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Legend generator 5.5 for ArcMap 10

User guide

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1 Abstract: legend-generator und FeatureRenderer

The legend generator and the map renderer are two extensions for esri arc map. Both were programmed with VB6 and ArcObjects und are available as OpenGis-Software. Both programmes meet the requirements of traditional "geological cartography". The extensions allow it to create a graphical layout, based on a legend table wich includes the required symbology-names. The legend table also makes it possible to render layers in arc map.

The advantage is that ArcMap-mxd's or layerfiles become redundant for illustrating a geological map. Thus a complete map can easily passed between revisers via a mdb-file.

The FeatureRenderer is eluciaded in a separate manual.

2 Installation

Preperations:

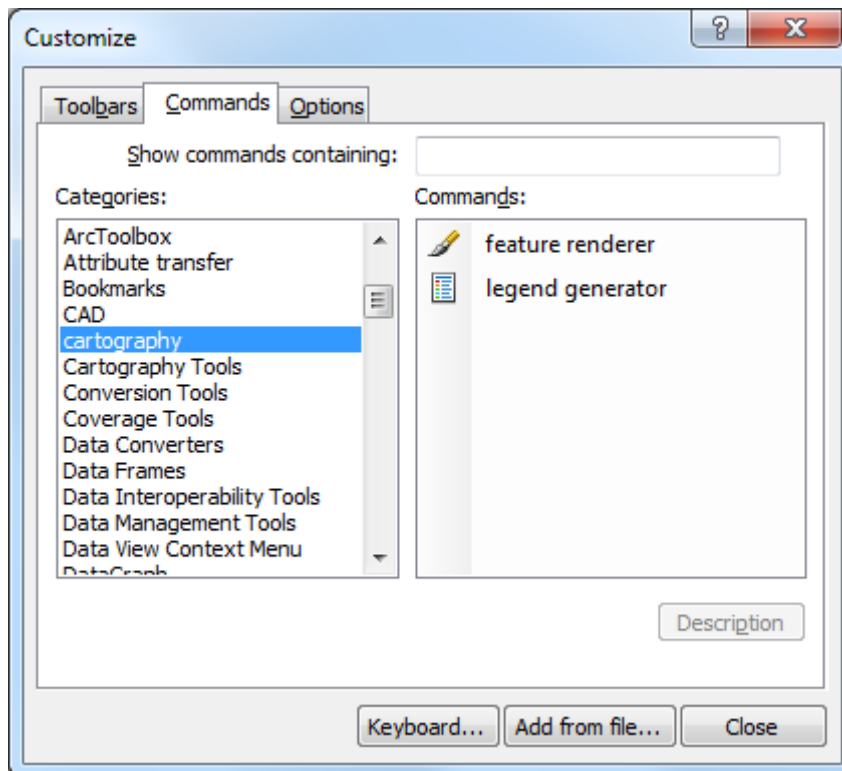
The required software – parts are ESRI-Addins resp. Style – files (FeatureRenderer, LegendGenerator, Stylefiles, TrueTypeFonds). All files can be downloaded by following the link: <http://gisgba.geologie.ac.at/webs/LegendGenerator/>

Subsequent to the download, the files should be pasted into a local directory. As standard thereby is considered D:\ Kartografie_tools\.. (the style geolba.style will be then automatically on use of the legend program loaded). The four TrueType Fonts (geolba_simple.ttf, geolba_standard.ttf, geolba_legende.ttf, geolba_struktur.ttf) can be installed for example by windows system manager - fonts in the operating system.

The four true type fonds (geolba_simple.ttf, geolba_standard.ttf, geolba_legende.ttf, geolba_struktur.ttf, geolba_iris.ttf, geolba_techinc_simple.ttf) can be installed by right click > „install“. All geolba-styles use exclusively these four true type fonds and Arial.

Installation of the LegendGenerator in ArcMap 10:

Click the button „Customize“ and choose „Customize mode“. Then in Commands/Categories/cartography in the right window (Commands) drag and drop GK- drag and drop the file into the desired position of any toolbar you want.



The window above shows the ESRI-ADDINS, loaded with „Add from File“

The window below shows the two ESRI-ADDINS placed into the toolbar.



If an update of the legend generator is implemented, the dll file can be easily overwritten with the Windowsexplorer - the group of commands (and/or individual dll) cartography should update itself then automatically. If the icon disappears once, the dll can be added again.

The input mask of the Legend Generator 5.5 is depicted below:

Legend Generator 5.5 für ArcMap 10.0

File Settings Export Information Help

Access - Database SDE - Database

☒ Use Access

Access database:

Load Access Tables

Further configurations:

Graphic positioning Wrap colors in %

X-Offset: Before heading 1:

Y-Offset: After heading 1:

Vertical distance: After heading 2:

Bracket distance: Notes offset:

legend box - legend text - distance:

☐ only compute within viewable area

ID:

QUERY (z.B. L_SORT LIKE 'a*' and HEADING1 LIKE 'Quartär*'):

Database columns Further database columns

Legend table:

Primary key:

Sort key:

Legend text:

Symbolics:

Legend graphics:

Heading 1:

Heading 2:

Heading 3:

Bracket 1:

Bracket 2:

Bracket 3:

Group:

Area symbol:

Line symbol:

marker symbol:

Legend number:

☐ sequential numbering [lookup table]

Preferred Symbol Style:

☐ Print color values into the legend

☐ accept 0-values for L_NUM

Legend template Create the legend

3 Creating a legend Template

A crucial requirement for rendering a map legend is the availability of a legend template.

If you click on „ Legend template“ a template will be generated.

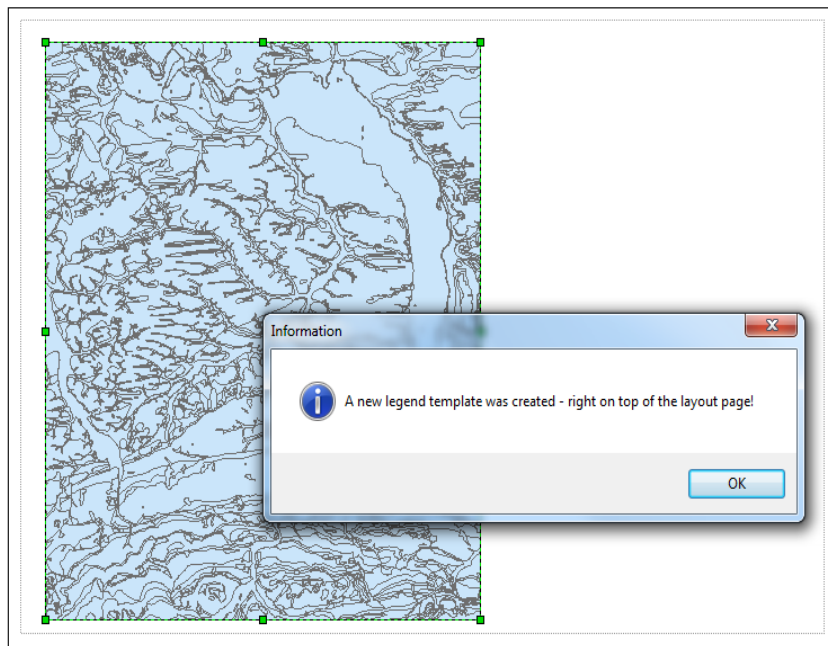


You can find the button „Legend template“ on the bottom of the Legend Generator

For creating a new legend template a collection of the following sketch-elements must exist in the reference style:

***legend box in fill symbols,
marker in marker symbols,
line and bracketline in line symbols,
headings 1 to 3 and bracket text
„graphics “- text and legend text and
label in text symbols.
brackettext in text symbols***

A successfully generated legend template right above the page in the layout (figure below).



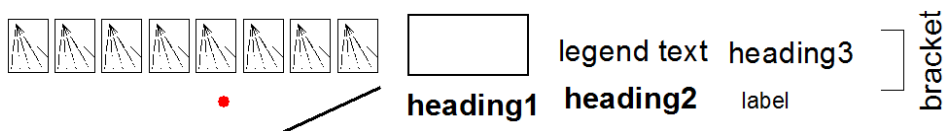
The legend generator takes graphic elements in the page layout for the construction of the legend. Thus the legend template can be arranged graphically on the own needs. e.g. own legend box size, red heading 2 right positioned, or dashed legend box outline, zigzag line for the line symbols, position of the label etc.

Tip: Sometimes it can happen the legend generator mistakenly uses another rectangle as a template in the layout. In order to avoid that mistake, layout elements should always be grouped. The actual legend template which should be used must not be grouped.

The following example shows how the graphic elements of a created template are put into a page layout:



The automatic template-creation leads to a an overlap of the graphic elements. Therefore the elements are shown neatly arranged below:



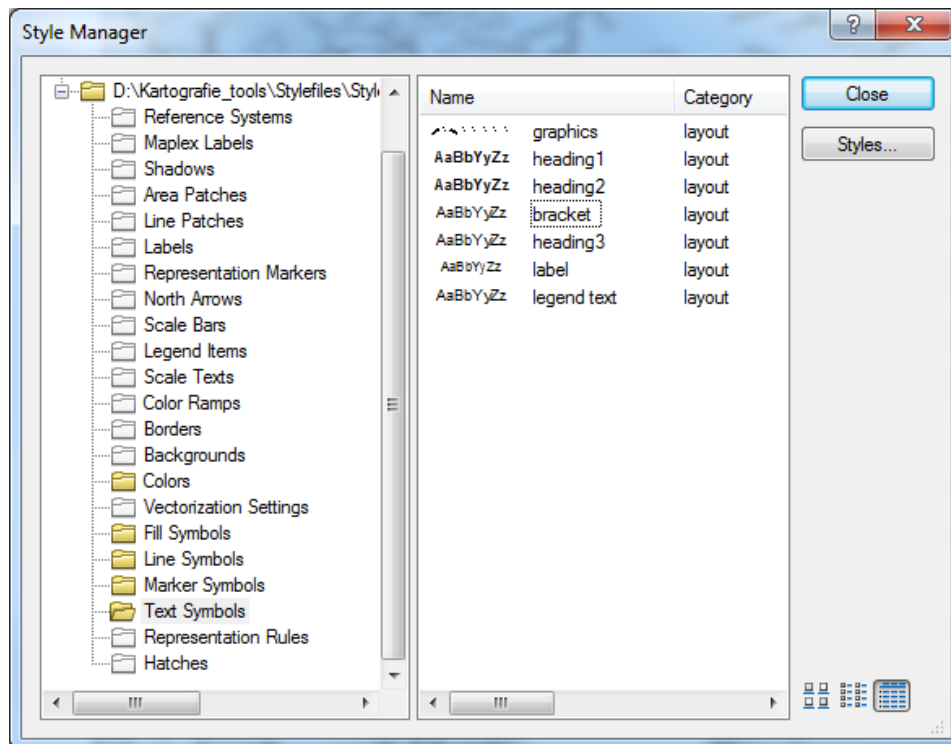
The PageLayout must provide the following graphic elements:

1 rectangle

(legend box max. 3 cm wide) - other rectangles existing in the page layout can be mistakenly used as legend boxes. In order to avoid this, other rectangles or lines or marker should be grouped before creating the legend. Multiple Templates can be stored grouped in a page layout.

1 Polyline as bracket right of the rectangle (max 7 mm wide). Care has to be taken that that the height and position of the bracket goes conform with the legend box size.

Texts in the desired character font, - size and position with the text wording “heading1”, “heading2”, “heading3”, “legend text”, “bracket”, “label” as well as “graphics” (but written in the font geolba_legende, if geolba_legende.ttf should be used for the legend graphics).



Needed text symbols in reference style for creating a legend template

Furthermore:

1 line (min 8 mm wide) and 1 marker on the legend box (rectangle) as pattern for line and marker symbols

The copying of a Template with Strg C, Strg from one ArcMap project (PageLayoutView) into another, is only possible if the paper size and the zoom factor are equal in both page layouts. Otherwise some objects will be deformed then.

4 Creating a Legend:

In general:

The legend generator opens the indicated legend table according to the sorting of the sorting key, and opens it filtered by a SQL query, if favoured.

For each data row a legend position will be provided according to the settings of the legend template. Furthermore it will be nested or combined etc. according to entries in the field L_GROUP or by entries in the field L_GRAPHICS completely or partly replaced by legend graphics.

Headings and brackets are set again or terminated by current comparisons of preceding cell contents. Zero entries (no cell value) cannot be processed, and are therefore represented by a hash mark „#“.

Tip: The legend generator draws each legend position, which is present as row in the legend table, after the sort sequence into the layout.

positions which were eliminated by an **attribute query**, or a **spatial query** (considering only visible data content) are excepted.

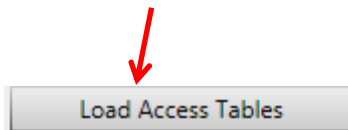
4.1 Choosing a database in the legend generator

First choose a database. The name of the GeoDataBase or the SDE – connection must be loaded, typed (or copy/pasted from the TableOfContent) or loaded through the open dialogue box.

In the presented example below an access database is used.



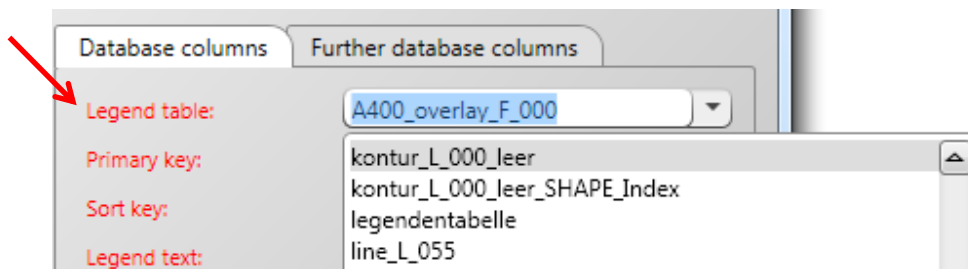
After choosing the access tables, they have to be loaded. Otherwise the Legend table will not become selectable.



Now the Access tables and thus the legend table become visible in the menu item. (at the top on the right in Legend Generator)

4.2 Choosing a legend table:

After choosing an appropriate data base, a Legend table becomes selectable.



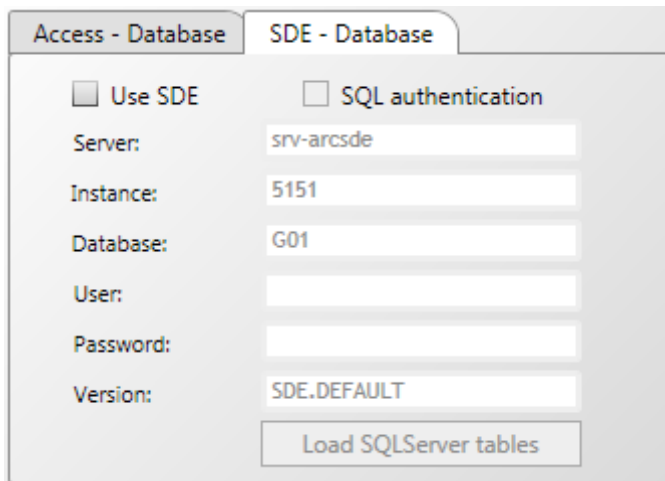
4.3 Table – and Field names

In the right part field names of the legend table can be defined. The name of the geodatabase or alternatively SDE database and the name of the legend table must be loaded typed (or copy/pasted) from the TableOfContent, or through the open dialogue.

The headings 1 to 3 are hierarchically processed. For example the heading 2 would be set again, even if it does not change - if a change in the heading 1 occurs. In other words, the headings 2 form subsets of heading 1, and headings 3 form subsets of headings 2. The headings category 4 to 6 (info lines) are not hierarchical and are not supervised on the connections described above.

4.4 Server Datenbank - remote database

If an ObjectID (OID field) is present in the table, the legend generator opens the indicated legend table sorted according to the sorting - key. That does not always apply to tables on serverdatabases, especially if they are not used exclusively by ArcGIS. In this case you can access a presorted view.



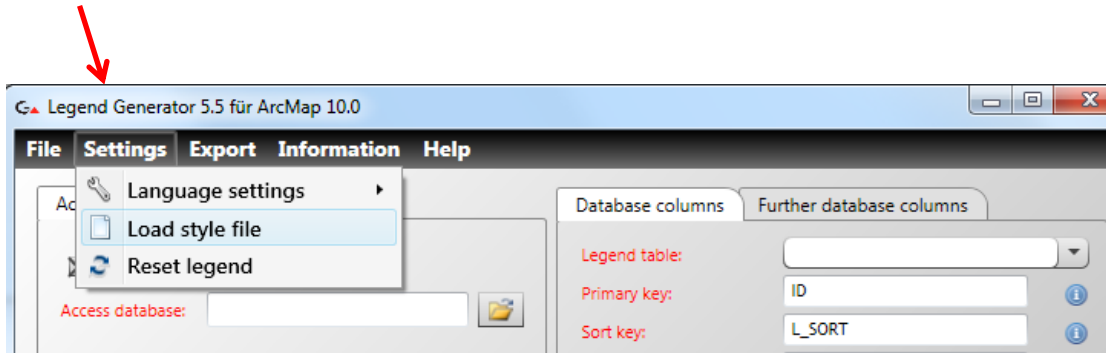
The screenshot shows a dialog box titled 'SDE - Database' with two tabs: 'Access - Database' and 'SDE - Database'. The 'SDE - Database' tab is active. It contains the following fields and controls:

- ☐ Use SDE
- ☐ SQL authentication
- Server:
- Instance:
- Database:
- User:
- Password:
- Version:
-

Menu window for indicating the „connection properties“ zur Server-Datenbank

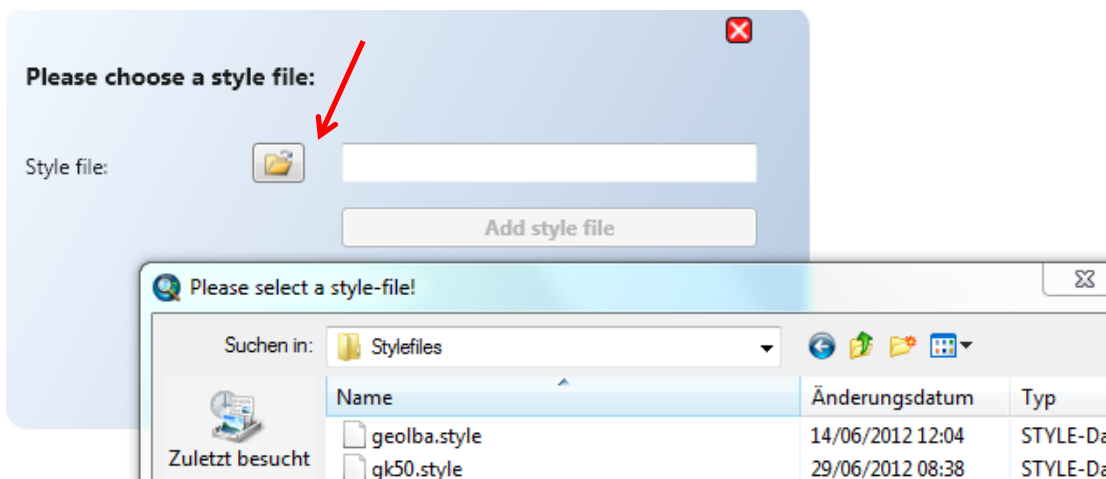
4.5 style reference

For creating a legend it is crucial to indicate a symbol style in which the patterns for the application of Fill - , Line-, and Marker – Symbols is defined. The symbol style has to be loaded into an ArcMap-Projekt via style manager before the starting of the generation of the legend. If the style gets loaded via the stylemanager dialog, the style specification will be updated automatically.



The needed styles can be loaded via "settings" in the legend generator.

choosing a stylefile:



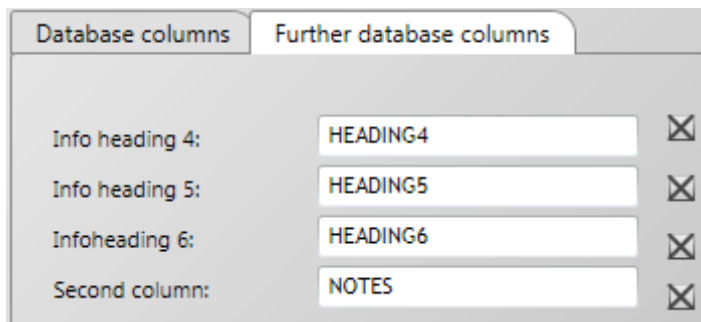
All symbols for legend production should be present in the indicated style too - with a 7-digit symbol name. If symbols are present in other loaded styles e.g. supplementary project styles -, they are processed and listed at the end in a „critical message“. An other possibility could be, to add supplementing project styles as separate categories into the standard style.

TIP:

The combination of several styles can lead to multiple equal symbol names. As a result it is not ensured that the legend generator and the map renderer use the same symbols for the representation in map and legend.

4.6 Extended headings and notes

If the Checkbox “notes” is checked, a new text column with entries from the legend table will be noted in the indicated note – offset.

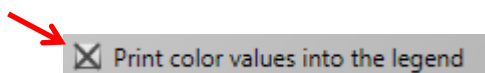


Database columns		Further database columns	
Info heading 4:	HEADING4		X
Info heading 5:	HEADING5		X
Infoheading 6:	HEADING6		X
Second column:	NOTES		X

Activated GIF export, additional notation of the legend boxes with symbol names, and use of the extended headings and a “notes column” (second) column.

4.7 write symbol names










If the checkbox „write symbol names“ is marked, it additionally notes the fill symbol, line symbol and marker symbol names left beside the legend box, in same font as labels.



4.8 Spot color definition

In the left part part (further configurations) the spot colors Schmuckfarben (Cyan = first column Magenta = second column; Yellow = third column; Black = fourth column) can be readjusted. 21% black percentage (K) means an overprinting for a further processing in the prepress print publishing.

Further configurations:

Graphic positioning	Wrap	colors in %			
RED:	0	100	100	21	
BLUE:	70	30	0	21	
GREEN:	70	0	100	21	
BROWN:	20	50	60	21	
GRAY:	10	10	10	21	
MAGENTA:	0	100	0	21	
CYAN:	100	0	0	21	
YELLOW:	0	0	100	21	
ORANGE:	0	30	100	21	

Definition of the process color portions for the representation of the spot colors.

4.9 Query – filter for the legend table

With QUERY (inquiring query filter) an SQL filter can be applied on any legend table field. Thus it is possible to create one discrete legend symbol for a group of symbols (e.g. a line – symbol for different tectonic lines) instead of constituting the symbols separately.

Thereby in the legend table more entries can be saved than it's necessary for rendering the Layer.

QUERY (z.B. L_SORT LIKE 'a*' and HEADING1 LIKE 'Quartär*'):

L_SORT LIKE 'a*' and HEADING1 LIKE 'QUARTÄR*

Filtering of the legend table by all entries in L_SORT starting with an „a “and in HEADING1 with „Quaternary = Quartär“.

4.10 Graphical positioning in page layout

With “**X-offset**” and “**Y-offset**” the relative positioning of the legend to the template is adjusted.

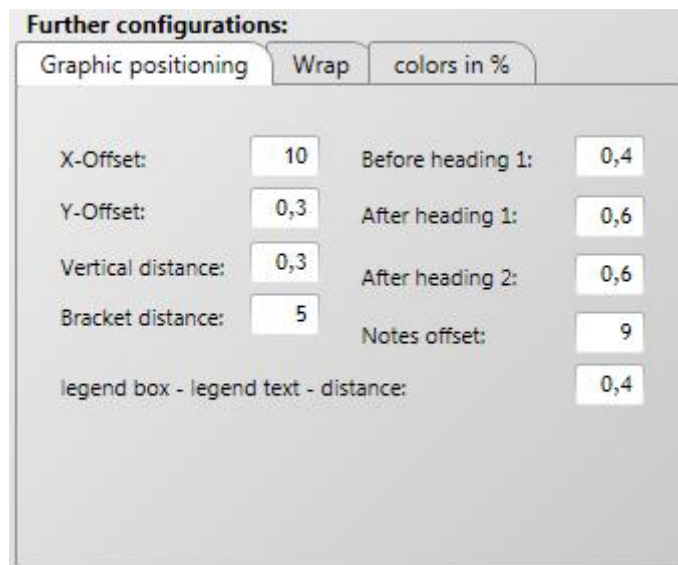
“**Vertical distance**” describes the extend oft the gap between the depicted legend boxes.

“**Bracket distance**” is the horizontal distance between the brackets.

„Before heading 1“ and „after heading 1“ an extra line feed before and after headings of the category 1 can be set.

„After heading 2“ an extra line feed can be set after headings of the category 2.

“2nd col. Offset” indicates the disalignment from the legend text to the 2nd column. But longer texts (longer than the legend text) do not cause additional line feed in the positioning of the legend boxes



Further configurations:			
Graphic positioning	Wrap	colors in %	
X-Offset:	10	Before heading 1:	0,4
Y-Offset:	0,3	After heading 1:	0,6
Vertical distance:	0,3	After heading 2:	0,6
Bracket distance:	5	Notes offset:	9
legend box - legend text - distance:			0,4

Graphical positioning relative to the legend template

4.11 Line – and column break

The line break for heading 1 to 3 and legend text (“2nd column” if activated) regulates the maximum number of characters in a line, whereby the closest blank is replaced by a carriage return. An \$-character in the text will be replaced by a line break (manual line break).

The maximum number of legend positions (boxes and headings) in a column, before a new column is created, regulates “entries per column”. With consideration of headings and brackets. „Column offset“ defines the column distance to the next legend column.

Count of chars for line break, and count of legend positions (records) per column, as well as the column distance.

4.12 Visible area – process the legend only for dataframe content

If the check box „only compute within viewable area“ is enabled, the program examines (when processing all legend entries) whether in the activated dataframe a geometric element is present - that has in the indicated field name the current ID of the legend. If found one, the legend entry is also drawn in such a way.

Input window „only compute within viewable area“

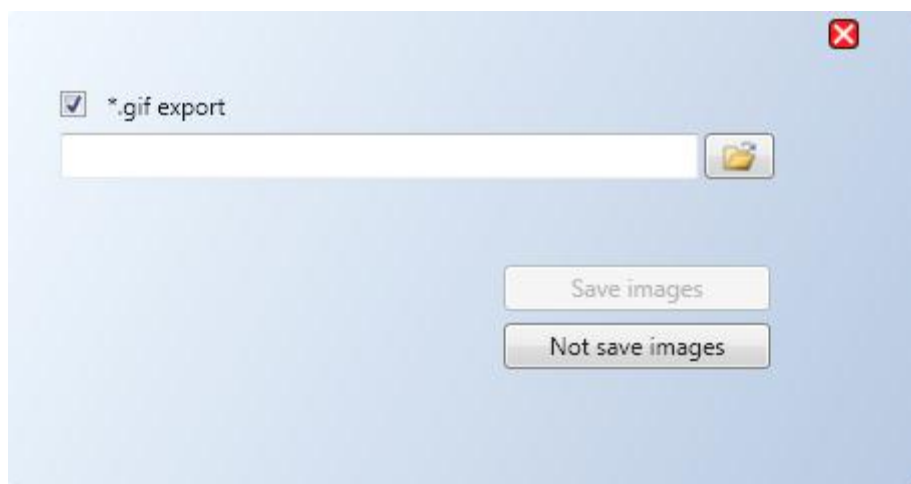
4.13 Ongoing numbers for the legend

The sequential numbering offers additionally the possibility to write a LookUpTable (as a text file) on the hard disk, in which the sequential numbering of the legend can be used with a join to the Featureclass (L_ID) for labeling the map.

4.14 Symbol export

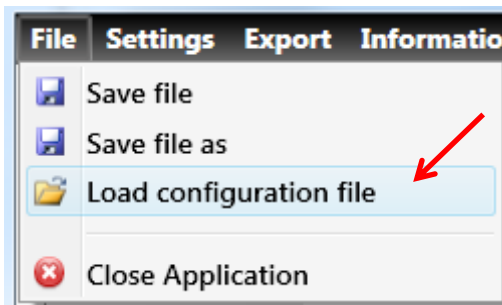
The menu item „Symbol export“ enables the export of legend boxes u.o. as GIF picture (“click “*gif export”) with name [ID].gif into a choosen directory

If the check box „*.gif export“ is enabled, it exports each legend box as GIF picture with name [ID].gif into a directory which can be typed. In such a way provided graphic files can be used again e.g. in ArcIMS, on homepages, or in Word.



4.15 Configuration file

All attitudes for the creation of a legend can be stored in a configuration file for initialization or loading again. If the filename ist typed without path, the configuration file will be saved in the directory “private profiles” (e.g. C:\dokuments and attitudes\user\Application Data\ ESRI\ArcMap\templates\start.lcfg). If an identical file is already present, then it will become overwritten. This extends to the LookUpTable for the sequential numbering.



When first calling the legend generator in a ArcMap session a start configuration (start.lcfg) is loaded from private profiles directory (e.g. C:\dokuments and attitudes\user\Application Data\ESRI\ArcMap\templates\start.lcfg) - if available.

4.16 Error reports

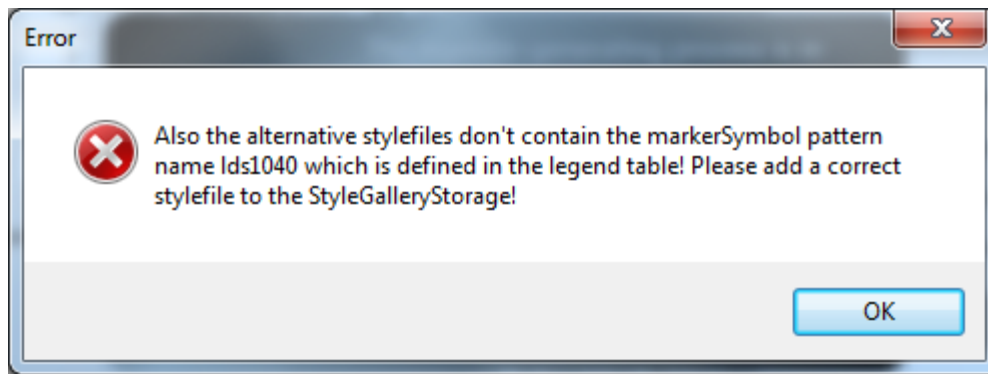
Error messages are provided in case of missing or wrong data base, file, table and field names; as well as missing or wrong symbols, spot color definitions.

z.B. Fehlermeldungen die zum Abbruch der Legendenerstellung führen:

ERROR - database not found
 ERROR - legend table not found
 ERROR - SDE connection properties
 ERROR - SDE legend table not found
 ERROR - SQL syntax
 ERROR - [grafische Elemente zB Klammerstext] not in template
 ERROR - field name [Feldname] not exists
 ERROR at ID : [eine Zelle in Datenzeile] - no field entries
 ERROR at ID : [ID] - symbol [7stelliger Symbolname] not defined
 ERROR at ID : [ID] - symbol color [Schmuckfarbnamen] not defined
 LCFG-File not found

False input format for the colors! Please only define numbers!

It is also important that the labeling of the legend – symbols equals to the coding of the symbols in the reference style. If the given labeling is not found in the stylefile, the rendering of the legend will be terminated, followed by the display of error messages:



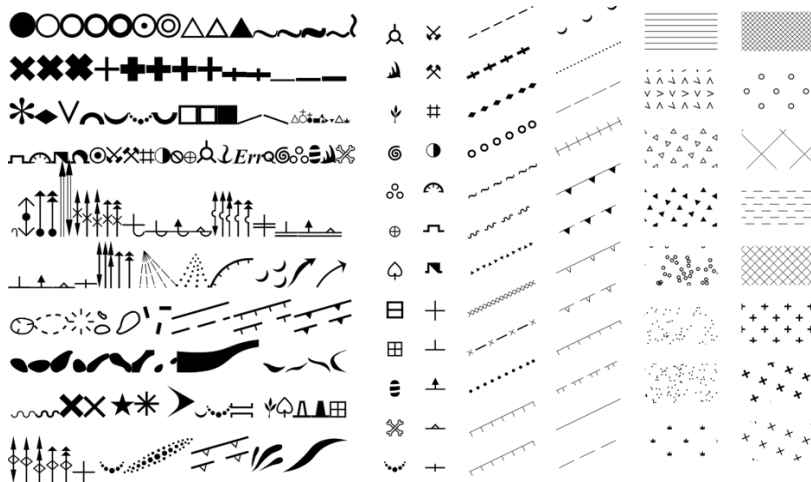
4.17 TruetypeFonts

Regarding the visualisation, four TrueType symbol-fonts (character sets) designed at the Geological Survey form the base for a symbology in ArcGIS. A symbol pattern catalogue was generated in the ArcGIS style format mainly by using these four truetype fonts, Arial font and ESRI simple marker.

- simplefont (simple geometric components)
- standardfont (geologically specified char.)
- structurefont (structural geological char.)
- legendfont (additional graphics for the legend representation).

Since only single patterns are stored here, without background color and pattern color, an easily comprehensible and limited amount of pattern is available.

The patterns were generated in ArcGis-Style whereby the TrueType – fonts served as source. Altogether about 150 – 200 filltypes, linetypes and markertypes were generated. These patterns either have geological or geometrical labels. Patterns with a geometrical definition must stay unchanged, while „geological patterns“ are allowed to become readjusted as needed.



TrueType-Fonts und daraus erstellte Mustervorlagen

4.18 Styles

The actual fill-, line- and marker symbols are defined as text entries into the legend table. The first four characters describe cyan-, magenta-, yellow-, and black color percentage of the background color in selected categories (no color percentage, 0%, 6%, 10%, 15%, 20%, 30%, 40%, 50%, 60%, 70%, 100% full color). In the following 7 text characters the pattern name is designated in accordance with symbol catalog. And with three characters the pattern color is ready defined.

4 Zeichen	7 Zeichen	3 Zeichen
20F0fls0300	ROT	
C M Y K		
Hintergrundfarbe	Mustername	Musterfarbe

Definition of a fill symbol with 20% cyan, 0% Magenta, 15% yellow, 0% black as background colour (lightgreen), and a line shading in spot red

The definition for background color is omitted for line- and marker symbol names. These symbol names only are noted with 10 characters instead of 14 (as for fill symbol names). The pattern colors or “spotcolors” can be redefined at the digital prepress and reprinted in a separate printing phase during the offset print.

By the overprinting effects for up to 10 printing phases (4c/6) a considerably higher degree of readability of the maps can be reached. Thereby the color design of a map is reduced at the use of process colors for planar polygons and the use of spot colors for overlaying pattern fills, lines and markers.

A characteristic percentage of the black tonal value (spot colores) beside standardized categories allows the selection and redefinition as a solid color in the printing – preparation.

4.19 Legend table

In the legend table one record stands for one legend position, one legend text, one ID, and max. one fill- and/or line- and/or marker symbol. The drawing order is specified by a sorting key. Successive identical entries in the heading and bracket fields produce the legend structure with headings and brackets. Connected legend boxes can be constructed by successive identical group arguments (encapsulated into each other, sticking together).

A parent-child relation with a hanger from parent to each other child can be reached with a group argument identical to parents ID. The primary key (ID) defines the join to the geometric data (featureclasses).

The primary key (ID) establishes a connection to the geometrical data (featureclasses). At this an active link or connection to the table for the functionality of the Legend Generator.

An additional field contains the legend text without a line break (it will be only defined by the legend generator) in the Access – Fieldtype “Memo”.

The legend text is written into another field without line break (this one is produced by the legend generator) in the memo fieldtype for up to 65536 characters.

Further attribute fields are available for the legend numbering, for legend graphics as an alternative replacement in the legend box (from the truetype font "legend.ttf") and of course for the symbol names.

Once a completely edited legend table contains the complete cartographical representation of the map legend in pagelayout and will be used later to render every single layer in Arcmap.

In a geodatabase (or distributed on several data bases) the complete representation of GIS data, including the legend structure is saved originally in only one legend table - beside the GIS data of a map.

The original - status of a central volume of data is thus extended to the representation of map and legend, contrary to the color and symbol management in various copies of layerfiles or mxd's.

The entire structure of the legend table is developed “data base-conformal” and can be used selectively while processing with the legend generator (e.g. by an attribute query or a spatial query of visible dataframe content).

For the view of a map clip also from several combined data sources the spatial restriction will be transferred as query to the legend. The creation of a clipping for the production of a legend is not necessary anymore.

The “data base-conformal” legend with all kinds of different representation options, (like e.g. headings of several hierarchies, bracket levels, partitioned and combined legend boxes) may have been changed and corrected very often during the production of geological maps.

Legend entries will be inserted, deleted, kept in reserve, sorted again and all this with a consistent legend structure. A legend table with the following formatting must be available for the construction of the legend. (The legend itself does not have to be loaded).

As a standard sign for in the table "no entry" stands the hash mark "#". Empty cells (appears as <null> in ArcMap) interrupt the building process of the legend. On the other hand the complete notation is thus also guaranteed in the legend table if the complete legend is made.

Standard table structure of the Legend Table:

fieldname	fieldtype	length	description
OBJECTID	Object ID	4	automatic ID for ArcGIS
ID	String	6	indexing the geometric features
L_GROUP	String	7	defines parent-child relationship
L_NUM	Short/String	2	number in legend box
L_SYMB	String	5	F, and/or L, and/or M (box/fill, line, marker), or "MM"
HEADING 1	String	200	hierarchical headings 1-3
HEADING 2	String	200	
HEADING 3	String	200	
BRACKET 1	String	200	not hierarchical brackets 1-3
BRACKET 2	String	200	
BRACKET 3	String	200	
L_TEXT	String	2147483647	legend text ("memo" formatted in MSAccess)
L_GRAPHICS	String	5	additional legend graphics
L_SORT	String	20	sorting key for legend
FILL_SYMBOL	String	14	fill symbol names
LINE_SYMBOL	String	10	line symbol names
MARKER_SYMBOL	String	10	marker symbol names

***TIP:** all fields must be filled out completely, the sign # stands for no entry !!!
but almost all fields can be deactivated if not in use*

Excepted for 1 ID – field (can be used as a sorting-key) and 1 field für the Legend – text must, all the other field can be switched off.

If you want to use the extended functions of the legend programme (e.g. headings 4 to 6 or notes), then such fields must exist also in the legend table!

All field names of the legend table of course can be chosen freely too, then they must be typed into the input mask of the legend programme or be loaded with a configuration file, however. During the first – time activation of the legend generator in an ArcMap-Session, a start configuration (start.lcfg) gets loaded from the private profile directory – if available. All configuration files will be stored and activated there if any path is indicated.

All the field names in the Legend Table can be choosen freely, but must be typed into the input mask of the Legend Programm afterwards. The indication of a Legen Table and it's related database is possible by an FileOpen-Dialog. Styles can be listed with the StyleManager-Dialog.

The the field **ID** is the legend primary key and the connection with the geometrical data in the map, eg. FeatureClasses for polygons, lines or marker. At a 6-digit notation the first three text characters could stand for a description of the data area (eg. DAG003 DAG stands for "Dachsteinkarte" or SHD830 SHD stands for Shade = Shadeset, number 830 for lakes. They all shall be supposed to be filtered out with a SQL query and not be drawn in the legend for lakes).

The last three signs could contain the first indication of the polygons. The ongoing numbering of the legend boxes can be made by the field "label" (texts or numbers).

L_GROUP: identical successive listings (**2** brother, child elements) create the legend boxes adjacent without vertical distance. If the the notation is equal with the first ID (**1** parent element) the legend boxes additionally get a connection to each other with a binder.

Furthermore, with identical successive listings and an additional "+" at beginning – multiple legend boxes can be created (**4** e.g. twins and so on), with chained legend texts. Parentship **3** will be canceled with identical successive listings and an additional "-" at the beginning. Then a succeeding combination with adjacent boxes can be made.

4	26	27	28	Terrassensediment (Murtal bei Flatschach; Frühwürm) / Schotterflur, Flussgeschiebe am Mitterberg / Konglomerat (nördlich Voldersdorf)
2	29			Aufschlusslose Hochplateaus der sogenannten Nockfläche (Formrelikte einer ehemaligen Rumpffläche mit mutmaßlich neogenen Reliktböden)
1	30			Schieferton, Sandstein (?Karpatum)
2	31			Brekzie im Schieferton (Göriachtal)
2	32			Wechselagerung von Schieferton, Sandstein und Konglomerat
3	33			Grundkonglomerat

Special case: *Favourite child (!!!) - if the child shall be printed over the parent without line feed and the legend text of the child shall be appended by the parent to this one. (Identification by a # in the beginning of the legend text).*

The ongoing legend number is noted down in the field **L_NUM**. With an entry of the number (or text) "0" the depiction of a box and a label number stops. (e.g. for locations under various sign). You can format also as a text field.

In the field **L_SYMB** by the detail of **F** and/or **L** and/or **M** will be notated, whether the legend entry shall be represented with legend box (fill) and/or line and/or marker.

If there are no symbol definitions (in FILL_SYMBOL, LINE_SYMBOL or MARKER_SYMBOL), an empty box is available according to template. The column L_SYMB only is used for the representation in the legend ! By inserting a "MM" (which means multiple marker) – a triple marker will be placed into the box.

HEADING1 to ..3 are hierarchically written headings. Successive entries write the heading for all legend entries once. A change in heading1 causes anyway a new drawing of heading2 and heading3 and so on. The same applies to heading 2 regarding heading 3.

In **BRACKET1..3** bracket levels are not defined hierarchically and comprehensive. As in the case of the headings successive identical entries form a bracket.

In **L_TEXT** the legend text is written in the Memo(MSAccess)-format (up to 2000 characters). The automatic line break is listed in the form (e.g. after 50 characters) and you also can complete the entries by manual line breaks with "\$."

A legend graphic can be defined in **L_GRAPHICS** (e.g. moraine embankment). The graphic is the symbol in the legend graphic of the used symbol font (e.g. geolba_grafik.ttf). A legend graphic is an additional notation and can replace lines (L) or replace a marker symbol (M) or a fillsymbol (F).

Furthermore the legend graphic can be drawn with a spot color e.g. blue (by the addition "BLA") etc., defined by their Cyan Magenta Yellow and Black values in the form.

With the addition "XXX" a text character with a fill symbol typed in FILLSYMBOL-field will be drawn with a standard contour.

Coding examples for symbol names:

#:	<i>for no legend graphics</i>
#0:	<i>Moraine embankment (geolba_legende font corresponds to the text character "0") in black</i>
#0BLA:	<i>Moraine embankment in the spot colour blue</i>
F0BLA:	<i>Legend graphic moraine embankment in blue replaces the fill symbol of the legend box</i>
F0XXX:	<i>The full representation of the legend box is replaced by a ttf legend graphic with fill symbol corresponding to column FILLSYMBOL</i>
L0:	<i>Legend graphic moraine embankment replaces line representation</i>
M0:	<i>Legend graphic moraine embankment replaces marker representation</i>
H:	<i>Legend box is separated horizontally; the right part is the line and/or a marker, in the left part the fill symbol</i>
H0BLA:	<i>like above but in addition with legend graphic (moraine embankment).</i>

In the field **L_SORT** The sorting order of the legend is determined alphanumerically. The sorting function is turned off at SDE tables in the meantime since we work with ArcObject - not registered tables - in the "Geological Survey of Austria", and such tables are not sortable with ArcObject scripts with "TableSort". Instead we have got one pre-sorted table view (on L_SORT).

In FILL_SYMBOL, LINE_SYMBOL, oder MARKER_SYMBOL the symbol names are defined as shown below:

Fill symbol names in the field **FILL_SYMBOL** consist of 4 signs for the background colour in CMYK (X for no colour percentage with overprinting, 0 for 0%, s for 6%, 1 for 10%, F for 15%, 2 for 20%, 3 for 30%, 4 for 40%, 5 for 50%, 6 for 60%, 7 for 70% and V for, 100%, colour percentage).

Example: The process colour 0VV0 corresponds to 0% Cyan, 100% magenta, 100% Yellow and 0% black yields "red".

Optionally it is possible to attach further 7 (exact) characters which have a pattern name of a fill symbol in the Stylesets (see stylemanager).

Optionally further 3 (exact) characters can be attached to define the spot color in which the pattern should be colored. RED for spot-red, BLU for spot-blue, GRN for spot-green, BLK for black, WHT for white, GRY for spot-grey, BRN for spot-brown, ORA for spot-orange, CYN for 100% CYAN, MGT for 100% magenta)

Examples of fill symbol names:

XXXXrauhwac
5200fpt0123MGT

*Rauhwacken -- cross hatching without background
blue background with "fpt0123" ringed pattern in magenta*

Line symbol names in **LINE_SYMBOL** field consist analogously of the first 7 characters of a line symbol name according to a style-set and optional of a line spot colour (e.g. breccieBRN).

Marker symbol names in **MARKER_SYMBOL** are defined like line symbol names: the first 7 characters for a marker spot name according to style-set and optional of a marker spot colour (e.g. erratblROT).

It has to be taken into account that all style names also can be found in the styles loaded in the ArcMap project. The samples can be distributed in several styles (e.g. geolba.style in combination with a project style)

For every symbol without defined colour the legend generator takes this one respectively it finds (unless at multicolor styles) . Not existing symbols in the styleset lead to the breaking off of the programme.

The samples can be distributed in several styles (e.g. geolba.style in combination with a project style)

For every symbol without defined colour the legend generator takes the first style it finds (unless at multicolor styles) . Not existing symbols in the styleset lead to the breakup of the programme.

Example for a printed legend and legend table

Below is a legend (right column was created with the disabled fields: L_NUM, L_GROUP, L_SYMB and L_GRAPHIC) shown with the associated legend table. The graphical elements were added letterings (in red).

<p>legend table : D:\Kartografie_tools\example_legend.mdb - legend printed at 15.12.2006 - 14:15:53 QueryFilter:</p>		Symbolnamen	
<p>QUARTÄR</p> <p>L_NUM</p> <p>L_GRAPHICS</p> <p>Spezialfall</p> <p>HEADING1..3</p> <p>BRACKET2..3</p> <p>Diverse Zeichen</p> <p>Streichen und Fallen der Schieferung</p> <p>Streichen und Fallen der Faltenachsen und Lineationen</p>		<p>QUARTÄR</p> <p>ID</p> <p>Holoän</p> <p>Pleistozän (Würm)</p> <p>OSTALPINE DECKEN</p> <p>Drauzug-Gurktal-Deckensystem</p> <p>Goldeck- und Gaugen-Komplex</p> <p>Goldeck-Komplex</p> <p>Gaugen-Komplex</p> <p>Diverse Zeichen</p> <p>Streichen und Fallen der Schieferung</p> <p>Streichen und Fallen der Faltenachsen und Lineationen</p>	
<p>1 Anthropogener Schutt, Deponie (D)</p> <p>4 Ablagerung in Talkerben (Schluff, Sand, Kies, Wildbachschutt)</p> <p>6 Schwemmfächer, Murenkegel</p> <p>8 Sinterkalk (z.B. bei Trebesing und im Radlgraben)</p> <p>9 Hangschutt, Schuttkegel; in Gneisarealen oft grobblockig</p> <p>10 Unterkühlte Schutthalde (Pflüghof im Maltatal)</p> <p>12 Moräne (Grund- und Ablationsmoräne)</p> <p>13 Endmoräne vom Hochstand um 1850, mit Wallform</p> <p>15 Rutschmasse (überwiegend oberflächennah; Spätglazial – Holozän)</p> <p>17 Abrisskante einer Massenbewegung (Spätglazial – Holozän)</p> <p>18 Zerspalte (Spätglazial – Holozän)</p> <p>31 Erratischer Block (Zentralgneis) / Erratischer Block (Ostalpiner Eklogit)</p>		<p>SPG001 Anthropogener Schutt, Deponie (D)</p> <p>SPG004 Ablagerung in Talkerben (Schluff, Sand, Kies, Wildbachschutt)</p> <p>SPG006 Schwemmfächer, Murenkegel</p> <p>SPG008 Sinterkalk (z.B. bei Trebesing und im Radlgraben)</p> <p>SPG009 Hangschutt, Schuttkegel; in Gneisarealen oft grobblockig</p> <p>SPG303 Unterkühlte Schutthalde (Pflüghof im Maltatal)</p> <p>SPG011 Moräne (Grund- und Ablationsmoräne)</p> <p>SPG033, PG038 Endmoräne vom Hochstand um 1850</p> <p>SPG013 #mit Wallform</p> <p>SPG013 Rutschmasse (überwiegend oberflächennah; Spätglazial – Holozän)</p> <p>SPG015 Abrisskante einer Massenbewegung (Spätglazial – Holozän)</p> <p>SPG017 Zerspalte (Spätglazial – Holozän)</p> <p>SPG029 / SPG305 Erratischer Block (Zentralgneis)</p> <p>SPG029 / SPG305 Erratischer Block (Ostalpiner Eklogit)</p>	
<p>parent</p> <p>child</p> <p>Bruder</p> <p>Trilling</p>		<p>SPG052 Grünschiefer (Metadiabas, Metatuff, Metatuffit)</p> <p>SPG053 Quarzphyllit, Serizit-Chloritquarzit, Phyllit</p> <p>SPG054 Quarzitlage darin</p> <p>SPG055 Quarzit</p> <p>SPG056 Graphitreicher Quarzit, Schwarzschiefer</p> <p>SPG057 Quarz-Muskovit-Phyllonit, retrograd metamorphe (Granat-)Glimmerschiefer, serizitreicher Chloritphyllit</p> <p>SPG058 / SPG059 / SPG060 Orthogneis / Kalkmarmor, massig, weiß, grau z.T. gebändert / Dolomitmarmor</p> <p>SPG062 Amphibolit, Granatamphibolit, Hornblende-Garbenschiefer, Kalksilikat</p>	
<p>L_GRAPHICS</p>		<p>Störung nachgewiesen, vermutet</p> <p>Deckengrenzen nachgewiesen, vermutet</p> <p>Schuppengrenze nachgewiesen, vermutet</p>	
<p>Naturdenkmal</p> <p>Kies-, Sand-, Tongrube</p>		<p>Naturdenkmal</p> <p>Kies-, Sand-, Tongrube</p>	

ID	L GROUP	L NUM	L SYMB	HEADING1	HEADING2	HEADING3	BRACKET1	BRACKET2	BRACKET3	L TEXT	L GRA	L SORT	FILL SYMBOL	LINE SYMBO	MARKER SY
SPG001	#	1	F	QUARTÄR	#	#	#	Holozän	#	Anthropogener Schutt	#	a001	XXXXanthropBLK	#	#
SPG004	#	4	F	QUARTÄR	#	#	#	Holozän	#	Ablagerung in Talkerb	#	a004	XXXXtpt1100BLA	#	#
SPG006	#	6	FL	QUARTÄR	#	#	#	Holozän	#	Schwemmfächer, Mur	LIBLA	a006	XXXX	schwemmBLA	#
SPG008	#	8	FM	QUARTÄR	#	#	#	Holozän	#	Sinterkalk (z.B. bei Tre	H	a008	XXXXmicrx30BLA	#	mre0200BLA
SPG009	#	9	F	QUARTÄR	#	#	#	Holozän	#	Hangschutt, Schuttk	#1BLA	a009	XXXXhscuttBLA	schuttBLA	#
SPG303	#	10	M	QUARTÄR	#	#	#	Holozän	#	Unterkühlte Schutthal	#	a009a	#	#	mdi0201BLA
SPG011	SPG011	12	F	QUARTÄR	#	#	#	Holozän	#	Moräne (Grund- und	#	a011a	XX1X	#	#
SPG033	SPG011	13	F	QUARTÄR	#	#	#	Holozän	#	Endmoräne vom Hoch	#	a011b	XX1Xtpt1100BRN	#	#
SPG038	SPG011	0	F	QUARTÄR	#	#	#	Holozän	#	#mit Vfallform	F0BLK	a011c	XXXV	#	#
SPG013	#	15	FMM	QUARTÄR	#	#	#	Holozän	Pleistozän (	Rutschmasse (überwi	#	a013	XXXX	#	rutschhROT
SPG015	SPG115	17	L	QUARTÄR	#	#	#	Holozän	Pleistozän (	Abrisskante einer Mas	L"ROT	a015	#	abrisskROT	#
SPG017	SPG115	18	L	QUARTÄR	#	#	#	Holozän	Pleistozän (	Zerrspalte (Spätglaz	#	a017	#	zerrspiROT	#
SPG029	+029	31	M	QUARTÄR	#	#	#	#	Pleistozän (	Erratischer Block (Zen	#	a029	#	#	erratlROT
SPG305	+029	32	M	QUARTÄR	#	#	#	#	Pleistozän (	Erratischer Block (Ost	#	a029a	#	#	erratlGRN
SPG052	SPG053	40	F	OSTALPINE	Drauzug-Gu	Goldeck- un	#	Goldeck-Ko	#	Grünschiefer (Metadia	#	a038	2050	#	#
SPG053	SPG053	41	F	OSTALPINE	Drauzug-Gu	Goldeck- un	#	Goldeck-Ko	#	Quarzphyllit, Serizit-C	#	a039	2F30	#	#
SPG054	SPG053	42	L	OSTALPINE	Drauzug-Gu	Goldeck- un	#	Goldeck-Ko	#	quarzitisch	#	a040	XXXXtpt1500BLK	quarzitBLK	#
SPG055	SPG053	43	F	OSTALPINE	Drauzug-Gu	Goldeck- un	#	Goldeck-Ko	#	Quarzit	#	a041	2F3F	#	#
SPG056	-SPG053	44	F	OSTALPINE	Drauzug-Gu	Goldeck- un	#	Goldeck-Ko	#	Graphitreicher Quarzit	#	a042	0004	#	#
SPG057	-SPG053	45	F	OSTALPINE	Drauzug-Gu	Goldeck- un	#	Goldeck-Ko	Gaugen-Ko	Quarz-Muskovit-Phyllo	#	a043	FF30	#	#
SPG058	+abc	46	F	OSTALPINE	Drauzug-Gu	Goldeck- un	#	#	Gaugen-Ko	Orthogneis	#	a044	0550	#	#
SPG059	+abc	47	F	OSTALPINE	Drauzug-Gu	Goldeck- un	#	#	Gaugen-Ko	Kalkmarmor, massig,	#	a045	5100	#	#
SPG060	+abc	48	F	OSTALPINE	Drauzug-Gu	Goldeck- un	#	#	Gaugen-Ko	Dolomitmarmor	#	a046	5300	#	#
SPG062	#	49	F	OSTALPINE	Drauzug-Gu	Goldeck- un	#	#	Gaugen-Ko	Amphibolit, Granatamp	#	a048	73V0	#	#
LIN101	#	0	L	#	Diverse Zeic	#	#	#	#	Störung nachgewiese	L-BLK	a144	#	stoergsBLK	#
LIN105	#	0	L	#	Diverse Zeic	#	#	#	#	Deckengrenzen nach	L-BLK	a145	#	decke1sBLK	#
LIN109	#	0	L	#	Diverse Zeic	#	#	#	#	Schuppengrenze nac	L-BLK	a146	#	schuppsBLK	#
LEG001	#	0	M	#	Diverse Zeic	Streichen un	#	#	#		#	a147	#	#	fzeicheBLK
LEG002	#	0	M	#	Diverse Zeic	Streichen un	#	#	#		#	a148	#	#	fachsenBLK
SPG308	div	0	M	#	Diverse Zeic	#	#	#	#	Naturdenkmal	#	a148a	#	#	naturd1ROT
SPG219	div	0	M	#	Diverse Zeic	#	#	#	#	Kies-, Sand-, Tongrub	#	a148b	#	#	sdgrubeBLK

5 Practical Examples of Legend creation

The example below shows a section of a legend table and the structure of character symbolisation.

Example: ID: OGG061

	ID *	L GROUP	L NUM	L TEXT	L SYMB	L GRAPHICS	FILL SYMBOL	LINE SYMBOL	MARKER SYMBOL
	OGG057	#	57	Kalkgraben-	F	#	3460	#	#
	OGG058	#	58	Perneck-For	F	#	3F50fls0302ROT	#	#
	OGG059	OGG059	59	Ältere Flysc	F	#	5460	#	#
	OGG060	OGG059	60	Reiselsberg- üF	#	#	XXXXfpt1706ROT	#	#
	OGG061	OGG059	61	Bunte Schief	FL	#	5460	lds1040MGT	#
	OGG062	OGG059	62	Rehbreingra	L	#	#	quarzitBLK	#
	OGG063	OGG059	63	Tristel-Form	L	#	#	lds1040BLA	#

Bsp: ID: OGG061

This is a legend field which is subordinated to a group (L_GROUP). The number 61 represents a subcategory of the legendnumber 59 and forms the legend group with 4 legend fields additionally. The field name "L_SYMB" indicates that the field was assigned to a FILL_SYMBOL as well as a LINE_SYMBOL.

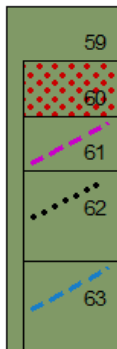
Symbolassignment:

The surface-type symbol (FILL_SYMBOL) was assigned to the 10-digit code 5460, resp. 50% cyan, magenta, 40% and 60% yellow and not black. The mixture of these color components results in an olive-green hue. In this case, only an assignment for colors was made.

The line-like symbol (LINE_SYMBOL) was assigned to the 10-digit code lds1040MGT. The first 7 digits ("lds1040") derive from the symbol-key in the "geolba.style". It corresponds to a dashed line. The last 3 digits show the color assignment whereby "MGT" indicates that the line is magenta.

The hash symbol in the category "SYMBOL MARKER" indicates that no marker symbol was assigned to the legend box.

The result is shown in the figure below:



Headings and brackets:

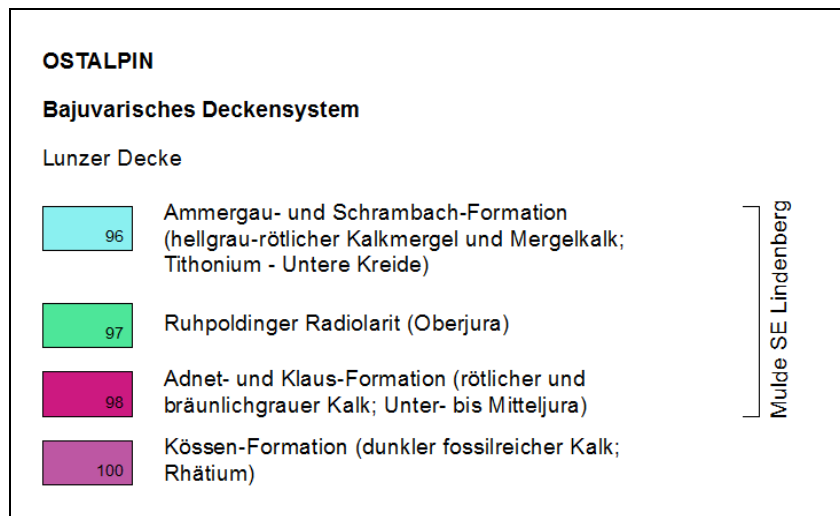
The bottom section of a legend table shows the hierarchical header module.

In this specific case, the main geological units (Austroalpine) is assigned to the highest ranked heading (heading 1). The Austroalpine is subordinate to the bajuvaric nappe-system, which was assigned to the heading of the second order (heading 2). As a smaller subsystem the Lunzer nappe received a third-order heading (heading 3).

In addition, the legend boxes 96, 97 and 98 were assigned to a bracket (bracket1) indicating that the those formations are related with th " SE Lindenberg-hollow" were assigned. The hash marks in the category "Bracket2" and "bracket3" indicate that no subordinate headings exist for the section shown.

L NUM	heading1	heading2	heading3	bracket1	bracket2	bracket3
96	OSTALPIN	Bajuvarisches Deckensystem	Lunzer Decke	Mulde SE Lindenberg	#	#
97	OSTALPIN	Bajuvarisches Deckensystem	Lunzer Decke	Mulde SE Lindenberg	#	#
98	OSTALPIN	Bajuvarisches Deckensystem	Lunzer Decke	Mulde SE Lindenberg	#	#
100	OSTALPIN	Bajuvarisches Deckensystem	Lunzer Decke	#	#	#
101	OSTALPIN	Bajuvarisches Deckensystem	Lunzer Decke	#	#	#
102	OSTALPIN	Bajuvarisches Deckensystem	Lunzer Decke	#	#	#

The result of the assignment of headings and brackets can be found in the lower figure:



6 License, Copyright, disclaimer

The ArcMap line extensions "Legend Generator" and "rendering" are available for free use in common with True Type fonts and styles as download on: [ArcGIS arcscripts.esri.com](http://ArcGIS.arcscripts.esri.com) (search term: geological map legend). They all are available to the public.

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