

**Compliance Test System
System Installation
Guide
CTS 3.0**



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1. Hardware Installation

The California Instruments Compliance and Test System (CTS) consists of several 19 inch rackwidth instruments that have to be interconnected in the correct way to create a complete measurement system. To operate the test system, a PC is required as well.

The hardware section of this installation guide walks the user through the hardware installation process. Follow the steps in this guide to install your new CTS 3.0 system hardware. Note that different system configurations may include additional units such as external reference impedance boxes (OMNI's), electronic output switches (EOS) and other optional units. This guide covers most standard single and three phase CTS configurations. If the system you purchased has a special SER model code, refer to the User Manual addendum for specific instructions on how to connect the hardware.

1.1. Component Description and Order of Connection

Since the CTS system consists of at least two units, the order of connection of the various units is very important. The following summary describes the available CTS system components and what function they perform in the test system:

AC Source. iX Series or PR Series AC power source. The AC Source provides low distortion AC voltage to the EUT to be tested. Typically, the AC source will be controller by the CTS software using either IEEE-488 or RS232C control. The AC source also acts as a frequency changer where needed to ensure testing is performed at the correct frequency. The power source is always the first instrument in the CTS configuration.

OMNI An OMNI is a single or three phase lumped reference impedance. For most single phase systems up to 5 kVA, the OMNI lumped reference components are built into the PACS unit directly so no additional OMNI unit is required. Higher power single phase and three phase CTS configurations may require an external OMNI unit. If so, the OMNI unit will be placed directly following the AC Source and before the PACS unit. The PACS measurements have to be taken AFTER the OMNI impedance during flicker tests. Note that most single phase CTS systems based on the 3001iX or 5001iX AC Source and three phase CTS systems based on the 15003iX AC Source use programmable impedance for flicker testing and thus don't need an OMNI unit. The OMNI lumped impedance may be added as an option to such configurations however.

PACS PACS is short for Power Analysis and Conditioning System. The PACS is an integral part of the CTS measurement system. PACS units are available in either single or three phase versions (PACS-1 or PACS-3). The PACS units connects to the output of the OMNI if an OMNI unit is present or otherwise to the output of the AC Source. The EUT normally connects the PACS output. The PACS also needs an AC line connection for its bias supplies of either 120 or 230 V L-N (selectable). **Check the line input voltage rating setting on the back of the PACS unit before connecting it to the AC line.**

EOS The EOS-1 or EOS-3 option may be used to support IEC 61000-4-11 Voltage Dips and Interruptions testing. If so, the EOS option needs to be connected to the output of the PACS and before the EUT. The EOS is controlled through a special interface from the iX Series AC Source. Unless an IEC 61000-4-11 test is in progress, the EOS will be in bypass mode.

PC The PC is typically not supplied by California Instruments but is a critical part of the CTS system. A PCI A/D Card is supplied with each PACS unit. This card must be installed in a suitable PC. Older ISA cards are still supported on single phase CTS systems. Three phase systems should be upgraded to use the PCI card however if the new interharmonics capability is enabled. The PC must have at least a 667 MHz Pentium processor and 64 MBytes of available system memory and a 800x600 SVGA display adaptor to run the CTS 3.0 revision software. Slower PC's are typically not fast enough to process the amount of data acquired during harmonics and flicker testing, especially with the addition of the requirement to include interharmonics. (EN/IEC 61000-4-7). If you are upgrading from revision 2.0 to revision 3.0, a faster PC may be needed to support the new interharmonics analysis added by amendment 14 of the harmonics standard.

Furthermore, as indicated, if you are upgrading to version 3.0 on a ISA card based, three phase CTS system, the ISA card has to be replaced with a PCI card. This requires calibration with the new A/D card. To upgrade, you need to order the CI400PCI and CI68C (cable), the price of which includes calibration of the PACS with the new A/D card if the PACS is sent to California Instruments in San Diego.

1.2. AC Source Installation

AC Source installation instructions are provided in the User Manual provided with the AC power source. Follow the instructions in the User Manual to set up the AC source. Note that AC Sources with power levels of 5 kVA and above require a three phase AC line connection. Note that the AC source has both one or more AC input terminal blocks - one per chassis in multi-chassis systems - and one or more AC output terminal blocks. Do not mix up the AC input with the AC output. Terminal blocks are clearly labelled. Please consult the wiring diagrams and tables in the user documentation to make sure the input power is connected correctly. After installation, the AC Source can be tested by itself if needed before the other CTS system components are connected. Before connecting the other components however, the AC source should be turned off for safety.

1.3. OMNI Installation

If an external OMNI was purchased, connect it immediately after the AC power source. The AC source output Hi and Lo should be connected to the OMNI AC input side. The output of the OMNI connects to the input of the PACS. Note that the OMNI also requires single phase AC line input for its bias supplies and fan. Check the line input voltage rating on the back of the OMNI chassis to make sure it is set to the correct line voltage at the place of installation, either 115 V or 230 V L-N. If not, set it correctly before applying power.

1.4. PACS Installation

The PACS units either connects directly to the output of the AC Source or to the output of the OMNI option if present. To connect the PACS, the top rear cover panel needs to be removed. This provides access to the AC In and AC Out terminal blocks. Connect the Hi output from the AC source or OMNI to the Hi input of the PACS. Do the same with the Lo side. For three phase systems, the three Hi's for phase A, B and C connect to the corresponding marked inputs on the PACS AC input side. Note that the PACS also requires single phase AC line input for its bias supplies and fan. Check the line input voltage rating on the back of the PACS chassis to make sure it is set to the correct line voltage at the place of installation, either 115 V or 230 V L-N. If not, set it correctly before applying power. **It is important that the AC line input to the PACS be connected to the same circuit as the AC line that powers the PC. Thus, connect both the PACS and the PC line cords to the same AC outlet strip to avoid ground loops. Ground loops caused by connecting the PACS and the PC to different outlets can seriously affect the harmonics and flicker measurements.** Finally, connect the DB-37 cable to either the front or back of the PACS. Both front and back panels provide the same 37 pin D-shell connector. The other end of the interface cable supplied with the CTS system connects to the A/D card.

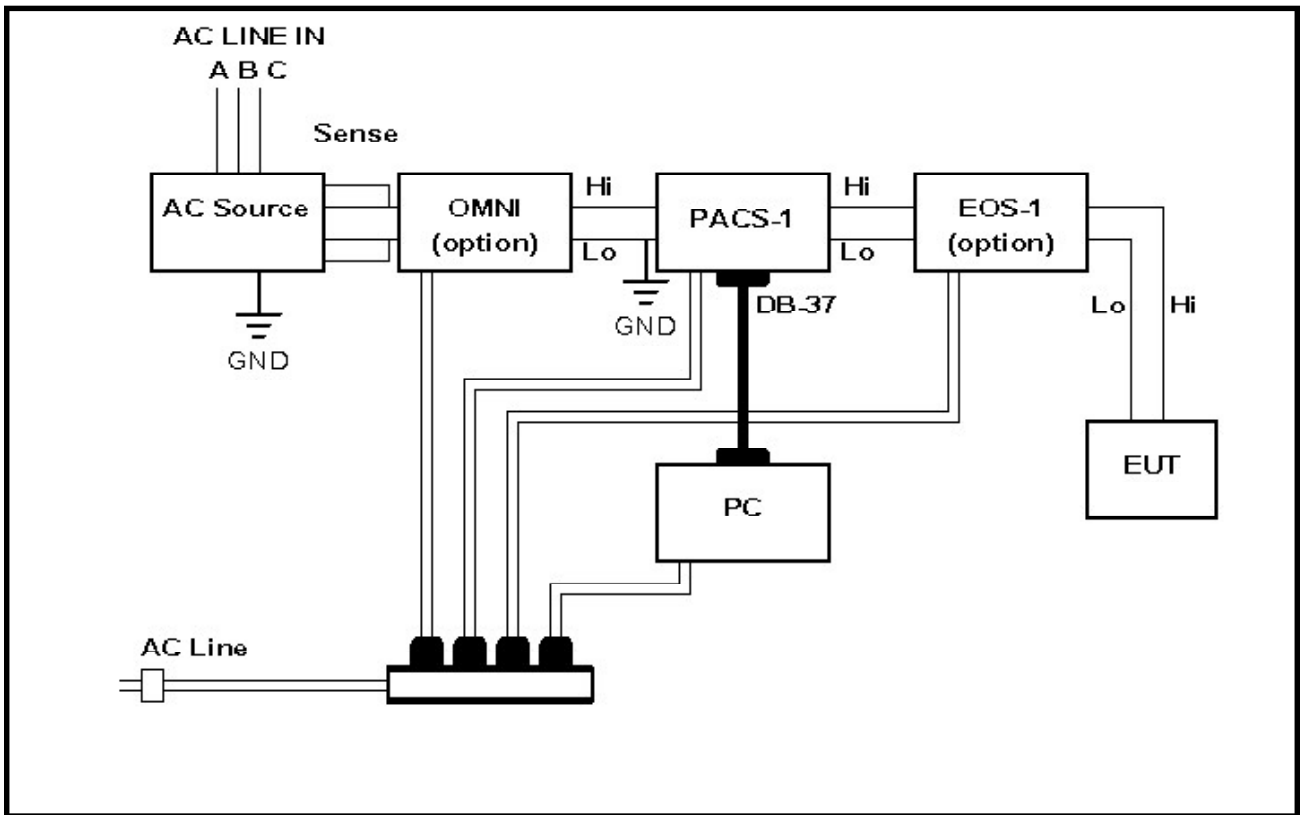
For single phase systems, the EUT can be connected to the front panel Euro style IEC/77 outlet socket. EUT connections can also be made at the rear of the PACS using the AC Out terminal block. Before system use, the PACS rear panel cover must be reinstalled however. You can elect to wire the output side of the PACS to a suitable outlet strip although it is highly recommend to use wires that are the correct gauge and are as short as possible. Long leads can add significantly to the overall impedance between the AC source and the EUT and invalidate the Flicker measurements. For three phase systems, all EUT connections have to be made at the rear panel of the PACS unit. Again, the top rear cover must be reinstalled before use.

1.5. PC Installation

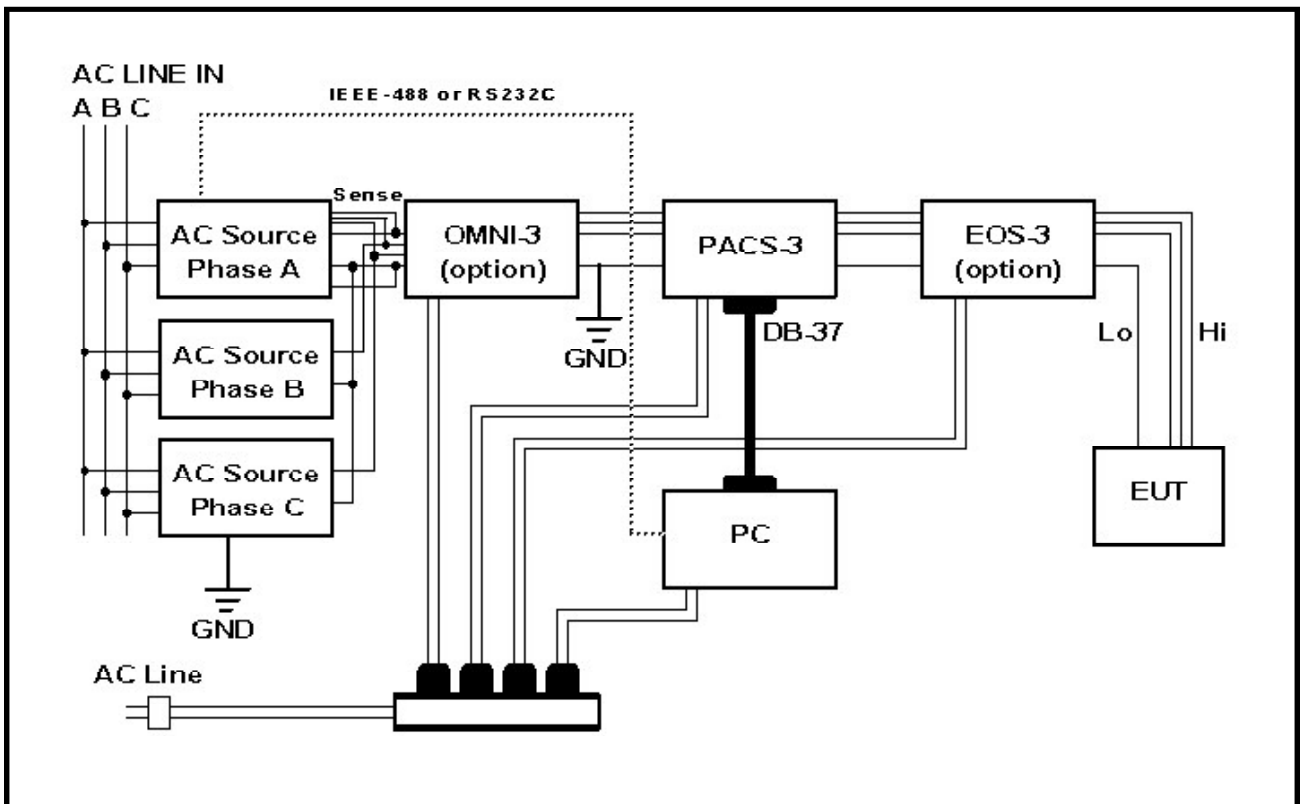
The A/D card supplied with the CTS system must be properly installed in a suitable PC. Make sure the PC is connected to the same AC outlet as the PACS unit to avoid possible ground loops affecting the measurements. For instructions on installing the A/D card and the required software, see subsequent paragraphs in this document.

1.6. EOS Installation

If an EOS option was purchased, it must be connected at the end of the CTS system unit chain. The EOS has AC input and AC output terminal blocks on its rear panel. Note that there is not ground connection on the terminal block. The EOS is grounded through its AC line cord. Note that the EOS also requires single phase AC line input for its bias supplies and fan. Check the line input voltage rating on the back of the EOS chassis to make sure it is set to the correct line voltage at the place of installation, either 115 V or 230 V L-N. If not, set it correctly before applying power. The control interface of the EOS must be connected to the iX Series AC power source master unit I/O interface. A DB-9 to DB-9 straight through cable is supplied for this purpose with the EOS option. Make sure this cable is installed or the iX Source will not find and control the EOS option.



Single Phase CTS System Setup



Three Phase CTS System Setup

2. PC Setup

The California Instruments Compliance and Test System (CTS) requires the CTS software suite to operate. This software must be installed on the PC which is used to control the system and acquire and process the data. **The A/D card must be installed in this PC before installing the CTS software.**

This installation guide walks the user through the installation process. Follow the steps in this guide to install your new CTS 3.0 software. Note that the CTS system can use one of three different A/D PC plug in cards or none at all. If no card is present, the CTS 3.0 software may be used to replay data files collected on another CTS system or run the program in a Demo mode. To use the demo mode, additional demo files need to be installed.

2.1. Data Acquisition Card Installation.

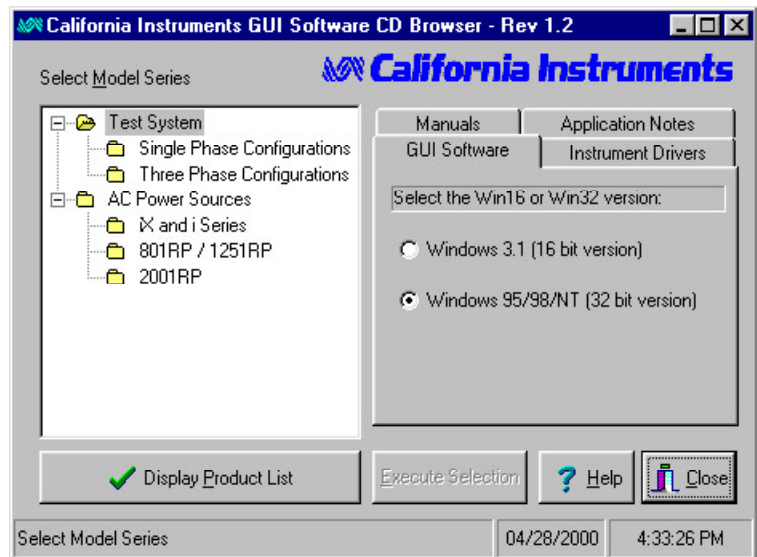
If you have an actual CTS system and have not installed the accompanying A/D card in your PC, do so before installing the CTS 3.0 software. This will ensure the card is present when needed. Note that the drivers for the PCI A/D card have to be installed separately and first before installing the CTS software itself. ISA A/D card drivers are installed concurrently with the CTS software. If you are upgrading an existing system, there is no need to re-install the A/D card drivers again. The CTS User Manual can also be found on the CTS distribution CD-ROM. To access, the user manual from CD-ROM, see the On-Line Documentation section at the end of this installation guide.

2.2 Installing or Upgrading to the CTS 3.0 Software

The CTS 3.0 software is only distributed on CD-ROM. The PC used must have a CD-ROM or it cannot be used for this application. If you are upgrading from CTS 1.X or CTS 2.0, you will not lose your previously installed version by installing version 3.0. The new version is installed in its own application directly. This will allow you to replay data files acquired with older versions of this software as they will not be replayed with the newer version. Thus, we recommend you retain your original installation of the CTS software. If you do want to un-install an older version however, use the Windows control panel Add/Remove program utility to uninstall your original CTS software.

Insert the CD-ROM (CIC 632) in the CD-ROM drive of your PC and proceed as follows:

1. If the PC's CD-ROM drive was set to auto-start, the CD Browser program should appear automatically. Select the Run entry from the start menu and enter d:\setup.exe followed by the Enter key to launch the CD Browser program. (d: is the CD-ROM drive letter. If you have a different drive letter assignment for the CD-ROM drive, substitute the correct letter instead. Alternatively, the Windows Explorer may be used to select the setup program. Note that on some CD's, the CD Browser program is called start.exe or CI_SWCD.exe. All result in the same CD Browser program being launched.



2. The figure on the right shows the initial start-up screen of the browser program. This browser allows you to select different programs and/or instrument drivers for installation or to read any of the available user manuals on line. To select any of these available options however, you must first select a system or AC power model series. Selecting a system or model series is done by clicking on the tree on the left hand side of the Browser. Extensive information on the CD Browser program and its use can be found in the on-line help by clicking on the Help button in the lower right hand corner of the program screen.

4. Use the mouse to click on either “Single Phase Configurations” or “Three Phase Configurations”. Three phase configurations are 15003iX-CTS and 30003iX-CTS. All other configurations are single phase.

5. Once you selected one of the system configurations, the tabs on the right hand side become enabled. On these tabs you will find entries for GUI software, Instrument Drivers, Applications Notes and Manuals. To install software, select the “GUI Software tab”.

6. If you have Windows 95, 98, NT or 2000, you can use the 32 bit CTS 3.0 software. If your PC only supports Win 3.1, you must use the 16 bit CTS 1.7 software. This version does not support the newer versions of the test standards and is no longer recommended for use. Select the correct Operating System for your PC.

7. Click on the “Execute Selection” button at the bottom center of the screen. The setup program for the selection software will be launched. The CD Browser program remains open during the entire installation process and does not impact the installation process in any way.

8. The CTS 3.0 software normally supports a PCI A/D Card. Support for the older ISA card is also provided. It is important that you select the correct type so the required card drivers are installed.

IF YOU HAVE THE PCI CARD AND THIS IS THE FIRST TIME YOU ARE INSTALLING THE CTS SOFTWARE, YOU MUST INSTALL THE PCI CARD DRIVERS FIRST (select CI400PCI option and Run Setup) BEFORE YOU INSTALL THE CTS SOFTWARE ITSELF. Follow the PCI setup program prompts. If you are upgrading from an older version and your A/D card and drivers have already been installed, you can skip to step 9.

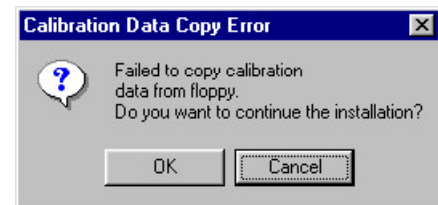
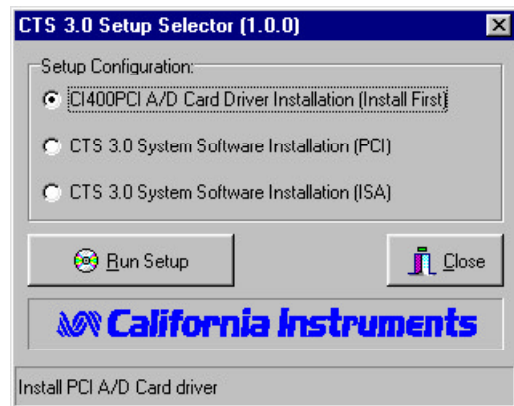
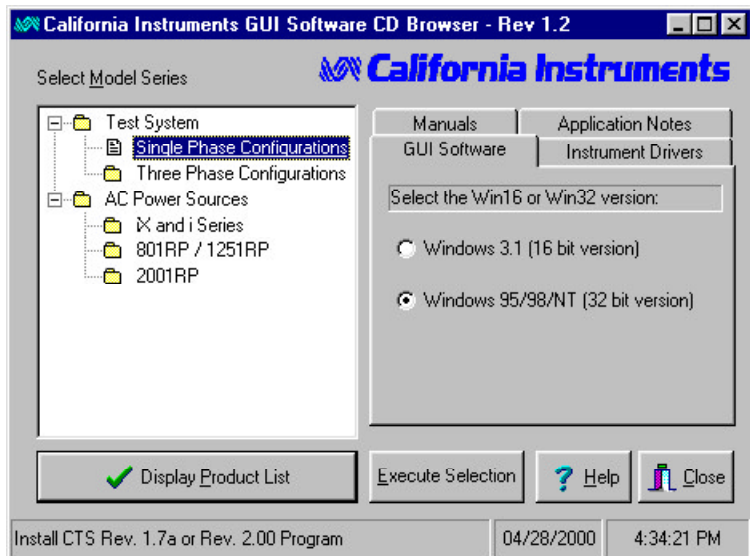
Select the PCI card driver selection. If this software is installed for file replay or demo purposes, there is no need to install the PCI card drivers either and you can skip to step 9. For demo purposes, install the PCI version of the CTS 3.0 software.

9. If you are installing a new CTS system for the first time, it is important that you insert the Floppy disk with the calibration data that is supplied with each new system in the PC’s floppy drive at this time. The installation program will look for this floppy to copy the calibration database to the PC. If the floppy is not present or the files on the floppy are missing, the following error will appear.

10. Insert the supplied calibration data floppy disk in the A drive and click on the “Run Setup” button. The calibration data will be transferred and the installation process begins.

11. If you are installing the software on a system that has a prior version of the CTS 1.X or 2.X software on it or for file replay or demo purposes, no floppy disk is available and you can ignore this warning by clicking on OK to continue the installation process. If you inadvertently forgot to insert the disk before clicking on the Run Setup button, click on Cancel, insert the floppy and click on “Run Setup” again.

If you have a prior version of the CTS 3.0 software installed on this system, you will have to uninstall it first before proceeding.



12. The CTS 3.0 software installation start-up screen is shown on the right. To begin the process, click on the OK button at the bottom. To abort, click on the Exit Setup button.

13. The first dialog will allow you select a complete installation. The default installation directory for the CTS 3.0 program is:

c:\Program Files\California Instruments\Cts30

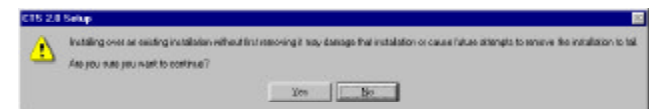
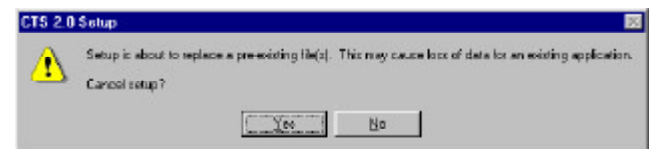
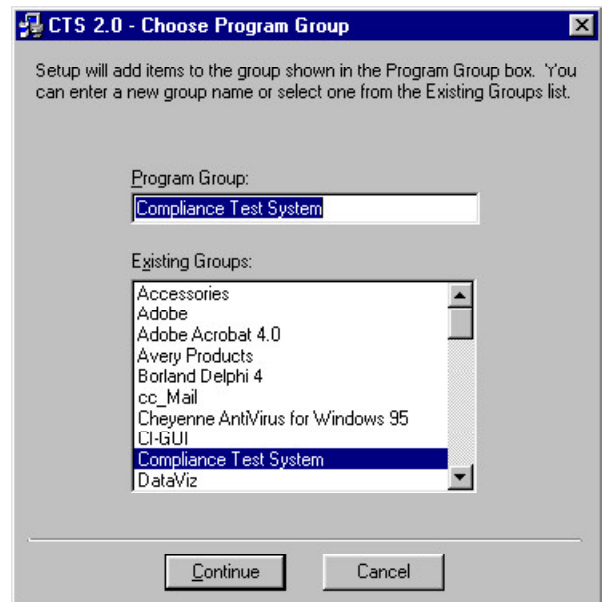
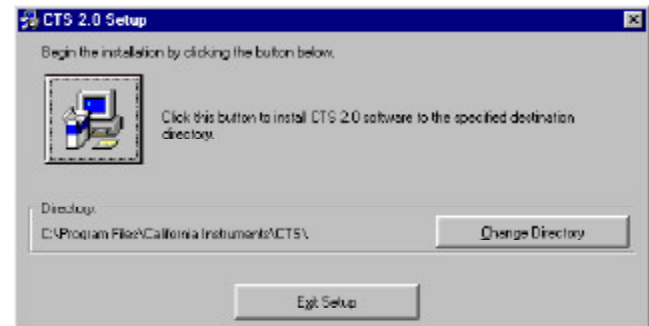
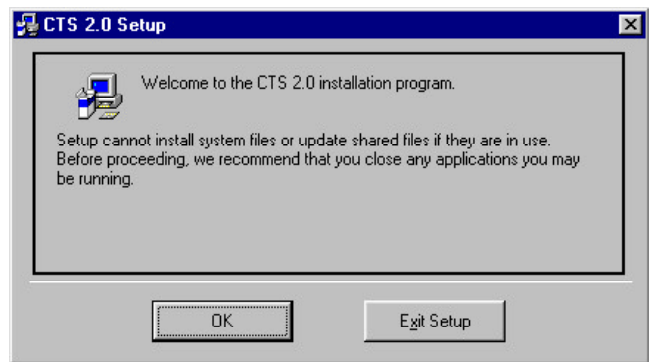
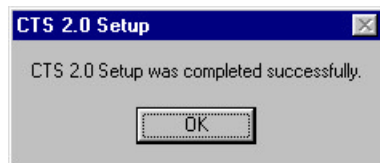
14. To change the default directory to a directory of your choice, click on the "Change Directory" button and select or create an alternative location.

15. If you opt to use the recommended default directory, click on the Installation button that has the PC symbol on it to start.

16. The next dialog will show you the name of the Start Menu entry that will be created. If you want to change the Start menu entry, do so now. If you want to use the default "Compliance Test System" name, click on the Continue button at the left bottom of the dialog window.

17. The CTS 3.0 installation will now proceed. If during the installation an existing file is about to be overwritten, the following warning dialog will be shown. This is a normal occurrence and you should instruct the installation process to continue by clicking on the Yes button. This will generate an additional dialog prompting you to confirm. Click on yes to confirm the replacement of the previous instance of the same file. These messages should normally only occur if your are installing the CTS 3.0 software on a PC that had this software installed on it before. To avoid this message, you should remove the original installation first and then reinstall.

18. If the setup completes successfully, the following message will appear. Click on OK to confirm the end of the setup process. You can now return to the CD-ROM browser program.



19. System check. Run a harmonics test with Interharmonics enabled. If during the test the debug window appears, the PC you are using has insufficient processing speed to handle the new interharmonics capability of version 3.0. You will either have to turn off interharmonics or upgrade your PC to a faster CPU.

3. Installing the AC Source control GUI

Next we need to install the AC Source control program from the same CD-ROM. The actual program required will depend on the AC Source model included with the CTS System. For most systems, this will be the iX Series. Some systems may use an RP Series model AC power source.

To install the AC Source control program, proceed as follows:

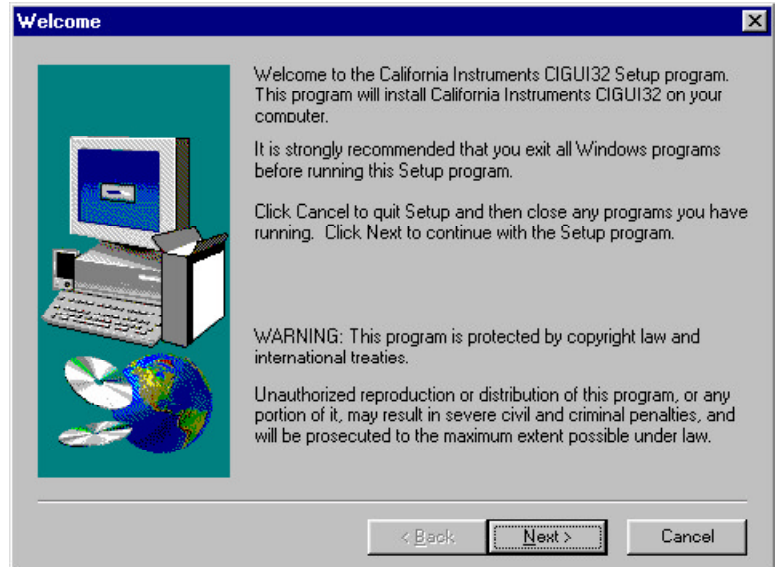
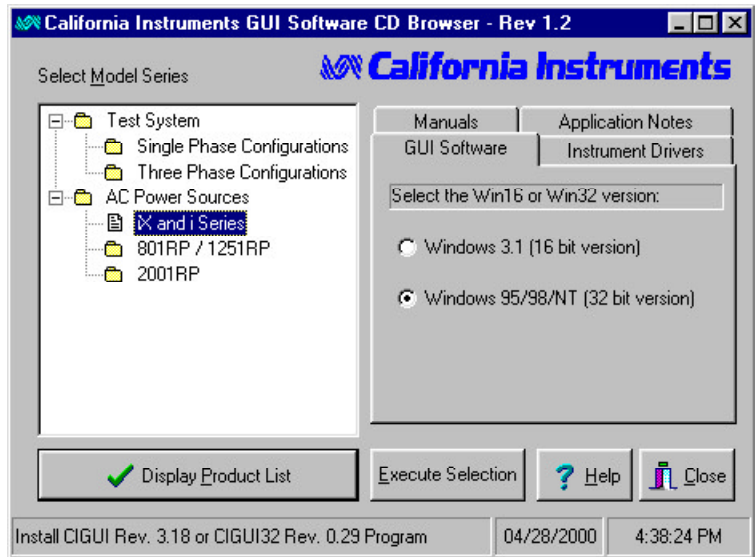
1. From the CD-ROM browser, select the AC Source model series that is part of the CTS system you received.

2. Once the correct model is highlighted, select the GUI Software tab on the right hand side.

3. Select the correct operation system. For most PC's, the 32 bit version GUI should be used.

4. Click on the Execute Selection button at the bottom of the CD Browser program. The installation of the GUI program will be launched.

5. The screen on the right shows the setup program for the GUI. Follow the setup program prompts to complete installation of the GUI program.



4. User Manuals

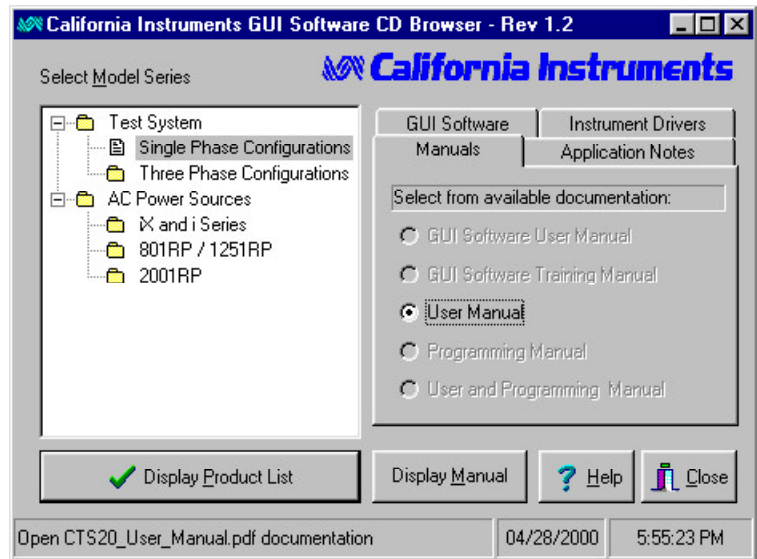
User manuals are provided on the distribution CD-ROM in Adobe Acrobat Portable Document format (PDF). If you have a Adobe Reader, you can copy these files to your hard drive. All user documentation is located in the “PDFDocs” subdirectory on the distribution CD-ROM.

You can also use the CD Browser program to access the PDF manual without the need to install the reader on your PC. In this case, the leader is executed from the CD-ROM and does not install on your PC’s hard drive.

1. To read a manual on-line, select the relevant model series on the left hand side and select the Manuals tab on the right hand side.

2. Available manuals will be enabled. Select the manual of interest and click on the “Display Manual” button located at the bottom center of the CD Browser.

3. The manual will be displayed and can be printed if needed. The CD Browser remains open and can be used to display additional manuals.



5. Closing the CD Browser program

The CD Browser utility program will remain open at all times until closed. To close the browser program, click on the Close button in the lower left corner of the program screen.

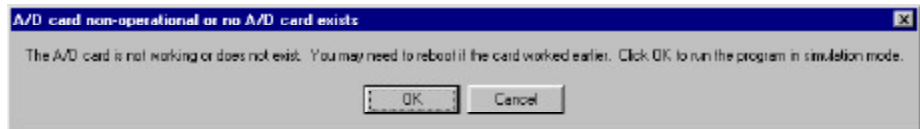
6. Replaying Sample Data Files

The CTS 3.0 distribution CD-ROM contains a number of sample data files recorded on an actual CTS test system. These files can be used to review the data replay capabilities of the CTS 3.0 software. File replay is supported even if the CTS hardware is not present. This allows data files to be analyzed by a third party that may not have access to an actual test system. The following four files are included on the distribution CD-ROM:

Filename	Description
A14_1ph_A.cts_data	Steady state harmonics A14 test, single phase mode.
A14_3ph_A.cts_data	Transitory harmonics A14 test, three phase mode.
SS_3ph_A.cts_data	Steady state harmonics test, single phase mode
TR_1ph_A.cts_data	Transitory harmonics test, three phase mode
Flk_1ph.cts_data	Flicker test, single phase mode.
Flk_3ph.cts_data	Flicker test, three phase mode.

To replay any of these files, proceed as follows.

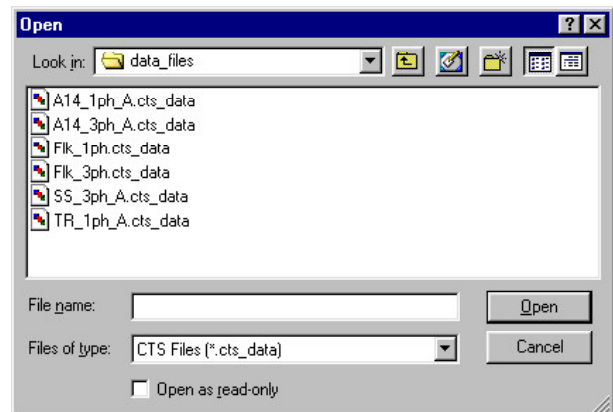
1. Make sure the CTS 3.0 software was correctly installed on the PC.



2. Open the CTS 3.0 program from the Start, Programs, Compliance Test System, CTS 3.0 entry. If you do not have an A/D card installed, the following warning dialog box will appear. This indicates no A/D card was found. Since this is expected, click on the OK button to continue loading the program.

3. Once the CTS 3.0 main test window appears, select the File, Close menu entry. This closes the existing setup and allows a new setup or data file to be loaded.

4. From the File menu, select the "Open data file..." entry. This will display the standard Windows File Open dialog. The default directory should be "C:\Program Files\California Instruments\Cts30\Data_files". This is the normal repository directory for CTS data files.



5. Click on the file you want to play back and click the Open button to open the selected file.

6. Once opened, the test data display window for the selected test mode is shown. The test mode will depend on the type of data file opened and is automatically recognized by the CTS program.

7. Click on the Start button to start the playback process.

To play back a different file, select the File, Close menu entry to close the currently selected data file. Once closed, a new data file can be opened using the same procedure as outlined above.

Note that if an actual CTS hardware system is present, you can collect data directly from an EUT. In this case, the CTS 3.0 program will automatically assign a file name to the test data if the option to save the test data is selected. Harmonic test data files always start with the letter "H", flicker test data files always start with the letter "F". If needed, you can rename the default assigned data file names to more descriptive names using Windows Explorer.

7. Operating without an A/D Card.

If you received a CTS 3.0 Demo CD distribution, the CTS 3.0 program cannot be used to acquire data as you will not have an A/D card. However, the program may still be used for file replay mode. A number of data files for both Harmonics and Flicker are provided for this purpose. You can also replay any CTS 3.0 data files that were recorded on other CTS systems.

When the program is launched in the absence of a supported A/D card, a message will be displayed indicating that the A/D card is either missing or not accessible. If you do have an A/D card, there may be a problem with the card drivers. In that case, try running the Measurement Automation Explorer for the PCI card (CI400PCI) and run the A/D card self-test. If this fails as well, try reinstalling the A/D card drivers. For ISA A/D card systems, check the autoexec.bat settings.

The message that appears will provide a choice of Cancelling the program or continuing on for replay purposes. If you select OK, the active test setup window will be closed and the main program with no new test window open will be displayed. You can now pull down the File menu and select 'Open data file..' menu entry. This will bring up the file dialog which allows you to select one of the harmonics or flicker data files for replay. Once opened, the main data display appears. To start the replay, use the Start button. This procedure is also outlined in the previous section.

At the end of the replay, you can move back and forth through the data file using the VCR style buttons in the lower left corner. See the user manual for details on setting replay options.

8. Technical Support

Should you experience any problems installing or using the CTS 3.0 software, contact California Instruments via email at support@calinst.com.

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