# Automotive Data Dictionary

## ADD MATLAB – Services v11.3.R0

November 13th 2015

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# Contents

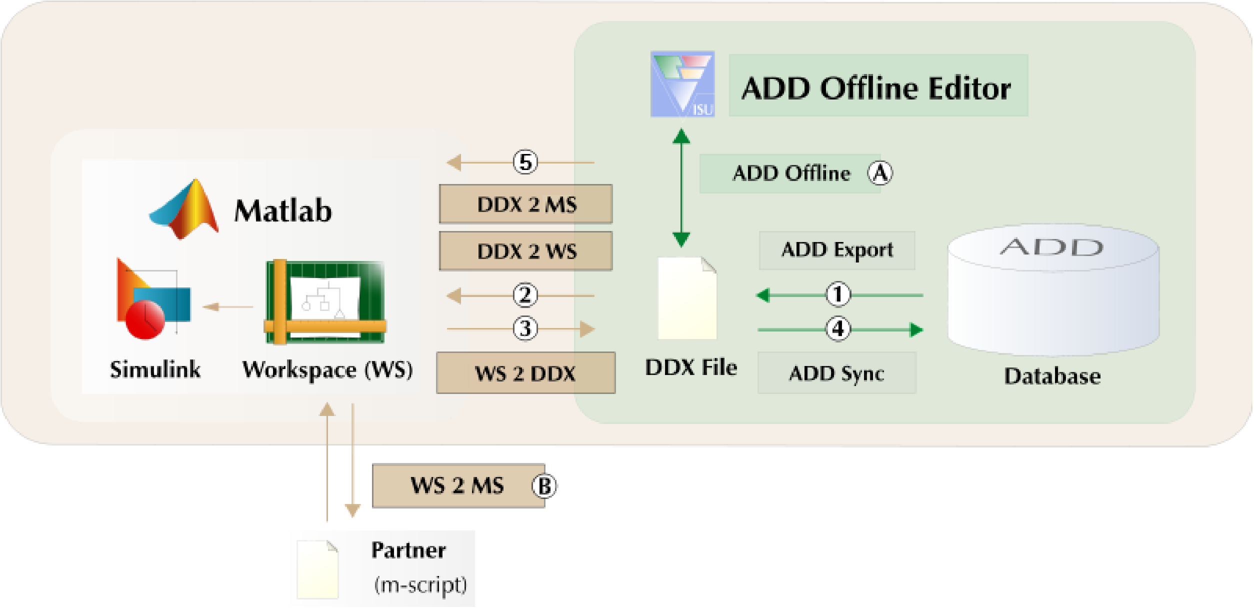
# 1 MATLAB Services

The task of “MATLAB Services” is to interlace “ADD Offline Editor” with MATLAB Workspace (WS). The lynchpin between the two systems is represented by a ddx – file. This file could be transfused to ADD Database via “ADD Sync” (cf. ④). More information’s about the synchronization tool are available on the “ADD Tool” Help section.

To create a ddx – file out of MATLAB the “ADD Export” must be used. This export is represented in MATLAB by the function “vitADD2MATLAB ()” (cf. ①).

The services “vitDDX2WS” (cf. ②), “vitDDX2MS” (cf. ⑤) and “vitWS2DDX” (cf. ③) represent the gateway between ADD and MATLAB. Furthermore there is a service “vitWS2MS” (cf. Ⓑ) implemented which creates an executable MATLAB m – script according to the MATLAB WS and a service “vitADDOffline” (cf. Ⓐ) that grand access to the ADD Offline Editor.

**Hint:** Services “vitDDX2WS”, “vitDDX2MS” & “vitWS2DDX” are able to read/write special container files (‘VIT_Ignore_for_ADDS.ddx’) automatically. In order to write WS variables (“vitWS2DDX”) into a special container file, the ‘ignore_for_adds’-attribute of each variable has to be set to value ‘1’.
Service “vitDDX2WS” will read the spec. container file ‘VIT_Ignore_for_ADDS.ddx’ automatically, if it’s located in the same directory as your selected ddx – file.



① ADD Export: vitADD2MATLAB();
③ WS 2 DDX: vitWS2DDX();
Ⓑ WS 2 MS: vitWS2MS();

② DDX 2 WS: vitDDX2WS();
⑤ DDX 2 MS: vitDDX2MS();
Ⓐ ADD Offline: vitADDOffline();

There is also the possibility to create an empty ddx-file using service “vitADDCreateNewContainer”.

Last but not least there are two more services (“vitDDXvsWS” & “vitCheckMultipleNames”) implemented, designed as check-up functions.
Service “vitCheckMultipleNames” verify the content of given MATLAB WS to make sure that no multiple variable names of struct member could be found. Whereas service “vitDDXvsWS” compares a given MATLAB WS to a ddx-file specified.

In order to use the services it is necessary to create a WS structure array called "adds". This "struct" has to include the fields "ddxfile", "mScript", "prefix" and "verbose".

At this junction the structure field

- "ddxfile" represents the absolute address of the ddx – file.
  MATLAB data type: char array
- "mScript" represents the absolute address of the MATLAB m – script
  (only used by service "vitWS2MS") .
  MATLAB data type: char array
- "prefix" represents the prefix of the MATLAB WS variables which will be created or transferred.
  MATLAB data type: char array
- "verbose" represents a flag to omit or allow progress messages.
  MATLAB data type: double array; Values: 0/1

Additional structure field:

- "add_environment" represents the name of the actual edited container or project.
  MATLAB data type: char array
- "pinfo" represents a flag to generate either plane datatype information (=1) or detailed datatype information (=0; create "datatype" and "conversion" structures!).
  MATLAB data type: double array; Values: 0/1

**Hint:** Service "vitWS2DDX/MS" will detected the datatype-information-level automatically!

Each service checks first of all the coherence of the "adds" – structure.
In case of a non existing structure field

- "adds.verbose" : Default will be generated and set to '0'.
- "adds.prefix" : Default will be generated and set to 'init_'.
- "adds.mScript" : Save dialog appears.
- "adds.ddxfile" : Open/Save dialog appears.

**Hint:** Service "vitADDCreateNewContainer" show up an "Overwrite File?" dialog in case of an already existing ddx – file.

"adds" example:

```
adds.ddxfile         = 'C:\Visu-IT!\ADD_Container.ddx'
adds.mScript         = 'C:\Visu-IT!\Interchange.m'
adds.prefix          = 'vit_'
adds.verbose         = 1
adds.add_environment = 'TEST 1.1.0'
```

All services got two return values which allow an interpretation of the service run. The result of the service run will be stored in the first return value as a logical value '1' or '0'.
At this '1' denotes a successful service run and '0' an aborted running. In case of an aborted running the second return value describes the occurred error.

**Hint:** A warning occurred during service run will return '1' and a not empty error string!

e.g.:

```
[result error_string] = vitDDX2WS();
               result = vitDDX2WS();
```

**Hint:** Most of the parameter values of the services are optional! If there is no parameter value declaration the respective default value will be used instead.

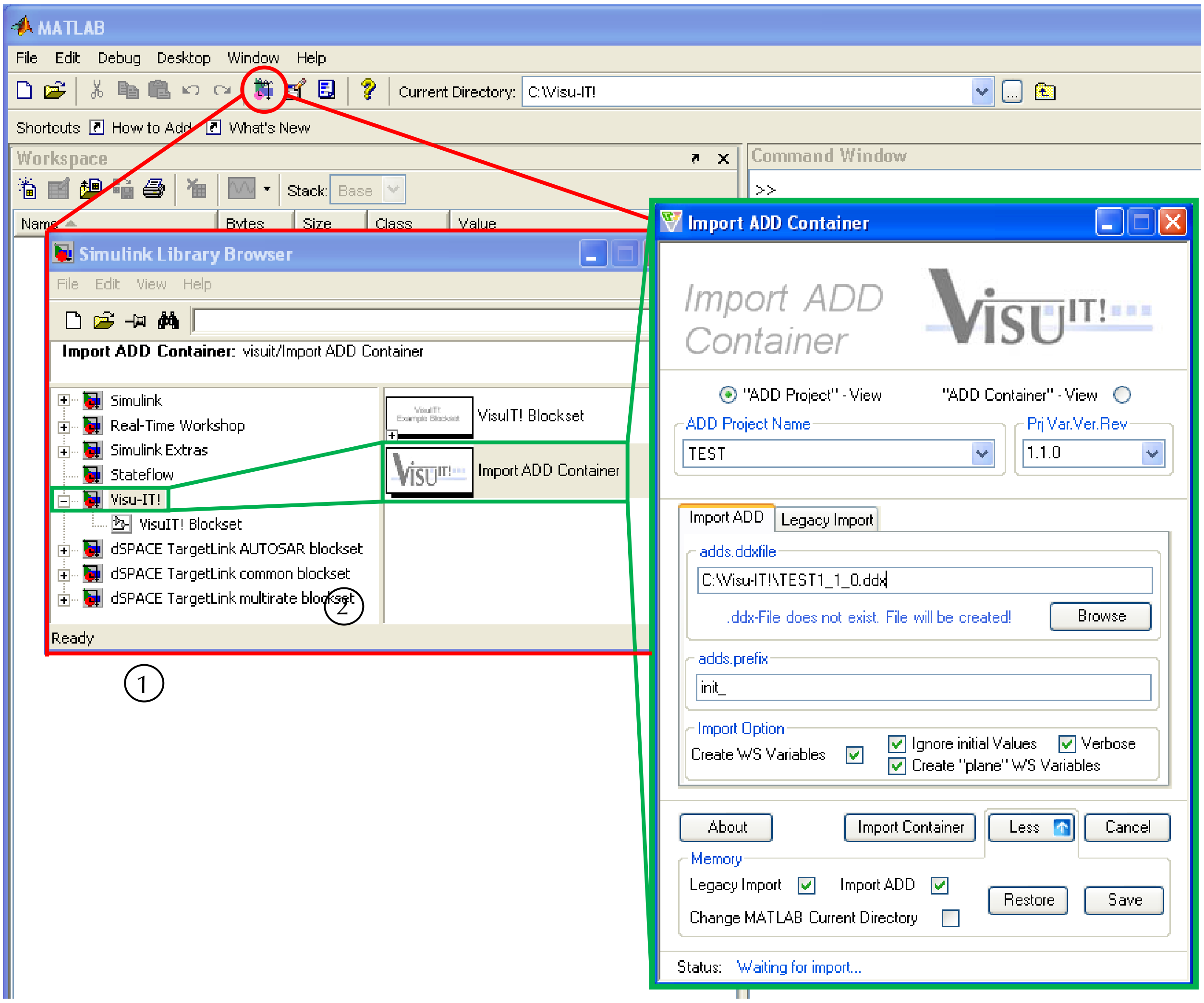
# 1.1 Service ① ADD Export

**Hint:**
This service is a component of ADD “Online”! In order to use this service it is necessary to install ADD Database.

The ADD to MATLAB – Interface is used to directly import an ADD Container into MATLAB Workspace. There are two different ways to open the interface.
On one hand the import mask could be started easily from MATLAB Command window on the other hand the interface could be opened by selecting the “Visu-IT!” - block in the MATLAB Simulink Library Browser.

## 1.1.1 How to start import mask

1. Open “Import ADD Container” using MATLAB Simulink Library Browser:



Current Directory: C:\Visu-IT!

Import ADD Container: visuit/Import ADD Container

● "ADD Project" - View ○ "ADD Container" - View

ADD Project Name: TEST

Prj Var.Ver.Rev: 1.1.0

adds.ddxfile: C:\Visu-IT!\TEST1_1_0.ddx

.ddx-File does not exist. File will be created!

adds.prefix: init_

Import Option

Create WS Variables ☑ ☑ Ignore initial Values ☑ Verbose ☑ Create "plane" WS Variables

Memory

Legacy Import ☑ Import ADD ☑

Change MATLAB Current Directory □

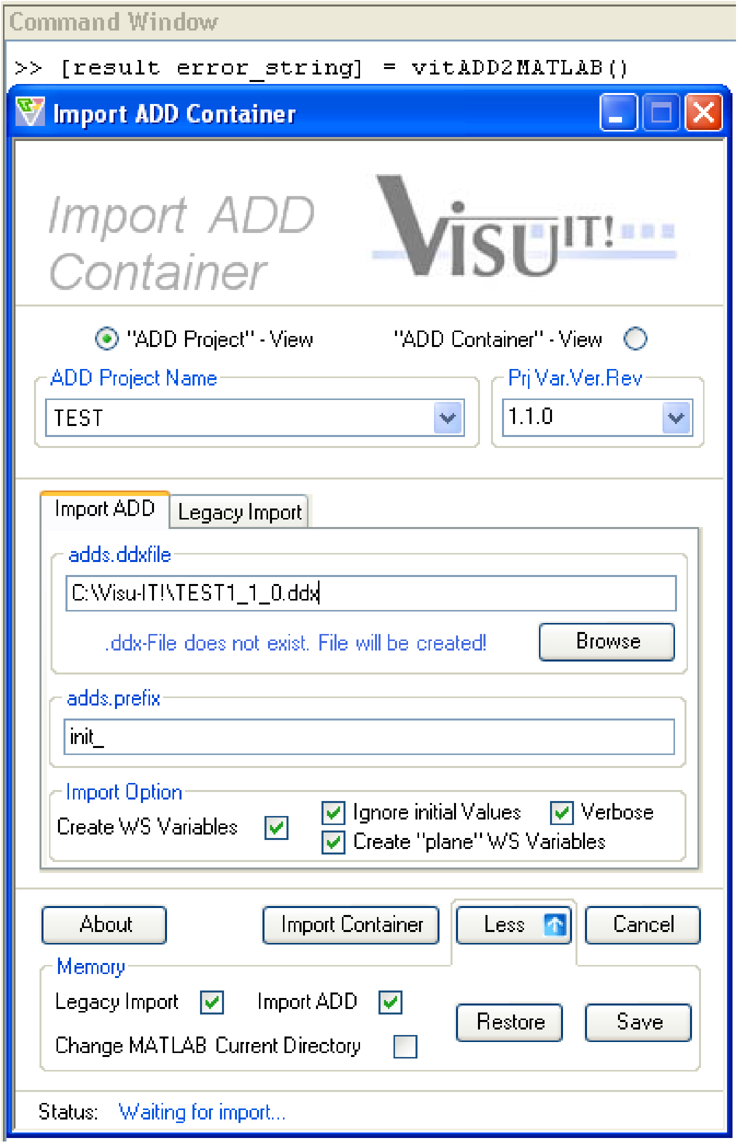
Status: Waiting for import...

After opening MATLAB Simulink Library Browser the “Visu-IT!” - block (cf. ①) must be selected.
By double clicking on the appearing “Import ADD Container” – block (cf. ②) the import mask will be automatically opened.

As a great benefit of this loading style the “Import ADD Container” – block can be handled as any other Simulink block. Hence “Drag & Drop” is possible.

2. Open “Import ADD Container” using MATLAB Command Window:

Service call: vitADD2MATLAB();



Command Window

```
>> [result error_string] = vitADD2MATLAB()
```

Import ADD Container

● "ADD Project" - View    "ADD Container" - View ○

ADD Project Name: TEST

Prj Var.Ver.Rev: 1.1.0

adds.ddxfile: C:\Visu-IT!\TEST1_1_0.ddx

.ddx-File does not exist. File will be created!

adds.prefix: init_

Import Option

Create WS Variables ☑

☑ Ignore initial Values

☑ Verbose

☑ Create "plane" WS Variables

Memory

Legacy Import ☑

Import ADD ☑

Change MATLAB Current Directory □

Status: Waiting for import...

In MATLAB Command Window type “vitADD2MATLAB()” to open import interface.
To check the quality of the started import it is necessary to define return values.

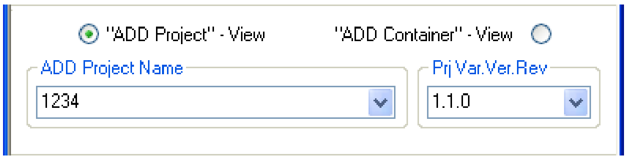
e.g.:

```
[result error_string] = vitADD2MATLAB();
                result = vitADD2MATLAB();
```

At this junction result denotes a successful (‘1’) or aborted (‘0’) import as a logical value. In case of an aborted run the char array error_string describes the error.

### 1.1.2 How to use import mask

Container/Project section:



● "ADD Project" - View    "ADD Container" - View ○

ADD Project Name: 1234

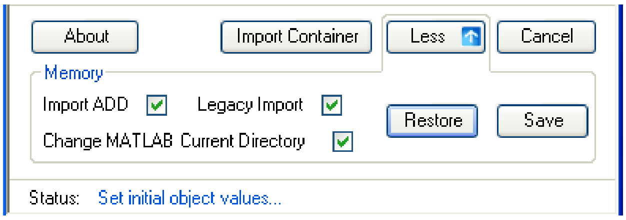
Prj Var.Ver.Rev: 1.1.0

The Container/Project – area provides an ADD container –respectively project list based on the ADD Database.

By selecting the "ADD Project" – View all available ADD projects will be listed in the "ADD Project Name" section. By switching to the "ADD Container"-View a list of those container who are linked to the selected project will be generated. By selecting the project "AllCnt", "ADD Container"-View will display all available containers.

Import style section:
"Import ADD" creates an ADD conform ddx – file. It is also possible to create MATLAB Workspace variables which can be used for "MATLAB Services" (see Import ADD).
"Legacy Import" creates a MATLAB m – script with an alternative variable structure (see Legacy Import).

Import and Memory section:
Button "Import Container" starts the ADD container import.



Memory

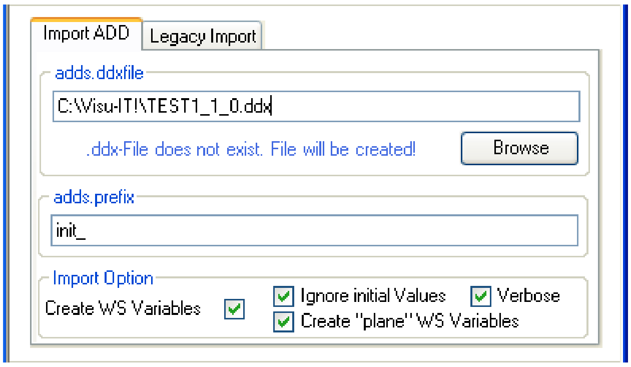
Import ADD ☑    Legacy Import ☑

Change MATLAB Current Directory ☑

Status: Set initial object values...

Button "More" expands the "Memory" – area.
By choosing the import style and apply with "Save" settings will be stored. To restore the saved settings press button "Restore".
Choosing the setting "Change MATLAB Current Directory" will change the MATLAB Current Directory to the selected file address assigned at "File Path" or "adds.ddxfile".

### 1.1.3 Import ADD



adds.ddxfile: C:\Visu-IT!\TEST1_1_0.ddx

.ddx-File does not exist. File will be created!

adds.prefix: init_

Import Option

Create WS Variables ☑    ☑ Ignore initial Values    ☑ Verbose

☑ Create "plane" WS Variables

DDX - File path section

MATALB variable prefix

Import mode

Import-Mode:

***"Create WS Variables":***
Generates appropriate MATLAB Workspace variables based on the generated ddx – file.

***"Ignore Init Values":*** Omit the allocation of variable values.

***"Create 'plane' WS Variables":*** Create additional MATLAB Workspace Variables which are containing the 'value' content of the appropriate Objects.

***"Verbose":*** Generate an appropriate MATLAB m – script.

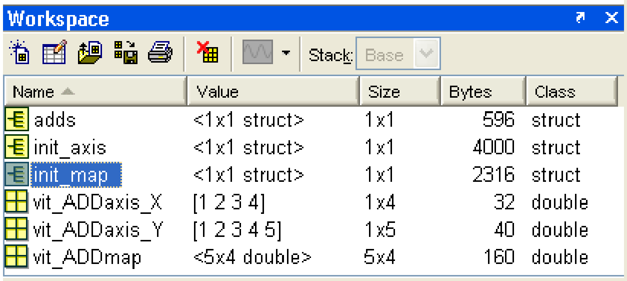
DDX - File path section:

Path and name of the ddx - file which has to be created.
Default path is MATLAB “Current Directory” or the value of the existing MATLAB Workspace variable “adds.ddxfile”.
Default name is the “SRS-Filename” of the selected ADD Container.

MATLAB variable prefix:

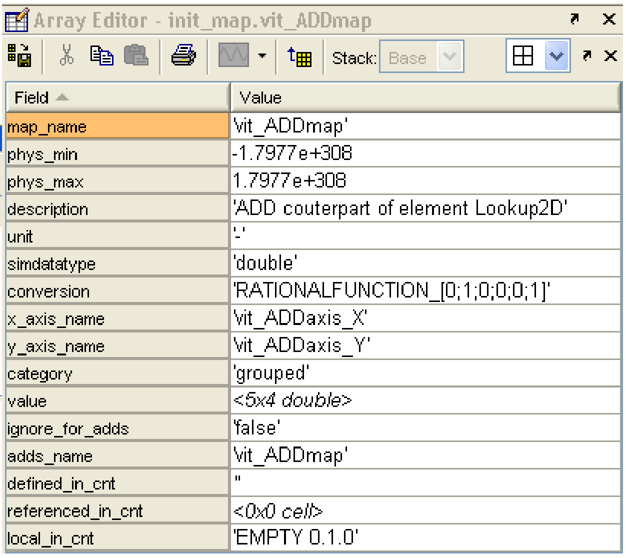
Prefix of the MATLAB WS variables which will be created. If there is no MATLAB Workspace variable “adds.prefix” assigned “init_” will be set as default.

*“Create WS Variables” amendment:*



Workspace

| Name | Value | Size | Bytes | Class |
|---|---|---|---|---|
| adds | <1x1 struct> | 1x1 | 596 | struct |
| init_axis | <1x1 struct> | 1x1 | 4000 | struct |
| init_map | <1x1 struct> | 1x1 | 2316 | struct |
| vit_ADDaxis_X | [1 2 3 4] | 1x4 | 32 | double |
| vit_ADDaxis_Y | [1 2 3 4 5] | 1x5 | 40 | double |
| vit_ADDmap | <5x4 double> | 5x4 | 160 | double |



Array Editor - init_map.vit_ADDmap

| Field | Value |
|---|---|
| map_name | 'vit_ADDmap' |
| phys_min | -1.7977e+308 |
| phys_max | 1.7977e+308 |
| description | 'ADD couterpart of element Lookup2D' |
| unit | '-' |
| simdatatype | 'double' |
| conversion | 'RATIONALFUNCTION_[0;1;0;0;0;1]' |
| x_axis_name | 'vit_ADDaxis_X' |
| y_axis_name | 'vit_ADDaxis_Y' |
| category | 'grouped' |
| value | <5x4 double> |
| ignore_for_adds | 'false' |
| adds_name | 'vit_ADDmap' |
| defined_in_cnt | '' |
| referenced_in_cnt | <0x0 cell> |
| local_in_cnt | 'EMPTY 0.1.0' |

Variable structure:
<Prefix><Objekttyp>.<Objektattribute>

- Prefix: Prefix of the MATLAB WS variables.
- Objekttyp:

| MABLAB Denotation | <-> | ADD Denotation |
|---|---|---|
| value | <-> | Parameter |
| const | <-> | cDefine |
| axis | <-> | Axis |
| curve | <-> | Map (1d, Kennlinie) |
| map | <-> | Map (2d, Kennfeld) |
| measure | <-> | Online |
| diag_idx | <-> | Diag_Idx |
| datatype | <-> | Simulation/Software Datatype |
| conversion | <-> | Conversion |
| codevariant | <-> | CodeVariant |

- Objektattribute:

Structure fields defined for all objects:

| | |
|---|---|
| < Objekttyp>_name: | Object name |
| phys_min, phys_max: | Minimum and maximum of the physical values |
| longName: | User-specific long name of the object |
| status: | Object status |
| customtags: | Object custom tag list |
| unit: | Physical unit |
| formatstring: | Object formatstring |
| displayname (*): | Object conversion name |
| basetype (*): | Object basetype |
| simdatatype: | Object simulation datatype if (*) else Object basetype |
| swdatatype (*): | Object software datatype |

| | |
|---|---|
| conversion: | Object conversion |
| type (*): | Object conversion type |
| value: | Object values |
| values (*): | Object conversion values |
| reference_values: | Object values; Field won't be influenced by argument 'IgnoreInits'! |
| ignore_for_adds: | Specifies if object should be exported to a special container. |
| adds_name: | User-specific object name |
| defined_in_cnt: | List of Container names within the object has been defined. |
| referenced_in_cnt: | List of Container names within the object has been referenced. |
| local_in_cnt: | List of Container names within the object is used as a local variable |
| dcm_function: | Free assignable field |
| dcm_displayname: | Free assignable field |

Additional structure field for object "axis":

| | |
|---|---|
| online_reference: | Object's online reference |
| maxaxispoints: | Object value count |
| category: | Axis category |
| axis_type: | Axis dimension type. Multiple dim. references possible (e.g. x_y_axis) |

Additional structure field for object "curve":

| | |
|---|---|
| x_axis_name: | Name of the referenced axis |
| category: | Curve Category |

Additional structure field for object "map":

| | |
|---|---|
| x_axis_name: | Name of the referenced x - axis |
| y_axis_name: | Name of the referenced y - axis |
| category: | Map Category |

Additional structure field for object "value":

| | |
|---|---|
| is_array_x | x-dimension-specified flag |
| array_size_x | Object's x-dimension array size value |
| size_x_from_system_constant | Object's x-dimension array size constant name |
| is_array_y | y-dimension-specified flag |
| array_size_y | Object's y-dimension array size value |
| size_y_from_system_constant | Object's y-dimension array size constant name |

Additional structure fields for object "online":

| | |
|---|---|
| bit_carrier | Name of the online carrier object |
| bit_position | Position definition of the bit object within the carrier |
| write_only | OnlineWriteOnly flag |

Additional structure fields for object "codevariant":

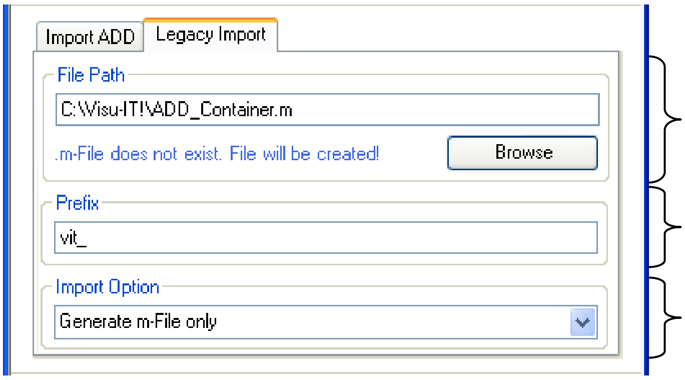
| | |
|---|---|
| condition | Codevariant condition defintion |

Additional structure fields where object type is ***not*** "constant":

| | |
|---|---|
| visible: | Object's visible attribute |
| mem_sec: | Object's memory section definition |
| task: | Object's task definition |

(*) The display of this field depends on the value of adds-struct "pinfo"!
pinfo = 0: "basetype", "displayname", "swdatatype", "type" "values" not avalaible!

### 1.1.4 Legacy Import



File Path: C:\Visu-IT!\ADD_Container.m

.m-File does not exist. File will be created!

Prefix: vit_

Import Option: Generate m-File only

M - File path section

MATALB variable prefix

Import mode

M - File path section:

Path and name (without file extension) of the MATLAB m – script which has to be created. Default path is MATLAB “Current Directory”. Default name is the “SRS-Filename” of the selected ADD Container.

MATLAB variable prefix:

Prefix of the MATLAB WS variables which will be created.

Import-Mode:

***„Generate m-File only“:***

Only create an executable MATLAB m - script. (For details see Appendix [Generate m-File only])

***„Import to MATLAB Workspace (incl. m-File!)”:***

Create an executable MATLAB m – script and appropriated MATLAB Workspace variables. (For details see Appendix [Import to MATLAB Workspace (incl. m-File)])

***„Create Container Library (incl. Container Model!)”:***

Create a Simulink Library and Model of the selected ADD Container. (For details see Appendix [Create Container Library (incl. Container Model!)])

## 1.2 Service ② “vitDDX2WS”

Service call: vitDDX2WS(Verbose, IgnoreInits, pValue);
*Alternative:* vitDDX2WS(Verbose, IgnoreInits); vitDDX2WS (Verbose); vitDDX2WS();

Based on the existing ddx – file (cf. adds.ddxfile ) the service “vitDDX2WS” (cf. ②) transfuses the ddx – file elements to MATLAB WS. The characteristic of the appropriate variables is the prefix assigned by adds.prefix.

| Parameter value | Value | Description |
|---|---|---|
| Verbose<br>[optional] | 0 | Do not create an executable MATLAB m – file. (default) |
| | 1 | Create an executable MATLAB m – file representing WS content. |
| IgnoreInits<br>[optional] | 0 | Structure field “value” of the WS variables will be set to the appropriate “Phys_Values” of the ddx – file element.<br>If there is no “Phys_Values” available the structure field “value” will be set to appropriate “Phys_min” – value. |
| | 1 | Structure field “value” will not be set. (default) |
| pValue<br>[optional] | 0 | Do not create additional WS Variables. (default) |
| | 1 | Create additional WS Variables which are containing the value content only (plane Variables). |

## 1.3 Service ⑤ “vitDDX2MS”

Service call: vitDDX2MS(IgnoreInits, pValue);
*Alternative:* vitDDX2MS(IgnoreInits); vitDDX2MS();

Based on the existing ddx – file (cf. adds.ddxfile ) the service “vitDDX2MS” (cf. ⑤) transfuses the ddx – file elements into a MATLAB m - file. The characteristic of the appropriate variables is the prefix assigned by adds.prefix.

| Parameter value | Value | Description |
|---|---|---|
| IgnoreInits<br>[optional] | 0 | Structure field “value” of the WS variables will be set to the appropriate “Phys_Values” of the ddx – file element.<br>If there is no “Phys_Values” available the structure field “value” will be set to appropriate “Phys_min” – value. |
| | 1 | Structure field “value” will not be set. (default) |
| pValue<br>[optional] | 0 | Do not create additional WS Variables. (default) |
| | 1 | Create additional WS Variables which are containing the value content only (plane Variables). |

## 1.4 Service ③ “vitWS2DDX”

Service call: vitWS2DDX(Verbose, AutoStartADDOff, IgnoreInits, pValue);
*Alternative:* vitWS2DDX(Verbose, AutoStartADDOff, IgnoreInits);
vitWS2DDX(Verbose, AutoStartADDOff); vitWS2DDX(Verbose); vitWS2DDX();

Based on existing MATLAB WS variables, which containing the surname prefix adds.prefix, the service “vitWS2DDX” (cf. ③) creates an ADD capable ddx – file saved at location adds.ddxfile.

| **Parameter value** | **Value** | **Description** |
|---|---|---|
| Verbose<br>[optional] | 0 | Do not create an executable MATLAB m – file. (default) |
| | 1 | Create an executable MATLAB m – file representing WS content. |
| AutoStartADDOff<br>[optional] | 0 | Omit automatic opening of ADD Offline Editor. (default) |
| | 1 | Automatically open the ADD Offline Editor. |
| IgnoreInits<br>[optional] | 0 | “Phys_Values” – object of the ddx – file elements will be set to the appropriate WS variable field “value”. |
| | 1 | “Phys_Values” – object of the ddx – file elements will not be set. (default) |
| pValue<br>[optional] | 0 | Do not create additional WS Variables. (default) |
| | 1 | Create additional WS Variables which are containing the value content only (plane Variables). **ONLY IF AutoStartADDOff = 1** |

**Hint:**
In Case of using the “AutoStartADDOff” – mode the dedicated WS will be updated after closing the ADD Offline editor. If “pValue” set to 1, service also writes additional variables into MATLAB Workspace.

## 1.5 Service Ⓑ “vitWS2MS”

Service call: vitWS2MS(limited);
*Alternative:* vitWS2MS();

Based on existing MATLAB WS variables, which containing the surname prefix adds.prefix, the service “vitWS2MS” (cf. Ⓑ) creates an executable MATLAB m – script saved at location adds.mScript.

| Parameter value | Value | Description |
|---|---|---|
| limited<br>[optional] | ‘ignADDS’ | All WS variables with struct field value *‘ignore_for_adds’* is set to ‘1’ won’t be written into the new m – script. |

## 1.6 Service Ⓐ "vitADDOffline"

Service call: vitADDOffline(objName, objType, loadMode, adaptDDXFileName);
*Alternative:* vitADDOffline(objName, objType, loadMode); vitADDOffline(objName, objType);
vitADDOffline(objName); vitADDOffline();

Service "vitADDOffline" (cf. Ⓐ) starts the ADD Offline Editor by loading the ddx – file (adds.ddxfile) and showing its content. If there is no ddx - file assigned in adds.ddxfile a template ddx – file will be generated and opened instead.

| Parameter value | Value | Description |
|---|---|---|
| objName<br>[optional] | Empty char array | Full access within the ADD Offline Editor. (default) |
| | char array | Restricted access within the ADD Offline Editor. Only the object assigned in "objName" is allowed to be edited. |
| objType<br>[optional] | char array | Specifies the type of a newly created ADD object.<br>Hint: "objType" effects only if object with name "objName" does not exist! |
| loadMode<br>[optional] | 0 | Full access within the ADD Offline Editor. (default) |
| | 1 | MATLAB Simulink Option:<br>For propose of calling the service within MATLAB Simulink Block.<br>Restricted access within the ADD Offline Editor. Only the object assigned as name of the MATLAB Simulink Block is allowed to be edited.<br>If there is no such element in the appropriate ddx – file, a new ADD object with classification "OUTPUT" will be created. |
| adaptDDXFileName<br>[optional] | 0 | Do not try to rename a loaded project – ddx – file. (default) |
| | 1 | If the underlying ddx – file contains an ADD Project, the ddx – file will be renamed to project name.<br>Hint: Backup file will be created at first! |

**Hint:** "objType" has to be one of the follow: 'online', 'parameter', 'cDefine', 'axis', 'map'.
"objType" will set only if specified ADD Container does not contain an element of name "objName".

```
[result, error_string, ADDobjName] = vitADDOffline("NewObject", "online");
[result, error_string, ADDobjName] = vitADDOffline("NewObject");
[result, error_string, ADDobjName] = vitADDOffline("", "parameter", 1);
```

**Hint:** Service "vitADDOffline" has an additional return value!

Beside the "result" and "error_string" value there is yet another value which returns a char array. In case of a non empty char array "objName" or "loadMode" – value "1" as service parameter value, the third value "ADDobjName" returns the ADD conform name of the given object.

In order to use "vitADDOffline" in the "Simulink Mode" (loadMode = 1) see also Appendix [3.1 Integrating ADD into MATLAB Simulink]

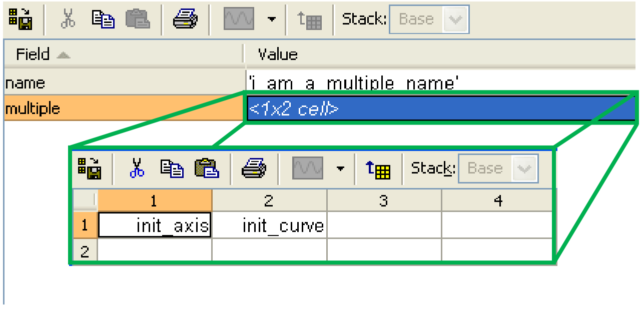
## 1.7 Service "vitCheckMultipleNames"

Service call: vitCheckMultipleNames(prefix, workspace);
*Alternative:* vitCheckMultipleNames (prefix);

Service "vitCheckMultipleNames" checks the MATLAB WS variables specified by the parameter value "prefix" for multiple name occurrences in the embedded variable structures. Base Point is the structure field "adds_name".

| Parameter value | Value | Description |
|---|---|---|
| prefix<br>[mandatory] | char array | Prefix of the MATLAB WS variables which will be processed. |
| workspace<br>[optional] | char array | Specifies the MATLAB WS where the variables could be found.<br>If there is no workspace declared MATLAB 'base' WS will be used instead. |

[rv, result] = vitCheckMultipleNames("prefix, workspace");



| Field | Value |
|---|---|
| name | 'i am a multiple name' |
| multiple | <1x2 cell> |

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 | init_axis | init_curve | | |
| 2 | | | | |

On successful run (rv = 1) with no multiple names detected the result value will be an empty array.

Otherwise the result value will be a struct containing the detected multiple names (result.names) as well as a cell array (result.multiple) with the appropriate MATLAB WS variables.

If there occurs an error during the service run rv will be set to '0'. In this case the result value contains the appropriate error string.

## 1.8 Service "vitADDCreateNewContainer"

Service call: vitADDCreateNewContainer(CntName);
*Alternative:* vitADDCreateNewContainer();

Service "vitADDCreateNewContainer" is designed to create an empty ddx – file. File will be stored at "adds.ddxfile" location.

It is also possible to label the newly created container with a user specific name assigned in parameter value "CntName" or "adds" variable "adds.add_environment".

| **Parameter value** | **Value** | **Description** |
|---|---|---|
| CntName<br>[optional] | Empty char array | Create new ddx-file. Container name will be set to "adds.add_environment". If "add_environment" is an empty char array or not assigned, container name will be labeled as "Empty 1.1.0". (default) |
| | char array | Create new ddx-file.<br>Container name will be set to "CntName". |

## 1.9 Service “vitDDXvsWS”

Service call: vitDDXvsWS(skipList, htmlPath);
*Alternative:* vitDDXvsWS(skipList); vitDDXvsWS ();

Service “vitDDXvsWS” checks given MATLAB WS variables (Characteristic of the appropriate variables is the prefix assigned by adds.prefix) against a ddx – file which is specified in adds.ddxfile.

| Parameter value | Value | Description |
|---|---|---|
| skipList<br>[optional] | Empty cell array | All elements will be processed. (default) |
| | cell array of strings | List of elements which will be skipped. |
| htmlPath<br>[optional] | Empty char array | Do not display and save the result as an html - file. |
| | char array | Display and save the result as an html - file. |

[retval, result, err_string] = vitDDXvsWS(skipList, htmlPath)

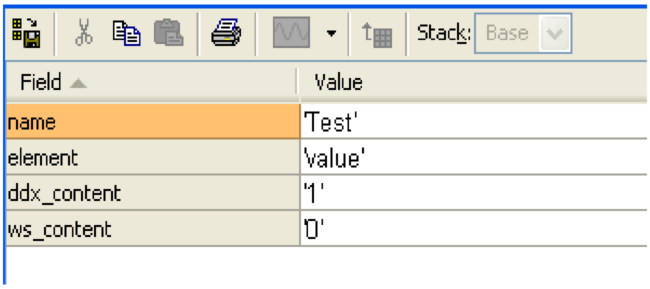
Beside the “result” and “error_string” value there is yet another value which returns an array of structs.

result.name:
Name of the dissimilar element.

result.element:
Name of appropriate struct field.

result.ddx_content:
Content of the ddx element.

result.ws_content:
Content of the ws element.



| Field | Value |
|---|---|
| name | 'Test' |
| element | 'Value' |
| ddx_content | '1' |
| ws_content | '0' |

## 1.10 Service “vitAccessMetaInfos”

Service call: vitAccessMetaInfos(access, key, value);
Alternative: vitAccessMetaInfos(access, key);

Service “vitAccessMetaInfos” writes/reads ddx-file (adds.ddxfile) related “meta” information.

| Parameter value | Value | Description |
|---|---|---|
| access<br>[madatory] | char array | Access type! Either “set” (write access) or “get” (read access) |
| key<br>[mandatory] | char array | Specifies the value which should be set or get. |
| value<br>[optional] | char array | Specifies the key value on access type “set” |

[retval, result] = vitAccessMetaInfos(“set”, “PRODUCER”, “Visu-IT!”)
[retval, result] = vitAccessMetaInfos(“get”, “PRODUCER”)

If there occurs an error during the service run retval will be set to ‘0’. In this case the result value contains the appropriate error string. On successful process run (retval=1), the get method will return the appropriate values of the selected key as result.

## 1.11 Service "vitDAT2WS" (Trial Version – DCM Only!)

Service call: vitDAT2WS(Verbose, pValue, aInfo);
Alternative: vitDAT2WS(Verbose, pValue) vitDAT2WS(Verbose); vitDAT2WS();

Service "vitDAT2WS" writes initial data-file (adds.initfile) information to the current MATLAB WS Variables.

| Parameter value | Value | Description |
|---|---|---|
| Verbose [optional] | 0 | Do not create an executable MATLAB m – file. (default) |
| | 1 | Create an executable MATLAB m – file representing the init-file content |
| pValue [optional] | 0 | Omit value setting on plane MATLAB WS Variables |
| | 1 | Set also plane MATLAB WS Variable values |
| aInfo [optional] | 0 | Do not set additional init-file information. |
| | 1 | Update MATLAB WS Variable values based on the additional init-file information (Object LongName, Unit) |

[retval, result] = vitDAT2WS("1", "1", "0")

If there occurs an error during the service run retval will be set to '0'. In this case the result value contains the appropriate error string. On successful process run (retval=1), the get method will return the appropriate values of the selected key as result.

## 1.12 Service "vitWS2DAT" (Trial Version – DCM Only!)

Service call: vitWS2DAT(Verbose);
alternative: vitWS2DAT();

Service "vitWS2DAT" writes the current MATLAB WS Variable information to an initial data-file (adds.initfile).

| Parameter value | Value | Description |
|---|---|---|
| Verbose [optional] | 0 | Do not create an executable MATLAB m – file. (default) |
| | 1 | Create an executable MATLAB m – file representing the init-file content |

[retval, result] = vitWS2DAT("1")

If there occurs an error during the service run retval will be set to '0'. In this case the result value contains the appropriate error string. On successful process run (retval=1), the get method will return the appropriate values of the selected key as result.

# 2 Questions?

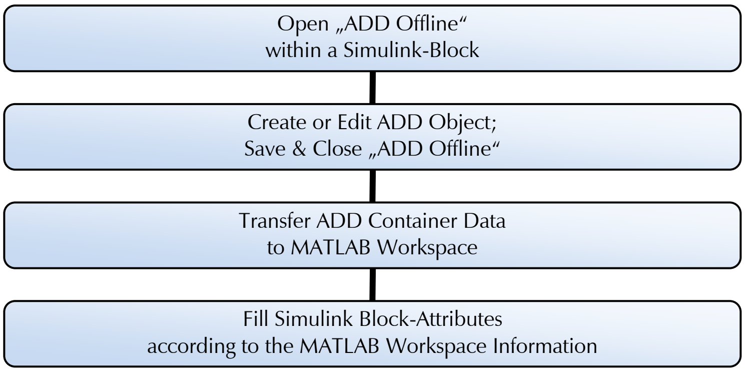
| ADD Hotline | ADD Contact | ADD Product page |
|---|---|---|
| Tel.: +49 (0)941 – 49082-16<br>email: hotline@visu-it.com | Tel.: +49 (0)9947 - 9040004<br>email: add@visu-it.de | Internet: http://www.visu-it.de/add |

# 3 Appendix

## 3.1 Integrating ADD into MATLAB Simulink

Like all MATLAB functions it's possible to embed "ADD MATLAB Services" into your "MATLAB Simulink" or "dSpace TargetLink" work flow.
In order to parallel the creation of a simulation model and an appropriate "ADD" – Container or Project (allegorised as DDX-file) it's necessary to adduct several services.

Schematic diagram:



Open „ADD Offline"
within a Simulink-Block

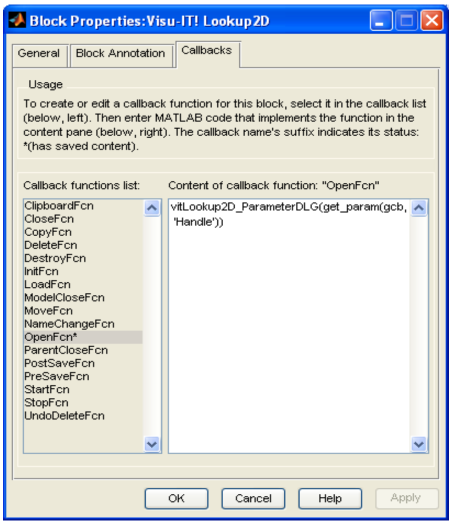
Create or Edit ADD Object;
Save & Close „ADD Offline"

Transfer ADD Container Data
to MATLAB Workspace

Fill Simulink Block-Attributes
according to the MATLAB Workspace Information

This example shows up the implementation for a Simulink "Lookup2D" - block!
The aim is to ally the creation of the "Lookup2D" – block and its corresponding ADD object ("Map") by using the services "vitADDOffline" and "vitDDX2WS".

### 1. Create & Link an individual "Function Block Parameter" (q.v. "vitLookup2D_ParameterDLG.fig")



Block Properties:Visu-IT! Lookup2D

Usage

To create or edit a callback function for this block, select it in the callback list (below, left). Then enter MATLAB code that implements the function in the content pane (below, right). The callback name's suffix indicates its status: *(has saved content).

Callback functions list:

ClipboardFcn
CloseFcn
CopyFcn
DeleteFcn
DestroyFcn
InitFcn
LoadFcn
ModelCloseFcn
MoveFcn
NameChangeFcn
OpenFcn*
ParentCloseFcn
PostSaveFcn
PreSaveFcn
StartFcn
StopFcn
UndoDeleteFcn

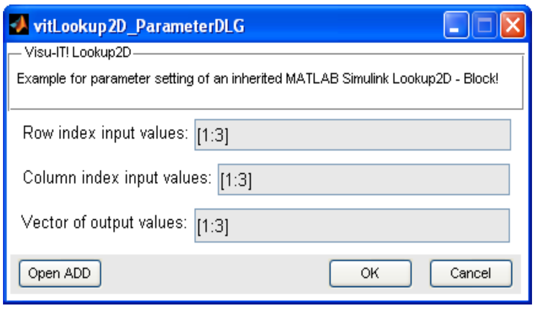
Content of callback function: "OpenFcn"

```
vitLookup2D_ParameterDLG(get_param(gcb,
 'Handle'))
```

To link a figure on a block element it is necessary to call the decated MATLAB function within the appropriated Callback function.

The Callback function "OpenFcn" hab been used in this particular example.

After double clicking on the appropriate block, "OpenFcn" executes the dialog function "vitLookup2D_ParamterDLG.m". The parameter value is defined as handle of the current block (*MATLAB function: "get_param(gcb, 'Handle')")*).



vitLookup2D_ParameterDLG

Visu-IT! Lookup2D

Example for parameter setting of an inherited MATLAB Simulink Lookup2D - Block!

Row index input values: [1:3]

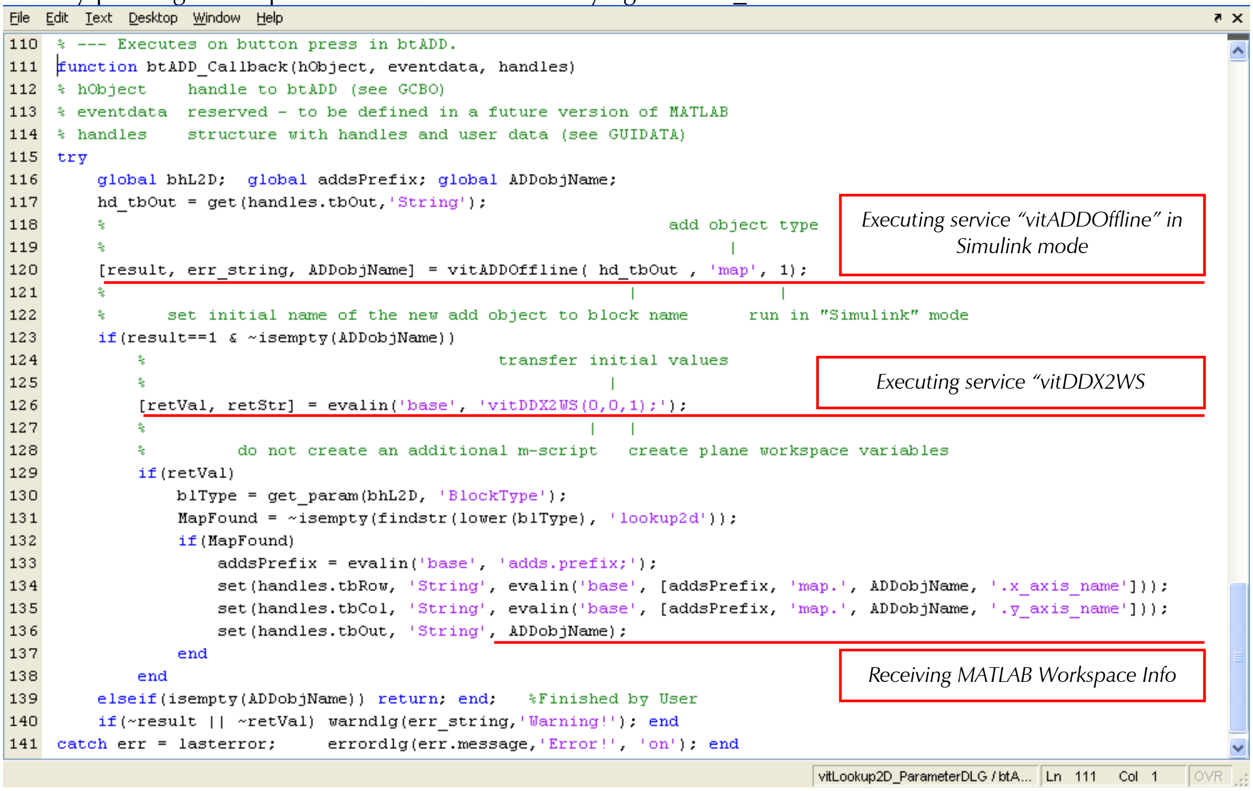
Column index input values: [1:3]

Vector of output values: [1:3]

The "vitLookup2D_ParameterDLG" block property window can handle the row, column and output data of a "Lookup2D" - block. Also it is possible to start "ADD Offline" by pressing the "Open ADD" button, set the block attributes ("RowIndex", "ColumnIndex", "OutputValues") by pressing "OK" and close the property window by pressing "Cancel".

## 2. Create ADD object using “ADDOffline”

By pressing the “Open ADD” button the underlying “btADD_Callback” function will be executed.



```
% --- Executes on button press in btADD.
function btADD_Callback(hObject, eventdata, handles)
% hObject    handle to btADD (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
try
    global bhL2D;  global addsPrefix; global ADDobjName;
    hd_tbOut = get(handles.tbOut,'String');
    %                                                        add object type
    %                                                               |
    [result, err_string, ADDobjName] = vitADDOffline( hd_tbOut , 'map', 1);
    %                                                    |              |
    %      set initial name of the new add object to block name      run in "Simulink" mode
    if(result==1 & ~isempty(ADDobjName))
        %                                   transfer initial values
        %                                               |
        [retVal, retStr] = evalin('base', 'vitDDX2WS(0,0,1);');
        %                                             |   |
        %         do not create an additional m-script   create plane workspace variables
        if(retVal)
            blType = get_param(bhL2D, 'BlockType');
            MapFound = ~isempty(findstr(lower(blType), 'lookup2d'));
            if(MapFound)
                addsPrefix = evalin('base', 'adds.prefix;');
                set(handles.tbRow, 'String', evalin('base', [addsPrefix, 'map.', ADDobjName, '.x_axis_name']));
                set(handles.tbCol, 'String', evalin('base', [addsPrefix, 'map.', ADDobjName, '.y_axis_name']));
                set(handles.tbOut, 'String', ADDobjName);
            end
        end
    elseif(isempty(ADDobjName)) return; end;   %Finished by User
    if(~result || ~retVal) warndlg(err_string,'Warning!'); end
catch err = lasterror;     errordlg(err.message,'Error!', 'on'); end
```

*Executing service “vitADDOffline” in Simulink mode*

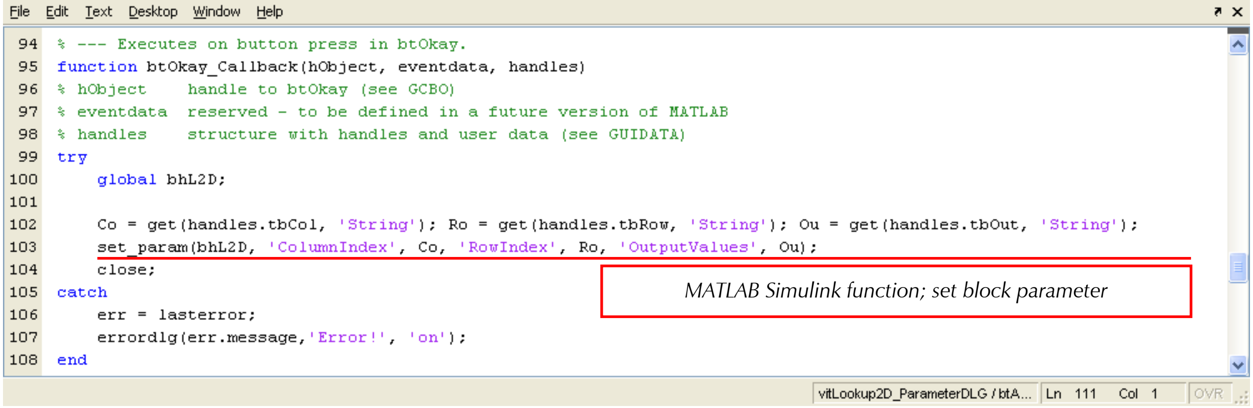
*Executing service “vitDDX2WS*

*Receiving MATLAB Workspace Info*

First service call “vitADDOffline” opens “ADD Offline” user interface and automatically creates a new object with classification “Output”, type “Map” and set the “Vector of output values” – string as name. At this junction object name will be “[1:3]”. After redacting the newly created ADD object to a proper “Map”-object, the “ADD Offline” editor must save the DDX-file and could be closed afterward.
The subsequent service call “vitDDX2WS” transmits the DDX-file into MATLAB Workspace (WS).
Now it’s possible to exactly snatch the content of a WS variable by composing its prefix (see “addsPrefix”), type (according to the block type: Lookup2D » Map) and name (“ADDobjName”).

## 3. Assign Simulink Block

WS data could be transferred to Simulink block (identifier: “bhL2D”) by pressing the “OK”-bottom.



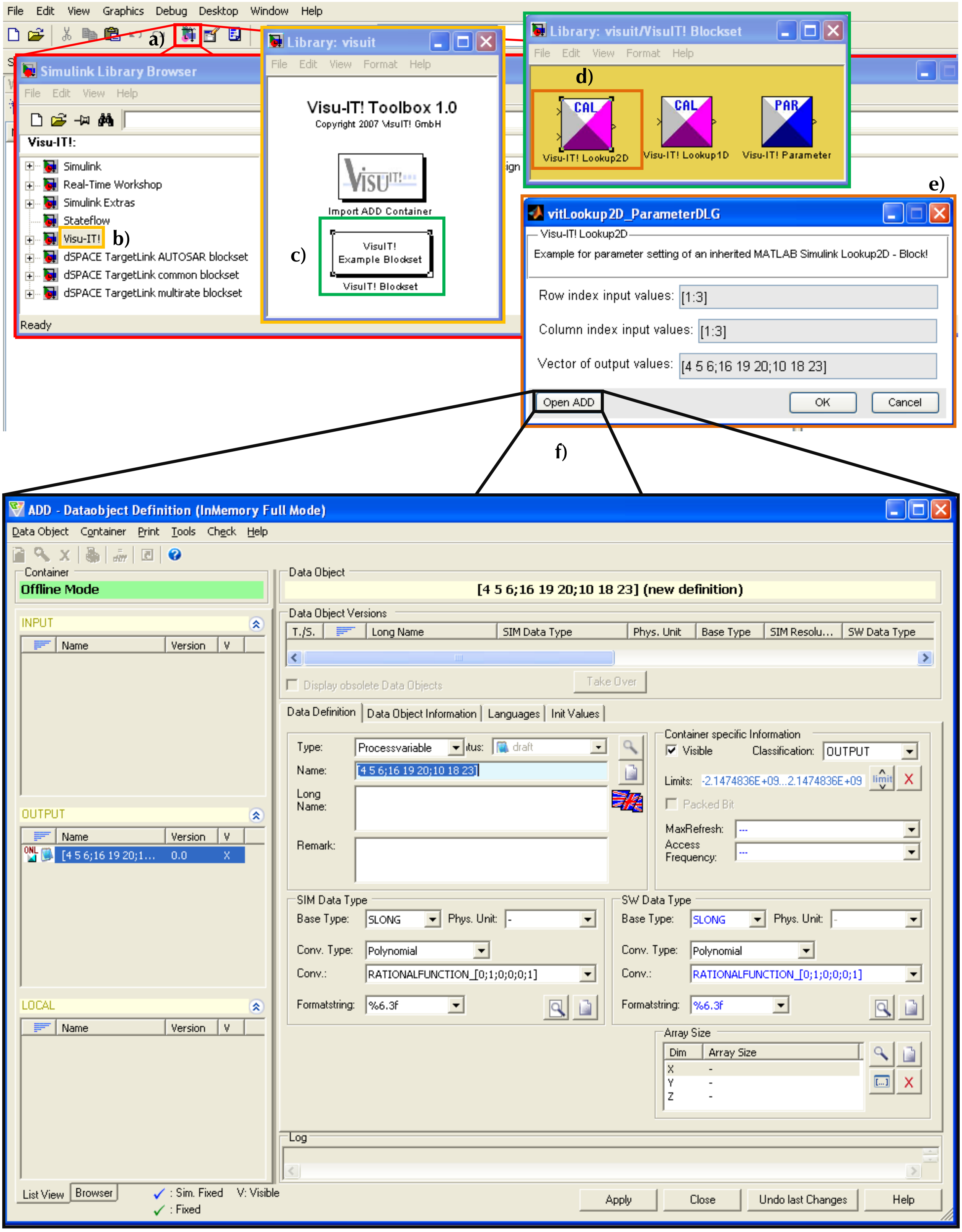
```
% --- Executes on button press in btOkay.
function btOkay_Callback(hObject, eventdata, handles)
% hObject    handle to btOkay (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
try
    global bhL2D;

    Co = get(handles.tbCol, 'String'); Ro = get(handles.tbRow, 'String'); Ou = get(handles.tbOut, 'String');
    set_param(bhL2D, 'ColumnIndex', Co, 'RowIndex', Ro, 'OutputValues', Ou);
    close;
catch
    err = lasterror;
    errordlg(err.message,'Error!', 'on');
end
```

*MATLAB Simulink function; set block parameter*

**Hint:** Block parameters could only be set if the underlying model is unlocked!

### 3.1.1 Building History


a)
b)
c)
d)
e)
f)
File Edit View Graphics Debug Desktop Window Help
Simulink Library Browser
File Edit View Help
Visu-IT!:
Simulink
Real-Time Workshop
Simulink Extras
Stateflow
Visu-IT!
dSPACE TargetLink AUTOSAR blockset
dSPACE TargetLink common blockset
dSPACE TargetLink multirate blockset
Ready
Library: visuit
File Edit View Format Help
Visu-IT! Toolbox 1.0
Copyright 2007 VisuIT! GmbH
Import ADD Container
VisuIT! Example Blockset
VisuIT! Blockset
Library: visuit/VisuIT! Blockset
File Edit View Format Help
CAL
Visu-IT! Lookup2D
CAL
Visu-IT! Lookup1D
PAR
Visu-IT! Parameter
vitLookup2D_ParameterDLG
Open ADD
OK
Cancel
ADD - Dataobject Definition (InMemory Full Mode)
Data Object Container Print Tools Check Help
Container
INPUT
Name Version V
OUTPUT
Name Version V
LOCAL
Name Version V
List View Browser
Data Object
Data Object Versions
T./S. Long Name SIM Data Type Phys. Unit Base Type SIM Resolu... SW Data Type
Take Over
Data Definition Data Object Information Languages Init Values
Container specific Information
SIM Data Type
SW Data Type
Array Size
Dim Array Size
Log
Apply Close Undo last Changes Help

Visu-IT! Lookup2D

Example for parameter setting of an inherited MATLAB Simulink Lookup2D - Block!

Row index input values: [1:3]

Column index input values: [1:3]

Vector of output values: [4 5 6;16 19 20;10 18 23]

Container: Offline Mode

OUTPUT: ONL [4 5 6;16 19 20;1... 0.0 X

Data Object: [4 5 6;16 19 20;10 18 23] (new definition)

☐ Display obsolete Data Objects

Type: Processvariable Status: draft

Name: [4 5 6;16 19 20;10 18 23]

Long Name:

Remark:

☑ Visible Classification: OUTPUT

Limits: -2.1474836E+09...2.1474836E+09

☐ Packed Bit

MaxRefresh: ---

Access Frequency: ---

SIM Data Type: Base Type: SLONG Phys. Unit: -

Conv. Type: Polynomial

Conv.: RATIONALFUNCTION_[0;1;0;0;0;1]

Formatstring: %6.3f

SW Data Type: Base Type: SLONG Phys. Unit: -

Conv. Type: Polynomial

Conv.: RATIONALFUNCTION_[0;1;0;0;0;1]

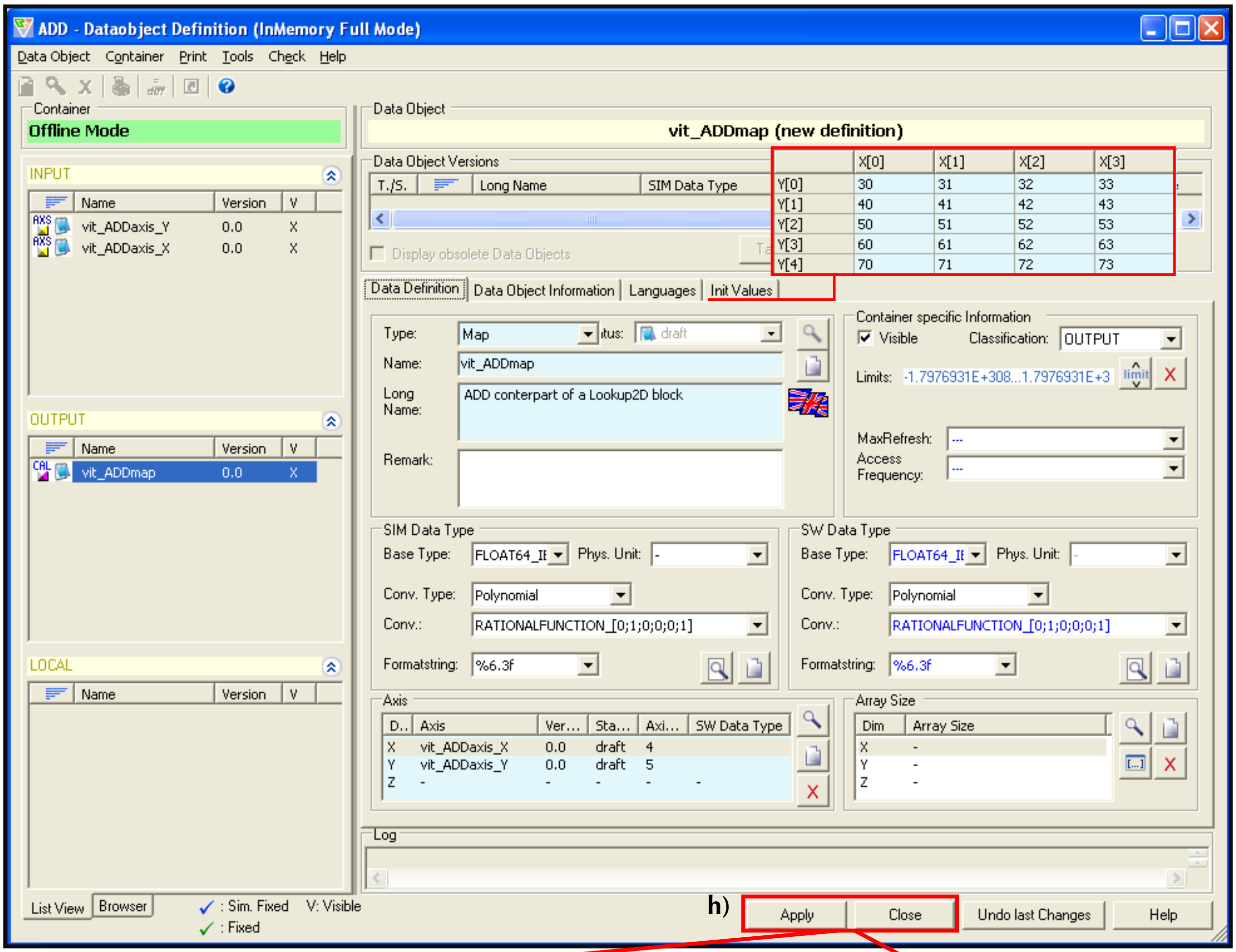
Formatstring: %6.3f

| Dim | Array Size |
|---|---|
| X | - |
| Y | - |
| Z | - |

✓ : Sim. Fixed V: Visible

✓ : Fixed

g)


ADD - Dataobject Definition (InMemory Full Mode)
Data Object Container Print Tools Check Help
List View
Browser
Apply
Close
Undo last Changes
Help
Data Definition
Data Object Information
Languages
Init Values
Display obsolete Data Objects

Container: Offline Mode

INPUT

| Name | Version | V |
|---|---|---|
| vit_ADDaxis_Y | 0.0 | X |
| vit_ADDaxis_X | 0.0 | X |

OUTPUT

| Name | Version | V |
|---|---|---|
| vit_ADDmap | 0.0 | X |

LOCAL

| Name | Version | V |
|---|---|---|

✓ : Sim. Fixed V: Visible
✓ : Fixed

Data Object: vit_ADDmap (new definition)

Data Object Versions: T./S. | Long Name | SIM Data Type

| | X[0] | X[1] | X[2] | X[3] |
|---|---|---|---|---|
| Y[0] | 30 | 31 | 32 | 33 |
| Y[1] | 40 | 41 | 42 | 43 |
| Y[2] | 50 | 51 | 52 | 53 |
| Y[3] | 60 | 61 | 62 | 63 |
| Y[4] | 70 | 71 | 72 | 73 |

Type: Map Status: draft
Name: vit_ADDmap
Long Name: ADD conterpart of a Lookup2D block
Remark:

Container specific Information
☑ Visible Classification: OUTPUT
Limits: -1.7976931E+308...1.7976931E+3
MaxRefresh: ---
Access Frequency: ---

SIM Data Type
Base Type: FLOAT64_IE Phys. Unit: -
Conv. Type: Polynomial
Conv.: RATIONALFUNCTION_[0;1;0;0;0;1]
Formatstring: %6.3f

SW Data Type
Base Type: FLOAT64_IE Phys. Unit: -
Conv. Type: Polynomial
Conv.: RATIONALFUNCTION_[0;1;0;0;0;1]
Formatstring: %6.3f

Axis

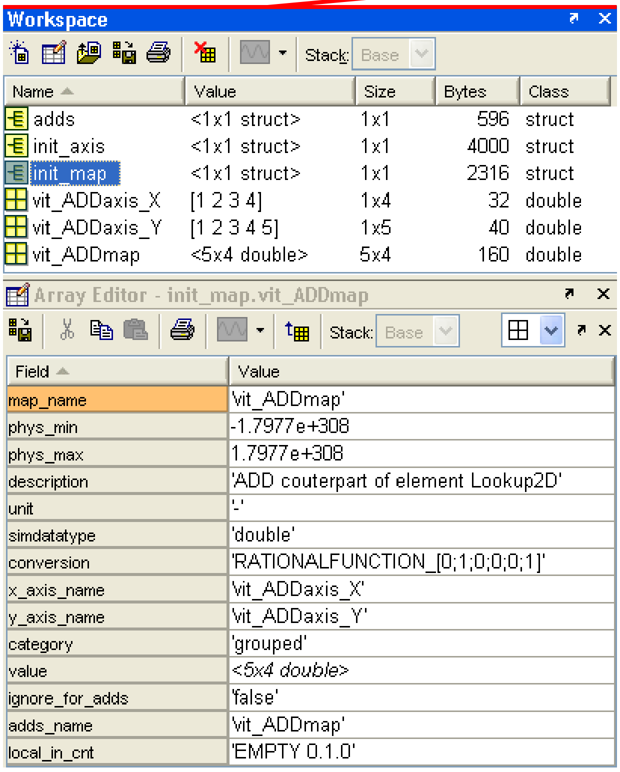
| D.. | Axis | Ver... | Sta... | Axi... | SW Data Type |
|---|---|---|---|---|---|
| X | vit_ADDaxis_X | 0.0 | draft | 4 | |
| Y | vit_ADDaxis_Y | 0.0 | draft | 5 | |
| Z | - | - | - | - | - |

Array Size

| Dim | Array Size |
|---|---|
| X | - |
| Y | - |
| Z | - |

Log

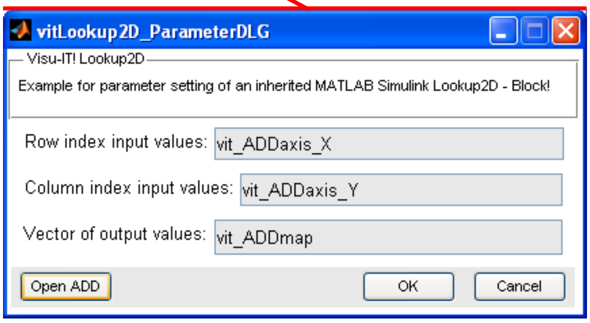
h)



| Name | Value | Size | Bytes | Class |
|---|---|---|---|---|
| adds | <1x1 struct> | 1x1 | 596 | struct |
| init_axis | <1x1 struct> | 1x1 | 4000 | struct |
| init_map | <1x1 struct> | 1x1 | 2316 | struct |
| vit_ADDaxis_X | [1 2 3 4] | 1x4 | 32 | double |
| vit_ADDaxis_Y | [1 2 3 4 5] | 1x5 | 40 | double |
| vit_ADDmap | <5x4 double> | 5x4 | 160 | double |

| Field | Value |
|---|---|
| map_name | 'vit_ADDmap' |
| phys_min | -1.7977e+308 |
| phys_max | 1.7977e+308 |
| description | 'ADD couterpart of element Lookup2D' |
| unit | '-' |
| simdatatype | 'double' |
| conversion | 'RATIONALFUNCTION_[0;1;0;0;0;1]' |
| x_axis_name | 'vit_ADDaxis_X' |
| y_axis_name | 'vit_ADDaxis_Y' |
| category | 'grouped' |
| value | <5x4 double> |
| ignore_for_adds | 'false' |
| adds_name | 'vit_ADDmap' |
| local_in_cnt | 'EMPTY 0.1.0' |

i)



Visu-IT! Lookup2D

Example for parameter setting of an inherited MATLAB Simulink Lookup2D - Block!

Row index input values: vit_ADDaxis_X

Column index input values: vit_ADDaxis_Y

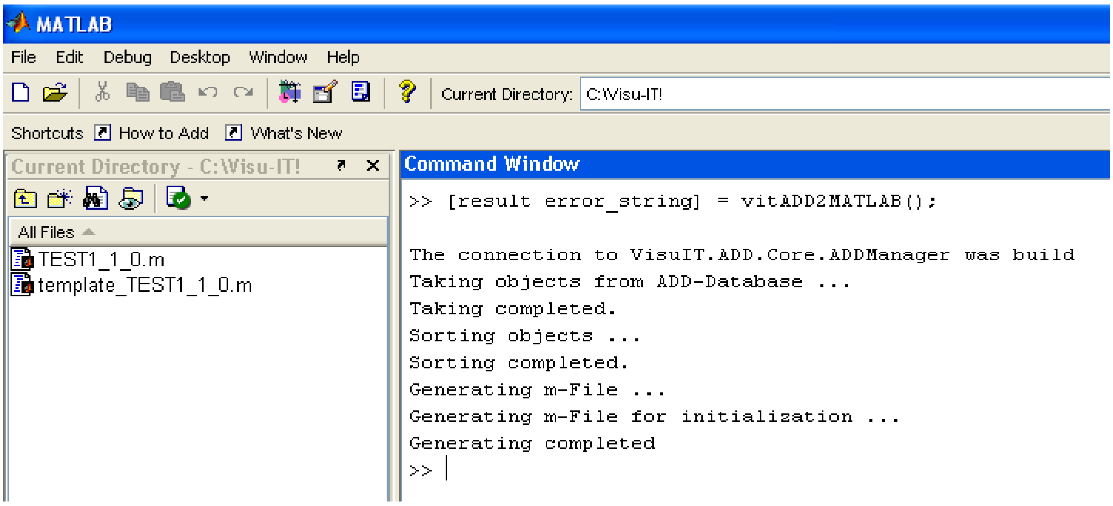
Vector of output values: vit_ADDmap

*Legend:*

a) Open “Simulink Library Browser”.
b) Select “Visu-IT!” library.
c) Open “Visu-IT! Blockset”.
d) Select a Block.
e) Open parameter dialog.
f) Open “ADD Offline” (Button “Open ADD”).
g) Adapt ADD element.
h) Save and Close “ADD Offline”.
i) MATLAB Workspace & Parameter dialog will be filled automatically.

## 3.2 Legacy Import

1. Generate m-File only:


MATLAB
File Edit Debug Desktop Window Help
Current Directory: C:\Visu-IT!
Shortcuts How to Add What's New
Current Directory - C:\Visu-IT!
All Files
TEST1_1_0.m
template_TEST1_1_0.m
Command Window

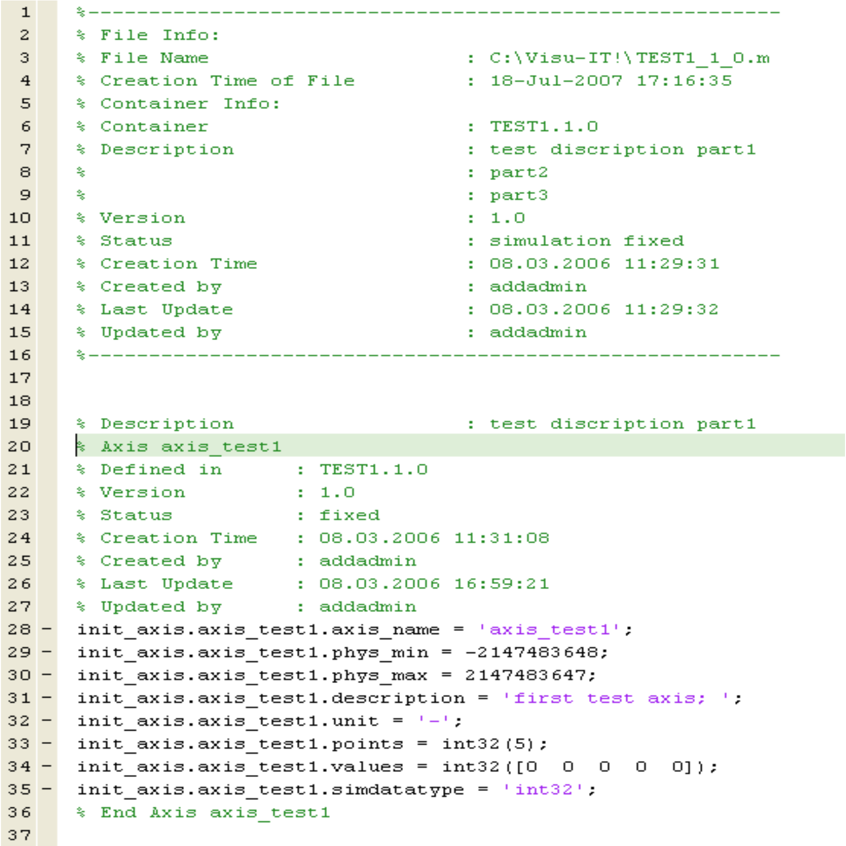
```
>> [result error_string] = vitADD2MATLAB();

The connection to VisuIT.ADD.Core.ADDManager was build
Taking objects from ADD-Database ...
Taking completed.
Sorting objects ...
Sorting completed.
Generating m-File ...
Generating m-File for initialization ...
Generating completed
>> |
```

MATLAB Command Window: ADD import info; MATALB Current Directory: Generated m – scripts.

At one hand “SRS-Filename”.m – file (see: „TEST1_1_0.m“) declares variables for MATLAB WS and at the other hand “template_” – file declares the initial value arrays of the variables.

“SRS-Filename”.m – file clipping:



```
%-----------------------------------------------------------
% File Info:
% File Name                       : C:\Visu-IT!\TEST1_1_0.m
% Creation Time of File           : 18-Jul-2007 17:16:35
% Container Info:
% Container                       : TEST1.1.0
% Description                     : test discription part1
%                                 : part2
%                                 : part3
% Version                         : 1.0
% Status                          : simulation fixed
% Creation Time                   : 08.03.2006 11:29:31
% Created by                      : addadmin
% Last Update                     : 08.03.2006 11:29:32
% Updated by                      : addadmin
%-----------------------------------------------------------


% Description                     : test discription part1
% Axis axis_test1
% Defined in        : TEST1.1.0
% Version           : 1.0
% Status            : fixed
% Creation Time     : 08.03.2006 11:31:08
% Created by        : addadmin
% Last Update       : 08.03.2006 16:59:21
% Updated by        : addadmin
init_axis.axis_test1.axis_name = 'axis_test1';
init_axis.axis_test1.phys_min = -2147483648;
init_axis.axis_test1.phys_max = 2147483647;
init_axis.axis_test1.description = 'first test axis; ';
init_axis.axis_test1.unit = '-';
init_axis.axis_test1.points = int32(5);
init_axis.axis_test1.values = int32([0  0  0  0]);
init_axis.axis_test1.simdatatype = 'int32';
% End Axis axis_test1

```

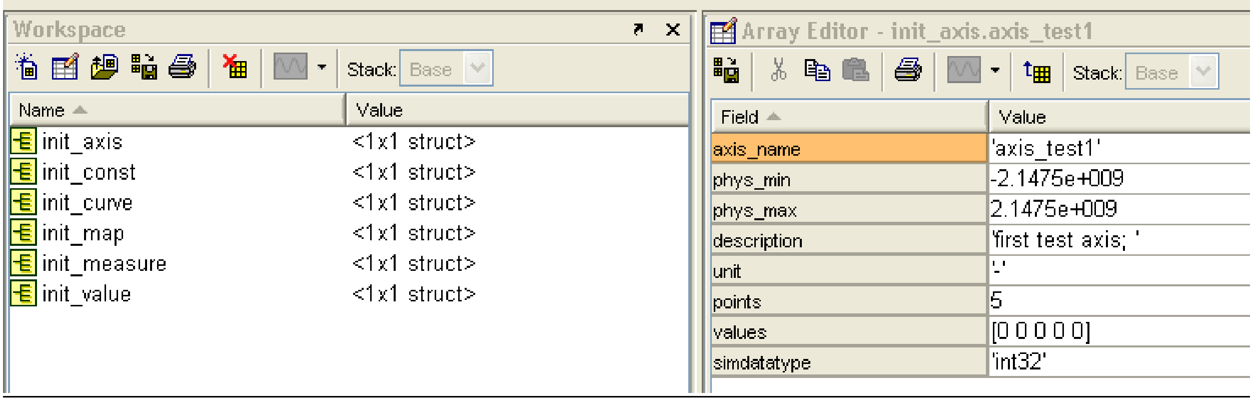
File and Container information

Container objekt - information

MATLAB variables

2. Import to MATLAB Workspace (incl. m-File!):
See also “1. Generate m – file only”!

Additional functionality of “Generate m – file only” which generates MATLAB Workspace variables.



| Name | Value |
|---|---|
| init_axis | <1x1 struct> |
| init_const | <1x1 struct> |
| init_curve | <1x1 struct> |
| init_map | <1x1 struct> |
| init_measure | <1x1 struct> |
| init_value | <1x1 struct> |

| Field | Value |
|---|---|
| axis_name | 'axis_test1' |
| phys_min | -2.1475e+009 |
| phys_max | 2.1475e+009 |
| description | 'first test axis; ' |
| unit | '-' |
| points | 5 |
| values | [0 0 0 0 0] |
| simdatatype | 'int32' |

Variable structure : <Prefix><Objekttyp>.<Objektattribute>

- Prefix: Prefix of the MATLAB WS variables.

- Objekttyp:

| MABLAB Denotation | <-> | ADD Denotation |
|---|---|---|
| value | <-> | Parameter |
| const | <-> | cDefine |
| axis | <-> | Axis |
| curve | <-> | Map (1d, Kennlinie) |
| map | <-> | Map (2d, Kennfeld) |
| measure | <-> | Online |

- Objektattribute:

Structure fields defined for all objects:

| | |
|---|---|
| < Objekttyp>_name: | Object name |
| phys_min, phys_max: | Minimum and maximum of the physical values |
| description: | Object description |
| unit: | Physical unit |
| values: | Object values |
| simdatatype: | Object datatyp |

Additional structure field for object “axis”:

| | |
|---|---|
| points: | Object value count |
| category: | Axis category |

Additional structure field for object “curve”:

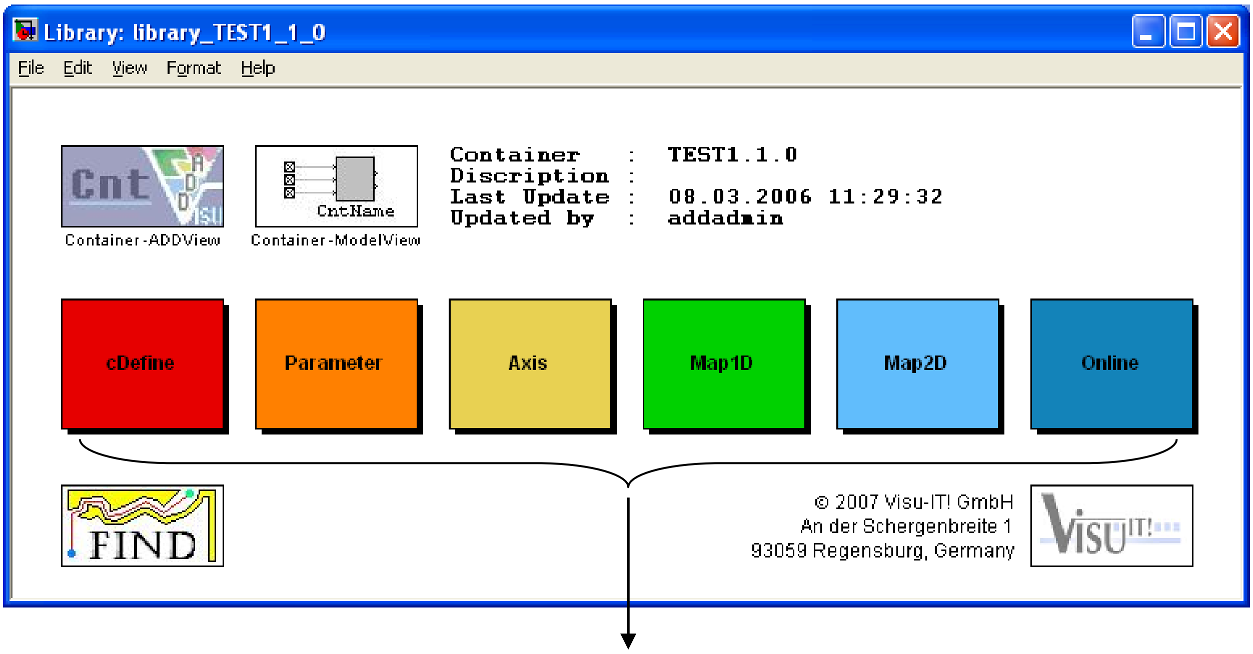
| | |
|---|---|
| x_axis_name: | Name of the referenced axis |
| category: | Curve Category |

Additional structure field for object “map”:

| | |
|---|---|
| x_axis_name: | Name of the referenced x - axis |
| y_axis_name: | Name of the referenced y - axis |
| category: | Map Category |

3.Create Container Library (incl. Container Model!):

Creates a structured Simulink Library based on the ADD container objects and a MATLAB Workspace "struct" variable call "ADD" which contains all necessary information about the imported container. Each other imported ADD container will be added to the "ADD" structure or overridden if it already exists.

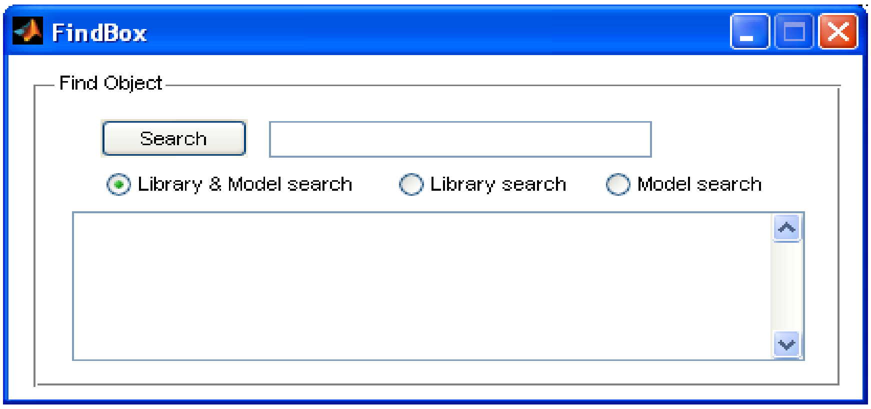


```
Container    :  TEST1.1.0
Discription  :
Last Update  :  08.03.2006 11:29:32
Updated by   :  addadmin
```

Note: The Container library could be handled as every other Simulink Library.

Container –ADDView: Opens container in ADD Offline Editor.

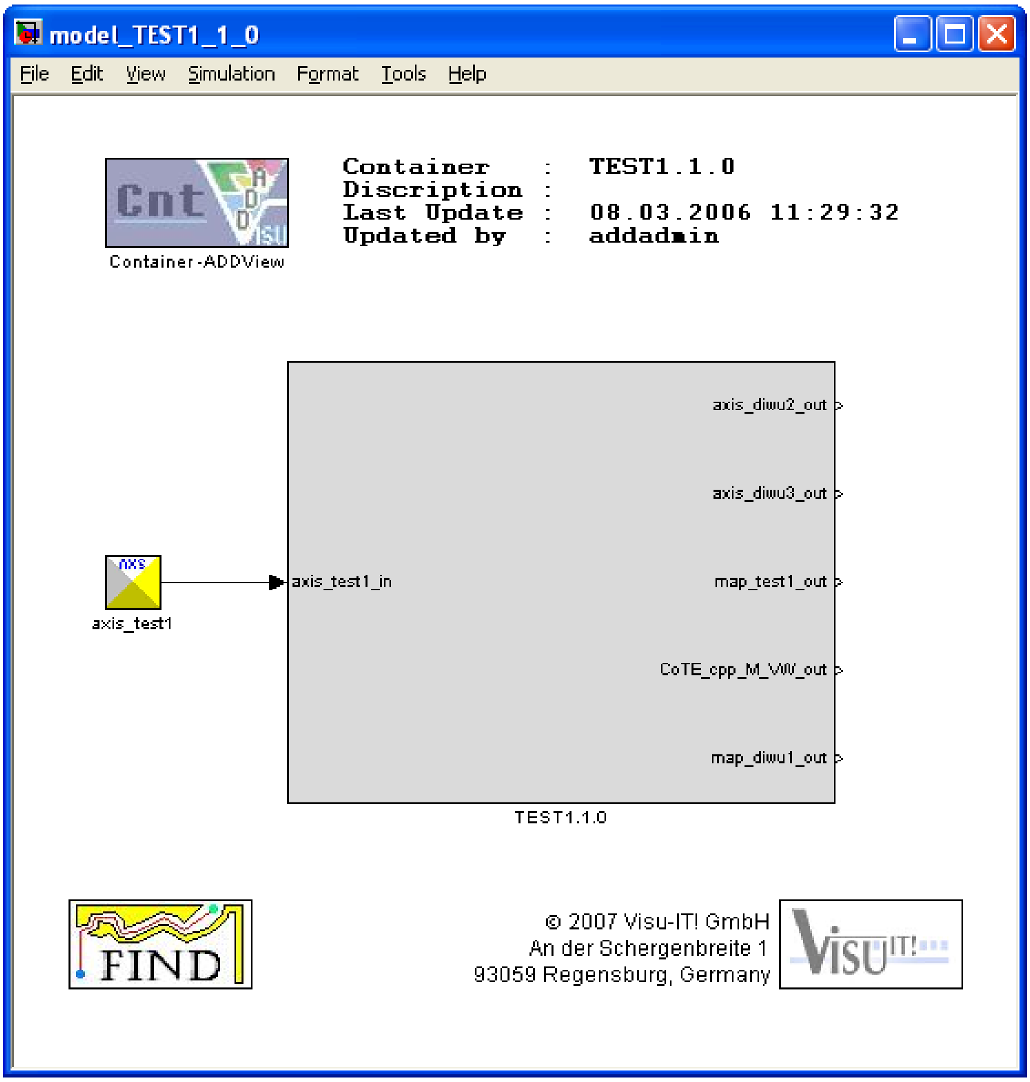
Find – Button: Opens the FindBox.



Help window for the search of container objects by name in the library and/or model.

By clicking on the appropriate list name Object will be shown and highlighted!

Container –ModelView: Opens a simplified model of the ADD container. The ADD container will be pictured as a Simulink Subsystem. Input objects of the container will be linked automatically with the container. Output and local objects will be placed inside the subsystem.



Container : TEST1.1.0
Discription :
Last Update : 08.03.2006 11:29:32
Updated by : addadmin

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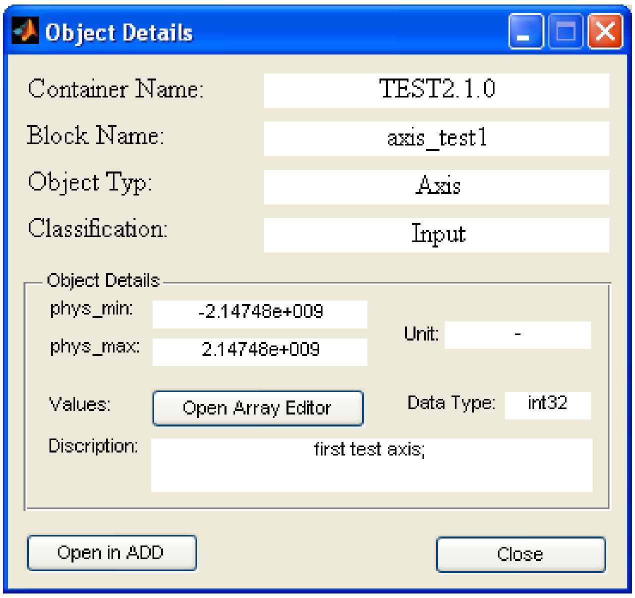
An der Schergenbreite 1
93059 Regensburg, Germany



Container Name: TEST2.1.0
Block Name: axis_test1
Object Typ: Axis
Classification: Input

Object Details
phys_min: -2.14748e+009
phys_max: 2.14748e+009
Unit: -
Values:
Data Type: int32
Discription: first test axis;

By double clicking on a container object the well arranged “Object Details” - window appears.

It shows content information of the appropriate Workspace variable.

The “Open Array Editor” – button displays the MATLAB Array Editor showing the appropriate values.

The “Open in ADD“ – button grand  a restricted access within the ADD Offline Editor. Only the object assigned as name of the MATLAB Simulink Block is allowed to be edited.

## 3.3 Structures used by MATLAB Services (Overview)

| **Global Struct *„adds“*** | | |
|---|---|---|
| **Field** | **Datatype** | **Restriction** |
| add_environment | STRING | Assigned by the service vitDDX2WS |
| ddxfile | STRING | - |
| mScript | STRING | - |
| pinfo (*) | SCALAR | ’0’ , ’1’ |
| Prefix | STRING | - |
| verbose | SCALAR | ’0’ , ’1’ |

| **Element** | **Prefix+Structure-name** | **Type of the element in ADD** |
|---|---|---|
| Axis | <xxx>_axis | axis |
| CodeVariant | <xxx>_codevariant | codevariant (data object & container attribute) |
| Constant | <xxx>_const | systemconstant |
| Conversion (*) | <xxx>_conversion | conversion definition |
| Curve | <xxx>_curve | map (1D) |
| Datatype (*) | <xxx>_datatype | data object data type definition (simulation & software) |
| Diagnose Index | <xxx>_diag_idx | diag_ddx |
| Map | <xxx>_map | map (2D) |
| Measurement | <xxx>_measure | online |
| Parameter | <xxx>_value | parameter |

| **Field** | **Datatype** | **Restriction** |
|---|---|---|
| <xxx>_name | STRING | - |
| task | STRING | - |
| adds_name | STRING | - |
| array_size_x | SCALAR[1x1] | >0 |
| array_size_y | SCALAR[1x1] | >0 |
| axis_type | STRING | ‘x_axis’ , ‘x_y_axis’ , ‘x_y_z_axis’ |
| basetype (*) | STRING | ‘enum’, ‘single‘, ‘double‘, ‘bool‘, ‘int**X**‘, ‘uint**X**‘ (**X**= 8, 16, 32, 64) |
| bit_carrier | STRING | - |
| bit_position | SCALAR [1x1] | - |
| category | STRING | ‘grouped’ , ‘individual’ |
| compresseddatatype | STRING | - |
| condition | STRING | - |
| conversion (*) | STRING | - |
| customtags | CELL-Array | {‚tag‘, ‚description‘, ‚kind‘} |
| dcm_displayname | STRING | - |
| dcm_formatstring | STRING | - |
| dcm_function | STRING | - |
| defined_in_cnt | CELL | - |
| description | STRING | - |

| | | |
|---|---|---|
| displayname (*) | STRING | - |
| formatstring (*) | STRING | - |
| ignore_for_adds | SCALAR [1x1] | ’0’ , ’1’ |
| is_array_x | SCALAR [1x1] | ’0’ , ’1’ |
| is_array_y | SCALAR [1x1] | ’0’ , ’1’ |
| is_enumeration | SCALAR [1x1] | ’0’ , ’1’ |
| local_in_cnt | CELL | - |
| mem_sec | STRING | - |
| maxaxispoints | SCALAR [1x1] | - |
| online_reference | STRING | - |
| phys_max | SCALAR [1x1] | - |
| phys_min | SCALAR [1x1] | - |
| reference_value | SCALAR | - |
| referenced_in_cnt | CELL | - |
| simdatatype (*) | STRING | - |
| size_x_from_system_constant | STRING | - |
| size_y_from_system_constant | STRING | - |
| status | STRING | - |
| swdatatype (*) | STRING | - |
| type (*) | STRING | ‘enum‘, ‘rationalfunction‘, ‘string‘,‘linear‘ |
| unit (*) | STRING | - |
| value | SCALAR | - |
| values (*) | | enum: [{'string', scalar[1x1]}; …]<br>rationalfunction: [{scalar[1x1], …}; …]<br>string: [{'string', scalar[1x1], scalar[1x1]}; …]<br>linear: [{scalar[1x1], scalar[1x1]}; …] |
| visible | SCALAR [1x1] | ’0’ , ’1’ |
| write_only | SCALAR [1x1] | ’0’ , ’1’ |
| x_axis_name | STRING | - |
| y_axis_name | STRING | - |

(*) The display of this field depends on the value of adds-struct “pinfo”!

pinfo = 0: “basetype”, “displayname”, “swdatatype”, “type” “values” not avalaible!

## *Structure schedule:*

**Structure of onlines in "list_measure":**

<online_name>.measure_name
<online_name>.phys_min
<online_name>.phys_max
<online_name>.description
<online_name>.status
<online_name>.customtags
<online_name>.unit (*)
<online_name>.formatstring (*)
<online_name>.simdatatype (*)
<online_name>.swdatatype (*)
<online_name>.compresseddatatype
<online_name>.conversion (*)
<online_name>.is_enumaration
<online_name>.bit_carrier
<online_name>.bit_position
<online_name>.write_only
<online_name>.value
<online_name>.reference_value
<online_name>.visible
<online_name>.mem_sec
<online_name>.task
<online_name>.ignore_for_adds
<online_name>.adds_name
<online_name>.defined_in_cnt
<online_name>.referenced_in_cnt
<online_name>.local_in_cnt
<online_name>.dcm_function
<online_name>.dcm_displayname

**Structure of parameters in "list_value":**

<parameter_name>.value_name
<parameter_name>.phys_min
<parameter_name>.phys_max
<parameter_name>.description
<parameter_name>.status
<parameter_name>.customtags
<parameter_name>.unit (*)
<parameter_name>.formatstring (*)
<parameter_name>.simdatatype (*)
<parameter_name>.swdatatype (*)
<parameter_name>.compresseddatatype
<parameter_name>.conversion (*)
<parameter_name>.is_enumaration
<parameter_name>.value
<parameter_name>.is_array_x
<parameter_name>.array_size_x
<parameter_name>.size_x_from_system_constant
<parameter_name>.is_array_y
<parameter_name>.array_size_y
<parameter_name>.size_y_from_system_constant
<parameter_name>.reference_value
<parameter_name>.visible
<parameter_name>.mem_sec
<parameter_name>.task
<parameter_name>.ignore_for_adds
<parameter_name>.adds_name
<parameter_name>.defined_in_cnt
<parameter_name>.referenced_in_cnt
<parameter_name>.local_in_cnt
<parameter_name>.dcm_function
<parameter_name>.dcm_displayname
<parameter_name>.dcm_formatstring

**Structure of axis in "list_axis":**

<axis_name>.axis_name
<axis_name>.phys_min
<axis_name>.phys_max
<axis_name>.description
<axis_name>.status
<axis_name>.customtags
<axis_name>.unit (*)
<axis_name>.formatstring (*)
<axis_name>.value
<axis_name>.reference_value
<axis_name>.visible
<axis_name>.mem_sec
<axis_name>.task
<axis_name>.simdatatype (*)
<axis_name>.swdatatype (*)
<axis_name>.compresseddatatype
<axis_name>.conversion (*)
<axis_name>.is_enumaration
<axis_name>.online_reference
<axis_name>.maxaxispoints
<axis_name>.category
<axis_name>.axis_type
<axis_name>.ignore_for_adds
<axis_name>.adds_name
<axis_name>.defined_in_cnt
<axis_name>.referenced_in_cnt
<axis_name>.local_in_cnt
<axis_name>.dcm_function
<axis_name>.dcm_displayname
<axis_name>.dcm_formatstring

**Structure of  constants in "list_const":**

<constant_name>.const_name
<constant_name>.phys_min
<constant_name>.phys_max
<constant_name>.description
<constant_name>.status
<constant_name>.customtags
<constant_name>.unit (*)
<constant_name>.formatstring (*)
<constant_name>.value
<constant_name>.reference_value
<constant_name>.simdatatype (*)
<constant_name>.swdatatype (*)
<constant_name>.compresseddatatype
<constant_name>.conversion (*)
<constant_name>.is_enumaration
<constant_name>.ignore_for_adds
<constant_name>.adds_name
<constant_name>.defined_in_cnt
<constant_name>.referenced_in_cnt
<constant_name>.local_in_cnt

**Structure of maps in "list_map":**

<map_name>.map_name
<map_name>.phys_min
<map_name>.phys_max
<map_name>.description
<map_name>.status
<map_name>.customtags
<map_name>.unit (*)
<map_name>.formatstring (*)
<map_name>.simdatatype (*)
<map_name>.swdatatype (*)
<map_name>.compresseddatatype
<map_name>.conversion (*)
<map_name>.is_enumaration
<map_name>.x_axis_name
<map_name>.y_axis_name
<map_name>.value
<map_name>.reference_value
<map_name>.category
<map_name>.visible
<map_name>.mem_sec
<map_name>.task
<map_name>.ignore_for_adds
<map_name>.adds_name
<map_name>.defined_in_cnt
<map_name>.referenced_in_cnt
<map_name>.local_in_cnt
<map_name>.dcm_function
<map_name>.dcm_displayname
<map_name>.dcm_formatstring

**Structure of onlines in "list_diag_idx":**

<diag_idx_name>.measure_name
<diag_idx_name>.phys_min
<diag_idx_name>.phys_max
<diag_idx_name>.description
<diag_idx_name>.status
<diag_idx_name>.customtags
<diag_idx_name>.unit (*)
<diag_idx_name>.formatstring (*)
<diag_idx_name>.simdatatype (*)
<diag_idx_name>.swdatatype (*)
<diag_idx_name>.compresseddatatype
<diag_idx_name>.conversion (*)
<diag_idx_name>.is_enumaration
<diag_idx_name>.value
<diag_idx_name>.reference_value
<diag_idx_name>.visible
<diag_idx_name>.mem_sec
<diag_idx_name>.task
<diag_idx_name>.ignore_for_adds
<diag_idx_name>.adds_name
<diag_idx_name>.defined_in_cnt
<diag_idx_name>.referenced_in_cnt
<diag_idx_name>.local_in_cnt
<diag_idx_name>.dcm_function
<diag_idx_name>.dcm_displayname

**Structure of curves in "list_curve":**

<curve_name>.curve_name
<curve_name>.phys_min
<curve_name>.phys_max
<curve_name>.description
<curve_name>.status
<curve_name>.customtags
<curve_name>.unit (*)
<curve_name>.formatstring (*)
<curve_name>.simdatatype (*)
<curve_name>.swdatatype (*)
<curve_name>.compresseddatatype
<curve_name>.conversion (*)
<curve_name>.is_enumaration
<curve_name>.x_axis_name
<curve_name>.value
<curve_name>.reference_value
<curve_name>.category
<curve_name>.visible
<curve_name>.mem_sec
<curve_name>.task
<curve_name>.ignore_for_adds
<curve_name>.adds_name
<curve_name>.defined _in_cnt
<curve_name>.referenced_in_cnt
<curve_name>.local_in_cnt
<curve_name>.dcm_function
<curve_name>.dcm_displayname
<curve_name>.dcm_formatstring

**Structure of  codevariants in "list_codevariant":**

<codevariant_name>.codevar_name
<codevariant_name>.condition
<codevariant_name>.description

**Structure of  codevariants in "list_datatype":**

<datatype_name>.datatype_name
<datatype_name>.basetype
<datatype_name>.conversion
<datatype_name>.formatstring
<datatype_name>.unit
<datatype_name>.adds_name

**Structure of  codevariants in "list_conversion":**

<conversion_name>.conversion_name
<conversion_name>.displayname
<conversion_name>.type
<conversion_name>.values
<conversion_name>.adds_name

(*) The display of this field depends on the value of adds-struct “pinfo”! (pinfo = 0: “basetype”, “displayname”, “swdatatype”, “type” “values” not avalaible!)