Explorer Draw

A software application for the TI-73 Explorer™

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Important information

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What is the Explorer Draw application?

Using the Explorer Draw application, you can draw and investigate shapes in two and three dimensions by choosing one of the two drawing modes.

- **Logo Light** is a programming language containing a set of commands that enable you to draw and study two-dimensional shapes. These shapes can be viewed with or without a coordinate system. Commands in the programming language include rotating the turtle and stepping forward or backward, as well as more complex ones like drawing circles and repeating a set of commands.
- **Isometric Dots** lets you draw 3-D wire-frame shapes in a 2-D environment by adding segments to an isometric drawing area.

The Explorer Draw application is a concept application that TI wants to share with our customers, educators, and students before the product definition and testing are complete. It is an alpha software version, and as such, it may contain imperfections, or the coding may be incomplete.

TI invites your feedback concerning the functionality and educational value of the Explorer Draw application. Please send your comments and questions to concept@list.ti.com.

What You Need

Hardware and software	Notes
TI-73 Explorer™ with version 1.60 or higher of the Graph Explorer software	You can download a free copy of the latest Graph Explorer software from education.ti.com/softwareupdates. Follow the link to Operating Systems.
Computer with Windows® 95/98/2000/XP, Windows NT®, or Apple® Mac® OS 7.1 or higher installed	
TI Connectivity computer-to-device cable	TI Connectivity cables are available for purchase from retail stores, online retailers, and instructional dealers. See a list at education.ti.com/buy. You may also purchase TI Connectivity cables from the TI online store at education.ti.com/shop.
TI Connect™ software, which works with most supported models of Flash-based TI graphing devices	You can download free copies of TI Connect software from education.ti.com/downloadticonnect.

Where to Find Installation Instructions

Detailed instructions on installing this and other applications are available at education.ti.com/guides. Follow the link to Flash installation instructions.

Getting Help

Explorer Draw has built-in help screens that give you basic information about using both Logo Light and Isometric Dots. To display help screens, select **HELP** (press TRACE).

The instructions in this guidebook are only for this application. If you need help using the TI-73 Explorer, refer to its comprehensive guidebook at education.ti.com/guides.

Starting and Quitting the Application

Starting the Application

1. Press [APPS] to display the list of applications on your TI-73 Explorer™.
2. Select **EXPDRAW**. The application's information screen is displayed.
3. Press any key to continue. The programmer's screen is displayed.
4. Press any key to continue. The main menu is displayed.

Quitting the Application

From the application's main menu, select **EXIT** (press [Y=]) or press [2nd] [QUIT].

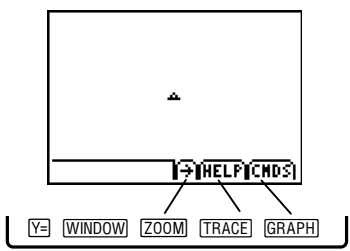
Navigating

Selecting Menu Items

To select an item from a menu, press ▼ or ▲ to highlight the menu item, and then press ENTER to select it.

Using On-Screen Options

To select an option at the bottom of the screen, press the graphing key directly below the option.



Drawing with Logo Light

Programming shapes with the basic set of commands in Logo Light helps you understand the basics of distances, angles, and characteristics of polygons while using logical thinking. In Logo Light, a turtle is programmed to draw various shapes and figures in a two-dimensional environment, using a programming language with a basic set of commands.

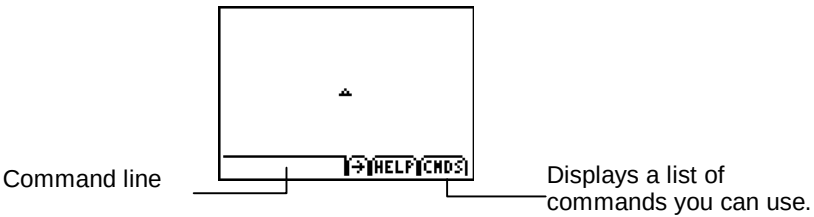
1. From the Explorer Draw main menu, select **LOGO LIGHT**.

2. Select an existing Logo file to open, or select **NEW LOGO FILE**.

The drawing screen has two parts:

- The main part of the screen is the drawing area. You start to draw from the center of the screen, where you see the tip of the drawing pen. The shape of the tip of the drawing pen (called the turtle, as in other versions of Logo) can be a triangle, a diamond or an X.

- Along the bottom of the screen are the command line and three menu buttons. You input commands into the command line to draw your drawing one step at a time.



Inputting drawing commands

1. Select **CMDS** to display a list of commands.

2. To select a command, press ▲ or ▼ to highlight the command, and then press ENTER to paste it into the command line.

3. Enter the parameter(s) (inputs) for the command, and then press ENTER. (Some commands do not require parameters.) If you have entered the command using the correct syntax, the command is executed. Otherwise, you need to revise the command.

Note

- Press ◀ and ▶ to move the cursor within the command line.
- Press CLEAR to delete everything on the command line.
- Press DEL to delete the highlighted character.
- Press 2nd [INS] to insert a command between two other commands.
- Press CLEAR to close the commands menu (or any other menu).

The following commands are available:

Command	Description
FD *number*	Move forward the number of steps specified in the current direction. The number of steps the turtle can move in one command is from 0 to 100. Each pixel is one unit on the screen.
BK *number*	Move backward the number of steps specified. The number of steps the turtle can move in one command is from 0 to 100. Each pixel is one unit on the screen.
LT *angle*	Rotate left to a new drawing direction by the angle specified. The angle must be from 0° to 360°.
RT *angle*	Rotate right to a new drawing direction by the angle specified. The angle must be from 0 to 360.

Command	Description
CIRCLER *radius*	Starting from the current position (on the circumference), draw a circle to the right. The maximum radius is 100.
CIRCLEL *radius*	Starting from the current position (on the circumference), draw a circle to the left. The maximum radius is 100.
ARCR *radius, angle*	Starting from the current position, draw an arc to the right. The maximum radius is 50; the angle must be from 0° to 360°.
ARCL *radius, angle*	Starting from the current position, draw an arc to the left. The maximum radius is 50; the angle must be from 0° to 360°.
PD	Sets the pen down to draw. This is the standard mode. Every move that is made will leave a trace on the screen.
PE	Makes the pen an eraser. Any commands to draw will erase the drawing after PE is executed. The pen stays in this state until the PD command is executed again.
PU	Lifts the pen so that you can move it without drawing. The pen stays in this state until the PD command is executed again.

Command	Description
HT	Hides the shape of the turtle. Drawing is still possible, but the turtle shape is not shown.
ST	Shows the shape of the turtle again.
CC	Deletes the command history entered so far. If you use the CC command before or when you reach 60 commands, you can keep adding to your current drawing. Only the last set of commands is saved when you save your drawing as a file. If you save your drawing as a PIC, the complete image in the drawing area is saved.
CS	Clears the entire screen and places the turtle in the center.
CT	Clears the text on the screen.
HOME	Turtle moves to the center of the screen.
GRID	Toggles the drawing grid on and off.
AXES	Toggles the coordinate axes on and off. Each pixel is one unit on the screen.

Command	Description
PR *text*	Prints text on the screen. Text can be at most 4 characters long. Use subsequent PR commands for longer texts. Enter text using the TI-73 Explorer text editor ([2nd] [TEXT]).
REPEAT *n* (*commands*)	Repeats a list of commands *n* times. A maximum of four commands can be entered in the parentheses. You can use the Repeat command a maximum of 1000 times in one drawing. The Repeat command uses two command "slots." It helps to think of it as using one command for REPEAT and one for the number of times the subsequent commands in parentheses will be repeated. For example, REPEAT 4 (FD 10 RT 90) uses four commands.
SETPOS *number, number*	Moves the turtle to position specified. The numbers must be from -50 to 50. If turtle is rotated before you use this command, it remains rotated after it moves to the new position.
SHAPE #	Changes the shape of the turtle to one of the following: 1 = triangle, 2 = diamond, 3 = X.
STAMP	Stamps the turtle's shape on the drawing area.

Correcting Errors

If a command you entered is invalid, an error message is displayed. Press any key to exit the error message and return to the command line.

Error message	Description
PRESS <CMDS> TO SELECT A COMMAND. PRESS <HELP> TO LEARN MORE ABOUT COMMANDS.	No command was entered or the Repeat command was used incorrectly, for example, “12” or “REPEAT 4(23)”.
LOGO LIGHT DOES NOT UNDERSTAND. TRY <HELP> OR [CLEAR].	The command(s) entered cannot be interpreted. Check **HELP** for help on using commands, or press CLEAR to clear the command line.
THE input FOR command MUST BE number<=input<=number	The input entered is not within the correct limits for the command. See the list of commands for limits.
TURTLE HAS REACHED THE MAXIMUM NUMBER OF 60 COMMANDS	The history holds a maximum of 60 commands. If this limit is reached, no more commands can be added. Enter the view side for further action like saving the files or the picture.

Error message	Description
ONLY number MORE COMMANDS ARE ALLOWED. THIS ENTRY HAS TOO MANY COMMANDS	The command history is almost full. The command you have entered (a Repeat command, for example), would exceed the 60-command maximum.
ONLY 4 COMMANDS CAN BE REPEATED	The Repeat command can repeat a maximum of four commands.
TURTLE IS OFF THE SCREEN! YOU CAN USE HOME TO SEE TURTLE AGAIN.	The commands you have entered have moved the turtle off the screen. To return to the center of the screen, use the Home command.

Viewing the Command History

After a command is executed, it is placed in the command history. The history stores up to 60 commands. You can view a numbered list of commands on the COMMAND VIEWER screen or you can scroll through the command history from the command line on the drawing screen.

- To display the COMMAND VIEWER screen, select the → option. Select ← to return to the drawing area.

- To scroll through the command history on the drawing screen, use the up and down arrow keys. To copy a command from the command history to the command line, press ▲ or ▼ to highlight the command, and then press ENTER. You can edit the command, if necessary, before pressing ENTER to execute it.

Saving a File or a PIC

To save a file:

1. Press 2nd [QUIT] or select **FILE** and then **SAVE FILE** from the COMMAND VIEWER screen.

2. Press ENTER to select **YES**.

Tip To cancel, press ▶ and then press ENTER to select **NO**.

3. Press ▲ or ▼ to highlight a file name, and then press ENTER to save the file to the file name.

When you save a PIC, you save the drawing that you created, but the commands to create that drawing are not saved. Only the drawing area of the screen is saved. The PIC is automatically cropped from the bottom so that the on-screen options are not part of the image.

To save a pic:

1. Select **FILE** and then **SAVE PIC** from the COMMAND VIEWER screen.

2. Press ENTER to select **YES**.

Tip To cancel, press ▶ and then press ENTER to select **NO**.

3. Press ▲ or ▼ to highlight a file name, and then press ENTER to save the file to the file name.

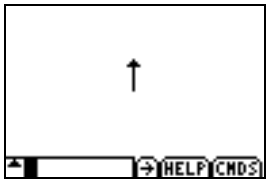
Tip You can use Explorer Draw PICs in a StudyCards™ stack without having to edit or crop them.

Example – Drawing a Square

1. From the Logo Light drawing screen, select **CMDS** to display the menu of commands.

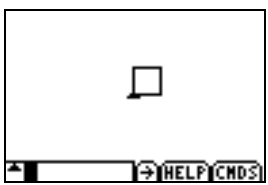
2. Select **FD**, and then type **10**.

3. Press ENTER to execute the command. Turtle moves forward 10 units.



4. Enter and execute the following commands to draw a square:

```
RT 90
FD 10
RT 90
FD 10
RT 90
FD 10
RT 90
```



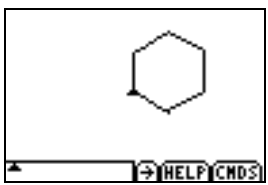
Tip

- You can press ▲ to see your previous commands. To copy a command, press ▲ to highlight it, and then press ENTER to copy it to the current command line.
- You can use the Repeat command to draw a square, by entering **REPEAT 4 (FD 10 RT 90)**.

Remember, you can see a list of your commands on the Command Viewer screen and you can save your file or save your drawing as a PIC.

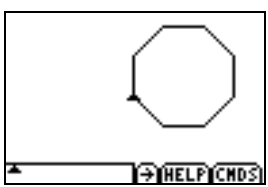
Example 2 – Polygons to Circle

1. Draw a regular hexagon using the following Repeat command: REPEAT 6 (FD 15 RT 60).



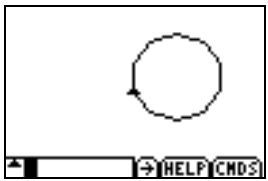
2. Clear the screen (use the **CS** command).

3. Now, draw a regular octagon: REPEAT 8 (FD 15 RT 45).



4. Clear the screen.

5. Next, draw a decagon: REPEAT 10 (FD 10 RT 36). What shape are you starting to see?



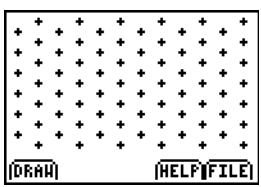
6. Try each of the following Repeat commands. (Remember to use the CS command to clear the screen before you enter subsequent Repeat commands.) Write a description of the shapes you see. As the number of sides of the polygon increases, does the polygon look like another familiar shape?
   REPEAT 30 (FD 2 RT 12)
   REPEAT 36 (FD 2 RT 10)
   REPEAT 45 (FD 2 RT 8)
   REPEAT 60 (FD 2 RT 6)
   REPEAT 90 (FD 2 RT 4)
   REPEAT 120 (FD 2 RT 3)

7. Clear the screen, and then use the CIRCLER or CIRCLEL commands. What do you notice? Try different radius values, too.
   CIRCLER 15
   CIRCLEL 15

Drawing with Isometric Dots

In Isometric Dots, you can draw three-dimensional images on an isometric two-dimensional grid. This helps you to understand principles of three dimensions and hidden surfaces.

1. From the Explorer Draw main menu, select **ISOMETRIC DOTS**.
2. From the ISOMETRIC DOTS main menu, select **ISOMETRIC DOTS**.
3. Select an existing file to open, or select **NEW ISO FILE**.

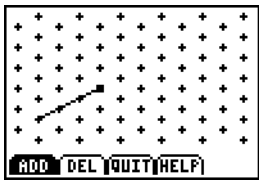


4. Select DRAW to enter the drawing mode.
5. Use the arrow keys to move the cursor to the location on the grid where you want to begin drawing.

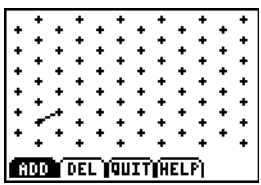
Note

- Press ▲ and ▼ to move the cursor vertically on the grid.
- Press ◀ and ▶ to move the cursor diagonally on the grid.

6. Select **ADD**, and then move the cursor to the endpoint of the first segment.



7. Select **ADD** again to complete the segment.



8. Repeat steps 5-7 until your drawing is complete.

Note Select **DEL** to delete line segments. Segments are deleted in the reverse order that they were added.

Saving a File or a PIC

To save a file:

1. Select **QUIT** to exit the drawing mode, if necessary.

2. Select **FILE** and then **SAVE FILE**.

3. Press ENTER to select **YES**.

4. Press ▲ or ▼ to highlight a file name, and then press ENTER to save the file to the file name.

To save a PIC:

1. Select **QUIT** to exit the drawing mode, if necessary.

2. Select **FILE** and then **SAVE PIC**.

3. Press ENTER to select **YES**.

4. Press ▲ or ▼ to highlight a file name, and then press ENTER to save the file to the file name.

Tip You can use Explorer Draw PICs in a StudyCards™ stack without having to edit or crop them.

Practicing with Sample Cube Stacks

The sample cube stacks test your ability to recognize three-dimensional images.

1. From the ISOMETRIC DOTS main menu, select **SAMPLE CUBE STACKS**. The introductory screen is displayed.

2. Select **NEXT** to start the sample.

3. Guess how many cubes it takes to build the image shown. You can try to build the image with multilinks, cubes, or sugar cubes.

4. Select **CUBES?** to see if your answer is correct.

5. Press any key to exit the answer screen, and then select **NEXT** to display the next image.

6. Select **QUIT SAMPLES** to return to the ISOMETRIC DOTS main menu.

Example 3 – Isometric Dots

1. From the Isometric Dots drawing screen, select **DRAW** to begin drawing.

2. Select **ADD** to add the first point of the segment.

3. Use the arrow keys to select another point, and then select **ADD** to finish the segment. Add all of the segments (edges) to finish drawing the cube shown.

4. Select **QUIT** to return to the main drawing screen.

Now, you can save your file to open later or save your drawing as a PIC.

Deleting the Application

1. Press [2nd] [MEM] to display the MEMORY menu.
2. Select **Delete**.
3. Select **Apps**.
4. Move the cursor to **EXPDRAW**.
5. Press [ENTER]. A confirmation message is displayed.
6. Select **Yes** to delete the application.

Installation Error Messages

Low Battery

Do not attempt to download a Flash application if the low-battery message appears on the home screen. Low battery indication is shown on the initial screen. If you receive this error during an installation, change the batteries before trying again.

Invalid Signature or Certificate

Either this calculator does not have a certificate to run the application, or electrical interference caused a link to fail. Try to install the application again.

Error in Xmit

This problem is usually associated with the unit-to-unit cable and its connection between the calculators. Make sure the cable is firmly inserted in the link port of each calculator.

Communication Error

This error indicates that the TI Connect™ software (“Unable to communicate with device”) is unable to communicate with the calculator. The problem is usually associated with the TI Connectivity cable and its connection to the calculator or to the computer.

- Make sure the cable is firmly inserted in the calculator link port and the computer.
- Verify that the correct cable type is selected in the software link settings.
- Verify that the correct communications port (Com Port) is selected in the software link settings.

If this does not correct the problem, try a different TI Connectivity cable and restart your computer.

Memory Error

This error occurs when the TI-73 Explorer™ does not have sufficient memory for the application. In order to make room for another application, you must delete an application from the device. Before you delete an application from the TI-73 Explorer, you can save it on your computer using TI Connect™ software. You can reload it to the device later using TI Connect software.

Other Errors

See Appendix B in the TI-73 Explorer manual for information about the specific error.

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Page Reference

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