





DriveAP

## **User's Manual**

ABB Drives

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# Chapter 1 - Introduction

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## **General**

**DriveAP** is a Windows based tool program for **Application Programming**. It can be used without a drive or with one or more drives.

DriveAP is designed to run under the Microsoft Windows 7, Windows Vista, Windows XP, Windows 2000 and Windows NT 4.0 operating environment on IBM-compatible PCs.

Application Programming is based on the use of function blocks like in other IEC 61131-3 tools. Block names, functionality and appearance are originated from the drive software.

By using the DriveAP program it is possible to:

- Make a connection to a drive. If there are more than one drive connected to the PC, the user can select the drive from the list of available drives.
- Upload the program from the connected drive and display it graphically on the screen
- Monitor actual values of user-selected block pins on the screen in real time
- Modify the program on the screen
- Download the program on the screen to the connected drive
- Set the state (*Running*, *Stopped* or *Edit*) of the program in the connected drive
- Print the program on the screen
- Save the program on the screen to a disk file
- Open program file saved earlier and display it graphically on the screen. The program can now be modified, downloaded, saved etc.
- See the descriptions of all blocks

## ***Program Types and User Interfaces***

When a program from a drive has been uploaded (or a program file has been opened), DriveAP automatically selects the appropriate user interface for the program:

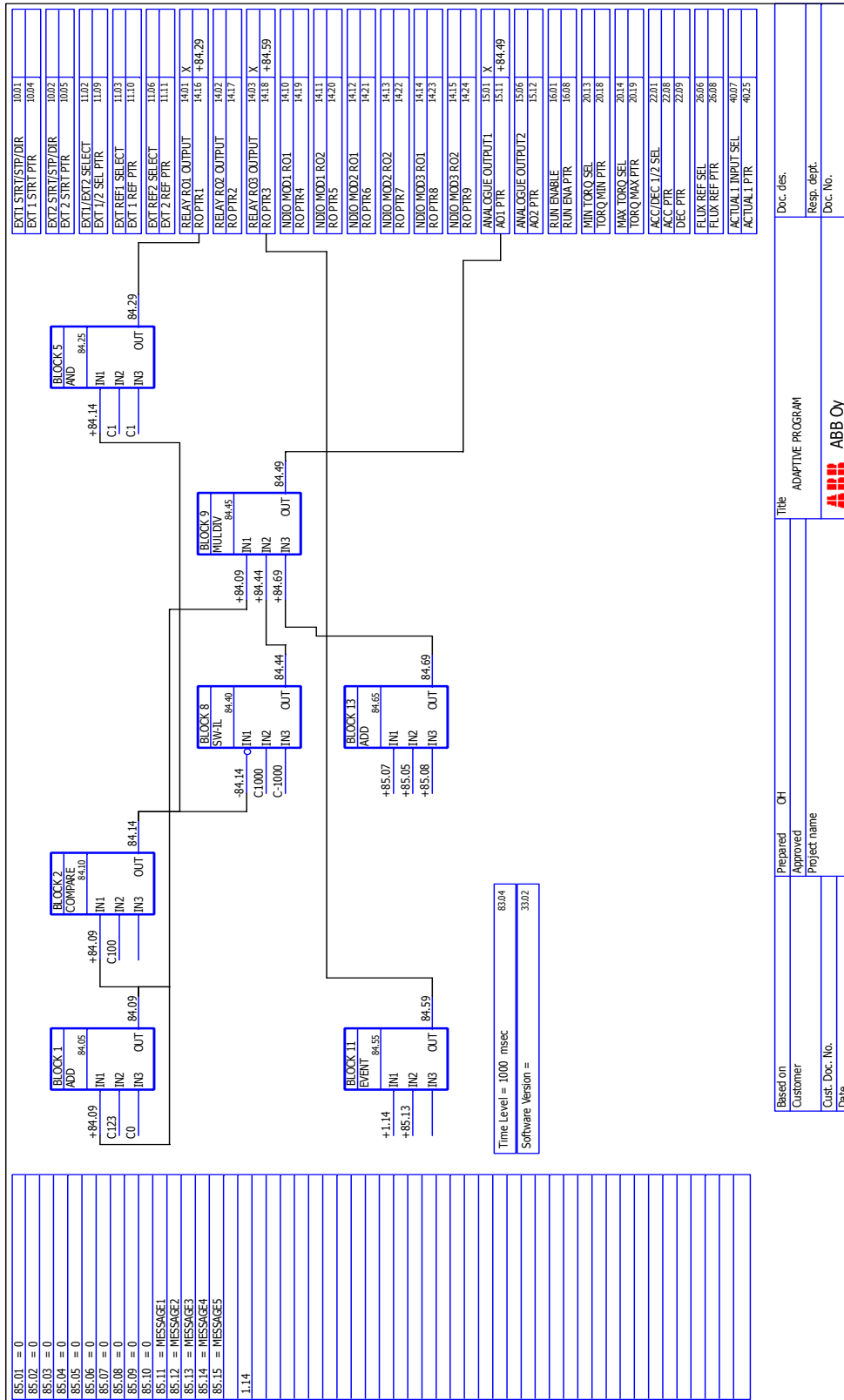
- *Standard User Interface* is used with *Adaptive Programming* programs.  
A program contains only one page with three parts:
  - user constants are at the left side
  - function blocks are in the middle
  - connection and pointer parameters are at the right side
- *Advanced User Interface* is used with *Multi Block Programming Application* programs.  
A program contains several pages selectable by page tabs. These pages contain blocks as follows:
  - input IO blocks are at the left side
  - normal blocks are in the middle
  - output IO blocks are at the right side
  - comment blocks can be anywhere

**DriveAP 1 includes only the *Standard User Interface* for *Adaptive Programming*.**

**DriveAP 2 includes both User Interfaces.**

On the following two pages are example pages of these two program types.







## **Operating Modes**

The DriveAP program has three operating modes:

- *Stand-Alone Mode:*
  - this is the default operating mode after the start-up of DriveAP
  - the mode can be used without a drive
  - the following functions are available:
    - open a program file and display it graphically on the screen
    - modify the program on the screen
    - print the program on the screen
    - save the program on the screen to a disk file
- *Off-Line Mode:*
  - the mode is started by menu command *Connect*
  - the following functions are available:
    - upload the program from the connected drive and display it
    - download the program on the screen to the connected drive
    - the functions of the *Stand-Alone Mode*
- *On-Line Mode:*
  - the mode is started by menu command *On-Line*
  - all modifications to the program on the screen are automatically copied to the program in the connected drive
  - actual values of user-selected block pins are displayed on the screen in real time
  - the state of the time level in the drive (*Running, Stopped or Edit*) is displayed on the screen and can be changed by the user
  - the drive status information is displayed on the screen
  - values of non-AP parameters can be read from the drive and the user can change these values in the drive

*Introduction*

## Chapter 2 – Installation of DriveAP

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DriveAP is designed to run under the Microsoft Windows 7, Windows Vista, Windows XP, Windows 2000 and Windows NT 4.0 operating environment on IBM-compatible PCs.

**Note:** If you are using DDCS RUSB-02 adapter, do not insert the RUSB-02 adapter before you have installed the DriveAP software.

**Note:** If you are using DDCS PCMCIA card, do not insert the PCMCIA card before you have installed the DriveAP software.

### **Installing DriveAP Software**

**Note:** You must have Administrator privileges to your PC.

Insert the DriveAP CD-ROM into the CD drive of your PC.

Start the *Control Panel* program (**Start->Settings->Control Panel**) and double click its *Add/Remove Programs* icon.

Click the **Add New Programs** button and follow the instructions that appear on the screen (select file *Setup.exe* from the CD-ROM).

With Windows 7 and Windows Vista right click on setup.exe and select run as administrator.

### **Using DriveWindow with DriveAP**

If you have the DriveWindow software in your PC and you want to use it *at the same time* with DriveAP, you must follow the instructions given in the DriveWindow User Manual (see its *Chapter 10 – Advanced Information, Section 2.2 Several Clients*).

Now you can e.g. monitor graphically actual values of drive parameters while DriveAP is running.

**Note:** Do not modify parameter values with DriveWindow (or panel) when DriveAP is in the *On-Line Mode*.

### **Installing DriveAP Hardware**

**Note:** No DriveAP hardware is needed if you use only the *Stand-Alone Mode* of DriveAP.

DriveAP can be used with DDCS RUSB-02 adapters (USB-DDCS) or DDCS PCMCIA (NDPA-02) cards . Installation of DDCS PCMCIA card is documented in DriveWindow User's manual.

***Installing the  
DDCS RUSB-02  
adapter***

Plug USB 2.0 Cable A-B between PC and RUSB-02 adapter. You should see Active green led on the RUSB-02 adapter.

Connect optical cables between the DDCS board and the drive(s).

## Chapter 3 - Use of DriveAP

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You start the DriveAP program by using the **Start** button in the *Taskbar* (**Start -> Programs -> DriveWare -> DriveAP** if you have used the default settings in the software installation).

An empty screen is displayed. Now you have two possibilities to continue:

- If you want to make a *new program*, open a template file (e.g. `MbpaTemplate.ap` for a new *MultiBlock* program or `StdTemplate.ap` for a new *Adaptive* program)  
**Note:** Do not use the name of the template file when you later save your new program!
- If you want to work with an *existing program*, open a program file (`*.ap`) or connect to a drive and upload program from the connected drive.

### **User Interface**

The user interface of DriveAP contains two parts:

- *Menu commands*
- *The program page on the screen* (if any)

By menu commands you can e.g.:

- Open and save program files
- Print program pages
- Connect to a drive
- Upload and download programs
- Start the *On-Line Mode*
- Start or stop the time level in the drive

By the program page on the screen, the left button of the mouse and three keys (Ctrl, Alt and Shift) you can e.g.:

- Add, move, remove and change function blocks
- Make connections between block pins
- Monitor pin values in real time

By the **right button** of the mouse you display context-sensitive *Quick Help*. This tells the actions that are possible with the item under the cursor (if any).

If the cursor is e.g. on a pin of a block when you press mouse's right button, *Quick Help* lists the available pin actions.

By the **F3** key you open the *Info* window (you can press the **F3** key even if the *Info* window is already visible in order to change its content, see below). This window contains a list of all available info items (e.g. the descriptions of all blocks) and you select the info item you want to see by clicking on it in the item list. It is not necessary to close this *Info* window because it "floats" on the program page.

If the cursor is on a block in the program page when you press the **F3** key, the description of this block is displayed in the *Info* window.

DriveAP includes two different user interface types:

- *Standard*
- *Advanced*

The main difference between these two interfaces is the number and layout of program pages.

When a program from a drive has been uploaded (or a program file has been opened), DriveAP automatically selects the appropriate user interface for the program.

### ***Standard User Interface***

*Standard User Interface* is used with *Adaptive Programming* programs (see the *AdaptiveProgrammingGuide.pdf* manual for more information about the *Adaptive Programming* method).

A program contains one time level and one page with three parts:

- User constants are at the left side
- Function blocks are in the middle.  
NO blocks (if any) are displayed as empty rectangles.
- Connection and Pointer parameters are at the right side

### ***Advanced User Interface***

*Advanced User Interface* is used with *Multi Block Programming Application* programs.

**Note:** Only DriveAP 2 includes this interface.

A program can contain several time levels and there are five pages for every time level (i.e. the total number of pages = 5 \* number of time levels). All pages can contain blocks as follows:

- Input IO blocks (if any) are at the left side



- Normal blocks (if any) are in the middle
- Output IO blocks (if any) are at the right side
- Comment blocks (if any) can be anywhere

A grid is displayed on every page. You can add and move blocks only to empty crossing points of this grid (and there must be enough empty space around this grid point).

The currently visible page is displayed either in *Full Fit Mode* (zoomed out) or in *Normal Mode* (zoomed in). You can change the display mode by clicking anywhere on the page (if you zoom in, the clicking point will be at the center of the zoomed page).

There are tabs for all pages at the bottom of the screen and you select the desired page by these tabs (if there are one or more blocks on a page, an asterisk is displayed in the corresponding tab).

In addition to the page tabs there is the *Info* tab, too. By this tab (or by the **F3** key) you open the *Info* window (described earlier).

## **Stand-Alone Mode**

After the start-up DriveAP is in the *Stand-Alone Mode*. In this mode DriveAP can be used without a connection to a drive.

By menu command **File - New** you read and display the content of a template file.

*Template* is an empty program and it is used as a starting point when you make new programs.

E.g. template file `MbpaTemplate.ap` is used for new *MultiBlock* programs and template file `StdTemplate.ap` is used for new *Adaptive* programs.

**Note:** Do not use the name of the template file when you later save your new program!

By menu command **File - Open** you read and display the content of a previously saved AP file. The filename extension of all AP files is `AP`.

If the cursor is on a block and you press the **F3** key, the description of this block is displayed in the *Info* window.

If desired, the AP program on the screen can now be modified (see Section [Program Modification](#) in this Chapter).

By menu command **File - Save** or **File - Save As** you save the program on the screen to a disk file. The filename extension of all AP files must be `AP`.

By menu command **File - Print** you print the program on the screen.

If there is a drive connected to your PC hardware, you can make a software connection to this drive by menu command **Drive - Connect** (if there are more than one drive connected to the PC hardware, you can select the drive from the list of available drives).

**Note:** If you change drive language when DriveAP is connected, you must switch drive power off and on and **Connect** again.

This **Connect** command changes the operating mode of DriveAP to the *Off-Line Mode*.

## **Off-Line Mode**

By menu command **Drive - Upload** you upload and display the AP program of the connected drive.

If the cursor is on a block and you press the **F3** key, the description of this block is displayed in the *Info* window.

If desired, the AP program on the screen can now be modified (see Section [Program Modification](#) in this Chapter).

By menu command **File - Download** you download the program on the screen to the connected drive.

In addition to the above-mentioned menu commands for upload and download, commands in the **File** menu are available in this operating mode.

If you want to use another drive connected to your PC, first disconnect the currently connected drive by menu command **Drive - Disconnect**, then make a connection to the new drive by menu command **Drive - Connect**

By menu command **Drive - On-Line** you change the operating mode of DriveAP to the *On-Line Mode*.

## **On-Line Mode**

**Note:** The AP program of the connected drive is automatically uploaded and displayed during the start-up of this operating mode.

If the cursor is on a block and you press the **F3** key, the description of this block is displayed in the *Info* window.

All modifications to the program on the screen (see Section [Program Modification](#) in this Chapter) during this mode are automatically copied to the connected drive

**Note:** Do not change values of AP parameters by the panel (or by some other means) during the On-Line Mode since these changes are not displayed on the screen!

If a parameter (or a bit of a parameter) is connected to an input pin of a block and you click on this *input pin* (or on any *output pin*) while holding down the **Shift** key, the actual value of this parameter (or this output pin) is displayed numerically on the screen in real time.

**Note:** If you have DriveWindow and you have enabled the simultaneous use of DriveWindow with DriveAP, you can monitor parameter values graphically with DriveWindow while DriveAP is running.

The value display can be removed by clicking again (while holding down the **Shift** key) on the same pin.

Standard User Interface: The state of the AP program (*Running*, *Stopped* or *Edit*) in the connected drive is displayed on the screen and can be changed by menu commands **Drive - Start**, **Drive - Stop** and **Drive - Edit**.

Advanced User Interface: The state of the currently visible time level (*Running*, *Stopped* or *Edit*) in the connected drive is displayed on the screen and can be changed by menu commands **Drive - Start This Time Level**, **Drive - Stop This Time Level** and **Drive - Edit This Time Level**.

The states of all time levels can be changed by menu commands **Drive - Start All Time Levels**, **Drive - Stop All Time Levels** and **Drive - Edit All Time Levels**.

The status information of the connected drive is displayed on the screen in real time in the DRIVE STATUS box. The reference value display can be removed by clicking on it while holding down the **Shift** key.

Standard User Interface: The list of all non-AP parameters is displayed in the list box below the function blocks.

Advanced User Interface: The *Parameter Window* lists all non-AP parameters. If you remove this window, you can see it again by pressing the **F2** key (or by menu command **Drive - Parameter List - Display Parameter List**).

Current values of all parameters in the parameter list can be read from the drive by menu command **Drive - Parameter List - Upload Values** (the current value of a parameter can be read by single clicking on this parameter in the list).

You can change the value of a non-AP parameter in the drive by double clicking on the desired parameter in the list.

*On-Line Mode* is stopped by menu command **Drive - Off-Line**. The operating mode of DriveAP will now revert to the *Off-Line Mode*. Program modifications on the screen are no more copied to the connected drive and the real time monitoring of block pins (if defined by the user) is removed from the screen.

## **Program Modification**

You can display an AP program on the screen by menu command **File - New**, **File - Open** or **Drive - Upload**.

Now you can modify the program on the screen by clicking on the desired program item while holding down either the **Alt** key or the **Ctrl** key.

By the **right button** of the mouse you display context-sensitive *Quick Help*. This tells the actions that are possible with the item under the cursor (if any).

If the cursor is e.g. on a pin of a block when you press mouse's right button, *Quick Help* lists the available pin actions.

If the cursor is on a block and you press the **F3** key, the description of this block is displayed in the *Info* window.

Advanced User Interface: If an *input pin* is connected to an *User Constant*, you can change the value of this User Constant by clicking on the input pin while holding down the **Shift** key.

**Note**: If the operating mode of DriveAP is *On-Line Mode*, all modifications to the program on the screen are automatically copied to the program in the connected drive.

### **Mouse Click with the Alt Key (Standard User Interface)**

- If you click first on an *output pin* of a block and then on an *input pin* of a block, this input pin is connected to the output pin.
- If you click first on an *user constant* (in the highest part of the left side) and then on an *input pin* of a block, this input pin is connected to the user constant.
- If you click first on an *output pin* of a block and then on a *Pointer Parameter* (at the right side), this Pointer Parameter is connected to the output pin.

### **Mouse Click with the Alt Key (Advanced User Interface)**

- If you want to move a *block* to another location (on this page or on another page), you first click on the desired block and then on the desired empty grid crossing point on the desired page (there must be enough empty space around this point).

If you move a normal block to another time level, you must specify block's number in this time level.

- If you click on an *input pin* of a block and this pin is connected to an output pin, the page that contains the block with this output pin opens.
- If you click on an *output pin* of a block, a dialog box opens. This box displays the user-defined symbolic name of this output pin (if any) and a list of all blocks that use this output pin. If you double-click on a block in this list, the page that contains this block opens. If you want to define a symbolic name for this output pin, you write the name to the *Symbol* field and click the *OK* button.

### **Mouse Click with the Ctrl Key (Standard User Interface)**

An item-specific dialog box opens and you can enter the needed values to this dialog box.

- If you click on a *function block* (or on an empty NO block rectangle), you can either insert a new block or remove or change the selected block. If you insert a new block, the last block in the block chain will be dropped out. If you remove a block, a new NO block will be added to the end of the block chain. Press the **F3** key if you want to see the description of the block you have selected from the block type list of the dialog box (this is not necessary if the *Info* window is already on the screen).
- If you click on an *input pin* of a block, you can either change the connection of this pin or set its value (if you have just before clicked on an *output pin*, this pin is connected to the input pin)
- If you click on the *time level* box, you can change the time level of this program.
- If you click on an *user constant* (in the highest part of the left side), you can change the value of this constant.
- The lowest part of the left side is used for *user-specified* (non-AP) *parameters* and their user-specified values. When this AP program is downloaded to the connected drive, the values of these parameters (if any) are downloaded to the drive, too. If no parameters have been specified, you must click on the lowest (empty) box of the left side in order to insert the first user-specified parameter and its value. Otherwise you click on an user-specified parameter to insert a new parameter or to remove or change the selected parameter.
- The right side contains the *Connection* and *Pointer Parameters* of the application of the drive. An **X** character in a Connection Parameter means that on a

program download DriveAP sets the value of this parameter to the value that selects the associated Pointer Parameter(s).

If the **X** character is missing, DriveAP does not modify the value of this Connection Parameter during download (i.e. its value after download will be the same as before download).

If you click on a Pointer Parameter (i.e. source selection parameter), you can either set its value or leave its value undefined.

If you click on a Connection Parameter, the response depends on the operating mode of DriveAP as follows:

- *On-Line Mode*: The Connection Parameter dialog box is always displayed with a list of the available parameter values. The current value is highlighted.  
If the associated Pointer Parameter(s) have been defined, the value that selects the associated Pointer Parameter(s) is marked by an **X** character. Otherwise this value is removed from the value list.

- *Other Modes*: If the associated Pointer Parameter(s) have been defined, the Connection Parameter dialog box is displayed and you can specify if on a download the value of this parameter is set to the value that selects the associated Pointer Parameter(s).

- If you click on the *header block*, you can change the header block information (if you later download your AP program to a drive, the download *does not* include this header information)

**Mouse Click with  
the Ctrl Key  
(Advanced User  
Interface)**

- If you click on an *empty grid crossing point* (and there is enough empty space around this point), you can add a new block into this point.

An asterisk is displayed in the page tab if there are one or more blocks on the page.

Press the **F3** key if you want to see the description of the block you have selected from the block type list of the dialog box (this is not necessary if the *Info* window is already on the screen).

Block numbers (with normal blocks only) determine the execution order of normal blocks within a time level. If you specify a number that is already in use, block numbers of existing blocks are automatically shifted to make room for this new block.

IO blocks are “virtual” blocks and they take no execution time.

- If you click on a *block* then  
*either (if normal block)* you can either change block’s number or remove this block

*or (if IO block)* a confirmation question is asked if you want to remove this block

or (if *comment block*) you can change the comment text and/or its alignment (empty text removes the block).

- If you click first on an *output pin* of a block and then on an *input pin* of a block, this input pin is connected to the output pin.
- If you click on an *input pin* of a block (without first clicking on an output pin), you can either change the connection of this pin or set its value.
- If you click on the *header block*, you can change the header block information.

The modified program can be saved to a disk file by menu commands **File - Save** or **File - Save As** or it can be downloaded to the connected drive by menu command **Drive - Download** (the download is unnecessary if the modifications have been made in the *On-Line Mode*).





## Chapter 4 - Menu Commands

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### File Menu

**New...** Using this command you can read and display the contents of a template file (if desired, you can do this with the **Open** command, too).

*Template* is an empty program and it is used as a starting point when you make new programs.

E.g. template file `MbpaTemplate.ap` is used for new *MultiBlock* programs and template file `StdTemplate.ap` is used for new *Adaptive* programs.

The name of the opened template file is displayed at the top of the screen.

**Note:** Do not use the name of the template file when you later save your new program!

You can now make your new program.

**Open...** Using this command you can read and display the contents of a previously saved AP file.

The filename extension of all AP files is `AP`.

The name of the opened file is displayed at the top of the screen.

If desired, the AP program on the screen can now be modified (see Section [Program Modification](#) in [Chapter 3 - Use of DriveAP](#)).

**Save** This command saves the program on the screen to the disk file. The name of this file is displayed at the top of the screen.

**Note:** Do not use this command if you have opened a template file!

**Save As...** Using this command you can save the program on the screen to a disk file. The filename extension of all AP files must be `AP`.

**Note:** Do not use the name of a template file!

**Save Horz Picture As...** Using this command you can save the program page on the screen to a disk file in the Picture (Enhanced Metafile) format. The filename extension of this file must be `EMF`.

Picture files are used by e.g. *MS Office* products. You can e.g. insert the saved Picture file to a *Word* document by Word's menu command **Insert - Picture - From File**.

**Save Vert Picture  
As...**

Using this command you can save the program page on the screen (rotated 90 degrees counterclockwise) to a disk file in the Picture (Enhanced Metafile) format. The filename extension of this file must be `EMF`.

Picture files are used by e.g. *MS Office* products. You can e.g. insert the saved Picture file to a *Word* document by Word's menu command **Insert - Picture - From File**.

**Print...**

Standard User Interface: Using this command you can print the program on the screen.

Advanced User Interface: Using this command you can print program pages. You can print either all pages or the desired page (or page range).

The page number of the first page (i.e. the leftmost page tab) is 1. The page number of the currently visible page is displayed in the Print dialog box when you have selected the **Print** command.

**Exit**

This command stops the execution of DriveAP.

## Drive Menu

**Connect**

If there is a drive connected to your PC hardware, you make a software connection to the drive by this command. If there are more than one drive connected to the PC hardware, you can select the drive from the list of available drives.

The identifier of the connected drive is displayed at the top of the screen.

This command changes the operating mode of DriveAP to the *Off-Line Mode* (see Section [Off-Line Mode](#) in [Chapter 3 - Use of DriveAP](#)).

**Disconnect**

If you want to use another drive connected to your PC, disconnect the currently connected drive by this command and make a connection to another drive by command **Drive - Connect**.

This command changes the operating mode of DriveAP to the *Stand-Alone Mode*.

**Upload**

This command uploads and displays the AP program of the connected drive.

**Note** (*Standard User Interface only*): When DriveAP uploads the connection information of an input pin that is connected to a parameter and its bit number is 0, DriveAP does not know if this input pin is connected to bit 0 of this parameter or to the whole parameter value. In this case DriveAP assumes that it is connected to the whole value and drops out bit number 0. If the user knows that it is actually connected to bit 0, (s)he can click on this input pin (while holding down the **Ctrl** key) and write bit number 0 to the *Bit number* field of the dialog box that appears on to the screen and click the **OK** button. Now bit number 0 is displayed in the block diagram.

If desired, the AP program on the screen can now be modified (see Section *Program Modification* in [Chapter 3 - Use of DriveAP](#)).

- Download** The command downloads the program on the screen to the connected drive.
- If you want, DriveAP starts the downloaded program in the drive after the download.
- On-Line** The command changes the operating mode of DriveAP to the *On-Line Mode* (see Section *On-Line Mode* in [Chapter 3 - Use of DriveAP](#)).
- Off-Line** The command changes the operating mode of DriveAP to the *Off-Line Mode*.
- Start** Standard User Interface: The command sets the state of the AP program in the connected drive to *Running*.
- Start This Time Level** Advanced User Interface: The command sets the state of the currently visible time level in the connected drive to *Running*.
- Stop** Standard User Interface: The command sets the state of the AP program in the connected drive to *Stopped*.
- Stop This Time Level** Advanced User Interface: The command sets the state of the currently visible time level in the connected drive to *Stopped*.
- Edit** Standard User Interface: The command sets the state of the AP program in the connected drive to *Edit*.
- Edit This Time Level** Advanced User Interface: The command sets the state of the currently visible time level in the connected drive to *Edit*.
- Start All Time Levels** Advanced User Interface: The command sets the states of all time levels in the connected drive to *Running*.
- Stop All Time Levels** Advanced User Interface: The command sets the states of all time levels in the connected drive to *Stopped*.

- Edit All Time Levels**      Advanced User Interface: The command sets the states of all time levels in the connected drive to *Edit*.
- Parameter List - Display Parameter List**      Advanced User Interface: The *Parameter Window* lists all non-AP parameters (the window is visible only in the *On-Line Mode*). If you remove this window, you can see it again by this menu command (or by pressing the **F2** key).
- Parameter List - Upload Values**      The command uploads the values of all parameters in the parameter list from the connected drive. This parameter list contains all non-AP parameters and it is visible only in the *On-Line Mode*.
- The current value of a single parameter in the parameter list can be read from the drive by single clicking on this parameter.
- The value of a non-AP parameter can be changed in the drive by double clicking on the desired parameter in the parameter list.

## Help Menu

- Contents...**      This command displays the main index of the *DriveAP Help*.
- Quick Help...**      This command (or the **F1** key) displays the default *DriveAP Quick Help*.
- If there is a program on the screen, context-sensitive *Quick Help* can be displayed by the **right button** of the mouse. This tells the actions that are possible with the item under the cursor (if any). If the cursor is e.g. on a pin of a block when you press mouse's right button, *Quick Help* lists the available pin actions.
- Info...**      This command (or the **F3** key) opens the *DriveAP Info* window (you can press the **F3** key even if the *Info* window is already visible in order to change its content, see below).
- This window contains a list of all available info items (e.g. the descriptions of all blocks) and you select the info item you want to see by clicking on it in the item list.
- It is not necessary to close this *Info* window because it “floats” on the program page.
- If the cursor is on a block in the program page when you press the **F3** key, the description of this block is displayed in the *Info* window.
- When you are adding a block to your program, press the **F3** key if you want to see the description of the block you have selected from the

block type list of the dialog box (this is not necessary if the *Info* window is already on the screen).

***About DriveAP...*** This command displays the DriveAP information box.

*Menu Commands*





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