



TI-SmartView™ CE Emulator Software for the TI-84 Plus Family

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What's New

What's New in TI-SmartView™ CE Software

TI-SmartView™ CE for the TI-84 Family

- Emulator Workspace
 - The CE emulator runs the Python App. To launch the Python App, select [prgm] 2:Python App. **See:** Programming Python in [TI-84 Plus CE Python eGuide](#).
- Explorer Workspace
 - A Python program (PY AppVar) will save from the CE to a computer as *.py file. Open the *.py file in a text editor to view or edit the file for the CE Python experience. As in previous releases, TI-SmartView™ CE and TI Connect™ CE Explorer will send/convert *.py files to the calculator file type, PY AppVar. There is no need to save the CE PY AppVar on your computer.
 - When sending an image from a computer to a connected CE, an additional image conversion option is available to convert and send the correct Python image AppVar format to the CE. Then, using the Python App, import the ti_image Add-On module to use the image in your program.

See: [Using TI-SmartView™ CE and the Python Experience](#).
- Save Emulator State
 - A stored emulator state will only open on the TI-SmartView™ CE version where it was created. Prior to updating TI-SmartView™ CE, open any favorite state file and save off the files needed to the computer. Update TI-SmartView™ CE and recreate the state file for the new version if needed.

See: [Saving and Loading a CE Emulator State](#)

Always update with the latest CE Bundle at:

- education.ti.com/84ceupdate
- education.ti.com/84cetupdate

Introduction to TI-SmartView™ CE Software

The TI-SmartView™ CE software allows you to display a TI graphing calculator for your entire classroom. Two workspaces are included to help enhance your classroom presentations.



Calculator Emulator Workspace

Allows you to:



- Display a Full Emulator View or a Key Pad with Large Display Screen View. With optional views to open or close.



- Key Press History
 - Displays images of keys pressed so students can follow along with the keys pressed.



- View3™
 - Teacher-controlled update of up to three additional emulated screens such as Graph, Table and Equation for multiple representations.

- Calculate and Graph
 - Same experience as on physical graphing calculator.
- Drag and Drop any emulated screen to your class presentation software.**
 - Build out your lessons with screens created during your class.
- Press emulator keys using a Remote Key Pad!
 - Run SmartPad™ CE App*** on your TI-84 Plus CE connected to the computer with your USB cable. When the TI-SmartView™ CE window is in focus on your computer, your calculator becomes a Remote Key Pad.
- Launch a separate Screen Capture Window
 - Capture and save emulator screens as computer files similar to TI Connect™ CE Screen Capture which captures screens from the graphing calculator.

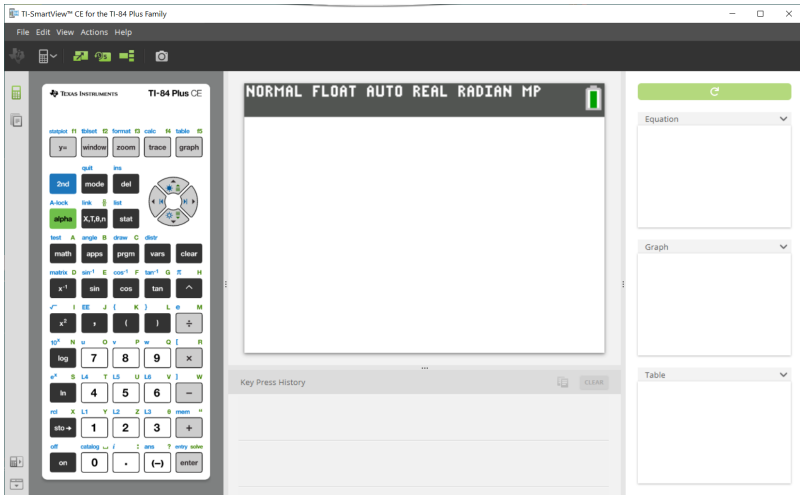


**Software such as Microsoft™ Office or other presentation software is supported.

***SmartPad™ CE App for TI-84 Plus CE comes pre-loaded on the calculator. If not on your TI-84 Plus CE, SmartPad CE App is also available to load to your calculator at education.ti.com/84ceupdate.

Note: The Large Display Screen is not touch enabled. Use emulator keys as on the calculator.

Calculator Emulator screen





Emulator Explorer Workspace

Allows you to:

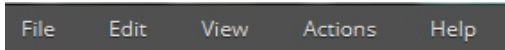




- Add single or multiple files to the emulator to set up for your classes:
 - Drag selected calculator files and/or your images (jpg, png, etc.) from your computer to your emulator for quick emulator set-up even during class instruction.
- Save files from the emulator to save or share to your students' calculators:
 - Drag selected calculator files to your computer to save files from a class presentation.
 - **Tip:** Once files are saved to your computer, you can drag those files to multiple connected student calculators using TI Connect™ CE Calculator Explorer for classroom sharing. TI Connect™ CE is free at education.ti.com/downloads.

Emulator Explorer default screen

The screenshot shows the TI-SmartView™ CE interface for the TI-84 Plus Family. The window title is "TI-SmartView™ CE for the TI-84 Plus Family". The menu bar includes "File", "Edit", "View", "Actions", and "Help". The main area displays a table of files and folders within the emulator workspace. The table has columns for "NAME", "TYPE", "SIZE", and "LOCATION". The files listed include "Window", "RclWindow", "TblSet", and several "L1" through "L6" Real List files, all located in RAM. Below these are several "Flash Application" files, including "Prob Sim", "EasyData", "CelSheet", "Transfrm", "Cabrijr", "Periodic", "SciTools", "Conics", and "PlySmlt2", all located in the Archive.

NAME	TYPE	SIZE	LOCATION
L... Window	Window	210 B	RAM
L... RclWindow	User Zoom Recall Window	209 B	RAM
L... TblSet	Table Setup	20 B	RAM
{←} L1	Real List	2 B	RAM
{←} L2	Real List	2 B	RAM
{←} L3	Real List	2 B	RAM
{←} L4	Real List	2 B	RAM
{←} L5	Real List	2 B	RAM
{←} L6	Real List	2 B	RAM
Prob Sim	Flash Application	71 kB	Archive
EasyData	Flash Application	167 kB	Archive
CelSheet	Flash Application	123 kB	Archive
Transfrm	Flash Application	28 kB	Archive
Cabrijr	Flash Application	102 kB	Archive
Periodic	Flash Application	46 kB	Archive
SciTools	Flash Application	54 kB	Archive
Conics	Flash Application	42 kB	Archive
PlySmlt2	Flash Application	88 kB	Archive

Parts of the TI-SmartView™ CE Software Workspace

1	
	<p>Menu Bar - Use these menus to perform all emulator functions, including:</p> <ul style="list-style-type: none">• File - file management• Edit - include copy key as font• View - change the displays• Actions - such as screen capture• Help - Help and links <p>Note: You can complete most of the actions in these menus by clicking icons in the toolbar.</p>
2	
	<p>Toolbar- Use these toolbar icons to:</p> <ul style="list-style-type: none">• Select a different calculator model• Toggle displays of Large Display Screen, Key Press History on or off, and View^{3™}• Capture current emulator screen
3	<p>Workspace Panel - Use this panel to navigate between the Calculator Emulator workspace and the Emulator Explorer workspace.</p>
4	<p>Choose Emulator and Toolbar Positions</p> <ul style="list-style-type: none">• Emulator position Left/Right  - to switch between left and right-hand display of the graphing calculator screen. This is convenient when projecting an Interactive White Board.• Toolbar Top/Bottom  - to toggle the toolbar between the top and the bottom of the screen. This is convenient when projecting an Interactive White Board. <p>Note: You can change the visual layout and/or position of elements to optimise access, especially when using an Interactive White Board.</p>
5	<p>Emulator Panel - Use this panel to use the full emulator or the emulator keypad-only view.</p>
6	<p>Large Display Screen Panel/Key Press History Panel - Use this panel to display a large version of the calculator screen and/or to display key press history. You have the following display options:</p> <ul style="list-style-type: none">• Large Display Screen only• Large Display Screen + Key Press History• Key Press History only• Hide panel
7	<p>View^{3™} Panel - Use this panel to show three additional screens simultaneously. 3</p> <p>(This panel is hidden by default. Click  to show the View ^{3™} Panel.)</p>

You can select any three of the following screens:

- Equation (Y= editor)
- List (Stat List editor)
- Window
- Table
- Stat Plot
- [Blank]
- Graph


8

Resize Panels - Click and drag the vertical bar at the side of a panel to resize it.

Using the TI-SmartView™ CE Emulator Keyboard

The mouse takes the place of your finger pressing keys on the computer keyboard.


Click the keys on the TI-SmartView™ CE emulator as you would press the keys on the graphing calculator.


1. Click the arrow keys  on the emulator keyboard to move the cursor to the desired setting.

2. Click  to select it.

You must first place the keyboard in its alpha typing mode to type text using the computer keyboard.



By default, the graphing calculator keyboard is in its normal mode, in which keys are simply shortcuts to graphing calculator keys.

For example, pressing [A] on your computer keyboard is the same as clicking  on the graphing calculator. In this mode, you cannot enter the letters A to Z on the graphing calculator screen by typing these letters on your computer keyboard.

To enter a letter or other alpha character, first click  on the graphing calculator keyboard (or press [F7] on your computer keyboard) to put the graphing calculator in alpha mode. For example, typing [F7] [A] on your computer keyboard enters an A on the graphing calculator screen. After you type the character, the keyboard returns to its normal mode.

You can lock the alpha key to type more than one character in succession.

To lock the alpha key:

- ▶ Click   on the graphing calculator keyboard or press [F6] [F7] on your computer keyboard.


To return to the normal mode:

- ▶ Click or press [F7].

In alpha typing mode, pressing [0] to [9] on your computer keyboard acts as a shortcut to the alpha functions associated with these keys on the graphing calculator keyboard. Pressing [1] enters Y (the alpha character associated with $\overline{1}$) on the graphing calculator screen. To type a number, be sure the keyboard is not in the alpha typing mode. These keys do enter the digits 0 to 9 in the normal mode.


You can hold down an arrow key to scroll the cursor continuously.

When you use an arrow key to move the cursor, you can hold down the key to scroll the cursor continuously, instead of having to press the key repeatedly. In the key press

history , the icon for a repeating arrow key has a clock symbol  attached to it.

Pressing an arrow key multiple times in a row displays an arrow with a repeat counter.

When you press an arrow key multiple times in a row, one arrow key is displayed in the

key press history; this arrow key  has a number attached to it that shows the number of times the arrow key was pressed.

Tip: When tracing along graphs or using Cabri™ Jr App to draw geometric shapes, the computer keyboard arrows may give you smoother continual action as opposed to using a mouse to click on the emulator arrows.

Dragging and Dropping a Screen to Another Application

You can drag and drop and paste any TI-SmartView™ CE screen into another application.

The TI-SmartView™ CE screens that you can drag and paste include the following:

- The screen above the keyboard in the Emulator Panel
- Large Screen
- View^{3™} panel screens

Note: You can drag a View^{3™} screen into Screen Capture and use Screen Capture as a history of important screens during a class session.

- Saved or unsaved screen captures

Connecting a Calculator as a Remote Keypad

The SmartPad™ CE App is available for the TI-84 Plus CE. To use the TI-84 Plus CE as a remote keypad for TI-SmartView™ CE:

1. SmartPad™ CE App for TI-84 Plus CE comes pre-loaded on the calculator. If not on your TI-84 Plus CE, SmartPad CE App is also available to load to your calculator at education.ti.com/84ceupdate.
2. Connect your TI-84 Plus CE to your computer using a USB Computer cable which came with your calculator.
3. Launch TI-SmartView™ CE. Make sure the TI-SmartView™ CE window is in focus by clicking on the TI-SmartView™ CE window.
4. Run SmartPad™ CE App on your TI-84 Plus CE. Press [apps] and select SmartPad™ CE from the Apps menu. Read the information on the splash screen.

SmartPad™ CE
for TI-SmartView™ CE
.....
TO START: UNPLUG USB CABLE
.....
COMPUTER WINDOW OF EMULATOR
MUST BE SELECTED
TO PRESS EMULATOR KEYS
.....

SmartPad™ CE
for TI-SmartView™ CE
.....
TO STOP: UNPLUG USB CABLE
.....
COMPUTER WINDOW OF EMULATOR
MUST BE SELECTED
TO PRESS EMULATOR KEYS
.....

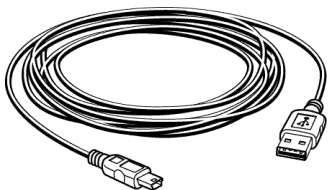
5. Press keys on the calculator's keypad which remotely press the emulator keypad on the TI-SmartView™ CE.
6. Disconnect USB cable from calculator to stop the App and remote keypad feature.
7. Reconnecting the USB cable and running the App again may be needed if the remote keypad connectivity is no longer responding.

Notes:

- The TI-84 Plus CE running the SmartPad™ CE App will not display the calculations or graphs. The calculator becomes a remote USB keypad for the emulator only.
- The TI-84 Plus CE will remain a remote keypad when the TI-SmartView™ CE window is in focus. Click on the TI-SmartView window prior to pressing keys on the calculator.
- The TI SilverLink cable is not supported in TI-SmartView™ CE.

USB Computer Cable

You must use the USB Computer Cable that comes with your TI-84 Plus CE graphing calculator to use SmartPad™ CE App. Other TI Connectivity Cables are not supported.



Additional information on connectivity

- **Emulator Link Menu - No Send/Receive**

The Link feature, **[2nd] [link]** on the emulators is disabled. To link files between a connected calculator and an emulator, please use Calculator Explorer in TI Connect™ CE and Emulator Explorer in TI-SmartView™ CE.

Drag calculator or emulator files to the computer first when transferring between Emulator Explorer in TI-SmartView™ CE and Calculator Explorer in TI Connect™ CE.

- **TI-SilverLink cable**

The TI SilverLink cable is not supported in TI-SmartView™ CE.

- **Bringing a calculator out of a TEST MODE setting**

TI-SmartView™ CE will not transfer a file to a connected calculator.

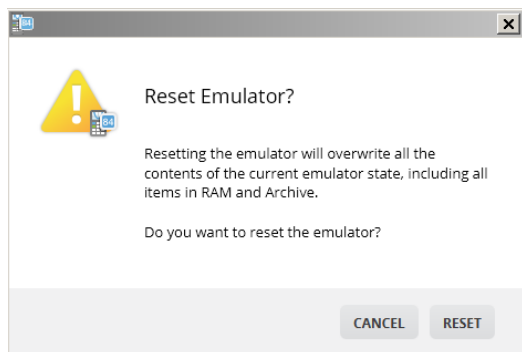
To quit **TEST MODE (EXAM MODE)** setting, please use one of these methods.

- Connect a CE to the latest version of TI Connect™ CE. See education.ti.com/84ceupdate
- Select **Actions > Quit Exam Mode on Connected CE Calculators**
- Send a file between two calculators
- Connect to the latest version of TI Connect™ CE and send a file to a connected calculator(s)

Resetting the Emulator

To reset the emulator:

1. Click **Actions**.
2. Click **Reset Emulator**.
3. Click **Reset**.



Resetting the emulator:

- Overwrites the current emulator state
- Returns the TI-SmartView™ CE Software to the factory-default setting
- Clears key press history

Update Emulator OS

In the future, if there is a CE calculator OS update but TI-SmartView CE emulator is not updated, then the Emulator can be updated with **Actions > Update Emulator OS...** TI-SmartView CE will require a special emulator state file to update the Emulator OS available at education.ti.com/84ceupdate. This file will be different than the file you use to update the calculator OS.

Saving and Loading a CE Emulator State

When you save the CE emulator state, a file is created that stores the emulator settings with all of the changes that you have made.

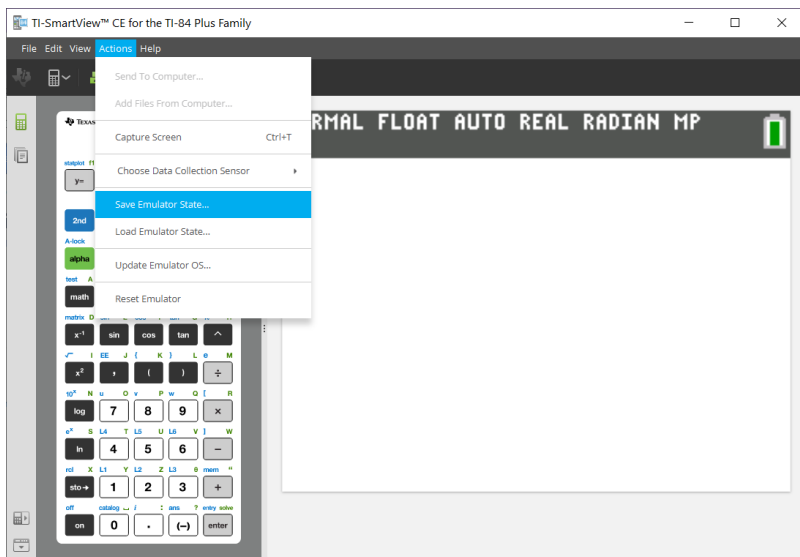
For example, you might want to set up a class presentation by entering functions in the Y= editor and changing Window and Zoom settings. When you save your changes in an emulator state file, you simply load the file to show your presentation. If you want to create different presentations for different classes, you can create multiple emulator state files.

Note: The key press history, screen capture shots, the emulator view and the emulator size are not saved in the emulator state file. **Please take note** the CE Emulator state files may be large. Contact your IT department if your storage capacity is an issue.

Saving the CE Emulator State

Managing, saving and loading an emulator state file is only available for the CE emulator. The TI-84 Plus CE Emulator State file can only be loaded on the TI-84 Plus CE emulator.

1. Click **Actions > Save Emulator State....**



2. In the dialogue box:
 - a) Navigate to the folder in which you want to store the CE emulator state file.
 - b) Type a file name. Use a name that describes the CE emulator state.

The CE emulator state files will have a pre-configured filename *TI84PCE Emulator State_OS x-x-x_date.s84* where the file extension, *.s84 indicates that the file is a TI-84 Plus CE emulator state created by the TISmartView™ CE software.

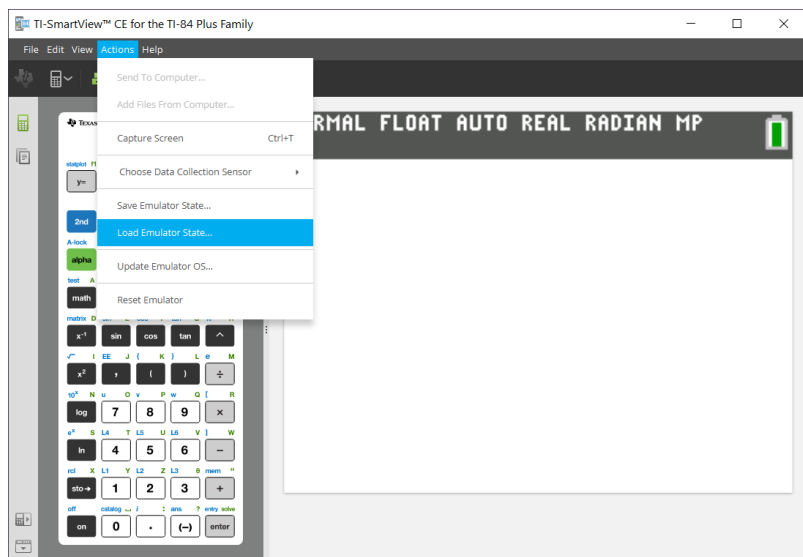
WARNING: A CE emulator state file created in TI-SmartView™ CE v5.6.0 or higher will not load on previous versions of TI-SmartView™ CE. State files are intended for use on the TI-SmartView™ CE version where the state file was created. State files created prior to TI-SmartView™ CE version 5.6.0 will not run on higher versions to TI-SmartView™ CE. Please review old state files and save off calculator files prior to updating TI-SmartView™ CE.

c) Click **Save**.

Loading an CE Emulator State

Because CE emulator state files are specific to each calculator model, you can only load an emulator state file for the active calculator model.

1. Click **Actions > Load Emulator State**.



2. In the dialogue box:

a) Navigate to the folder that contains the emulator state file.

Note: Only the CE emulator state files for the active calculator model will be displayed.

b) Click the CE emulator state name to highlight it.

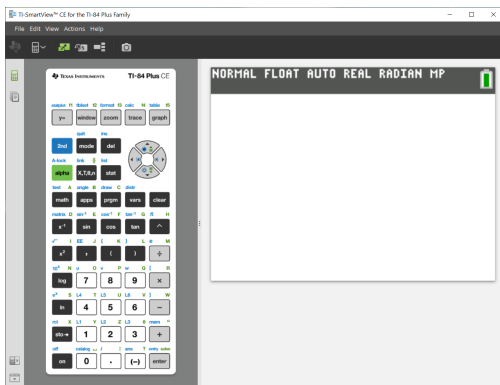
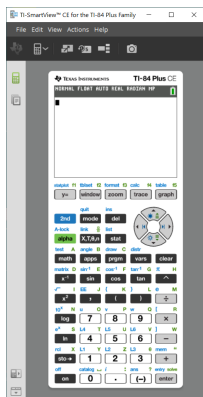
c) Click **Open**.

Choosing a Display Option

You can customise your display to show or hide optional panels and change the type of information displayed in each of them. By default, the TI-SmartView™ CE software displays the calculator emulator workspace in Large Display Screen.

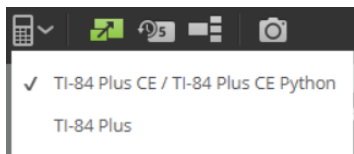
Displaying the Calculator Screen

1. Click  to view the calculator screen above the keyboard in the Emulator Panel.
2. Click  again to show the Keypad + Large Display Screen.



Choosing an Emulator Type

Click the down arrow on  to choose an emulator type.

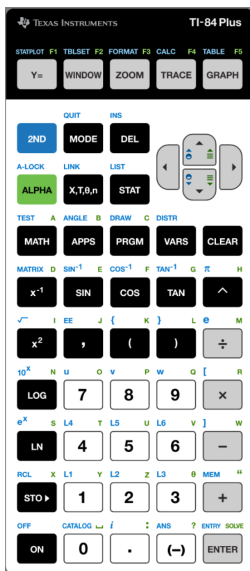


Each emulator type displays its relevant calculator model.

TI-84 Plus CE / TI-84 Plus CE Python



TI-84 Plus



Changing the Calculator Faceplate

To change the faceplate:

1. Click **View**.
2. Hover over **Calculator Faceplate**.
3. Click on a calculator faceplate name.

Light




Outline



Dark



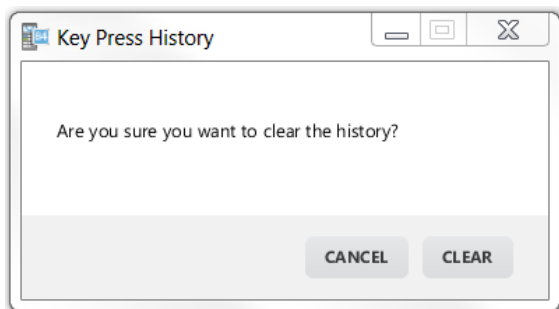
Showing or Hiding the Key Press History

Click  to show or hide key press history.
Click **CLEAR** in the panel next to Key Press History to clear the history.







- 1 Click here and drag to resize the Key Press History panel.
- 2 Click here to clear the Key Press History.

When you press clear, you will see this information box:



Copying the Key Press History to Another Application

You can copy all or only a selected portion of the key press history to another

application such as a word processor. You can copy the key graphics  as they are shown in the key press history panel, or you can copy the key presses as font text characters   .

Note: When you copy keys as font text characters, those characters use the **TI84PlusCEKeys** font. This font is installed on your computer automatically when you install the TI- SmartView™ CE software.

Copying Keys as Graphics or Font Characters

1. Select the key(s) you want to copy.

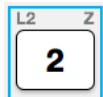
To select keys in the Key Press History Panel, use one of the following methods:

Key	Method
– A single key:	Click on a key.
– Multiple keys:	Click on a key. Press and hold Ctrl on your computer keyboard. Click other keys to select multiple keys.
– Multiple keys in a sequence:	Click on a key. Press and hold Shift on your computer keyboard. Press another key. Note: This allows you to select those two keys plus all of the keys between them.
– All keys:	Click on a key. Right click. Click Select All .

Note: This is what a key looks like before and after you select it.

Before:

After:

Key**Method**

2. Right-click the selected key(s).
3. Click **Copy** (to copy keys as graphics).

-or-

Click **Copy As Font** (to copy keys as font characters).   


4. Switch to another application.
5. Paste the keys at the appropriate location.

Note:

- You can also drag the selected keys as graphics to the other application.
- You can re-size the key graphics after you paste them into a new application.
- In some applications, the characters pasted as a font may be shown in the font that is in effect at that location, so they may not look anything like graphing calculator keys. If necessary, apply the **TI84PlusCEKeys** font to the characters. See the help file for the destination application you are using for details on how to apply a font to the characters.

Displaying the View^{3™} Panel

3

1. Click  to display the View[™] panel.
2. Click the title bar of each screen to choose from these display options:
 - Equation (Y= editor)
 - List (Stat List editor)
 - Window
 - Table
 - Stat Plot
 - [Blank]
 - Graph
3. Click the green teacher-controlled update button in the View^{3™} panel to refresh the View^{3™} screens. This updates the view for your students during investigations.



Update detected



Updating or cancel



No update detected

4. View content in the selected screens, or repeat step 2 to change the screen type.

Changing the Size of the TI-SmartView™ CE Screen

Click and drag the edge of a panel to change the size of the Emulator Panel, the Large Display Screen or the View³™ Panel.



Note: All of these are left/right actions, except the Key Press History which is pull up or down to size.

Emulator and Toolbar positions



Emulator position Left/Right - to switch between left and right-hand display of the graphing calculator screen. This is convenient when projecting an Interactive White Board.



Toolbar Top/Bottom - to toggle the toolbar between the top and the bottom of the screen. This is convenient when projecting an Interactive White Board.

Always in Front

Select this option in the View Menu to keep the TI-SmartView™ CE windows in front of any other computer software window open. Similar to having the calculator sitting on your desk, on top of your papers! Position the window on your computer desktop where it is best to remain "Always in Front."

To turn off "Always in Front," deselect the menu item in the View menu. There is no toolbar icon for this feature and no indicator other than the menu check mark when active.

Notes:

The TI-SmartView™ CE Emulator Workspace window and Screen Capture windows will both be "Always in Front" and toggle in front depending on their position.

"Always in Front" is not recommended when in full screen mode since all other windows will be behind the full screen of TI-SmartView™ CE.

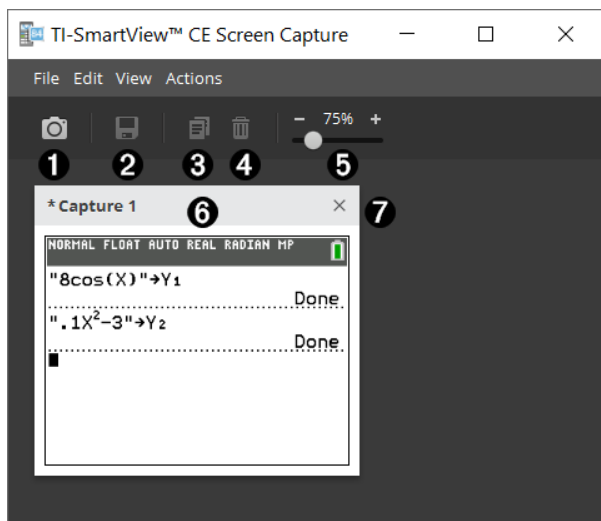
Using Screen Capture

You can capture the current graphing calculator screens using the TI-SmartView™ CE screen capture tool.

To use screen capture:

- ▶ Click  on the toolbar.

This window appears:



Parts of the Screen Capture Workspace

1	Capture	<p>Click here to take an emulator screen capture.</p> <p>Actions > Capture Screen</p> <p>Note: A border is automatically added to each image when you capture it, but you can remove the border by clicking View > Hide Screen Capture Borders. (If you have multiple images, this removes the border from every image.)</p> <p>With screen capture you can:</p> <ul style="list-style-type: none">capture up to 44 screens at a time (to capture additional images, delete images from the Screen Capture window),automatically store screen captures in memory until you close the main TI-SmartView™ CE window. <p>Closing Screen Capture gives a prompt to save your screen captures. You can start a new Screen Capture session during a TI-SmartView™ CE session.</p>
2	Save	<p>Click here to save selected screen captures.</p> <p>File > Save As</p>
3	Copy	<p>Click here to copy selected screen captures to the clipboard.</p> <p>Edit > Copy</p>
4	Delete	<p>Click here to delete selected screen captures.</p> <p>Edit > Delete</p>
5	Resize	<p>Slide the dot along the bar to adjust the current screen capture preview size.</p> <p>View > Scale Screen Captures</p> <p>Note: Screens save at the percentage in view.</p>
6	Rename	<p>Rename a screen capture by highlighting the title and typing in a new name.</p>
7	View	<p>View screen captures here.</p>

Dragging and Dropping a Screen to Another Application

You can drag and drop and paste any TI-SmartView™ CE screen into another application.

The TI-SmartView™ CE screens that you can drag and paste include the following:

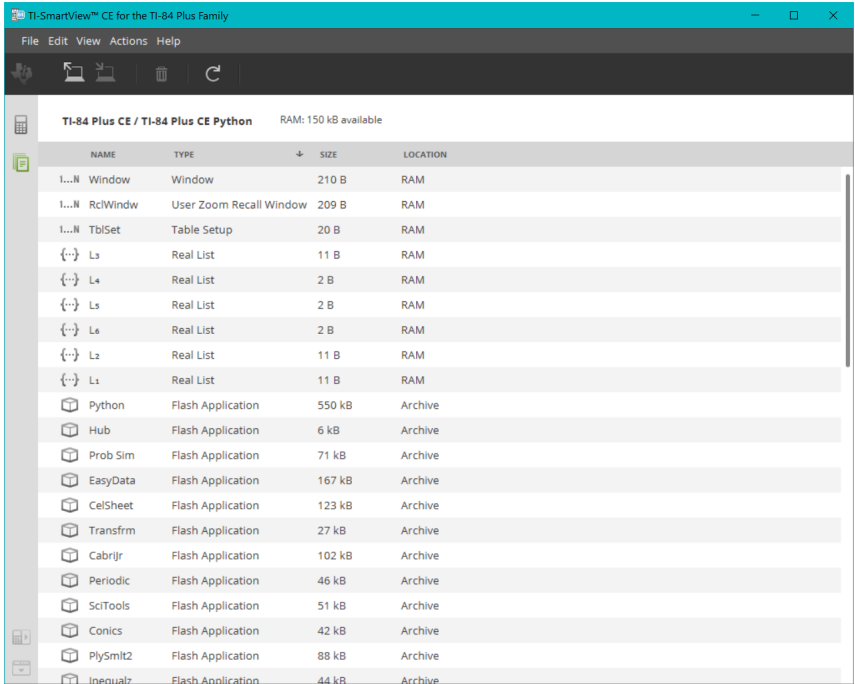
- The screen above the keyboard in the Emulator Panel
- Large Screen
- View^{3™} panel screens

Note: You can drag a View^{3™} screen into Screen Capture and use Screen Capture as a history of important screens during a class session.

- Saved or unsaved screen captures

Using TI-SmartView™ CE Emulator Explorer Workspace

Emulator Explorer workspace allows you to manage emulator files, add content from your computer to your emulator and send selected content to your computer.



Parts of the TI-SmartView™ Emulator Explorer Main Workspace



① Add calculator files from computer to emulator.

② Send selected calculator files to computer.

③ Delete selected calculator files.

④ Refresh the view of the emulator's contents.

Note: When changing the workspace to Emulator Explorer, refresh the view of the emulator files to update any changes made in the emulator.

Copying Emulator Files to the Computer

You can copy most data, files and programs from your emulator to your computer as a backup, to send to others or to free up emulator memory.

To copy a file from the emulator to the computer

1. Click on the file name to select it.

2. Click .

-or-

Drag and drop the file into a folder on your computer or onto your desktop.

To copy a file from the computer to the emulator

1. Click .

2. Navigate to the desired calculator file on your computer.

Note: You can also drag your images (.jpg, .png, etc.) to convert to emulator/calculator Background Images as well.

3. Click on the file to select it.


4. Click **Open**.

Deleting Emulator Files

You can delete data, files and programs from your emulator.

To delete files from the emulator

1. Click on the file name to select it.

2. Press .

Data Import

The Data Import feature lets you convert/send spreadsheet data saved as csv data files to the calculator as calculator list(s) matrice(s) files.

Access the Data Import feature from the Explorer Workspace.

Highlights:

- Create (or download) a spreadsheet of data.
- Prior to import, edit data in your spreadsheet software to only allowed calculator numeric formats (specified below) for the import to a calculator file.

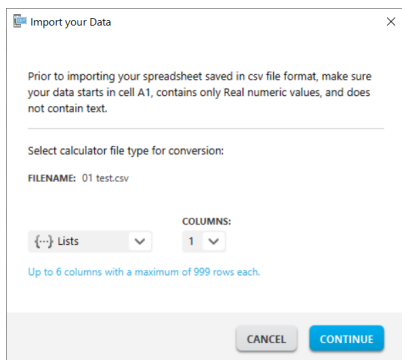
About the spreadsheet

- **Only one spreadsheet** saved as a CSV (Comma Delimited) (*.csv) file will be imported via Explorer workspace at a time.
- Spreadsheet (.csv) file can be dragged into the Explorer Workspace or imported via **Actions > Import Data (.csv) to List/Matrx...** menu.
- Up to 6 calculator lists or 1 matrix from the spreadsheet data will send to the connected calculator.

Rules for preparing the spreadsheet for import:

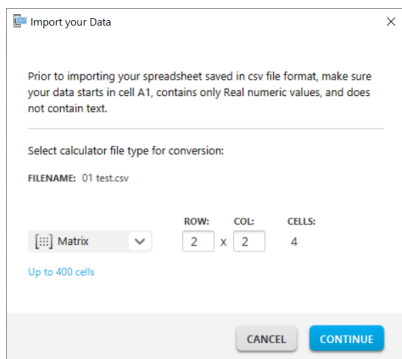
- All cells must contain Real Number data as experienced on the calculator and no text.
 - Complex numbers are not supported for data import.
 - If decimal numbers are represented with the use of a comma in the *.csv file, the file will not convert using the Data Import Wizard. Please check your computer operating system number formatting and convert the *.csv to use the decimal point representation. The calculator list and matrix editor use the number format as, for example, 12.34 and not 12,34.
- Data must start in cell A1

- List(s) Import: If calculator lists are desired:



- Only six spreadsheet columns A-F will be imported
- Columns can be of length up to 999 cells.
- The first empty cell in a column will be interpreted as the end of the data for that list import

- Matrix Import: if calculator matrix is desired:



- Only one matrix can be imported from a spreadsheet file.
 - Up to 400 cells can be imported. (Example: row x col: 10 x 5 = 50 cells from row range 1-10, columns A-E.)
 - Dimension of matrix of the form (row x column) will be requested during the import experience in Calculator Explorer.
 - Any empty cell within the specified matrix dimension will be interpreted as 0.
- Do not have data in the spreadsheet outside of the allowed sizes for list(s) or matrix as described above. Otherwise, the file will be invalid when a data import to Calculator Explorer is attempted.

To save calculator list(s) or matrix files

- To save calculator files created to the computer, after import/send to calculator, drag the list(s) or matrix file from Calculator Explorer to the desired computer location.

Computer Keyboard Shortcuts

You can use your computer keyboard to press a key, instead of pressing that key on the TI-SmartView™ CE keyboard image.








For example:

If you want to enter the "log" function on the emulator keypad, use the table below to find the computer key to press.



- ▶ Press [N] on your computer keyboard (notice that the emulator key upper left is the alpha letter N.)

Note: In some instances, pressing the computer keyboard key will display the key on the emulator. The Key Press History icon may not display until the next key press.

stat plot f1 y= [F1]	tblset f2 window [F2]	format f3 zoom [F3]	calc f4 trace [F4]	table f5 graph [F5]
2nd [F6]	quit mode [Shift] + [m]	ins del [Delete]	 [←]	 [t]
A-lock alpha [F7]	link  X,T,θ,n [Shift] + [x]	list stat [Shift] + [s]	 [j]	 [→]
test A math [A]	angle B apps [B]	draw C prgm [C]	distr vars [shift] + [v]	clear [Backspace]
matrix D x⁻¹ [D]	sin ⁻¹ E sin [E]	cos ⁻¹ F cos [F]	tan ⁻¹ G tan [G]	π H ^ [Shift] + [*]
 x² [I]	EE J , [.]	{ K ([Shift] + [(]	} L) [Shift] + [)]	e M ÷ [I]
10 ^x N log [N]	u O 7 [7]	v P 8 [8]	w Q 9 [9]	[R × [Shift] + [*]
e ^x S ln [S]	L4 T 4 [4]	L5 U 5 [5]	L6 V 6 [6]] W - [-]
rcI X sto → [X]	L1 Y 1 [1]	L2 Z 2 [2]	L3 θ 3 [3]	mem " + [Shift] + [+]
off on [Shift] + [~]	catalog  0 [0]	i : . [.]	ans ? (-) [Shift] + [-]	entry solve enter [Enter]

Compatibility with Graphing Calculators

Please refer to the TI-84 Plus CE Getting Started Guide for compatibility with graphing calculators.

Note: In general, TI-84 Plus CE graphing calculator files are compatible with other TI-84 Plus and TI-83 Plus models.

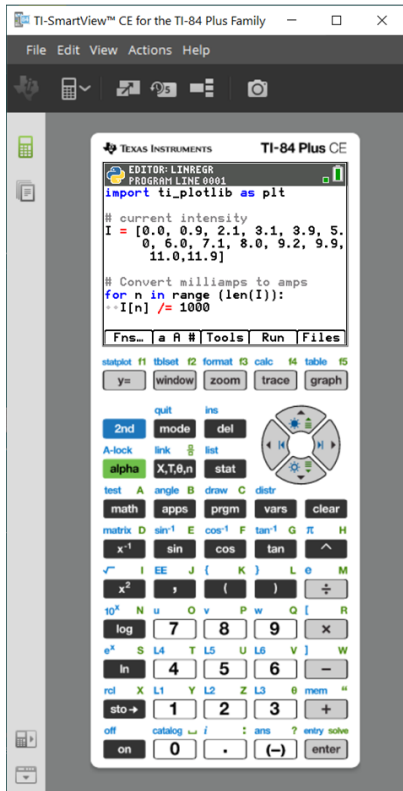
Apps, Operating Systems and some data files with unsupported numeric types do not share between models.

TI-Basic programs may need to be modified to display correctly on the high resolution colour screen models.

The Python Experience

Using TI-SmartView™ CE and the Python Experience

- Update to the latest TI-SmartView™ CE at education.ti.com/84ceupdate.
- Launch TI-SmartView™ CE.
- Run the Python App on the TI-84 Plus CE emulator.
- The Python App offers
 - File Manager
 - Editor
 - Execution of your Python program in the Shell
- Add-On modules `ti_draw` and `ti_image` are also included.
- SmartPad CE App will remotely press the keypad when the Python App is running.
- You can send your computer *.py files to the Emulator Explorer workspace to convert your programs to PY AppVars.



Hub/Rover Programs

- Create `ti_hub`/`ti_rover` Python programs in the CE emulator running the Python App.
 - ***Note:** There is no connectivity between TI-SmartView™ CE and TI-Innovator™ Hub or TI-Innovator™ Rover. Programs can be created and then run on the CE calculator.
- Quit the Python App to prepare to transfer the Python AppVar(s) from the emulator. The emulator should not “be busy” running an App or program for the next step.
- Change to the Emulator Explorer workspace and send the program(s) to the computer.

- Use TI Connect™ CE to send the Python AppVars from the computer to the CE calculator for the TI-Innovator™ Hub/TI-Innovator™ Rover experience.

Note: To break a running Python program in the Shell, such as if a program is in a continuous loop, press [on]. Press [Tools] [zoom] > 6:New Shell as an alternate method to halt a running program.

Reminder: For any computer/TI-Python experience: After creating a Python program in a Python development environment on the computer, please validate your program runs on the calculator/emulator in the TI-Python experience. Modify the program as needed.

SmartPad CE App Remote Keypad

- Running the SmartPad CE App on your connected CE functions as a remote keypad including the special keypad mapping offered when the Python App is running.

Emulator Workspace

- The CE emulator runs the Python App. To launch the Python App, select [prgm] 2:Python App. **See:** Programming Python in [TI-84 Plus CE Python eGuide](#).

Emulator Explorer Workspace

- Please quit the Python App so the emulator is not busy when you access the full features of the Emulator Explorer workspace.
- A Python program (PY AppVar) will save from the CE to a computer as *.py file. Open the *.py file in a text editor to view or edit the file for the CE Python experience. As in previous releases, TI-SmartView™ CE and TI Connect™ CE Explorer will send/convert *.py files to the calculator file type, PY AppVar. There is no need to save the CE PY AppVar on your computer.
- When sending an image from a computer to a connected CE, an additional image conversion option is available to convert and send the correct Python image AppVar format to the CE. Then, using the Python App, import the ti_image Add-On module to use the image in your program.

See: [TI-84 Plus CE Python eGuide](#) for details on TI-Python.

See: [TI Connect™ CE eGuide](#) for more details on image conversions.

- When sending a program.py file created in another Python environment, your PY AppVar will need to be edited to run as expected in TI-Python. Use the Python App Editor to modify as needed for the unique modules such as ti_plotlib, ti_system, ti_hub and ti_rover.

Data Import Wizard

- *.csv files of data, formatted as stated in the wizard dialog, will convert data into CE list variables. Methods in ti_system can then be used to share lists between the emulator CE OS and the Python App. This feature is similar to the Data Import Wizard in TI Connect™ CE.
- If decimal numbers are represented with the use of a comma in the *.csv file, the file will not convert using the Data Import Wizard. Please check your computer operating system number formatting and convert the *.csv to use the

decimal point representation. The calculator list and matrix editor use the number format as, for example, 12.34 and not 12,34.

Data Collection Using Vernier EasyData® App on the TI-84 Plus CE / TI-84 Plus CE Python Emulator

Vernier EasyData® CE App allows you to use Data Collection on the TI-84 Plus CE emulator. The Vernier EasyData® CE App for TI-84 Plus CE comes pre-loaded on the emulator in TI-SmartView™ CE. This App allows you to collect single sensor data similar to using the App on the calculator.

Tips:

- Make sure you are familiar with collecting data using the EasyData® App on the calculator prior to using TI-SmartView™ CE to collect data.
- Make sure you are familiar with the EasyData® CE App menu (**File>New**) or the **Scan** shortcut key feature. You will use these features in the emulator to connect a sensor to the emulator while the sensor is connected to the computer.




Using Vernier Sensors with TI-SmartView™ CE and EasyData® CE App

If you already use Vernier sensors with the TI-84 Plus CE or TI-8x family calculator with a mini-USB port, the sensor connects to the mini-USB port on the calculator.




Vernier sensors used with the TI-8x family (mini-USB) need the appropriate adapter to connect (USB) to the computer for data collections demonstrations.

Adapters

Connect Sensor Type to Computer

Name	Adapter	Description
Easy to Go!		Use this adapter to connect an EasyTemp or EasyLink™ adapter to a computer for data collection. See more
Go!Link		Use this single-channel interface adapter to connect most Vernier sensors to your computer. See more
Go!Motion to Computer Cable		Use this cable to connect a Go!Motion or CBR 2 to a computer. It is included with Go!Motion. See more

Connect Sensor Type to Calculator

Name	Adapter	Description
EasyLink™	 The EasyLink adapter is a small, black, rectangular device with a USB-A port on one end and a single-channel interface on the other.	Use this adapter to link Vernier sensors to your TI-84 Plus CE graphing calculator. EasyLink™ is a single-channel interface that plugs into the USB port of a TI-84 Plus graphing calculator or TI-Nspire™ Handheld. See more
Go!to Easy Adapter (mini USB)	 The Go!to Easy Adapter is a black cable with a mini-USB connector on one end and a standard USB-A connector on the other.	Use this adapter to connect a Go!Temp or Go!Link™* to the USB port of a TI-Nspire™ handheld or TI-84 graphing calculator. See more
Go!Motion to Calculator Mini-USB port	 The Go!Motion to Calculator Mini-USB port cable is a black cable with a Mini-USB connector on one end and a standard USB-A connector on the other.	Use this 72" cable to connect a Go!Motion or CBR 2 to the USB port of a TI-Nspire™ handheld or TI-84 graphing calculator. The cable has a USB Mini-A plug that connects to the calculator and a standard-B USB plug that connects to the Go!Motion or CBR 2. The cable is included with a CBR 2. See more

If Using for Classroom Demonstrations

Data collection using the EasyData® App is only supported on the TI-84 Plus CE emulator for classroom demonstration purposes. If your class is using any TI-8x Family calculator running the latest Vernier EasyData® App for that calculator, the demonstration of data collection using TI-SmartView™ CE and the TI-84 Plus CE will be parallel to the calculator experience on TI-8x Family calculators.

Single Sensors Data Collection

Single-sensor data collection is supported in the TI-84 Plus CE emulator (similar to the TI-84 Plus CE calculator).

If a sensor is supported using the EasyData® App on the calculator via mini-USB, the emulator in TI-SmartView™ CE provides a demonstration tool for data collection similar to the experience on the calculator.

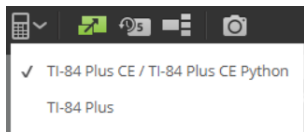
- CBR 2™ (Calculator-Based Ranger™) is supported with the USB cable.
- CBL 2™ (Calculator-Based Laboratory™ system) is **not** supported.
- The latest Vernier EasyData® CE App for TI-84 Plus CE comes pre-loaded in the emulator.
- Older versions of the App are blocked in Emulator Explorer for the best data collection experience.

Using TI-SmartView™ CE to Demonstrate Data Collection

1. Launch TI-SmartView™ CE.

Tip: If you are running any other computer software that also collects data using Vernier USB sensors, we recommend that you close all other data collecting software so TI-SmartView™ CE recognises the single sensor for your data collection session. Otherwise, your computer operating system will “decide” which sensors it will recognise. You may not see your sensor connect to TI-SmartView™ CE until you close other software.

2. Click the down arrow on  to choose an emulator type.



3. Connect one sensor to your computer via standard USB.

Advanced Feature: You can have several sensors connected to your computer ports. You can use the TI-SmartView™ CE Actions menu (**Actions>Select Data Collection Sensor**) to switch between sensors. Use the EasyData® CE App menu (**File>New**) to connect the new sensor to the emulator.

4. Run the EasyData® CE App on the TI-84 Plus CE emulator.

Note: Always update to the latest TI-SmartView™ CE at education.ti.com/84ceupdate. The latest EasyData App will be loaded in the latest TI-SmartView™ CE.

5. EasyData® launches on the emulator. You should see the name of the sensor (or link connection) on the splash screen. The sensor name will then appear in the meter screen similar to the calculator experience.

If EasyData® App does not recognise the sensor connected to the computer, use either **Scan** or **File>New** in the EasyData® App on the emulator to connect the sensor.

6. Use EasyData® App features as on the CE emulator to collect and analyse the data.
7. When data collection is complete, **QUIT** the EasyData® App in the emulator to continue to use TI-SmartView™ CE.
 - Data from the data collection experiment is stored to lists in the emulator when quitting the EasyData® CE App.
 - You may leave the sensor plugged into your computer as needed.

While EasyData® CE App is running on the CE emulator you may do the following:

Switch Emulator Workspace	You may switch emulators while EasyData® is running; however, the data experiment will stop and the sensor will disconnect from the CE emulator running the EasyData® App. When you return to the CE emulator, you will need to reconnect the sensor to EasyData® CE App using either File>New or the “ Scan ” shortcut key in the EasyData® App and begin a new data collection experiment. Previous experiment data may or may not be stored. Always “ QUIT ” the EasyData® CE App to store experiment data to the emulator lists.
View^{3™} and Apps	View ^{3™} is not available (disabled) for all Apps other than the Inequality Graphing App. View ^{3™} only displays screens from the ™ Operating System and does not display App screens. We recommend that you keep View ^{3™} closed when not using this feature or if the feature is disabled as when most Apps are running on the emulator.
Switch to Emulator Explorer Workspace	If EasyData® is running in the CE emulator and if you need to use Emulator Explorer, please quit the EasyData® App and then use Emulator Explorer.
Capture Screens	You can capture EasyData® CE App screens while running an experiment using Screen Capture.
Close and Re-open TI-SmartView™ CE	You may close TI-SmartView™ CE while EasyData® is running; however, the data experiment will stop and the sensor will disconnect from the CE emulator running the EasyData® App. When you return to the CE emulator, you will need to reconnect the sensor to the EasyData® CE App using either File>New or the “ Scan ” shortcut key in the EasyData® App and begin a new data collection experiment. Previous experiment data may or may not be stored. Always “ QUIT ” the EasyData® CE App to store experiment data to the emulator lists.

Additional help

If you need additional help using the EasyData® App with the calculator to collect data, please see http://www2.vernier.com/manuals/easydata_guidebook.pdf for details.

General Information

Online Help

education.ti.com/eguide

Select your country for more product information.

Contact TI Support

education.ti.com/ti-cares

Select your country for technical and other support resources.

Service and Warranty Information

education.ti.com/warranty

Select your country for information about the length and terms of the warranty or about product service.

Limited Warranty. This warranty does not affect your statutory rights.

Updates

education.ti.com/84ceupdate