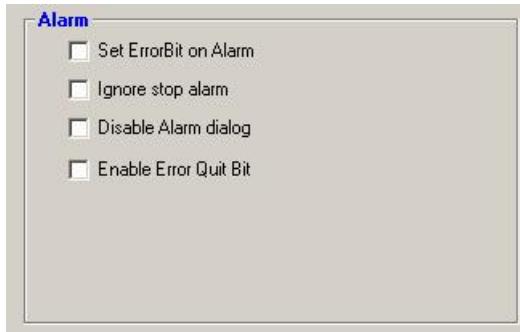


## 4.4 Set Error Bit in Case of Alarm



**It is possible to configure what will happen when an alarm occurs.**

1. Select Options > Settings.
2. Enter the password.
3. Click [OK].
4. Select the tab “General”.
5. Check “Set ErrorBit on Alarm”  
to set the error bit when an alarm occurs.  
The bit is cleared again after the operator  
has closed the message box with the  
alarm message.
6. Check “Ignore stop alarm”  
if the External Stop should not be treated  
as an alarm.
7. Check “Disable Alarm dialog”  
to deactivate the alarm dialog (no user  
input is necessary in case of an alarm).
8. Check “Enable Error Quit Bit”  
to be able to reset errors via a signal (for  
example, to allow the handling to clear  
alarms).
9. Click OK – SAVE.



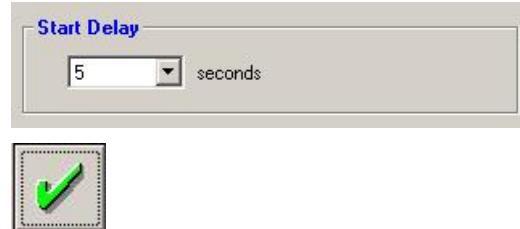
## 4.5 Define Start Delay Time

If the option to select a layout file automatically after the start of the VMC2 application (via Options > Settings > Job Control) is enabled, it is necessary to enter a delay time. If the PC is connected to a network, this delay time might be set to a longer delay.



The default for the start delay time is 5 seconds. If VMC2 is not started with this option enabled, the start delay can be set to 0 to speed up the start of the application.

1. Select Options > Settings.
2. Enter the password.
3. Click [OK].
4. Select the tab "General".
5. Enter an adequate time for the start delay in seconds.
6. Click OK – SAVE.



## 4.6 Enable Logging

There are different kinds of log files that can be enabled or disabled independently:

- Status and Error message log file
- Status log file
- Matrix data log file
- Configured data logging with customer-defined log file(s)
- GEM log file

### Enable Status and Error Message Log File



**The status and error message log file saves the information from the status line.**

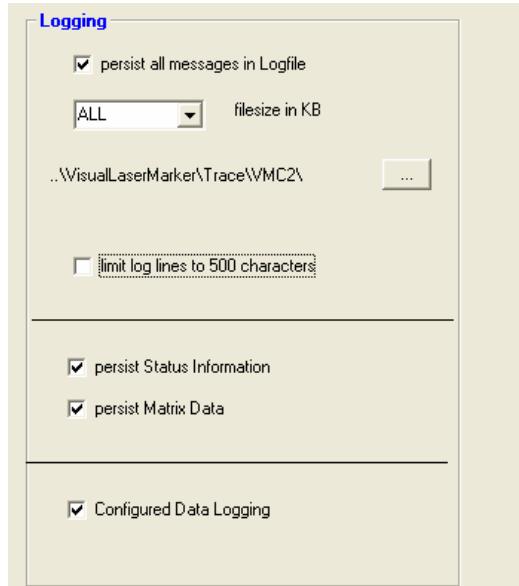
1. Select Options > Settings.
2. Enter the password.
3. Click [OK].
4. Select the tab “General”.
5. Activate the checkbox “persist all messages in Logfile”.
6. Select a file size from the drop-down menu.  
ALL means no file size limit.
7. Click [...].  
The window for the log file path opens.
8. Select a folder from the file system.  
The default folder is \\VisualLaserMarker\\Trace\\VMC2.
9. Click [Open].

#### Result:

Installed versions of VLM and VMC2, any error messages and process data are now logged in the log file called VMC2\_Log\_yyyymmdd.txt in the configured directory.

10. Activate the checkbox “limit log lines to 500 characters”, if desired.  
In case of long log lines (for example, binning commands for large matrix objects) the lines can be limited to 500 characters to avoid large log files.

11. Click OK – SAVE.



» For further information on log files, refer to section 2.8.

## Enable Status Information Log File

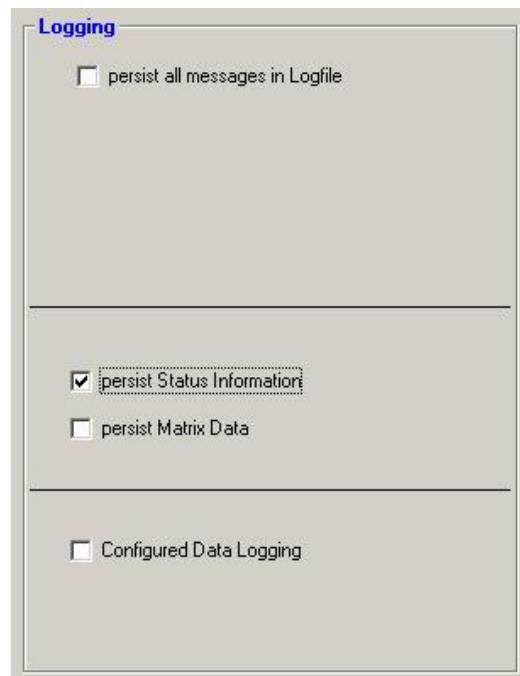


The status information log file saves the current process data. The information in the log file reflects the last status of the machine. This can be helpful if the VMC2 has an abnormal program termination.

1. Select Options > Settings.
2. Enter the password.
3. Click [OK].
4. Select the tab "General".
5. Activate the checkbox "persist Status Information".

### Result:

The information on the last status of the machine is now logged in the log file called StatusLog.txt in the <VLM>\System directory.



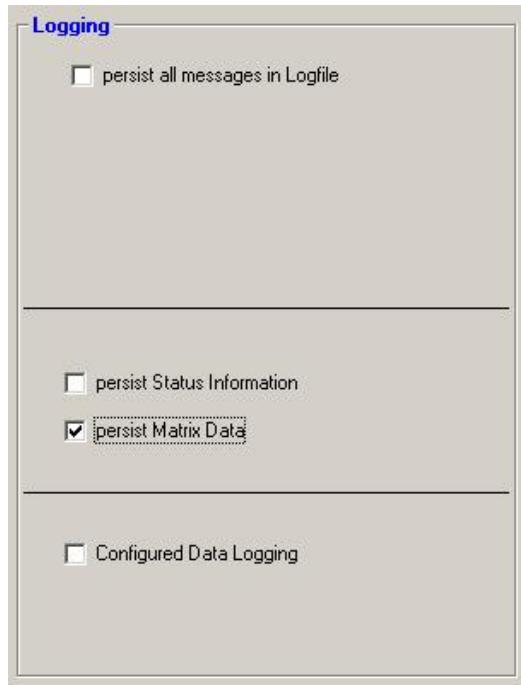
6. Click OK – SAVE.



### Enable Matrix Data Log File



**The Matrix data log file saves the status of the last marked cell. This file is only useful if the layout file contains a matrix object.**



1. Select Options > Settings.
2. Enter the password.
3. Click [OK].
4. Select the tab "General".
5. Activate the checkbox "persist Matrix Data".

Result:

The information on the last status of the last marked cell is now logged in the log file called MatrixLog.txt in the <VLM>\System directory.

6. Click OK – SAVE.



## Enable Configured Data Logging

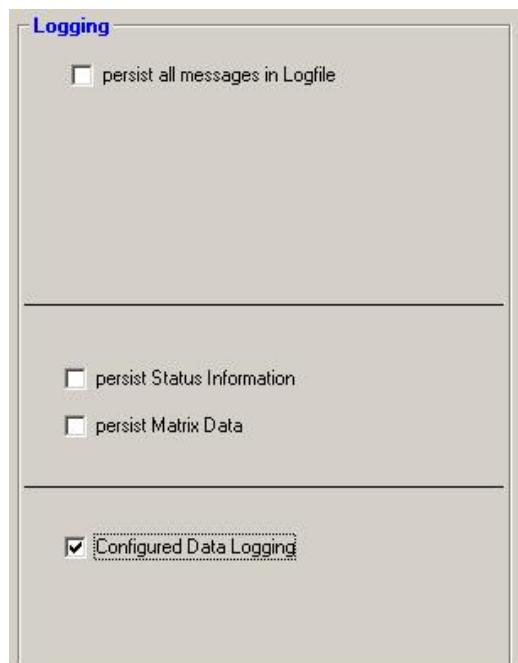


The XML file VMC2Logging.XML allows the configuration of one or more customized log files.

1. Select Options > Settings.
2. Enter the password.
3. Click [OK].
4. Select the tab “General”.
5. Activate the checkbox “Configured Data Logging”.

Result:

Different kinds of information are saved in one or more log files, depending on the definitions in the file VMC2Logging.XML in the <VLM>\System directory.



6. Click OK – SAVE.



» For further information on the VMC2Logging.XML file and the elements and attributes defined in the DTD file refer to section 2.8.

## Enable GEM Log File

The GEM log file is enabled as soon as Secs/GEM host communication is configured. All GEM messages are logged into the file VMC2\_GEM\_yyyymmdd.txt. The size and path setting of the Status and Error message log file is used.



GEM messages are only logged if status and error message logging is enabled.

» For information on how to enable Secs/GEM host communication refer to the Secs / GEM documentation.

## 4.7 Enable VB Script File



**Layout-specific scripts are loaded whenever a new layout gets selected. A layout-specific script file has the same name as the layout file, only with the file extension .txt instead of .vlm. They must be located in the same directory as the corresponding .vlm file. If there is no script file in the layout directory, the layout is loaded without scripting functionality.**

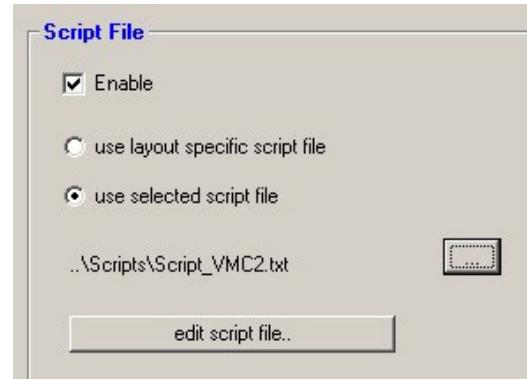
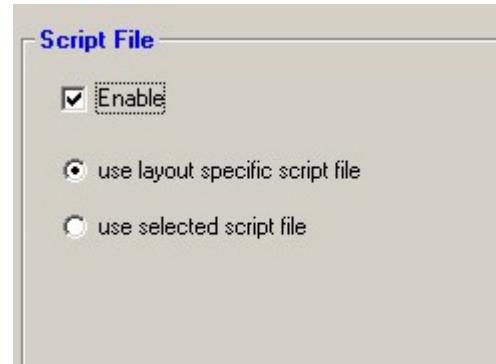
**Global script files are shared across multiple layouts.**

1. Select Options > Settings.
2. Enter the password.
3. Click [OK].
4. Select the tab “Script”.
5. Activate the checkbox “Enable” to allow the use of a script (file).
6. Choose the option “use layout specific script file” for a layout-specific script.

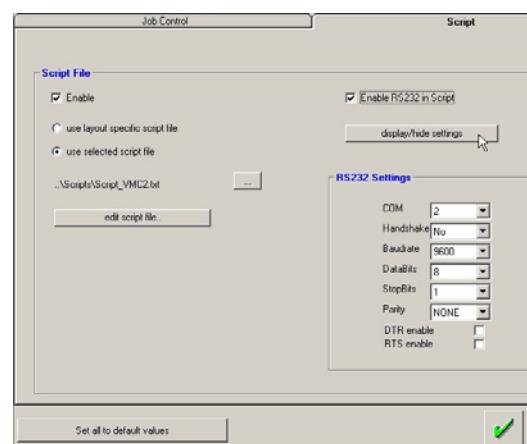
**Result:** Depending on the contents of the layout, script functions will be read from the .txt file that has the same name as the layout file with a .txt file extension or from an associated script include file.

7. Choose the option “use selected script file” to use a global script file.
8. Click [...] to select a script file other than the default Script\_VMC2.txt.
9. Click [edit script file...] to modify the selected script file using a text editor, if necessary.

**Result:** All functions in the selected/edited script file will be available after OK - Save.



10. Click [Enable RS232 in Script] to allow data transfer from/to script functions.
11. Click [display/hide settings] to view the RS-232 settings.
12. Make adjustments, if necessary.
13. Click OK – SAVE.





**The button [Set all to default values] restores all factory settings in Options > Settings and Options > Configuration.**

» For further information on script files, refer to section 2.9.

## 4.8 Configure Job Control Options



**It is possible to customize the default process flow.**

1. Select Options > Settings.
2. Enter the password.
3. Click [OK].
4. Select the tab “Job Control”.
5. Activate the desired checkboxes and radio buttons.  
For information on the different options refer to section 2.1.7

If “Automatic job/lot file (Polling)” is enabled, the button [>] for the advanced settings is enabled.

6. Click [>] to set up Lot File Polling.
7. Select the directory for lot files from the file system.  
All files found with the specified extension are processed with oldest file first (the default file extension for lot files is defined in View > Customize...).
8. Activate the checkbox for “Lot filename” to use only one defined lot file.
9. Click [...].
10. Select a lot file from the file menu.
11. Click [Open].
12. Define when polling shall take place.  
It is possible to activate more than one option.
13. Define the polling interval.
14. Click OK – SAVE.

If “Create Autoteach file (VIS file) on LoadJob is enabled, define the directory for this file:

15. Click [...].
16. Select a file from the file menu.
17. Click [Open].



18. Click OK – SAVE.



**The button [Set all to default values] restores all factory settings in Options > Settings and Options > Configuration.**

It is also possible to customize the process (for example, hints for the operator, asking for input of values) by creating a script file.

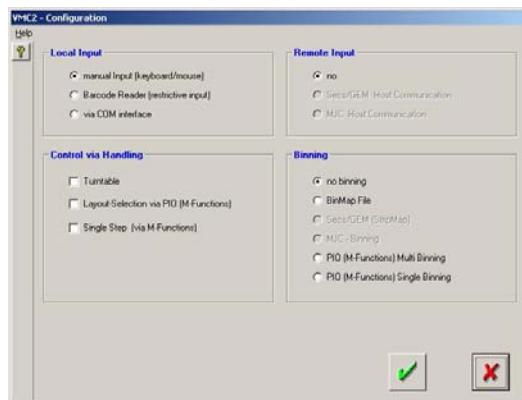
» *For information on job control options refer to section 2.1.7.*

## 4.9 Configure Local Input



If local input is configured, the data required for a marking job is entered via keyboard/mouse, barcode reader or via the COM interface (RS-232).

1. Select Options > Configuration.
2. Enter the password.
3. Click [OK].
4. Activate the desired mode for local input.
5. Select “no” for remote input.
6. Deactivate all checkboxes for “Control via handling”.
7. Select “no binning” for Binning.

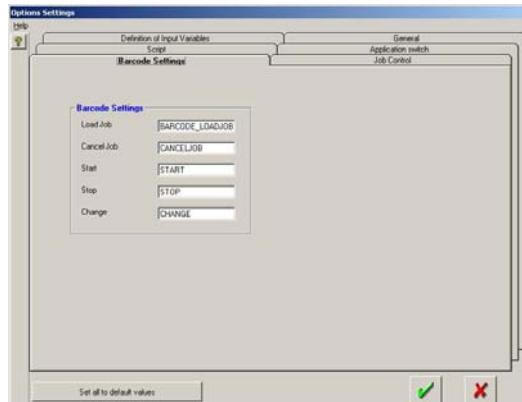


8. Click OK – SAVE.

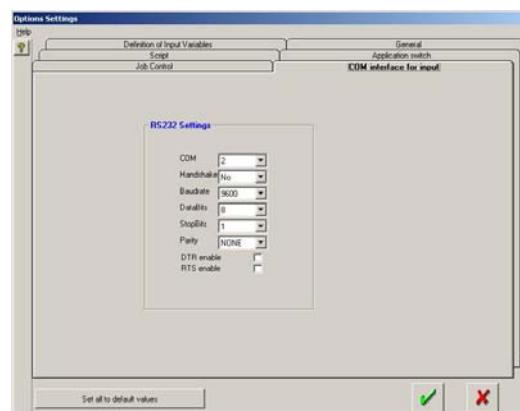


To configure barcode settings:

9. Select Options > Settings.
10. Enter the password.
11. Click [OK].
12. Select the tab “Barcode Settings”.
13. Determine which value or text is used for the input of the commands.



14. Click OK – SAVE.



To configure COM interface settings:

15. Select Options > Settings.
16. Enter the password.
17. Click [OK].
18. Select the tab “COM interface for input”.
19. Select the appropriate values from the drop-down menus.
20. Enable or disable TTR and/or RTS.



21. Click OK – SAVE.



In “Barcode Reader“ mode the main window changes accordingly.

» For further information on different local input types, refer to section 2.2.1.

## 4.10 Configure Remote Input via MJC



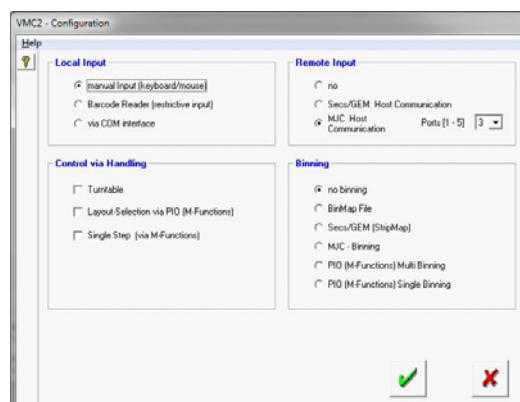
If remote input via MJC is enabled, commands are sent to the VMC2 application via MJC commands (communication via TCP/IP or via RS-232).

1. Select Options > Configuration.
2. Enter the password.
3. Click [OK].
4. Select “MJC Host Communication“ for remote input and select number of ports.

Result:

The tab “MJC-Host Communication“ is enabled in Options > Settings.

5. Deactivate all checkboxes for “Control via handling“.
6. Select “MJC – Binning“ if binning is supposed to be used for layout selection.



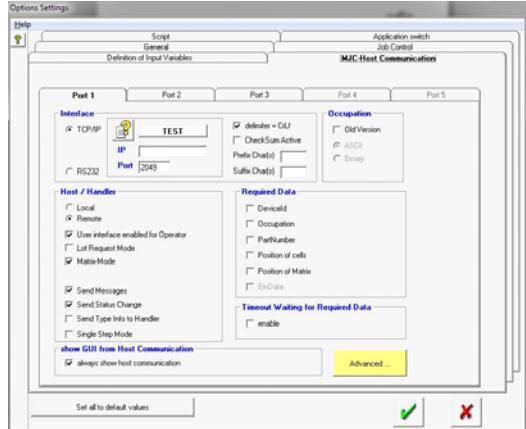
Result:

The tab “Good / Bad Bins“ is enabled in Options > Settings.

7. Click OK – SAVE.
8. Select Options > Settings.
9. Enter the password.
10. Click [OK].
11. Select the tab “MJC-Host Communication”.



12. Configure MJC.  
For information on this window, refer to section 2.3.1.



13. Select the tab “Good / Bad Bins” to configure MJC Binning.
14. Mark the desired bins as “good bins”.
15. Click OK – SAVE.



» For other binnings, please contact your Rofin sales department for further information.

## 4.11 Configure Control via Handling



**A handling can control the layout that is to be marked next and the positioning of the layout via the M-functions (=I/O signals).**

1. Select Options > Configuration.
2. Enter the password.
3. Click [OK].
4. Select “no“ for remote input.
5. Enable “Turntable“ if VMC2 is supposed to react to signals sent from a turntable.

**Result:**

The tab “Turntable“ is enabled in Options > Settings.



6. Enable “Layout-Selection via PIO (M-Functions)“ if layouts are supposed to be selected dynamically via a value set by the parallel interface (=PIO).

**Result:**

The tab “PIO Layout Selection“ is enabled in Options > Settings.

7. Enable “Single Step (via M-Functions)“ if it should be possible to mark layouts that do not fit into the galvo field in several parts via M-Functions.

**Result:**

The tab “Single Step“ is enabled in Options > Settings.

» Please contact the Rofin Sales Department for further information about Single Step.

8. Click OK – SAVE.



After configuring the software for control via handling, it is necessary to make further configurations via Options > Settings in the corresponding tabs “Turntable“, “PIO Layout Selection“ and/or “Single Step“ that are then available.

## 4.12 Set up Turntable Control

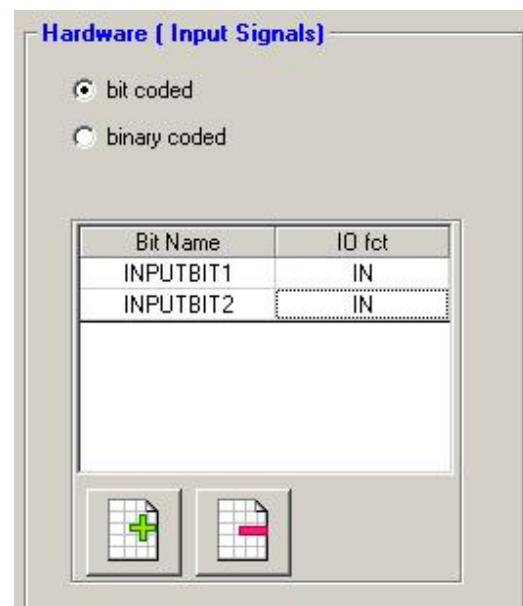


If VMC2 is configured as “Turntable” in Options > Configuration, additional settings are required in Options > Settings > Turntable. All M-functions need to be defined first.

1. Select Options > Settings.
2. Enter the password.
3. Click [OK].
4. Select the tab “Turntable”.
5. Select “none” for operation without a handling system (This option is for testing purposes only.)
6. Select “RTX (Nest A/B/C/D/E/... )” to activate the drop-down box containing the turntable designs.
7. Select your turntable design from the drop-down box.  
Result: VMC2 interprets the “X” as the number of nests on this turntable.
8. Set the “Galvo Head Index” according to your system’s configuration:
  - double galvo head:  
either one or both checkboxes
  - single galvo head:  
one of the checkboxes
9. Enter a position value for each nest that has been activated and needs offset correction. Use the arrow buttons to scroll up or down.

Nest	X	Y	Angle
Nest E	1	0	0
Nest F	0	0	0
Nest G	0	0	0
Nest H	0	0	0

10. Click [add new bit] to add an M-Function.
11. Double-click the entry.
12. Select an M-Function from the drop-down list.
13. Click [delete selected bit] to delete an M-function from the list.
14. Select an M-function to change it.
15. Replace it with an entry from the drop-down box.
16. Click OK – SAVE.



If the number of entry fields for “Position values” is not correct, check if the correct Turntable has been selected.

» For further information on turntable positions, refer to section 2.5.

## 4.13 Set up External Layout Selection



All M-functions have to be set up in the Machine Configuration before the External Layout Selection configuration.

Layout-Selection via PIO (M-Functions) must be enabled in Options > Configuration.

1. Select Options > Settings.
2. Enter the password.
3. Click [OK].
4. Select the tab “PIO Layout Selection”.
5. Click [...] for the Database Path.
6. Select the path to the database file.
7. Click [Open].
8. Click [...] for the Layout Path.
9. Select the path to the layouts.
10. Click [Open].
11. Choose the Layout Selection mode.
12. Click [Add New] to add a new layout.
13. Click in “Layout Name”.
14. Select a file.
15. Click [Delete] to delete a selected entry from the assignments list.
16. Confirm deletion with [Yes].
17. Click any “Layout Name” to change the settings.
18. Click on [...] for a list of layout files in the default folder.
19. Select a file.
20. Click [add new bit] to add an M-Function.
21. Double-click the entry.
22. Select an M-Function from the drop-down list.
23. Click [delete selected bit] to delete an M-function from the list.
24. Select an M-function to change it.
25. Replace it with an entry from the drop-down box.
26. Click OK – SAVE.

Binary Value	Layout Name
0	Default.VLM
1	0001.VLM
2	0002.VLM
3	0003.VLM

Bit Name	IO fct
INPUTBIT0	IN
INPUTBIT1	IN

Adding M-functions other than those initially set-up is not a routine task. It is only possible to add M-functions in this dialog that have been defined as input bits.



The default database for the assignments is PIOList.mdb. Use PIOList.mdb as a template to create several product-specific databases related to different products (copy PIOList.mdb and rename it).

» For further information on external layout selection, refer to section 2.4.

## 4.14 Define Input Variables

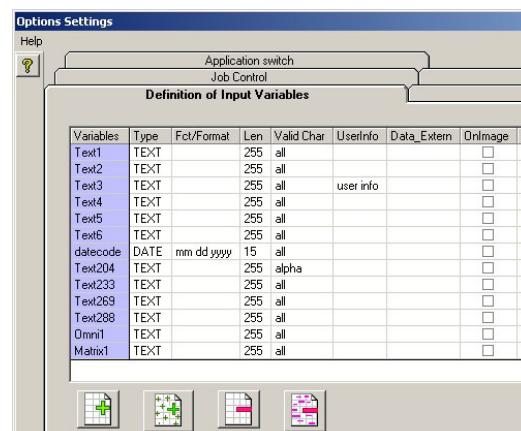
 When setting up Input Variables in the definition table, all Marking Objects of a layout can be added to this table in one step. It is also possible to add variables manually one after the other.

If no variables need to be imported, omit steps 1, 6 and 7.

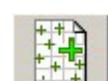
1. Select the layout to import from in the drop-down box in the main window.



2. Select "Options > Settings".
3. Enter the password.
4. Click [OK].
5. Select the tab "Definition of Input Variables".



6. Click [add all MOs].
7. Select ... from layout to import all variables contained in the layout that is currently loaded  
or:  
Select ... all global VLM counters and variables



to import all global variables defined in your VLM environment.

Result:

All MOs are added as Input Variables of type TEXT to the definition table.

8. Click [add new input variable] to manually add additional variables.
9. Give the variable a name that matches the object name of the Marking Object.



Text288	TEXT	255	all
NewVar	TEXT	255	all

10. Choose a variable type from the drop-down menu.

Definition of Input Variables						
Variables	Type	Fct/Format	Len	Valid Char	User Info	
Text1	TEXT		255	all		
Text2	TEXT		255	all		
Text3	TEXT		255	all	user info	
Text4	TEXT		255	all		
Text5	TE		255	all		
Text6	TEXT		255	all		
datecode	FUNCTION		yyy	15	all	
Text204	DATE			alpha		
Text233	LCOUNTER				all	
Text269	G COUNTER					
Text288	FORMAT				all	
Matrix1	MASK				all	
	CONSTANT					
	INPUT					

If necessary, delete selected variables (or all, in order to start over):

11. Click [delete selected input variable] or [delete all input variables].



The button **[Set all to default values]** restores all factory settings in Options > Settings and Options > Configuration.

» For further information on input variables, refer to section 2.6.

## 4.15 Define how Input Values are Interpreted, Validated and Assigned to the Layout

It is possible to manipulate and check the input values in several ways: by masks, format strings, validations and VB script functions. An input value can also be fixed as a constant or be taken from an external source.

Save input values to a separate IV file to be able to load the same values later.



It is only possible to use VB script functions included in the VMC2 script file assigned under Options > Settings > Script.



**Employ a script function to interpret an input value. Assign the script via property “Fct/Format”. It is possible to assign a script function to variables of type FUNCTION or INPUT.**

1. Double-click the property field “Fct/Format”.
2. Enter the name of the script function as defined in the script source file.

Options Settings					
Definition of Input Variables					
Variables	Type	Fct/Format	Len	Valid Char	User
Text1	FUNCTION	BuildChecksum	255	all	
Text2	TEXT		255	all	
Text3	TEXT		255	all	
Text4	TEXT		255	all	
Text5	TEXT		255	all	
Text6	TEXT		255	all	
datecode	DATE	mm dd yyyy	15	all	
Text204	TEXT		255	all	
Text200	TEXT		255	all	



**Employ a script function returning “true” or “false” to validate a variable of type TEXT. Assign the script via property “Valid Char”.**

1. Double-click the property field “Valid Char”.
2. Enter the name of the script function as defined in the script source file.

Options Settings					
Definition of Input Variables					
Variables	Type	Fct/Format	Len	Valid Char	User
Text1	TEXT		255	MyVal	
Text2	TEXT		255	all	
Text3	TEXT		255	all	user
Text4	TEXT		255	all	
Text5	TEXT		255	all	
Text6	TEXT		255	all	
datecode	DATE	mm dd yyyy	15	all	
Text204	TEXT		255	all	
Text200	TEXT		255	-"	



**Define valid input variable of type TEXT according to predefined character sets in "Valid Char". Or apply your own set of characters using the bracket notation.**

**"Valid Char" forces the operator to provide valid data right from the start. It rejects any false keyboard stroke.**

Definition of Input Variables							
Variables	Type	Fct/Format	Len	Valid Char	Userinfo	Def	...
Text1	TEXT		255	alpha			
Text2	TEXT		255	all			
Text3	TEXT		255	alpha	info		
Text4	TEXT		255	alphanumeric			
Text5	TEXT		255	numeric			
Text6	TEXT		255	real			
datecode	DATE	mm dd yyyy	15	all			
Text204	TEXT		255	all			
Text205	TEXT		255	all			

Definition of Input Variables							
Variables	Type	Fct/Format	Len	Valid Char	Userinfo	Def	...
Text1	TEXT		255	[abelmn]			
Text2	TEXT		255	all			
Text3	TEXT		255	all	user info		
Text4	TEXT		255	all			
Text5	TEXT		255	all			
Text6	TEXT		255	all			
datecode	DATE	mm dd yyyy	15	all			
Text204	TEXT		255	all			
Text205	TEXT		255	-"			

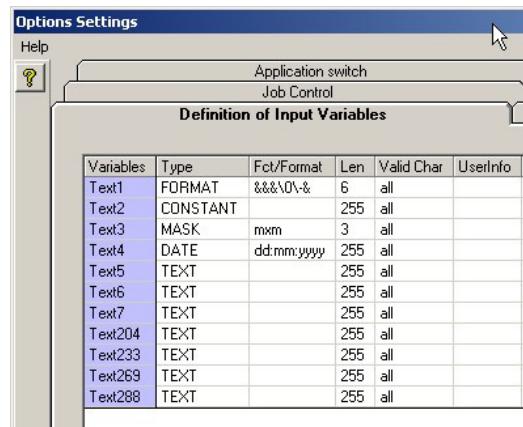


When applying "alphanumeric", any number entered is interpreted as text.



**Define other properties to meet your needs like maximum input length, a format string, a mask, or a date. Follow the pattern described above.**

1. Double-click the field for the desired property:  
- "Fct/Format" or  
- "Len".
2. Enter a definition or a limit.



#### When using **format expressions**:

To include fixed characters to retain in the output, we recommend to include a backslash ("\\") for clarity. Some characters have a special meaning in other Fct/Format contexts which could be mixed up otherwise. For example, use "\\M" instead of "M" to avoid the recognition of "M" as a mask.

#### When using **masks**:

A mask is applied as soon as a layout is loaded. To prevent malfunction, make any input string from a Marking Object fit the length of the mask straightaway. It is not possible to adapt a false string length via the input frame afterwards due to an error caused by the unfitting initial string length.

#### When using **date/time**:

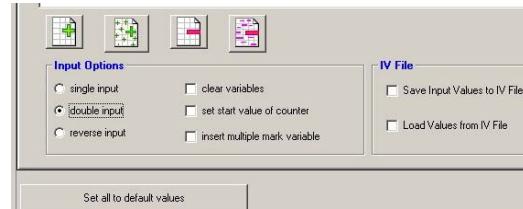
VMC2 date/time formats can be built with the separators ":" and "/". The actual character which these separators are converted into depends on your system's locale settings for the date/time display output.

» For details on applying the *Data\_Extern* property, refer to section 4.17.

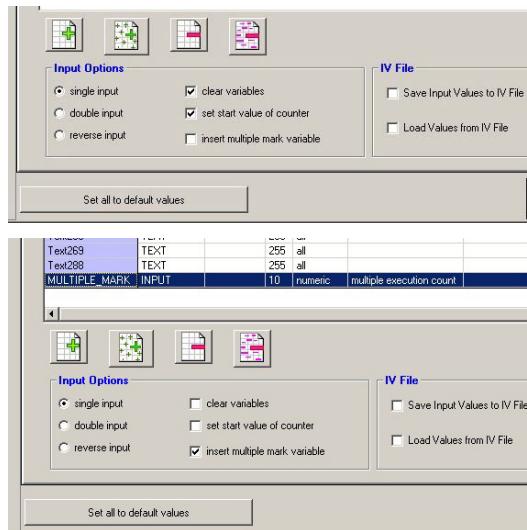


**Define several more options that take effect when a layout is loaded.  
If needed, apply these options concurrently.**

1. Select "single input" if the operator must only enter the value for a variable once.
2. Select "double input" if the operator must enter the value for a variable twice (to ensure correctness).
3. Select "reverse input" if the operator must enter the value for a variable once in the correct order and once in reverse.

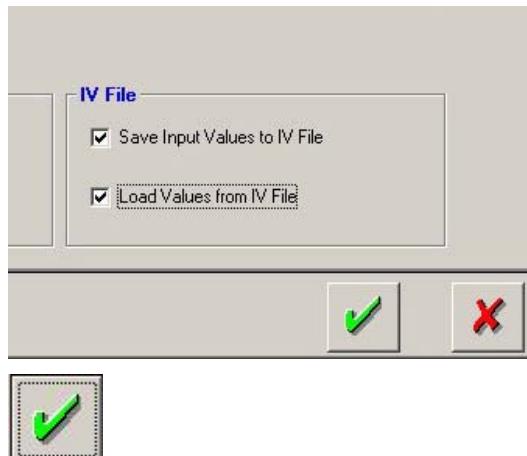


4. Enable “clear variables” if the values for all of the variables shall be cleared when loading a new layout.
5. Enable “set start value of counter” to allow the operator to set a start value for counters.
6. Enable “insert multiple mark variable” to automatically add a variable called “MULTIPLE\_MARK” to the definition table. The value assigned to that variable (by operator or remote command) defines the number of marking executions per start signal.



**Let VMC2 preserve the last input values in an IV file and/or or retrieve saved values from there.**

1. Enable “Save Input Values to IV File” to save values.
2. Enable “Load Input Values from IV File” to read values from an existing file.



3. Click OK – SAVE.

» For further information on input variables, refer to section 2.6.

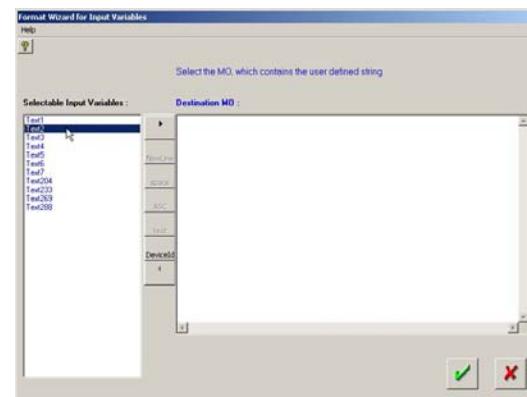
## 4.16 Compose User-defined Formats for Marking Objects



**Output strings to combine input values and user-defined text can be composed in the Format Wizard. Any existing input value of the selected value will be replaced with the defined string.**

To use the Format Wizard, a layout needs to be loaded first.

1. Select Tools > Format Wizard.
2. Select an Input Variable assigned to a target MO in the loaded layout.



3. Click [add object to format string].

**Result:** The destination (e.g. Text2) is defined; the button toolbar is activated.

4. Start building a string by making use of the buttons for composing a sequence:

[NewLine] > add a new line (Cr Lf)

[space]> > add a space (char. 20H)

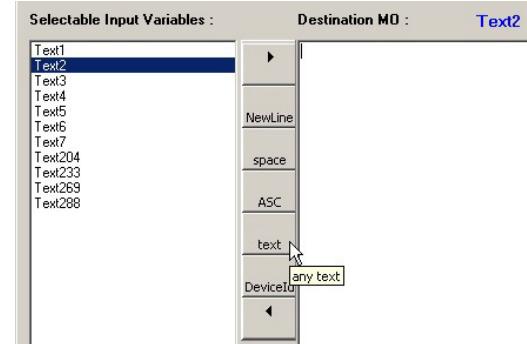
[ASC] > add any ASCII character by typing its Hex code

[text] > add text

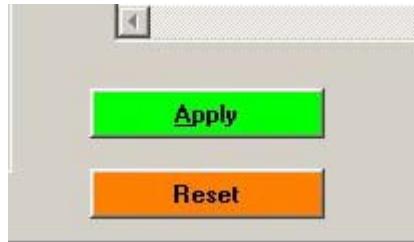
[DeviceId] > add a DEVICEID symbol as a placeholder for the pre-decoded data supplied by the handler

5. Set out the data in the right-hand portion of the screen or enter it in the separate window.

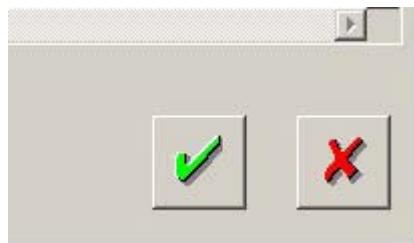
(A separate input dialog comes up when pressing the buttons [ASC] or [text].)



6. Complete the string by adding more variables (e.g. "<Text3>"), texts, NewLines etc.  
 (When adding variables, select one from the list on the left first.)
  
7. Click [Apply] to finish a string definition, or click [Reset] to abort a definition altogether.
8. Repeat steps 2 to 7 for more string definitions, if necessary.



9. Click [OK - SAVE] to finally accept all definitions.  
 ([OK] and [CANCEL] close the format wizard return to the main window)



The button [undo last entry] at the bottom of the toolbar successively deletes improper string elements: on each click, the rearmost entry is removed.

The button [CANCEL] at the bottom right discards all string definitions made so far.

## 4.17 Enable Assigning Data from an External Data File



To use Data Extern, it is necessary to define input variables that get their values from an external data source (TXT or SEQ file).

1. Select Options > Settings.
2. Enter the password.
3. Click [OK].
4. Select the tab “Definition of Input Variables”.
5. Click the field “Data\_Extern” of a chosen Input Variable.
6. Click the browse button [...]. (or double-click the “Data\_Extern” field to bypass [...])

**Result:** The dialog for marking variables “EXTERN” appears.

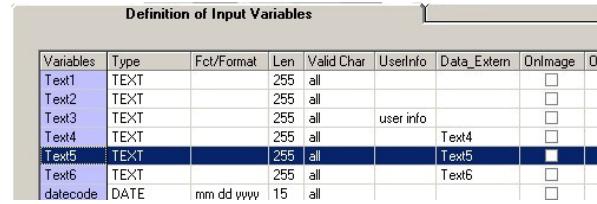
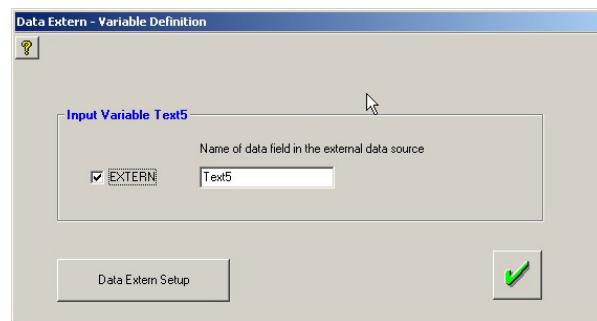
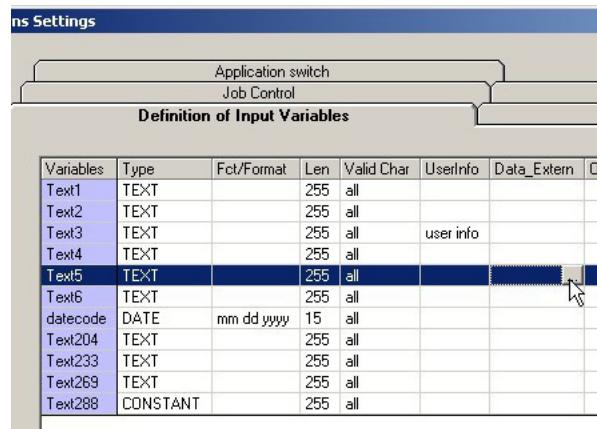
7. Activate checkbox “EXTERN”.

As a proposal the variable’s name is entered in “Name of data field in the external source”.

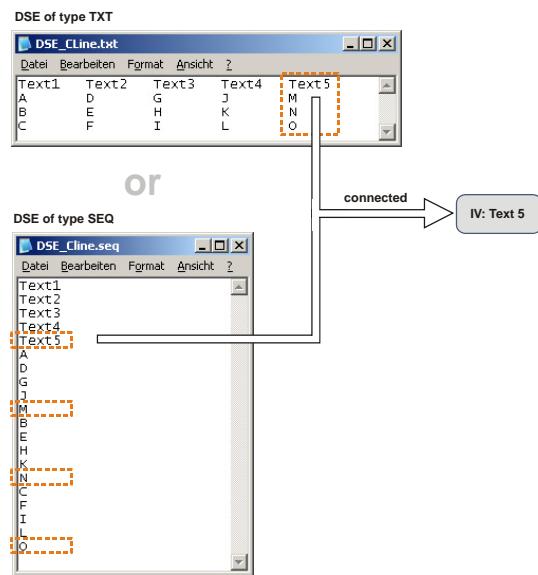
8. Change that name, if necessary. (The entry must resemble a DSE control data field name.)

9. Repeat steps 5 to 8 for every Input Variable that shall receive input from a DSE data field.

10. Click OK – SAVE.

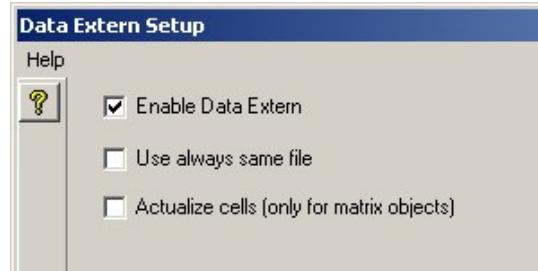


**Result:**  
Selected variables are ready for DSE input.



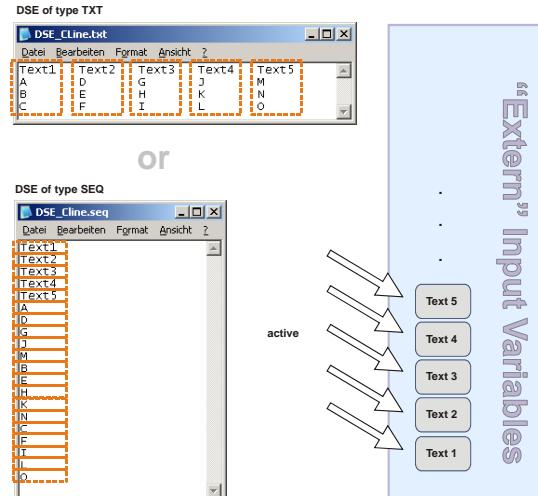
To be able to assign external data to the input variables, VMC2 needs to be configured for Data Extern.

1. Select Options > Data Extern > Setup.
2. Activate “Enable Data Extern” in the top left corner of the “Data Extern Setup” window.



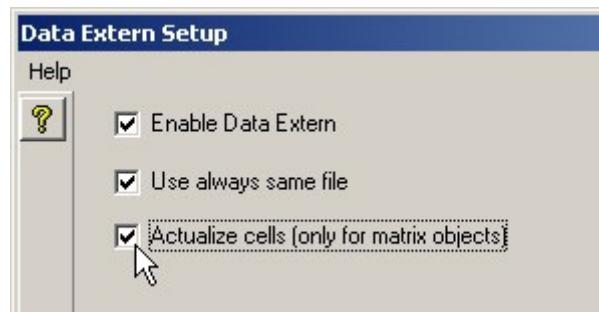
**Result:**  
Variables that are marked as “EXTERN” become functional with DSE input.

(If disabled,  
the marking of variables as  
“EXTERN” will have no impact.)

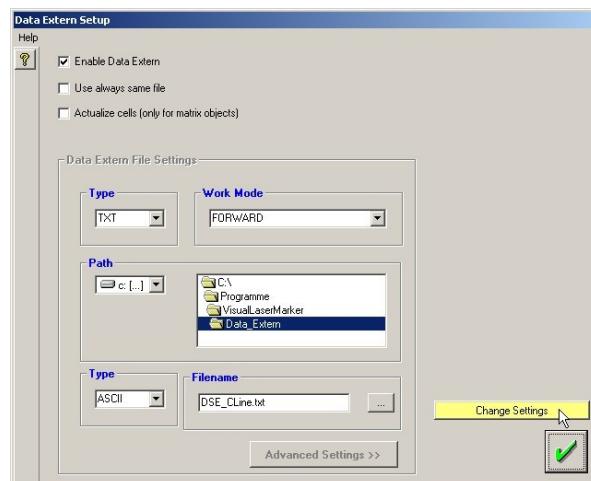


Enable these options, if needed:

3. “Use always same file”:  
**Result:** tells VMC2 not to prompt for a DSE file name each time a layout is loaded.
4. “Actualize cells (only for matrix objects)”:  
**Result:** assigns a separate value to each cell in a matrix.
5. Click on [Change Settings] to unlock the “Data Extern File Settings” pane.  
 The button label changes to [OK].



6. Select the DSE file type “Type”: TXT or SEQ.
7. Select a drive in the “Path” drop-down menu.
8. Select a folder.
9. Select an encoding scheme “Type”: UNICODE or ASCII
10. Click [...]
11. Select a file from the file system.
12. Click [Open].



13. Click [Advanced Settings >>] to define control line and piece count settings.

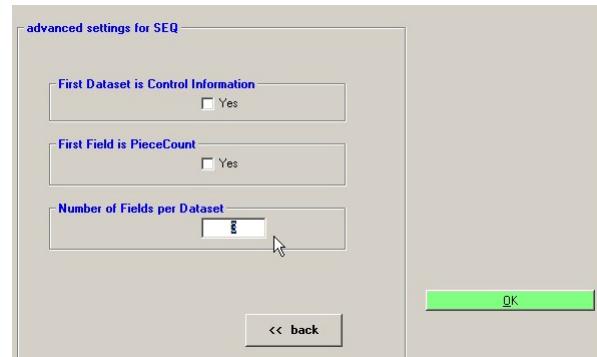
#### For TXT files:

14. Activate “First Line is Control Line” if the first line is supposed to be used as column header.
15. Deactivate “First Line is Control Line” if there is a PieceCount and/or the first line shall include marking data.
16. Activate “First Column is PieceCount” to use this option.

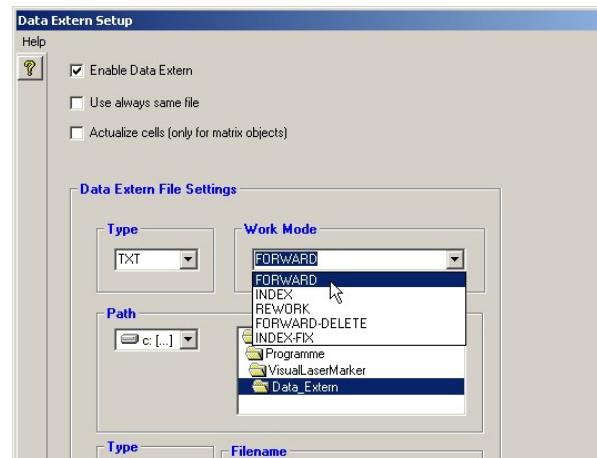


**For SEQ files:**

17. Activate “First Dataset is Control Information”, if applicable.  
If activated, the PieceCount becomes unavailable.
18. Activate “First Field is PieceCount” to enable Piece Count.
19. Type in the “Number of fields per Dataset” according to the data set length.  
If PieceCount is enabled, make sure to keep the extra data field in mind.
20. Click [<< Back].
21. Click [OK].



22. Select the appropriate “Work Mode” from the drop-down list.  
The work modes INDEX, FORWARD-DELETE and INDEX-FIX do not work with SEQ files.



23. Click OK – SAVE.

» For further information on Data Extern, refer to section 2.7.

## 4.18 Change the VMC2 Language



**It is possible to change the language used in the VMC2 GUI.**



1. Select Options > Language.
2. Select the language.
3. Click OK – SAVE.
4. Restart VMC2.



**It is also possible to set up VMC2 to use a language that is not part of the standard delivery.**

**It is necessary to define a language file for the customized language. The file needs to be a tab-delimited text file (created with any text editor or Excel). The first column of the text file contains ID numbers, which are referenced from VMC2. The second column contains the translation.**

1. Copy the default language file \VisualLaserMarker\System\VMC2Languages.xls and rename it, for example, to VMC2Custom.xls.
2. Replace the text of the second column (English) with the translation.  
The first two columns (IDs and first text column) must remain in the file. The other columns can be deleted.
3. Save the file.
4. Select Options > Language.
5. Select “User defined”  
The button [...] is enabled.
6. Click on [...].
7. Select the user-defined language file from the file system.
8. Click [Open].
9. Click OK – SAVE.
10. Restart VMC2.





If VMC2 cannot find the appropriate entry in the custom file, the english text from the default language file is used.

## 4.19 Customize the User Interface

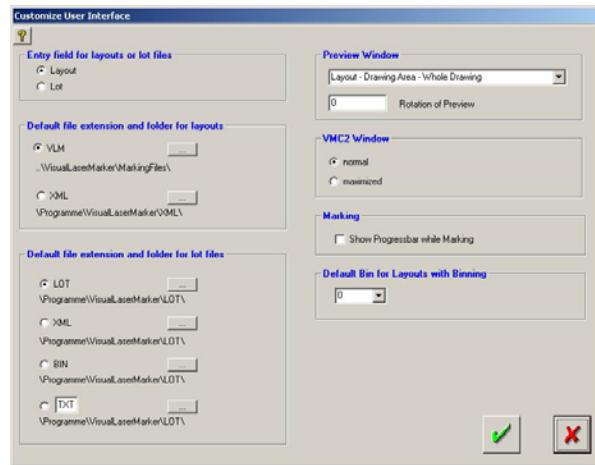


**It is possible to customize some sections in the user interface.**

1. Select View > Customize...
2. Select an entry field.

If the option “Layout” is selected, the entry field is a combobox, which lists all the files of the default path set via the option Default file extension and folder for layouts.

If the option “Lot” is selected, the entry field is a textbox for the input of a lotname or lot ID. The input is completed with the extension and path of the settings in “Default file extension and folder for lot files”.



3. Select the file extension for layout files.
4. Click on the button [...] next to the selected file extension.
5. Choose a default folder from the file system.
6. Click [Open].
7. Select the file extension for lot files.
8. Click on the button [...] next to the selected file extension.
9. Choose a default folder from the file system.
10. Select the default preview window from the drop-down box.
11. Enter a number in the field “Rotation of Preview” if preview is to be rotated by a certain angle.
12. Select whether VMC2 should start with a normal-sized window or in full-screen mode.
13. Activate “Show Progressbar while Marking” if progress of a marking process should be visible in the main window.
14. Select a default bin number for layout selection from the drop-down menu.

15. Click OK – SAVE.





The default file and folder settings are used when layouts or lots are loaded via remote control.

If the layout or lot is specified without extension or without path, the default settings defined under View>Customize are added.

For example:

- EntryField is configured for Lot
- Default lot extension is TXT
- Default path for \*.txt files is ..\VisualLaserMarker\LOT
- operator types in A123

VMC2 looks for the lot file ..\VisualLaserMarker\LOT\A123.TXT

## 4.20 Add a Button to the User Interface to Switch to Another Application

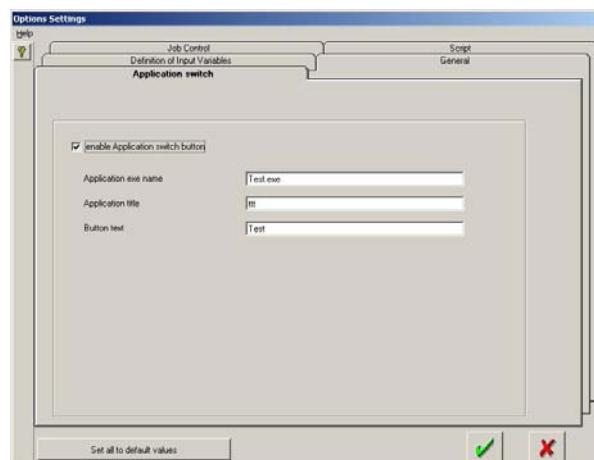


You can add a button to the user interface that lets you switch to another application.

Clicking on the button switches to but does not start the application. Therefore, the application must already be running.

1. Select Options>Settings.
2. Enter the password.
3. Click [OK].
4. Select the tab “Application switch”.

5. Check the checkbox “enable Application switch button”. The fields to enter the application data are shown.
6. Enter the file name for the application.
7. Enter the application title.
8. Enter the text that is supposed to appear on the application button in the user interface.
9. Click OK - SAVE.



The result is a new button in the user interface. It appears next to the Status-/Error-Report and below the cycle counter.

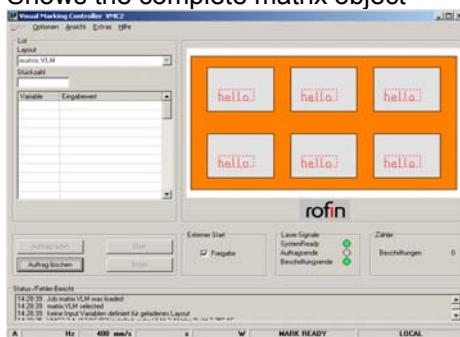
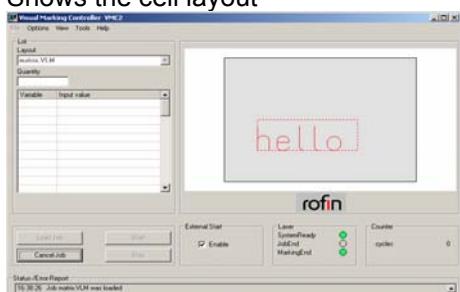


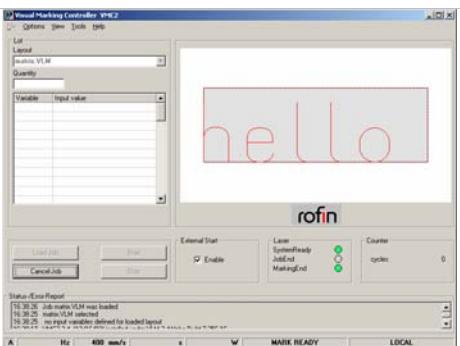
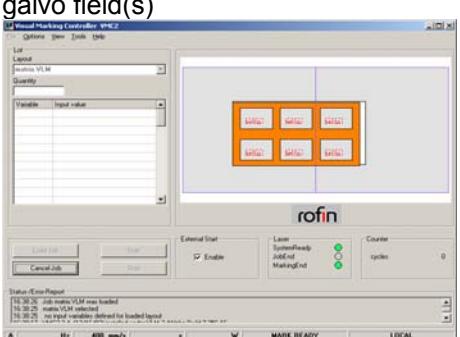
## 4.21 Change View for the Preview Window



There are several different views that can be displayed in the preview window.

1. Select View>Layout  
or  
Right-click in the preview window and select Layout.
2. Choose the layout view.  
The table below explains the different possibilities.

View Selection	Description / Result
Drawing Area > Whole Drawing	<p>Shows the complete matrix object</p> 
Drawing Area > Cell View	<p>Shows the cell layout</p> 
Drawing Area > Cell Zoomed	<p>Zooms the objects of the cell layout</p>

	
Marking Area	Shows the placement of the layout within the galvo field(s)
DrawCellOccupation	 <p>Only enabled with MJC host communication          Shows the occupation of the cells after an OCC command (occupation command) has been sent</p>
Show-Bin	 <p>Only enabled if layout contains a matrix with bin layouts          Shows the matrix with the selected bin layout</p>

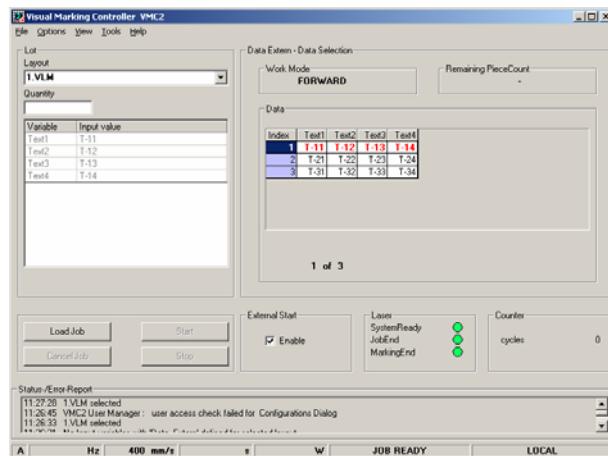
## 4.22 View External Data in the Layout Display



**It is possible to display the external data in a data table in the preview window.**

1. Select View>Data Extern
- or
- Right-click in the preview window and select Data Extern.

**Result:**  
 The external data is displayed in the preview window.



» For further information on Data Extern, refer to 2.7.

## 4.23 Update the Preview Window



**There are two differnt ways to update the preview window.**

1. Select View>Redraw Layout F12
- or
- Press [F12].

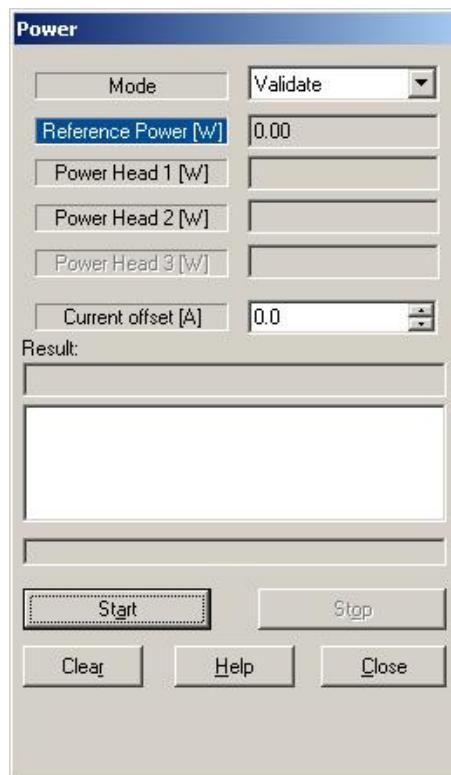
## 4.24 Display Power Measurement



**It is possible to validate or regulate the power measurement.**

1. Select Tools>Power  
The Power window appears.

2. Select "Validate" or "Regulate" from the drop-down list.
3. Click [Start] to start validation or regulation.  
  
Power measurement may take up to 90 seconds. Click [Stop] to abort.
4. Click [Close] to close power measurement.



## 4.25 Start or Stop Position Help



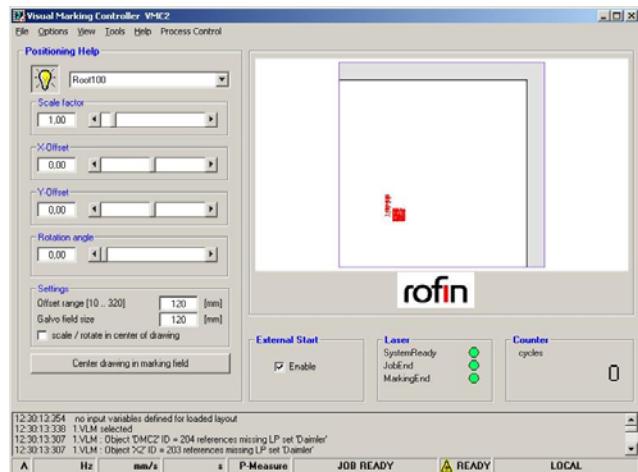
**Position help shows the size and position of the marking objects. A rectangle including all objects is displayed. Position help is available as soon as a layout file has been loaded.**

1. Select Tools>PositionHelp  
or  
Press [F7]  
to turn position help on.

Result:

The main window changes.

2. Select an MO from the drop-down list.  
„root“ selects the whole drawing.
3. Make the appropriate changes in the other fields.
4. Select Tools>PositionHelp  
or  
Press [F7]  
to turn position help off.



## 4.26 Change Global Laser Parameters

The values of laser parameters can be changed in VMC2. New laser parameters can only be added in the VLM software.



The menu entry and the OK button (to save changes) can be password-protected via the User Manager.



If the VLM editor is opened while laser parameters are changed in VMC2, the changed values will not be applied.

**Caution**

Do not open the VLM editor while changing laser parameters in VMC2.

1. Select Tools>Global Laser Parameters  
or  
Press [F9]
- The window "Global Laser Parameter Settings" opens.

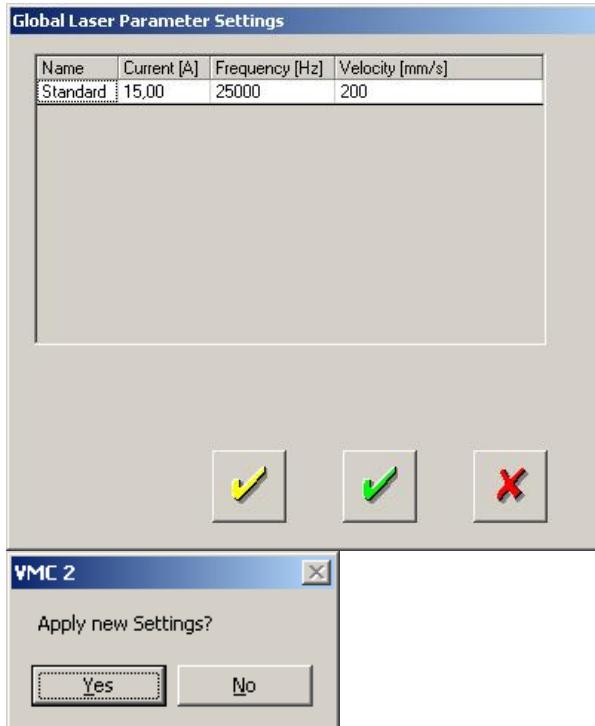
2. Click in the field that must be changed and type in the new value.
3. Click on the yellow arrow to apply the changes without closing the window.

Click on the red cross to close the window without saving the changes.

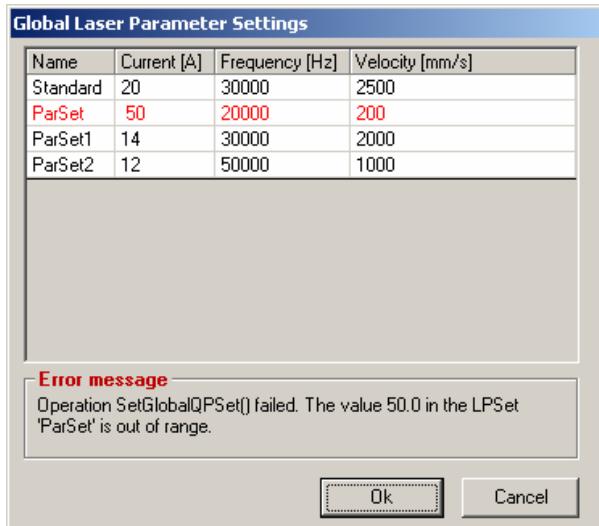
Click on the green arrow to apply the changes and close the window.  
In this case a new window appears:

4. Click [Yes] to apply the new settings.

Click [No] to abort.



If any values are out-of-range, the line is highlighted and an error message appears.



## 4.27 Configure Laser Output Signal



The operator can select an output signal which is set/reset according to the table below.

1. Select Tools>Laser  
The window "Laser Type Settings" opens.

2. Activate the checkbox "Enable".
3. Select a signal from the drop-down list.
4. Click OK – SAVE.



VMC2 Process State	SHG State	Shutter	Output Signal
MARKREADY, MARKING	INSTABLE	open	on
	WARMUP	closed	on
	STABLE	open	off
	CONSERVATION	closed	on

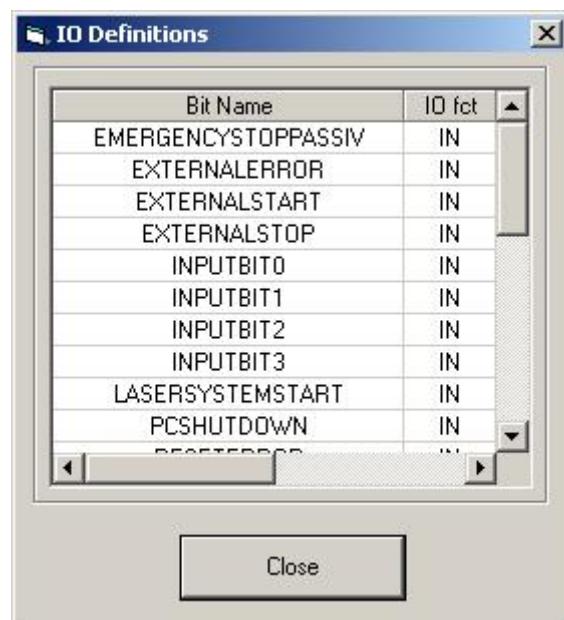
## 4.28 View IO Definitions



**It is possible to view IO definitions, but it is not possible to change them.**

1. Select Tools>IO definitions  
The window “IO Definitions” opens.

2. Click [Close].



## 4.29 Monitor Operation Hours



**It is possible to monitor the operation hours. This feature can be activated in the Tools menu. The table below describes the color-coding.**

1. Select Tools>ActivateOHM.  
or  
Press [Ctrl] + [O].
2. Enter the password.
3. Click [OK].

**Result:**  
The field “OPHOURS” is displayed below the preview window.



VMC2 checks the values on startup and when no job is loaded. A running lot is not terminated.

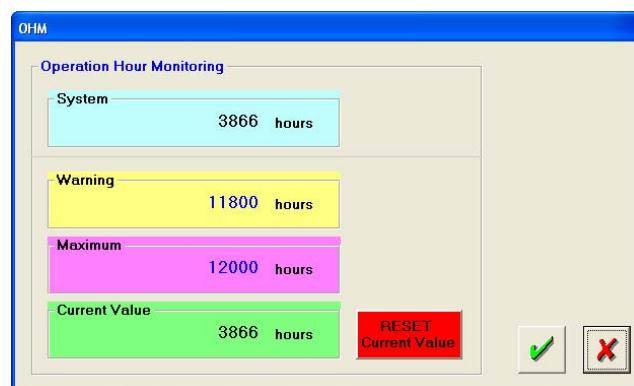
Color	Description
Green	No limit has been reached Further lots can be started.
Yellow	Limit for “Warning” has been reached Further lots can be started.
Red	Limit for “Maximum” has been reached No more lots can be started. The operator must either reset the current value or change the value for “Maximum” to continue.

If the limit for “Maximum” has been reached, the operator must either reset the current value or change the value for “Maximum”.

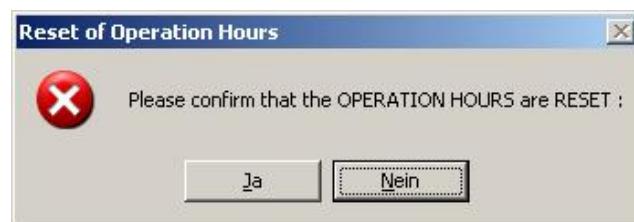


It is also possible to only view the limits without changing them via Tools > OHM > Display.

1. Select Tools > OHM > Change.
2. Enter the password.
3. Click [OK].  
The window “OHM” opens.
4. Click in the field “Warning” to change the limit.
5. Enter the amount of hours after which the OHM field should change to yellow (Warning).
6. Click in the field “Maximum” to change the limit.
7. Enter the amount of hours after which the OHM field should change to red (Maximum). No more lots can be started after this limit has been reached.
8. Click on [RESET Current Value] to reset the working hours.



9. Click on [Yes] to confirm the reset



10. Click OK – SAVE.



The defined values for “Warning” and “Maximum” have no effect on the internal system operation hours.

## 4.30 Open Online Help



**There are several ways to open online help. The help file is installed during software installation.**

1. Select Help>Contents
- or
- Press [F1]
- or
- Select Help>Search for Help On...

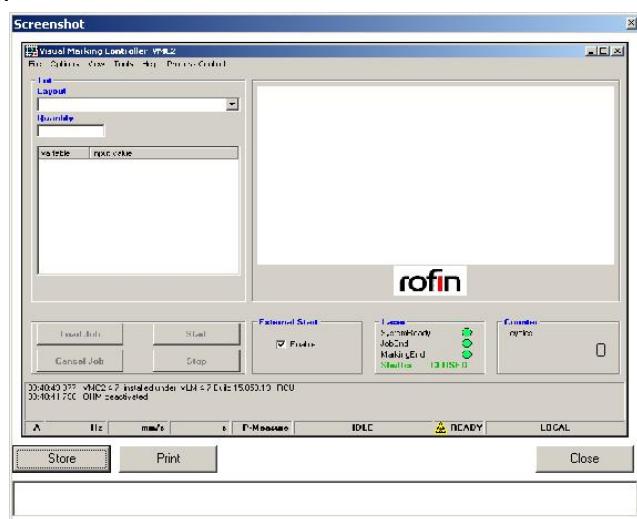
## 4.31 Make a Screenshot



**The VMC2 software provides a menu to make a screenshot of the current VMC2 window. This might be helpful when contacting Rofin support in case of problems.**

1. Select Help>Make Screenshot
  - or
  - Press [STRG] + [F1]
- The window "Screenshot" opens.

2. Click [Store]  
to save the screenshot in the file system.
3. Select a folder.
4. Enter a file name.
5. Click [Save].
6. Click [Print]  
to send the screenshot to a printer.
7. Click [Close]  
to close the screenshot.



## 4.32 Get Information on Software Version



The VMC2 software provides a menu to view the current VMC2 and VLM version and build number. This might be helpful when contacting Rofin support in case of problems.

1. Select Help>About  
The window “About VMC2“ opens.



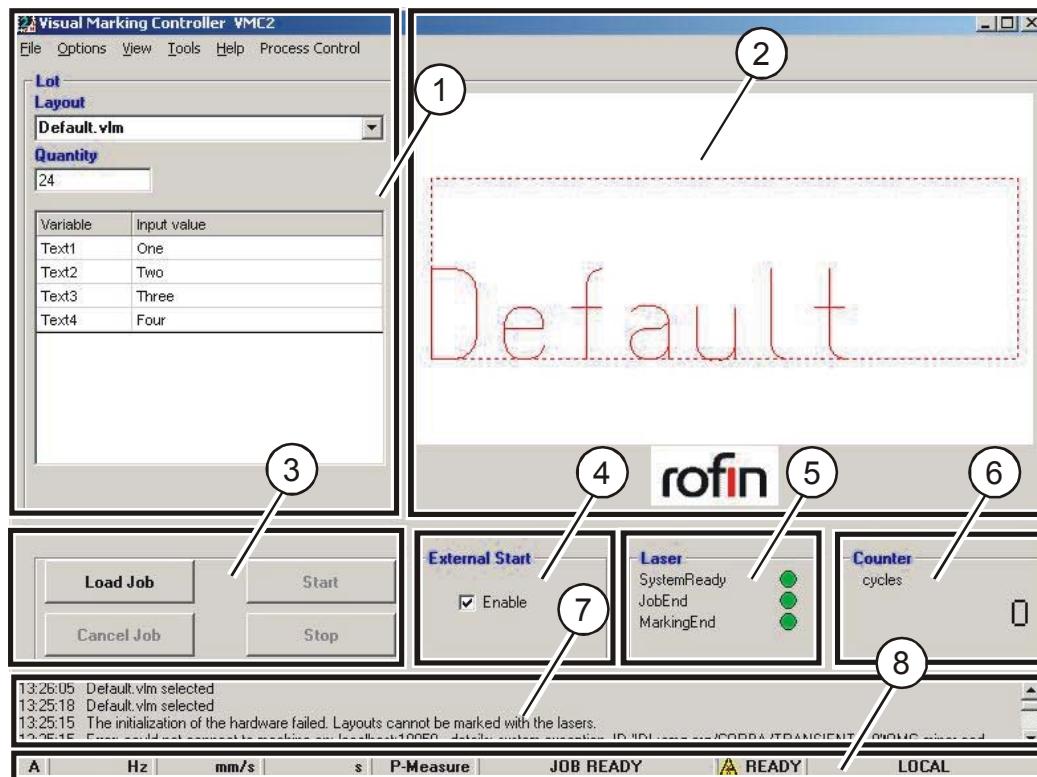
## 5 Software Use

This chapter contains the procedures to be carried out by the operator. The chapter is available in various different languages as stand-alone documents.

### 5.1 Main Window

Click on Start > VisualLaserMarker > Production Tools > VMC2 to start the application.

The main window appears:



(1)	<b>Data display</b> Entry field / drop-down box for layout Entry field for amount of parts to be marked Display field for input variables
(2)	<b>Layout display</b> The preview window shows the currently selected layout. It is available after layout selection.
(3)	<b>Command buttons</b> Load Job: Loads the currently selected layout and data for the marking process Cancel Job: Cancels the job that is currently loaded Start: Starts the marking process Stop: Stops the marking process

(4)	<b>External Start</b> Check box that allows enabling or disabling the External Start
(5)	<b>Laser status display</b> SystemReady JobEnd MarkingEnd
(6)	<b>Counter Marking Cycles</b> Counts and displays the number of markings since the last time a job has been loaded.
(7)	<b>Status-/Error Report</b> Displays information and error messages for system status and status of the marking process. Status messages can be saved in a log file.
(8)	<b>Status line</b> Shows current laser parameters (current, frequency, speed), the last measured reference power, the execution time, the current process state, and the connection state of host communication.

## 5.2 Marking Process

To mark pieces, the operator needs to:

- Select layout
- Change values of input variables
- Enter the quantity of pieces to be marked
- Load the job
- Start marking



If the software is configured for remote input via Secs / GEM or MJC or if it is configured for Control via Handling, the marking process is usually carried out automatically without any user interaction in the VMC2 GUI. Therefore, the following sections only describe the necessary steps in the configuration “local input“.

» *For further information and documentation on the Secs / GEM configuration and interface, contact your sales department. For further information on remote input via MJC, refer to section 2.3. For further information on Control via Handling, refer to section 2.2.4.*

### 5.2.1 Select Layout



If “**Select layout file automatically after start**“ in Options > Settings > Job Control is enabled, the last layout that has been used is automatically selected as soon as the application is started.

If “**Automatic job/lot file (Polling)**“ is enabled in Options > Settings > Job Control or via File > Enable AutoJob (Strg+F2), the application loads the layout defined in the lot file.



**Manually select a layout file via the file menu or the drop-down box in the main window.**



**Select a lot file that contains the information on the layout file.**

1. Select File > LOT-File...
2. Select a lot file from the file system.
3. Click [Open].  
The layout is displayed in the preview window.





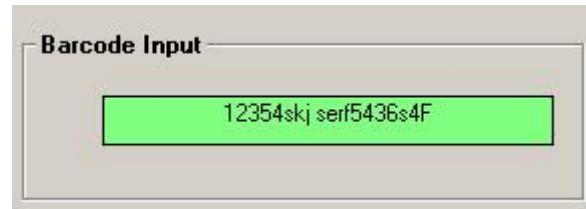
**Poll for a lot file.** “Automatic job/lot file (Polling)“ must be enabled in Options > Settings > Job Control and “on Request“ must be enabled.

1. Select File > AutoJob Request  
or  
Press [F2].  
The layout is displayed in the preview window.



**If the software is configured for local input in barcode mode, scan in the barcode that contains the information on the layout file to be selected.**

1. Scan the barcode.  
The barcode is displayed in the main window.  
The layout is displayed in the preview window.



## 5.2.2 Change Values of Input Variables



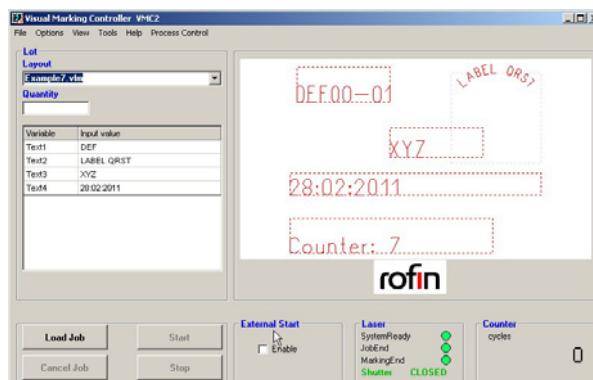
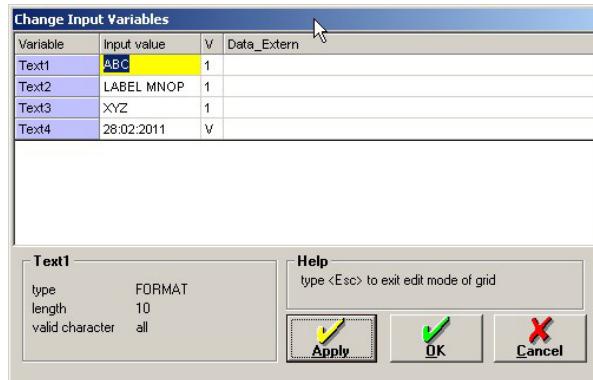
If a lot file has been selected for the marking process, this file also includes information on the values for input variables. In this case, the values are modified automatically.

If input variables are defined as "Data Extern", the values for these variables are taken automatically from the external data source. Therefor these variables cannot be changed.



**The frame to manually modify input variables opens automatically after a layout has been selected. It is also possible to open this frame again later on by double-clicking the field for the variable display in the main window. Depending on the definition of the input variables, the operator may have to enter the values twice and/or in reverse order.**

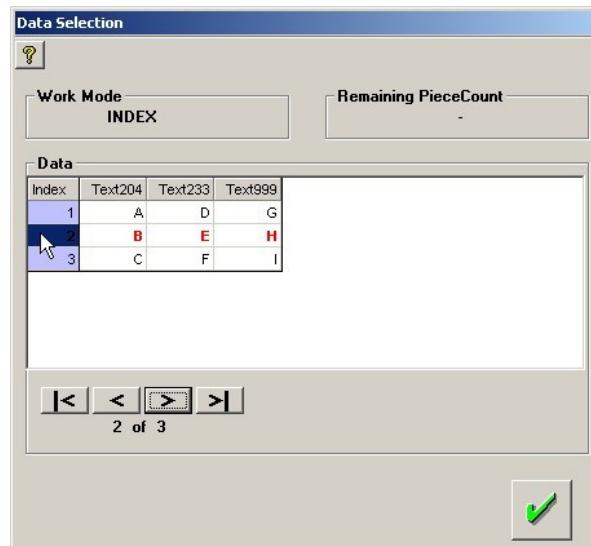
1. Select a variable while observing its properties in the bottom left pane of the window.
2. Enter new input data as required either via keyboard or barcode reader.
3. Click [Apply] to submit the new entry for the variable.
4. Repeat steps 1 to 3 for other variables.
5. Click [OK - SAVE] to finally accept the changes. The values are displayed in the variable display and the layout preview.
6. Revisit your adjustments in the data display and layout preview.
7. If necessary, call up the input frame again and re-edit (steps 1 to 7).





After the values for input variables have been modified, the input variables defined as Data Extern are displayed either in the main window (View > Data Extern) or in a separate VMC2 window (Options > Data Extern > Data Selection). If the work mode for these variables is INDEX or INDEX FIX, it is possible to select which data set is supposed to be used as the first (work mode INDEX) or only (work mode INDEX-FIX) data set for the marking process.

1. Select Options > Data Extern > Data Selection  
or  
View > Data Extern.  
The window "Data Selection" opens or is displayed in the preview window.
2. Click the index number on the table display  
or  
use [<] or [>] to set the new pointer.  
The data set getting red will be used as first (work mode INDEX) or only (work mode INDEX-FIX) data set.
3. Click OK – SAVE.



### 5.2.3 Enter Quantity



If a lot file has been selected for the marking process, the quantity of pieces to be marked, is filled in automatically out of the lot file.

If "Quantity Required" is disabled under Options > Settings > Job Control, this field can be left empty. Then, the marking of pieces continues until the process is stopped (for example, by clicking on the [Stop] button).

1. Enter the amount of pieces to be marked in the field "Quantity".

<b>Quantity</b>
50

### 5.2.4 Load Job



If the option “LoadJob automatically after file selection“ is enabled under Options > Settings > Job Control, the LoadJob command is automatically executed after a valid layout file has been loaded.

1. Click [Load Job]  
or  
Select ProcessControl > Load Job  
or  
Press [Shift+F1].  
or  
Scan the respective barcode command.  
The buttons [Start] and [Cancel Job] are enabled.



### 5.2.5 Edit Mode



**Edit Mode is only available if MJC in local mode is activated**

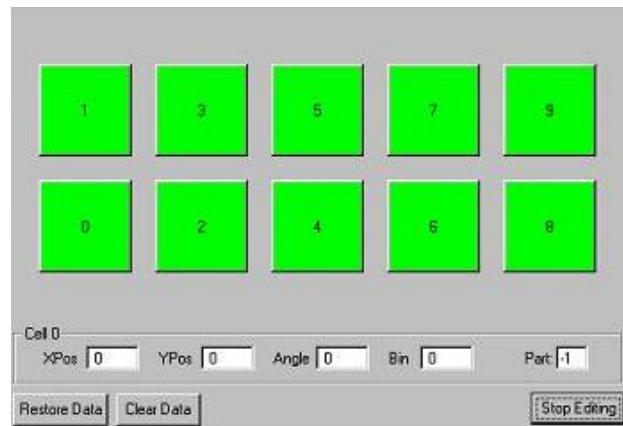
The Edit Mode allows setting occupation, binning and position data for testing.

The [Edit Mode] button is visible in the main window as soon as a job has been loaded.

1. Click [Edit Mode]
2. Enter the password.
3. Click [OK].
4. Click in the fields to change the occupation data.

Green: occupied  
Grey: not occupied  
Disabled: cell is not in the active part

5. Enter values for XPos, YPos, or Angle to change the position data for a given cell.



6. Enter a value for Bin to change the bin data for a given cell.

7. Enter a partnumber in the field "Part" to activate another part.
8. Click on [Restore Data] to restore the data from the last marking process.
9. Click on [Clear Data] to set all cells to unoccupied and reset all binning data and position data.
10. Click on [Stop Editing] to leave the Edit Mode.

## 5.2.6 Start Marking



If “External Start“ is enabled, the marking process is started automatically after a job has been loaded (for example, by the handling system).

1. Click [Start]  
or  
Select ProcessControl > Start  
or  
Press [Shift+F3].  
or  
Scan the respective barcode command.  
The button [Stop] is enabled.



## 6 Troubleshooting

### 6.1 Error Codes

The following table lists error codes of the VMC2 software.

Error Code	Description
1	JOB_PROCESSING_ERROR for system errors
999	ALARM_AUTOMATIC for customized alarm handling
1000	GENERAL_ERROR general error
1100	VLM_ERROR alarms generated from VLMActX
1002	NO_VALID_MARKINGFILE
1003	VLM_FILE_NOT_FOUND
1004	LOAD_JOB_FAILED
1005	CANCEL_JOB_FAILED
1006	POWER_ERROR
1009	START_MARKING_FAILED
1010	STOP_MARKING_FAILED
1011	LAYOUT_ABORTED
1012	LAYOUT_NOT_CORRECT
1013	LAYOUT_STOPPED
1015	INVALID_STATE_TRANSITION
1017	AUTOTEACH_ERROR
1018	COULD_NOT_SELECT_BIN
1019	NO_MATRIX1
1020	BINLAYOUT_ERROR dynamic binning
1022	PIO_LAYOUT_BIT_LIST
1023	PIO_DATA_SOURCE
1600	PROCSTATE_ERROR
1700	INPUTVAR_ERROR
1701	MO_NOT_DEFINED_AS_INPUT_VAR
1800	DSE_ERROR
1810	JOB_ERROR
1820	LANGUAGE_ERROR
1900	BARCODE_INPUT_ERROR
1910	BARCODE_SETTINGS_ERROR
2000	ACTIVE_GEM_ERROR = 2000 general
2001	ACTIVE_GEM_S14F1NotAck ' S14F1
2002	ACTIVE_GEM_S14F1StripIDError
2003	ACTIVE_GEM_S14F1OrlocError
2004	ACTIVE_GEM_S14F1OrlocWrong
2005	ACTIVE_GEM_S14F1RowCount
2006	ACTIVE_GEM_S14F1ColCount
2007	ACTIVE_GEM_S14F1MarkGradeError
2008	ACTIVE_GEM_S14F1MarkGradeWrong
3000	ACTIVE_PIO_ERROR

Error Code	Description
4000	ACTIVE_BINMAP_ERROR
5000	LOTFILE_DATA_ERROR
6000	MJC_ERROR
7000	TCP_ERROR

Other error codes refer to system or 3rd party component errors.