

The Internet and Your Calculator

(session 112)

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<http://www.bergen.org/~tejohhan/intercalc.pdf>

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The connections: It is not necessary to have both an Internet connection and a calculator connection simultaneously, but it helps!

If you have an internal modem and an available serial port on the back of your computer, then you can probably have a simultaneous Internet and calculator connection. If you use an external modem, you might be able to connect the modem to one serial port and the Graph-Link cable to the other serial port. If you use an external modem and have only one serial port (as on most laptops) then you cannot connect the Internet and your calculator simultaneously.

Types of files you'll find on the WWW:

- HTM or HTML: these are "Web pages", files that a Web browser *displays*.
- ZIP: *compressed* files containing other files. Use a program like WinZip (<http://www.winzip.com>) or PKzip (<http://www.pkware.com>).
- UUE: "*Unix to Unix Encoded*" files. These are usually 'binary' files (program files) converted to text files so that they can be transmitted via email or posted to Usenet newsgroups. ***Avoid them.***
- EXE, COM: these files are 'computer programs' or 'executable' files. EXE files may be DOS or Windows programs. COM files are DOS 'commands' but may run through Windows in a DOS box. The Graph-Link programs are EXE files.
- OCX, DLL, VBX: Windows 'support files'. These are files that a Windows EXE file might use. They are usually stored in **c:\windows\system** on your computer, but may also reside in the program's home directory.
- 73*, 8**, 9***: TI calculator files. There are many different types of files. Some can be opened in the Graph-Link software. All can be sent directly to your calculator using Graph-Link.
- PDF: (Portable Document Format) Adobe Acrobat documents. You can read these files using the *free* Adobe Acrobat Reader (<http://www.adobe.com/prodindex/acrobat/readstep.html>). Many of the Calculator Activities on TI's Website can be downloaded in PDF format for offline reading and high-quality printing (<http://www.ti.com/calc/docs/activities.htm>).

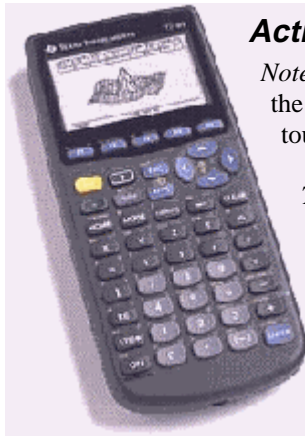
Must-haves:

- **Internet access** and a **Web browser**.
- **TI calculator** with a link port (this leaves out the TI-81).
- **Graph-Link cable**. All TI calculators use the same cable. This is a PC to calculator cable with a 1/8" jack on one end and a 25-pin serial connector on the other. You may also need a 25-pin to 9-pin adapter or a 25-pin to MAC cable. These extras are included in the 'full' Graph-Link package.
- **Graph-Link software** for your computer. Each TI calculator requires a different Graph-Link program. These programs can be downloaded *for free* from the TI Website (<http://www.ti.com/calc/docs/link.htm>)



Activity 0: Get Graph-Link

- Establish an Internet connection, and load your browser.
- **Browser tip #1: NEVER DOUBLE-CLICK on a link!**
- **Browser tip #2: If the BACK button changes from 'enabled' to 'disabled', click the 'X' button in the upper right corner of the browser window to close it.**
- Get the Graph-Link software from <http://www.ti.com/calc/docs/link.htm>. It comes in an EXE (setup) file. Download it to **c:\temp**. Run this EXE file to set up the Graph-Link software.
- Connect your Graph-Link cable to the computer and to the calculator.
- Run the Graph-Link software and set up the COM port that the cable is connected to (see the **Link** menu). To test your connection, use the Link/Receive menu item.
- The Graph-Link programs are all slightly different!



Activity 1: Back up your calculator

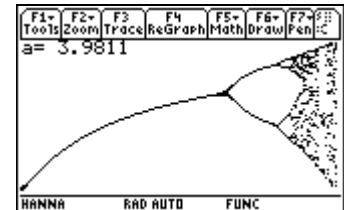
Note: The TI-82 and TI-85 calculators require you to work with both the calculator keyboard *and* the computer software to transfer files. The other calculators let you do all transfers without touching the calculator ("Live-Link").

Tip: Know where your files are! For this session all your data files are going into the `c:\temp` folder or to your own diskette (`a:\`).

1. Run the Graph-Link software.
2. On the **Link** menu, choose **Get Backup** or **Link/Receive (and select "all files")**.
3. *Troubleshooting:* If you get a "Transmission Error":
 - Is the Graph-Link cable *connected securely* at both ends?
 - Is the calculator **ON** and on the **HOME** screen?
 - Is the correct COM port selected in the **Link** menu?
4. (82/85) additional step: The Graph-Link program should display "Waiting...". Go to the calculator and perform Link (`(2nd|X,T,Θ,n)`)/Backup/Transmit.
5. The default filename is **backup.??b**. You can change the filename but *do not change the extension*. Save it in `c:\temp` or on your disk (`a:\`).

Activity 2: Paste calculator screen shots into your word processor

1. Run Graph-Link and your word processor.
2. Display *any* desired screen on the calculator.
3. In Graph-Link, select **Link/Get Screen** and send it to the (*important!*) clipboard.
4. Switch to the word processor.
5. Place the cursor at the point where you want the picture to go.
6. Select **Edit/Paste**.
7. You may be able to do custom editing, but the methods depend on the word processor.



Activity 3: Download a calculator program from the Internet and send it to the calculator

Part I: from Internet to Computer

1. Point your browser at <ftp://ftp.ti.com/pub/graph-ti/calc-apps>
 FTP (*File Transfer Protocol*) allows us to transmit files across the Internet. The page you now see is a directory listing of the TI calculator program archive. Navigate to a directory (**83/math**). Each program consists of two files: a TXT file that describes the program and a "P" or "G" file that contains the **Program** or a **Group** of calculator stuff. Avoid the UUE files.
2. Click on the text file (**ALGEBRA.TXT**) to load it in the browser and read it and print it from the browser (**File/Print**).
3. Click the BACK button on the browser's toolbar to go back to the directory.
4. Click on the calculator file (**ALGEBRA.83G**) and download it to `c:\temp`.
Note: some browsers try to *display* these files. If that happens, you will see 'garbage' on the screen. Click the **BACK** button to go back to the directory listing and **right-click** the ALGEBRA.83G file. On the menu, select "**Save Target As...**" or "**Save Link As...**".

Part II: from Computer to Calculator

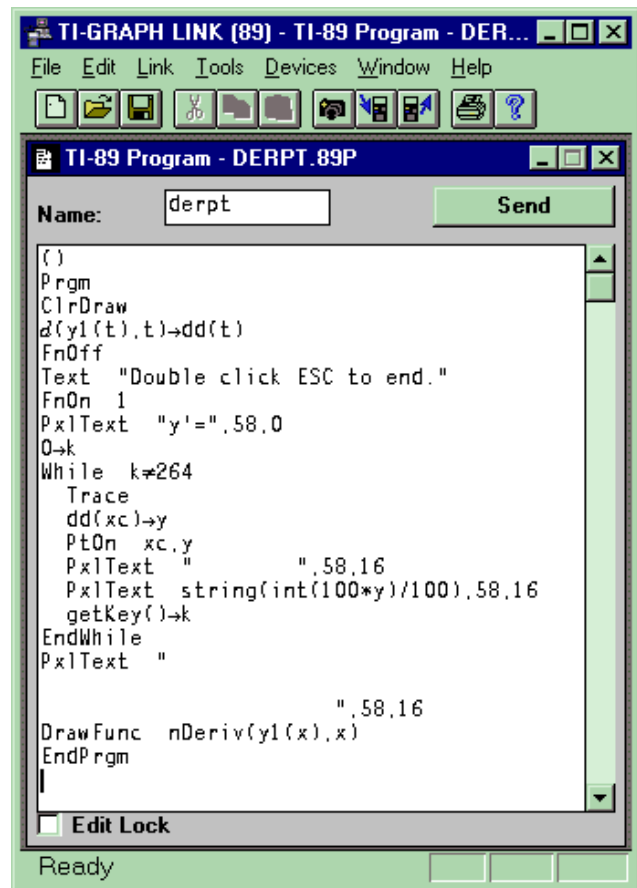
1. Run Graph-Link. Make sure the Link cable is **plugged** into the calculator and the calculator is **ON**.
2. (82/85) On the 82/85, press Link (`(2nd|X,T,Θ,n)`)/Receive. The calculator screen should display "Waiting...". The other calculators should just be on the HOME screen.
3. In Graph-Link, select **Link/Send**.
4. Navigate to `c:\temp`.
5. Select the file (**ALGEBRA.83G**), click the **ADD** button, then click the **OK** button. Several files are downloaded to your calculator. A "G" file is a "Group" of calculator files stored in one computer file.
6. Press the **PRGM** key on the calculator to see the programs that were downloaded!



Activity 4: Write and send a program with Graph-Link

All the Graph-Link programs have a built-in program editor and shortcuts to the programming commands in the calculator. You can edit and send a program quickly to the calculator right from the program editor. You can type in programs 'by hand' or select programming statements from a menu.

1. Run Graph-Link.
2. If there is no program window, select **File/New**.
3. Type a program into the program window: (do not type the colons; they will appear each time you press the **Enter** key) (*Where do you get that 'square root' symbol?*)
4. Save the program in **c:\temp** or on your diskette.
5. (82/85) be sure the calculator is 'Waiting...'
6. Click the **SEND** button in the program editor window to 'quick send' this program to the calculator.
7. If you want the program to be 'un-editable' in the calculator, check the 'Protected' or 'Edit Lock' check box before sending.
8. Press the **PRGM** or **Var-Link** key on the calculator to verify that the program is in the calculator.
9. Run the program in the calculator, not on the computer.
10. If there is an error, do not fix it in the calculator: fix it on the computer and re-send it.
11. You can save this program on the computer (in a "P" file). You can open other programs (and have multiple program windows open simultaneously for copying chunks of code).
12. In the 92 and 89 Graph-Link you can also edit TEXT files and DATA files.



Activity 5: Fun with Image files

Image files are calculator *PIC files* sent to the computer, not 'Screen Shots'. Using IVIEW for Windows 95, you can open, edit, and print these "I" files on your computer.

- 1) Get IVIEW:
 - a) On the Internet, go to <http://www.bergen.org/~tejohhan/iview.html>
 - b) Download a "Setup package" for the calculator you use into **c:\temp**. This is a ZIP file.
 - c) If you don't have WinZip or PKZip, get it and install it (see page 1).
 - d) Unzip the IVIEW Setup package (if you installed WinZip, just double-click the IVIEW.ZIP file to run WinZip on it and extract the files.
 - e) Run SETUP.EXE. This will install the IVIEW program on your computer.
 - 2) Run IVIEW and Graph-Link simultaneously.
- <continued on next page>





- 3) On your calculator...
 - a) Get a **graph** screen that you like.
 - b) Save the picture in a PICture variable in the calculator. The calculators differ in the method:
 - i) 82/83/73: Use Draw(2ndPRGM) STO STOPIC, then VARS), PICTURE, and choose one, then press ENTER.
 - ii) 85/86: Use Draw/StorePic and enter a name for the picture, then press ENTER.
 - iii) 92/89: On the graph screen, press **F1: Save copy as**. In the dialog box, change the type from GDB to Picture, choose a folder from the second list, and enter a filename in the Variable box. Press Enter to save it. This saves the entire screen.
- 4) Use Graph-Link to get the PICture from the calculator to the computer...
 - a) Get the picture file from the calculator and save it in **c:\temp**. The file extension will end in "I" (89I, 92I, 73I, etc.)
- 5) In IVIEW...
 - a) Open the file, edit it and save it.
- 6) Use Graph-Link to send it back to the calculator.
- 7) Back on the calculator...
 - a) Use **RclPic** <picvar> to display an image. It helps to first clear the graph screen and turn **off** all functions, plots, and the axes so they don't mess up the picture.

Activity 6: Flash downloads

The TI-73, TI-89, and TI-92+ have 'Flash' memory. This makes the operating system of the calculator 'upgradeable'. Software is available at <http://www.ti.com/calc/docs/downloads.htm>



Flash software installs itself. Just...

- back up your calculator files using Graph-Link
- download the Flash upgrade program
- run the Flash upgrade program on your computer with the calculator connected

TI-73:

The base operating system: <http://www.ti.com/calc/flash/73winbase.htm>
 The CBL/CBR application: <http://www.ti.com/calc/flash/73wincbl.htm>

TI-89:

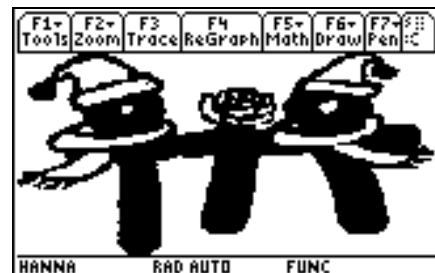
The base operating system: <http://www.ti.com/calc/flash/89winbase.htm>.

TI-92+ :

The base operating system: <http://www.ti.com/calc/flash/92pwinbase.htm>.

Other interesting resources on the 'Net:

A rich resource for calculator programs: www.ticalc.org
 Excellent mathematics resource: <http://forum.swarthmore.edu>
 and (related)...
 the Philadelphia Graphing Calculator Committee:
<http://forum.swarthmore.edu/~stevek/>
 A good database of 'other sites' is at www.ticalc.org/sitelist
 Eisenhower National Clearinghouse: <http://www.enc.org>
 NCTM: <http://www.nctm.org>
 Blue Monkey Software: <http://members.aol.com/monkey109>



This TI-89 screenshot shows the 1999 T³ conference logo from page one converted from GIF to the TI-89 format using 89IVIEW+'s "Import" feature.