

DotX Windows Version 0.12



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1. Welcome

Welcome to your new software for the DotPad 320 and DotPad 320X.

In many countries, including Germany, Microsoft Windows is the leading operating system.

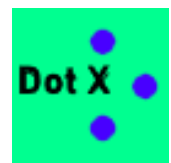
Therefore, we are developing software that makes using the DotPad (320/X) easier on Windows PCs or laptops, even without a screen reader. You can download this software from the website.

2. Installing Dot X Win

First, download the installation package "Setup-DotX.exe" from the product page "https://dotpad.vision/produkte/dotpad/dot_x_windows/". Running this file will copy the software to the program directory and create shortcuts in the Start menu and on the desktop.

The files temporarily created during installation are automatically removed when the installation is complete.

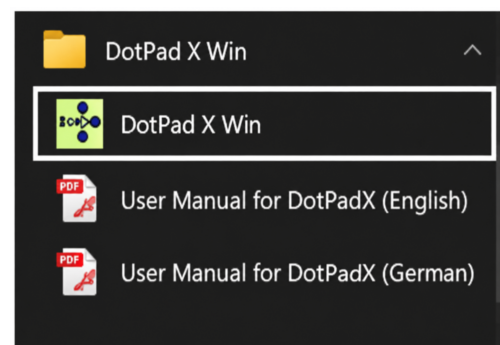
You can now start the program via the Start menu or the desktop.



3. Starting the application

Click the DotX icon on your desktop:

Alternatively, select "DotX Win" from the Start menu and press Enter. The program does not require any special permissions or path information.



4. First steps

Depending on your settings, the program may take a few seconds to start. A simple startup graphic will inform you about the startup process. Once this disappears, you can begin working with the program.



First, in the "Settings" menu, select your preferred language under the "Language" submenu. Then, go to the "Device" menu and select the serial port to which you connected the DotPad or Graphiti under the "Port" submenu. The software will then attempt to establish a connection between the PC and the device. Of course, the DotPad or Graphiti must be switched on for this to work, even though the interfaces are displayed even when the device is switched off.

Attention: This program version does not yet support Bluetooth LE connectivity! The Graphiti device must also have VCP mode enabled (Space + Dot 8).

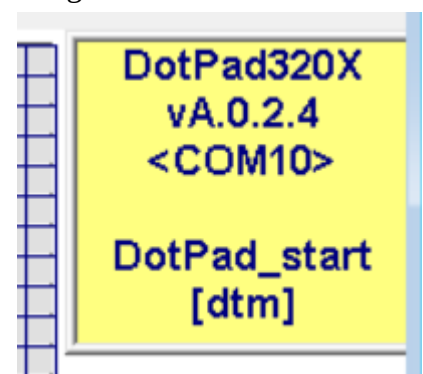
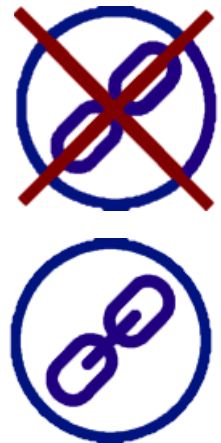
5. Connect DotPad / Graphiti

Connect the DotPad to your PC using a USB-A to USB-C cable. Connect the Graphiti using a USB-A to Micro-USB cable. You should receive a message from your PC about newly connected hardware. On the Graphiti, press Space + Dot 8 to activate VCP mode. -New ports (virtual USB to COM) will appear in Windows Device Manager. Note the first number of these (e.g., COM10). In the DotPadX Win program, select "Port" from the "Device" menu and choose the COM port of the DotPad or Graphiti. A connection will now be established. The icon, which is currently a link with a line through it, will change to a link icon.

If the connection fails, the crossed-out symbol will remain. You can also click this symbol with your mouse to start or disconnect the connection process.

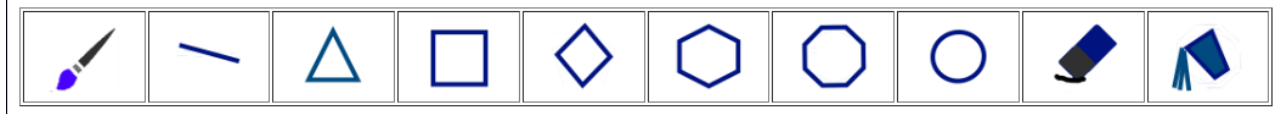
If the connection is successfully established, a simple graphic is displayed on the DotPad. This disappears the first time a custom graphic is displayed. Simultaneously, the product name, version, and interface are displayed in the information area on the right. You can also access this information in the "Device" menu under "Information" (*Hotkey: Alt+I*).

You can enable automatic connection after program startup in the "Device" menu. Then the DotPad will connect automatically every time the program starts, as long as the COM port doesn't change.



6. Drawing

You have 10 tools available for drawing. These can be modified using the symbols Left (Shift + Up Arrow) or Right (Shift + Down Arrow).



The following elements are available:

- Paint brush
- line
- triangle
- square
- rhombus
- hexagon
- octagon
- Circle
- eraser
- Fill tool

It should be noted that due to the DotPad's low resolution, the shapes are not perfect. However, they can be easily felt on the DotPad itself.

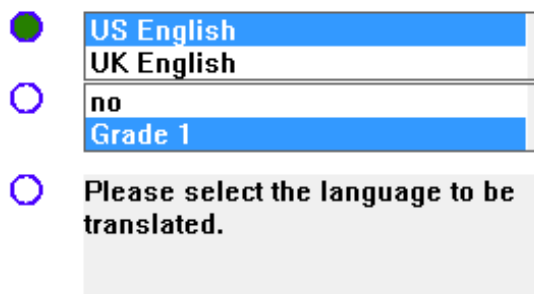
If you have made a mistake, you can undo the last changes using the icon ,  the keyboard shortcut *Ctrl+Z* , or via the "Edit" – "Undo" menu. The individual layers are displayed in different colors. To apply the drawing, select "Apply" from the "Edit" menu, press *Ctrl+Enter* , or use the icon. 

You can invert the current drawing via the "Edit" menu or using the keyboard shortcut *Ctrl+I* .

7. Braille

7.1 Select Braille language and grade

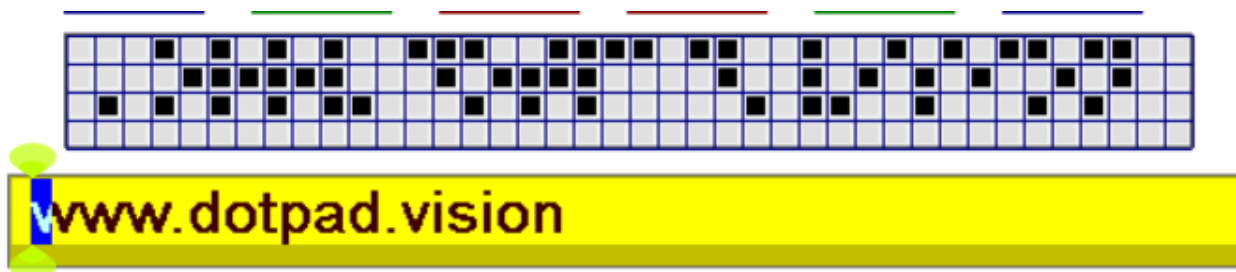
To select the desired Braille language and Braille grade , use the two list boxes to the right of the text fields. -You can switch between the fields using the Tab key and then make your selection with the arrow keys. Of course, you can also make your selection with the mouse . Please note that loading the respective tables may take a moment for the selection process to complete.



Attention! When you are in the program menu, the selection buttons are replaced by an **M** to indicate that no selection is possible in this case.

7.2 Text input

As soon as you enter text into the input field, it is automatically converted to Braille and displayed in the 20-cell area of the DotPad and the screen display. The conversion is performed according to the language and grade selection. If you change these, the text will also be displayed differently.

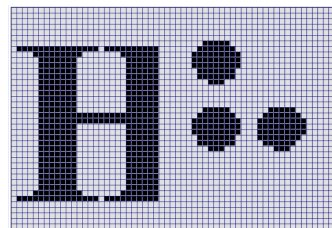


7.3 Transferring the text to the graphics area

To drag the displayed text into the graphics area, simply left-click in the Braille text box. You can then drag the entire area into the graphics area and position it by clicking the left mouse button again. Pressing *Esc* or right-clicking will cancel the action.

7.4 Displaying letters and text in large format

To display letters very large in both print and Braille, select the lower selection button and then use *Ctrl + left/right arrow keys to navigate* through the text. Only one letter at a time will be displayed in both text and Braille. You can select the corresponding font in the "Settings" menu under "Braille Font" or "Text Font." The Braille fonts are installed by the program, while the text fonts are Windows system fonts.



Alt + left/right arrow displays multiple letters, albeit smaller. The same applies to the fonts used as to the display of individual letters. In the Braille display, you'll notice that the shapes aren't perfect circles; this is due to the mapping of the TrueType fonts to the low resolution. However, the shapes are easily discernible by touch.



8. Camera

DotPad X Win supports the connection of cameras, mostly webcams, to the DotPad via the so-called "Still Capture API". The captured image is displayed in a small or large preview window, and a configurable portion of it is sent to the DotPad after prior processing. Numerous settings are available for this process.

You have to experiment a bit to find the best possible display.

8.1 Setting up the camera

In the "Camera" menu, you can select one of the connected cameras from the "Device" submenu. If no camera is detected by the system, this menu will be inaccessible. If multiple cameras are connected, you will find them in the "Device" menu.

Next, select a suitable resolution from the "Resolution" submenu. Do not select a resolution that is too high, as it cannot be evaluated.

You can now activate the camera via the camera icon or the "On/Off" menu item. The program window will then expand to the right and a preview image will appear. Below this are several sliders for adjusting the camera properties. Properties that are not available will be grayed out.



8.2 The trigger / threshold

The individual color pixels of the camera (red, green, blue) are converted into grayscale values $g = \sqrt{(R^2 + G^2 + B^2)}$ to ultimately obtain a black and white value for display. This trigger or threshold can be set manually using a slider, or you can have it calculated dynamically. With the dynamic threshold, an average value is calculated across the sampled range. You can try both options and decide which value is better suited to your application.

8.3 The display area

When the program starts, the display area is the same as the DotPad resolution of 60x40 pixels. A semi-transparent area represents the display area. You can resize this area using the mouse wheel, a context menu (right-click), or the keyboard shortcut "Ctrl + Numpad +" or "Ctrl + Numpad -". Move the mouse over the camera image or the program window itself. To freeze the image, you can use the context menu or the Numpad key. This also allows you to use the mouse to access other menu functions.

9. Explore the screen

A similar workflow to using the camera is possible with "Explore Screen". To activate this function, press the key combination "Ctrl + Shift + Numpad -". The program window will disappear and the rest of the screen will reappear. Now you can drag the mouse across the screen and explore it on the DotPad.

10.1 File

The File menu has the following entries:

<u>O</u> pen	F3
<u>N</u> ew	Alt+N
<u>S</u> ave	F2
Sa <u>v</u> e As	Alt + F2

I <u>m</u> port graphics & PDFs	F10
E <u>d</u> it slideshow	F9

Exit Alt +

F4

10.1.1 Open

Selecting this menu item opens a file open dialog. Beforehand, it checks if a file is already open and asks if it should be saved.

In the file open dialog, the file type to open can be selected.

Four formats are currently supported for opening and saving files.

- .DTM

The standard DotPad format

- .BMP

bitmap file, in black and white encoding, has a size of 60 x 44 pixels. It can be saved and loaded. Other encodings and formats will be included in a future program version.

- .XML

We are still working on this format; in particular, a designated description area is still missing for adding a description to a graphic.

- .CSV

This format was adopted from Graphiti. Here, the bits are stored individually, separated by commas, line by line.

10.1.2 New

If you edit a file but don't save it, you will be asked at several points in the program whether you want to save the data. One of these points is the "New" menu item.

10.1.3 Save

If a filename has already been assigned, the current data will be saved. If no name has yet been assigned, the process will proceed as described in the "Save As" menu item.

10.1.4 Save As

A file save dialog will open. In this dialog, you can select the desired format and enter a file name.

10.1.5 Import graphics & PDFs

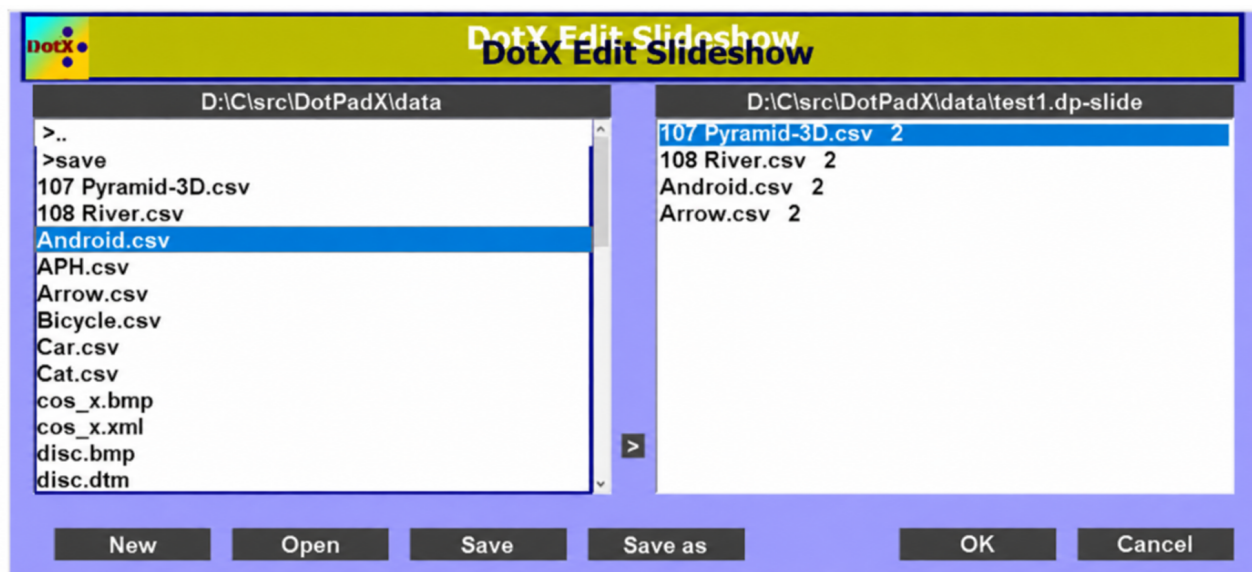
To import graphics from other formats, e.g., PDFs created with Arithmico⁽¹⁾, select this menu item. You can also use the program icon on the right. A file open dialog will then open, allowing you to select a PDF or graphic. The selected file will then be converted and displayed in a window on the right. For more information, see "Displaying Graphics".



The third-party software IrfanView⁽²⁾ is required for file conversion.

10.1.6 Edit slideshow

After selecting this option, a dialog box opens, consisting mainly of two lists and several buttons. The left list displays a directory view. Directories are marked with a greater-than sign (>). The available drives are shown at the root level.



Furthermore, all files supported by the program are offered. Clicking on a file or pressing the Enter key either changes the directory or adds the file to the list on the right.

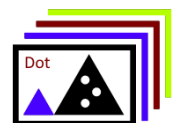
You can switch between lists using the mouse or Ctrl+Tab. The active list is highlighted with a border.

The number displayed in the right-hand list is the display duration in seconds. This value can be changed for this file or for all files by clicking or selecting it with the Enter key.

You can change the sort order of the files using Ctrl+Up and Ctrl+Down.

At the bottom of the dialog you will find the buttons to open and save the slideshow file, as well as to cancel or close the dialog.

The slideshow file has the extension .dp-slide and is internally a ZIP archive. Therefore, if you rename this file to *.zip, you can access the individual files, for example, in Windows Explorer.



10.1.7 Exit

Selecting this menu item will terminate the program.

10.2 Edit

10.2.1 Overview

The Edit menu has the following entries:

Delete all	Alt+D
Undo	Ctrl+Z
Apply	Ctrl+Enter
Invert	Ctrl+I

Explore screen	Ctrl+Shift -

Calculator	F12
Start slideshow	F11
Arithmico Calculator	F8

Some of these entries do not have buttons; they are rarely needed and can also be accessed via hotkey.

10.2.2 Delete everything

The entire editing area will be deleted.

10.2.3 Undo

The last drawn element is removed.

10.2.4 Apply

All changes are carried over, meaning the "Undo" function is no longer possible afterwards.

10.2.5 Invert

The display is inverted, i.e., white becomes black and vice versa.

10.2.6 Explore screen

10.2.7 Calculator

The calculator is described in section 11.

10.2.8 Start slideshow

A file open dialog will appear where you can select a file with the extension **.dp-slide**.

The slideshow will now start automatically.

You can control the behavior of the slideshow using the following keys.

Cursor up	Increase speed by 0.1 seconds, up to a maximum of 10 seconds.
Cursor down	Reduce speed by 0.1 seconds to at least 1 second
Cursor left	Back to previous image, stop autoplay
Right cursor	Next image, stop automatic playback
spacebar	Stop or start automatic playback
Enter key	Start automatic playback
Escape	Stop automatic playback

10.2.9 Arithmico Calculator

The Arithmico Calculator is launched. If this program is already running, the program will switch to it.

10.3 Device

Under Device, meaning the DotPad, you will find the following entries:

- Connect**
- port**
- information**
- Connect automatically**

10.4 Settings

The following settings are possible:

Language

Sound

Braille Font

Text Font

Using a joystick

Braille in PDF

IrfanView as an SVG converter

IrfanView as a PDF viewer

Embed text in graphic

Chart type

10.4.1 Language

Under "Language" you can select the program language. Currently, German and English are available. Localization for other languages is easy and is described in a separate section.

10.4.2 Sound

The "Sound" button turns the playback of sounds within the program on or off.

10.4.3 Braille Font

For large display of text and Braille, see section 7.4, select the appropriate fonts here.

10.4.4 Text Font

Similar to the Braille font, you select the text font here for large display on the device.

10.4.5 Using a Joystick

The software also supports joysticks or gamepads as an additional control device. This allows the display windows to be positioned independently of the mouse.

10.4.6 Braille in PDF

If the "Text in Graphics" switch (10.4.9) is active, labels will be inserted into the graphics. When this option is active, 8-dot Braille will be used as the font. This would allow, for example, swell copies to be created from the PDFs that also contain Braille.

10.4.7 IrfanView as an SVG converter

If this field is active, IrfanView will be used for conversion; otherwise, the included program SVG2PDF.exe will be used.

10.4.8 IrfanView as a PDF viewer

If this field is enabled, IrfanView will be used as the PDF viewer. Otherwise, the default PDF viewer will be launched.

10.4.9 Embedding text in a graphic

When calculating curves or graphs, the result can be saved as an SVG or PDF. Text, such as the formula and data ranges, can be embedded in this file. If only the graph is desired, this option should be deselected.

10.4.10 Diagram type

Here you can select the type for the chart/diagram function. The available options are vertical and horizontal bar charts, as well as pie charts.

10.5 Camera

Most of these menu items were already explained in point 8:

On off

Device >

resolution

small / large window **Shift ***

To turn the camera on or off, use either the menu item or the camera icon.

Explanations about the camera can be found in menu item 8.



10.6 Help

Help F1

About

info

www.DotPad.Vision

Check for updates

Debug information

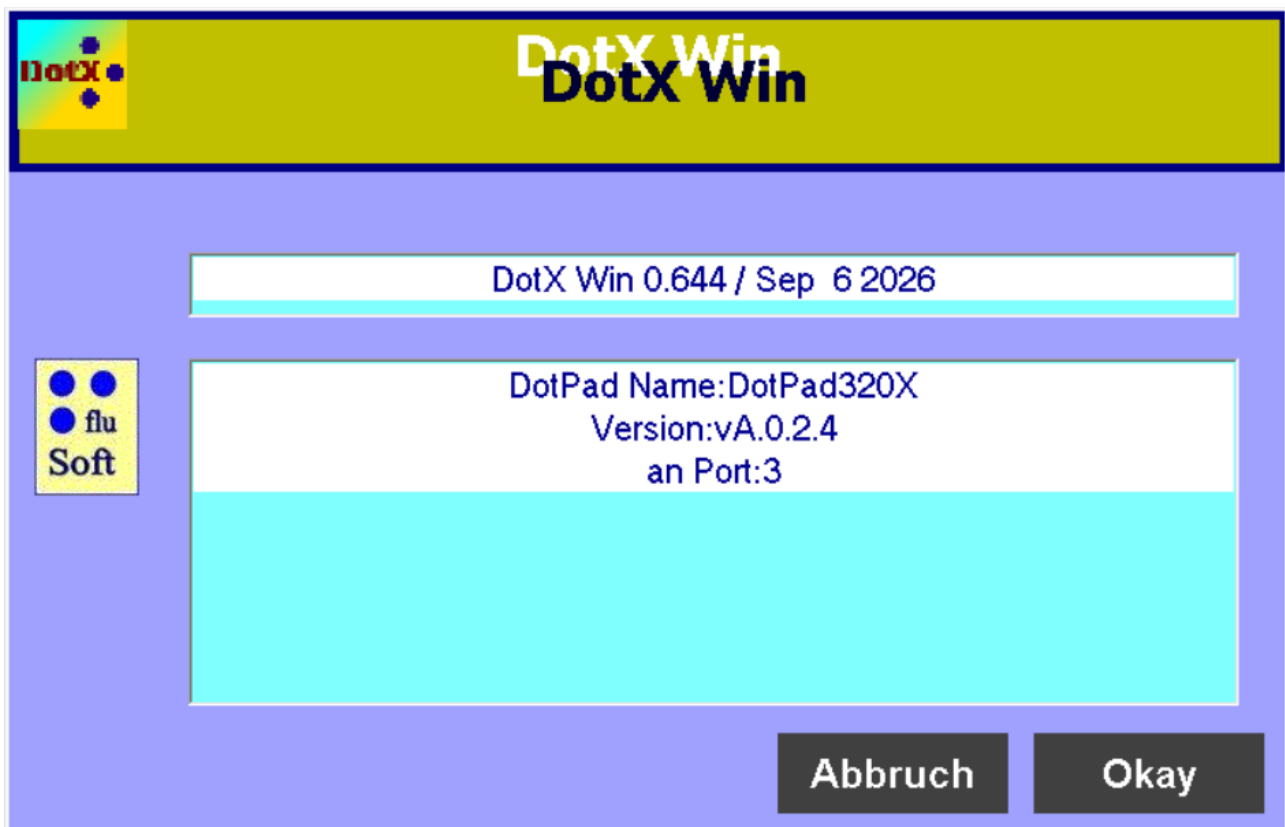
10.6.1 Help

Press F1 to access this help.

10.6.2 About



10.6.3 Info



10.6.4 www.dotpad.vision

The website <https://www.dotpad.vision> will open in your browser. An internet connection is required for this to work.

10.6.5 Check for updates

A connection is established to the web server dotpad.vision, and a check is performed to see if an update is available. If so, it can be downloaded and installed.

10.6.6 Debug Information

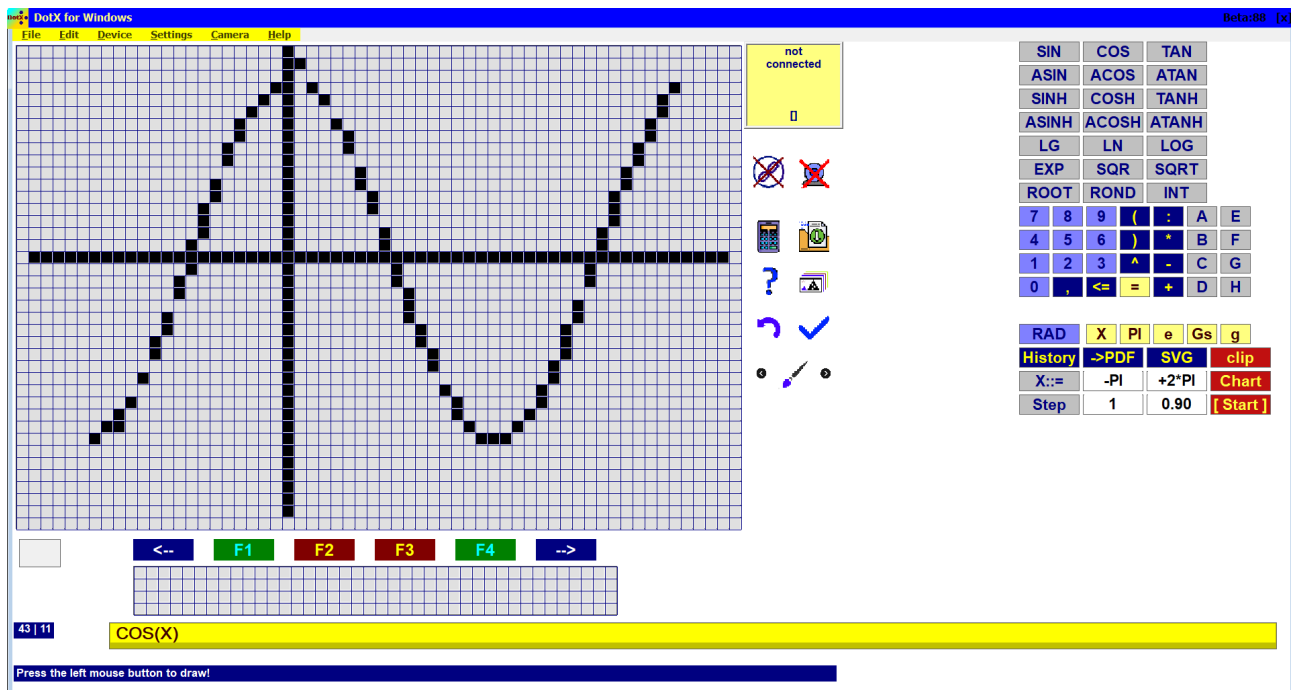
The program can write information to a file (DotX.pro) during operation. This information helps with troubleshooting should an error occur. Unfortunately, this function can significantly slow down the program, for example, during calculations with small step sizes.

Should an error occur, activate this switch, repeat the faulty function and send us, along with a description of the error, the file DotX.pro, which you can find in the \res directory of the program directory.

11. Calculator

11.1 General

The calculator can be accessed via the "Edit" menu or via the icon.



It supports numerous mathematical operations and functions. Most of these functions require one parameter; only the LOG and ROOT functions require two arguments, which must then be separated by a semicolon (;).

11.2 Available functions

$\exp(x)$ is equivalent to e^x

$\lg(x)$ Calculates the logarithm of x to the base 10

$\ln(x)$ Calculates the logarithm of x to the base e .

$\log(x; \text{base})$ calculates the logarithm of x to the base base

$\sin(x)$ Calculates the sine of x

$\cos(x)$ Calculates the cosine of x

$\tan(x)$ Calculates the tangent of x

$\sin(x)$ Calculates the arcsine of x

$\cos(x)$ Calculates the arccosine of x

$\tan(x)$ calculates the arctangent of x

$\sinh(x)$ Calculates the hyperbolic sine of x

$\cosh(x)$ calculates the hyperbolic cosine of x

tanh(x) Calculates the hyperbolic tangent of x

asinh(x) Calculates the inverse hyperbolic sine of x.

acosh(x) calculates the inverse hyperbolic cosine of x.

atanh(x) Calculates the inverse hyperbolic tangent of x.

sqrt(x) Calculates the square root of x.

root(x; n) Calculates the nth root of x.

round(x) returns the nearest integer.

11.3 Variables

The calculator allows the use of 26 variables (A – Z), where X has a special meaning. Assignments are made using the equals sign '=', e.g., B=33*5. Pressing the Enter key or clicking "Start" executes an instruction.

If a statement contains the symbol 'X', the X is executed with the values 'X::=' and displayed in DotX. The X and Y coordinates are scaled accordingly. Y scaling can be tested using the second input field in the bottom row. This value should be between 0.05 and 1.0; values between 0.5 and 1.0 are generally recommended.

Variables A to H can be clicked on the interface.

11.4 Constants

In this calculator, constants always consist of two letters:

PI	3.1415926535897...	Pi (pi) is the mathematical constant of π .
GS	1.6180339887	Golden Ratio
EZ	2.7182818284	Euler's number
EM	0.5772156649	Euler-Mascheroni constant:
AP	1.2020569031	Apéry constant
EB	1.6066951524	Erdős-Borwein constant
RS	1.4513692348	μ Ramanujan-Soldner constant
GR	9.81	Earth's gravity

In the interface, some of these constants are displayed by only one letter, e.g. "e", but in the formula the two letters "EZ" are inserted.

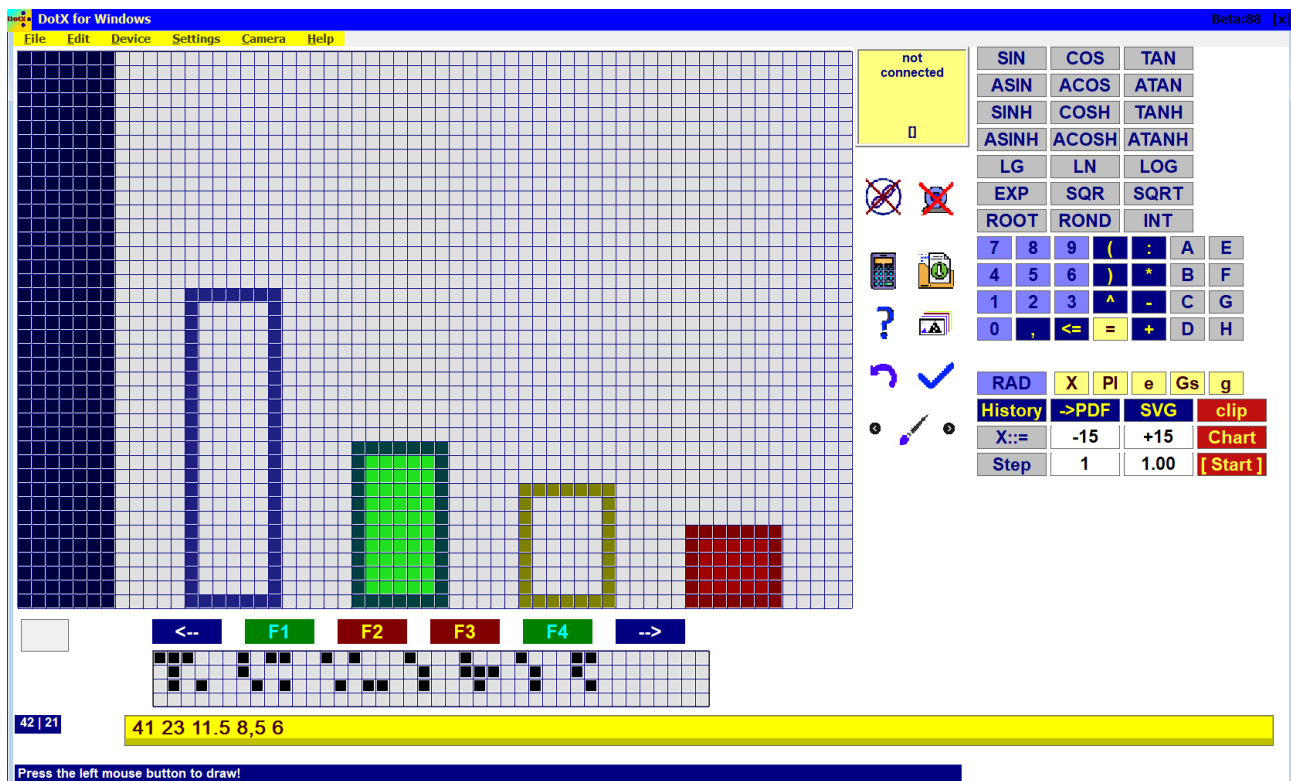
11.5 Arithmico Calculator Lists

Users of the software "Arithmico Calculator ⁽²⁾" can create a list of value pairs using the "table" command and copy it to the clipboard. This list can then be imported using the DotX command "Clip" and processed further. The structure of this list can be described as follows: [[X1;Y1; [X2;Y2]; ... [Xn;Yn]]

When the Import button is clicked in the calculator, a file open dialog does not open; instead, the current task is calculated and transferred to the graphics area. Now more details of the graphs can be displayed.

11.6 Diagram / Chart

If you want to quickly display a simple diagram, e.g. to show a quick overview of election forecasts, the chart area can be used.



The individual values are entered separated by spaces or commas and the chart is generated by clicking "Chart". The desired chart type can be selected in the settings menu. Currently, three types are available: horizontal bar chart, vertical bar chart, and pie chart.

12. Keyboard shortcuts

Ctrl + Shift + Num-	Toggle screen exploration on/off
Esc + Shift	Exit program
F1	Open Help
F2	Save file
F2 + Alt	Save As
F3	Open file
O + Alt	Open file
N + Alt	New file
I + Alt	Show information window
A + Alt	About this program
W + Alt	Open the dotpad.vision website
Esc	Cancel
Enter	Confirm
Z + Ctrl	Undo
Enter + Ctrl	Apply
Left + Ctrl	Letters in large Braille
Right + Ctrl	Letters in large Braille
Left + Alt	Word in large Braille
Right + Alt	Word in large Braille
Up	Braille language / grade selection
Down	Braille language / grade selection
I + Ctrl	Invert
Tab	Switch between Braille language, grade, and display
Tab + Shift	Switch between Braille language, grade, and display
Num+	Increase threshold
Num-	Decrease threshold
Num+ + Ctrl	Increase display area
Num- + Ctrl	Decrease display area
Num+ + Shift	Unassigned
Num- + Shift	Unassigned
Num+ + Alt	Unassigned
Num- + Alt	Unassigned
Num*	Freeze camera image
Num/	Manual threshold
Enter + Shift	Open popup menu
D + Ctrl	Delete graphic area
+Shift	
Up + Shift	Switch drawing tool
Down + Shift	Switch drawing tool

13. Localization

To perform localization into another language, the following steps are required:

1. Locate the file "DotPadX.ini" in the \res directory and open it with a text editor, e.g. Edit, Wordpad...
2. In this file, locate the [*Language*] section, which is currently located from line 142 and looks like this:

[Language]

01=de

02=en

3. Create another entry, e.g. 03=cz

[Language]

01=de

02=en

03=cz

4. Save this file and close it.
5. Open one of the files DotX_de.ini (German) or DotX_en.ini (English) in the editor and save it under the name DotX_cz.ini.
6. Now you can edit and translate this file line by line.
In longer strings, "\n" means a line break and "\t" means a tab. A string, such as a name, is inserted into the string "%s" and a digit into "%d".
7. Save the new .ini file and start the program. You should now find your new language in the settings menu under Language.

14. Acknowledgements

This project uses the following third-party software modules:

- Still Capture Library < <http://noeld.com> > © 2006-2013, Noël Danjou. All rights reserved.
- liblouis Braille Translation and Back-Translation Library, ©2018 SBS Swiss Library for the Blind, Visually Impaired and Print Disabled, see
<http://www.gnu.org/licenses/>
- A modification of the math parser is based on the book "C++ The Complete Reference" by H. Schildt, ISBN: 9780070532465
- ⁽¹⁾ IrfanView
IrfanView is a fast, compact, and innovative free image viewer (for non-commercial use) for Windows. It is designed to be easy to use for beginners while still being powerful.
<https://www.irfanview.com/>
- ⁽²⁾ Arithmico Calculator
Arithmico Calc is free, open-source scientific calculator software specifically designed for maximum accessibility. It is designed for full compatibility with assistive technologies and is therefore ideally suited for blind and visually impaired people.
<https://arithmico.com/>