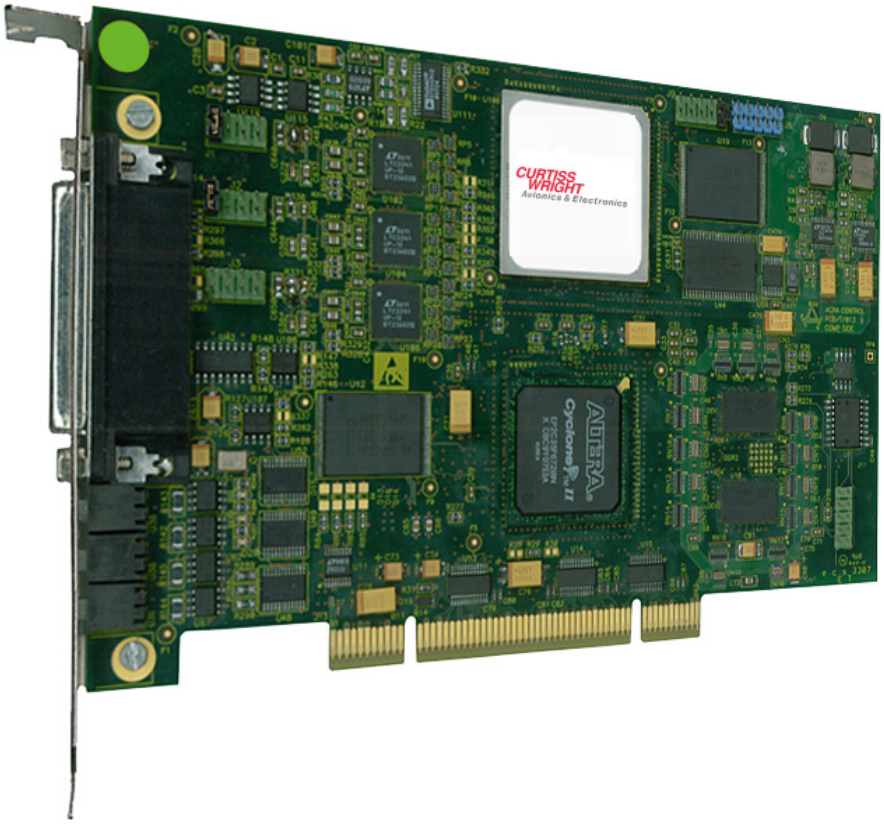
CURTISS-WRIGHT

Ground Station Boards
User Guide



INNOVATION DELIVERED

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Chapter 1
WELCOME

Congratulations on purchasing a ground station (GTS-500) board from Curtiss-Wright!

Curtiss Wright manufactures GTS-500 boards using leading edge technology. The GTS-500 boards are a 100% digital design, which reduces the effects of temperature and noise that are normally inherent to analog systems and produces the same performance at all rates and for all codes, to help deliver the best quality data for display and analysis.

About this Ground Station Boards User Guide

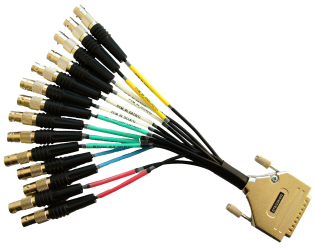
The Ground Station Boards User Guide is intended for ground station engineers who need to install a GTS-500 board and related software in a computer.

Unpacking and checking the contents

Remove all contents from the package (but keep the GTS-500 board in its antistatic bag) and confirm that the following items are included:

WARNING: GTS-500 boards are vulnerable to electrostatic damage. Before you remove the GTS-500 board from the antistatic bag, see "Electrostatic considerations" on page 3.

GROUND STATION BOARD



GROUND STATIONS CABLE
(IMAGE OF A GTS/CON/002)

GTS SDK 3 SOFTWARE CD

DOCUMENTATION CD

DAS STUDIO 3 SOFTWARE CD[1]

1. A DAS Studio 3 software CD is only shipped with compatible GTS-500 boards; refer to the DAS Studio 3 release notes for a list of supported modules.

1

Inspect the GTS-500 board and cable for any visible signs of damage that may have occurred during transit. If damaged, contact Curtiss Wright support (acra-support@curtisswright.com).

Other items may be included in the package depending on the items ordered. Keep the packing material in case you need to return the product or ship it to another location.

Which chapters should I read?

The chapters you read in this user guide as shown in the following table will depend on the software you purchased with the GTS-500 board.

Table 1: Suggested reading path

Chapter	Recommendation
“Hardware and software installation” on page 3	Read this chapter before installing the GTS-500 board in a computer.
“Setting up the GTS-500 board using DAS Studio 3” on page 11	Only read this chapter if you are using DAS Studio 3 to setup and manage the GTS-500 board.
“Developing code for the GTS-500 board using GTS SDK 3” on page 13	Only read this chapter if you are using the supplied software development kit to write your own software.
“Setting up the GTS-500 board using GS Works 8” on page 15	Only read this chapter if you purchased GS Works 8, real-time and post-test data visualization and analysis software for GTS-500 boards.

Registering for technical updates

Curtiss Wright issues a monthly bulletin, which provides updates on software versions and documentation changes. To register for this bulletin, contact Curtiss Wright support (acra-support@curtisswright.com).

Getting help and support

Visit www.cwc-ae.com for further information about the company’s products and for resources such as FAQ, technical notes and tutorials.

Please send details of any hardware or software problems you have to Curtiss-Wright support (acra-support@curtisswright.com).

Chapter 2
HARDWARE AND SOFTWARE INSTALLATION

This chapter explains how to install the GTS-500 board and related software in a computer. The following topics are discussed.

- "Electrostatic considerations" on page 3
- "System requirements" on page 4
- "Hardware and GTS SDK 3 software installation" on page 4
- "DAS Studio 3 software installation" on page 10
- "GS Works 8 software installation (optional)" on page 10
- "Connect cable inputs" on page 10
- "GTS-500 board settings overview" on page 10

Electrostatic considerations

GTS-500 boards are vulnerable to electrostatic damage. Read this section before you remove the GTS-500 board from the antistatic package.

WARNING: Always ensure that proper ElectroStatic Discharge (ESD) precautions are in place before handling or storing Curtiss Wright equipment.

- Always disconnect the computer from the power outlet whenever you are working inside the computer case.
- When antistatic equipment is not available, touch some metal frame (the computer case for example) to discharge static from your body before removing the board from the antistatic bag. Only handle the GTS-500 board by the metal bracket.
- When transporting or storing GTS-500 boards, ensure that they are placed in antistatic bags.
- In a laboratory environment, use antistatic mats and wrist straps.

System requirements

To run GTS-500 board software, we recommend the following minimum computer specification.

Minimum recommended hardware requirements

Item	Description
Processor	2.4GHz Intel® Dual Core
Hard-disk	80GB
RAM	2GB
Screen	1024 x 768 (if using GUIs)
Graphics card	Intel® G31/G33 Express Chipset Family[1]
PCI slot per board	32-bit PCI slot [2]

1. If using GS Works, we recommend using one of the following graphics cards: nVidia GeForce 6xxx+; nVidia Quadro 3xxx Video (PCI Express16).
2. Required if using a ground station board.

Supported operating systems

Operating system
Windows® XP 32-bit Service Pack 3 (SP3)
Windows 7 32-bit Professional or higher English
Windows 7 32-bit English Ultimate or Enterprise and language packs

NOTE: Microsoft ® Windows 7 and Microsoft Windows XP are not real-time operating systems; they are general-purpose operating systems that have the capability to provide very fast response times, but are not as deterministic as a real-time system. It is therefore recommended that ground station software real-time API is used on a dedicated PC with no other applications running in order to minimize data loss.

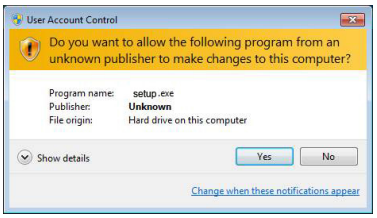
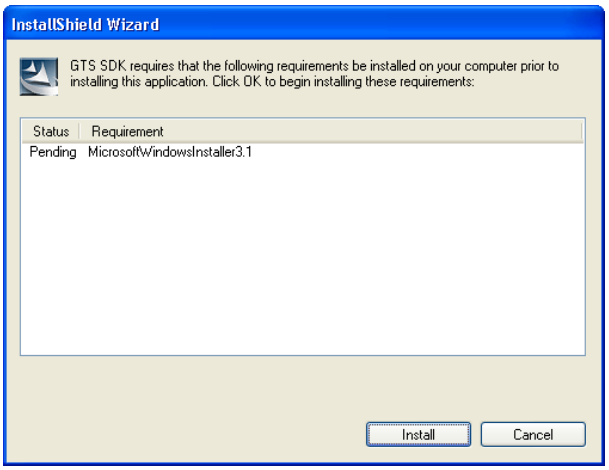
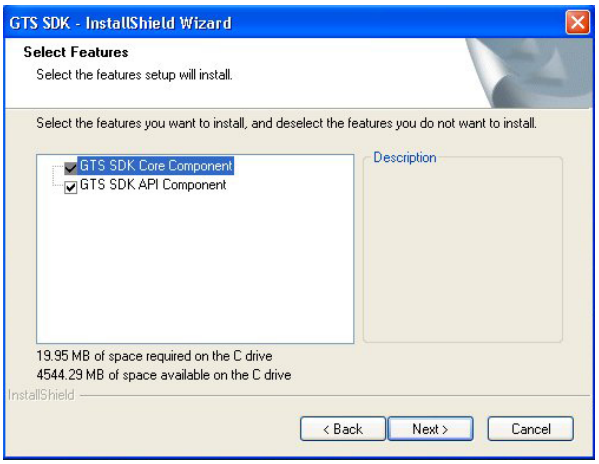
Hardware and GTS SDK 3 software installation

NOTE: GTS SDK 3 is the latest software development kit for ground station boards and contains the drivers required to interact with the GTS-500 board. If you are using GTS SDK 2, it may not be compatible with all GTS-500 boards; refer to the GTS SDK 2 release notes for a list of supported modules.

Begin GTS SDK 3 software installation

The installation steps in this section are similar for Windows 7 and Windows XP. The screen captures shown use the Windows 7 theme. Where indicated, steps apply to Windows 7 only. For more information, refer to the GTS SDK 3 release notes and installation instructions found on the GTS SDK 3 CD.

WARNING: If a previous GTS SDK is installed you may see a warning message when you start this installation. In that case, go to **Control Panel** -> **Add or Remove Programs**, and remove **GTSDECDriver** or **GTS SDK**. Then start this installation again.

1. Insert the supplied GTS SDK 3 software CD and click on **Run setup.exe**. (Windows 7 only)	
2. A User Account Control warning appears. Click **Yes**. (Windows 7 only)	
3. You are prompted to install MicrosoftWindowInstaller. Click **Install** and then follow the on-screen instructions.	
4. In the **Select Features** dialog box, ensure **GTS SDK files** are checked and click **Next**. **5.** Continue to follow the on-screen instructions.	

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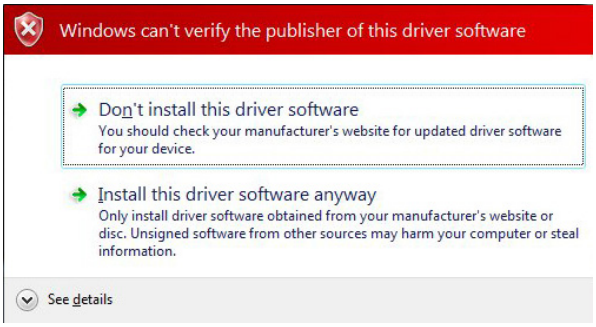
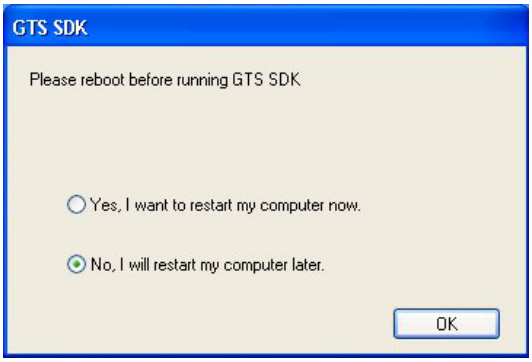
6. Select **Install this driver software anyway**.
(Windows 7 only)



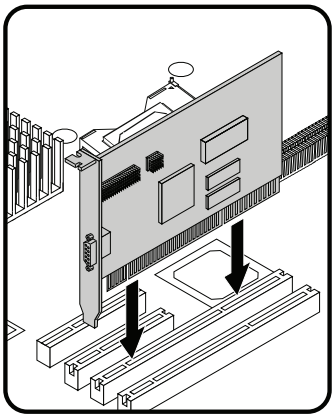
7. Select **No, I will restart my computer later** and click **OK**.
Do not allow the system to reboot; instead turn off the computer.



Install the ground station board

NOTE: Before installing the GTS-500 board, ensure the selection headers for the GTS-500 board are set as required. For header settings, refer to the respective GTS-500 board data sheet.

1. Disconnect the computer power cable to ensure power is drained from the motherboard.
2. Open the computer case and remove the blanking plate for the PCI slot you will use.
3. Install the GTS-500 board into the PCI slot. Push firmly and evenly on the board to ensure it is inserted fully into the slot.
4. Secure the metal bracket of the GTS-500 board to the system case with a screw and close the system case.



5. Connect the cable to the connector on the GTS-500 board and then hand-tighten both securing screws.

Resume GTS SDK 3 software installation

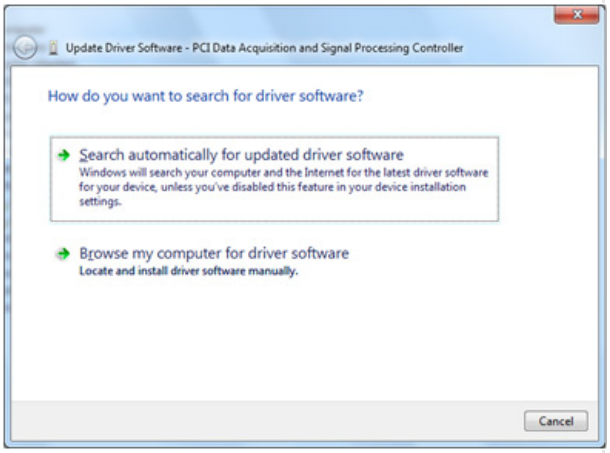
If your operating system is Windows 7, refer to "Resume Windows 7 installation" on page 7.

If your operating system is Windows XP, refer to "Resume Windows XP installation" on page 9.

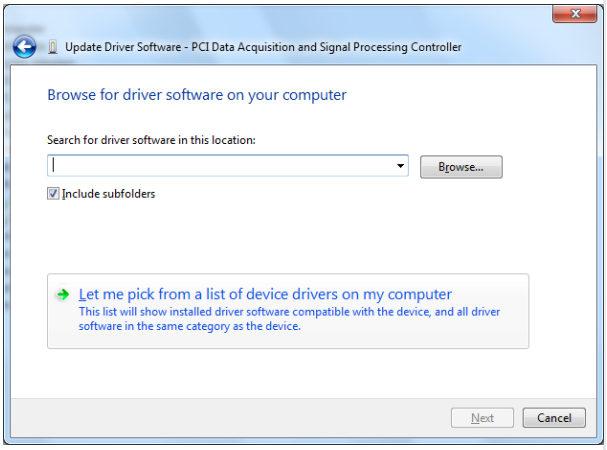
Resume Windows 7 installation

1. Reconnect the power cable and start the computer.

   The **Update Driver Software** dialog opens.
   (If this dialog does not appear then the GTS-500 board may not be properly inserted. Turn off the computer, then remove and firmly reseat the GTS-500 board.)
   Select **Browse my computer for driver software**.



2. Select **Let me pick from a list of device drivers on my computer** and click **Next**.



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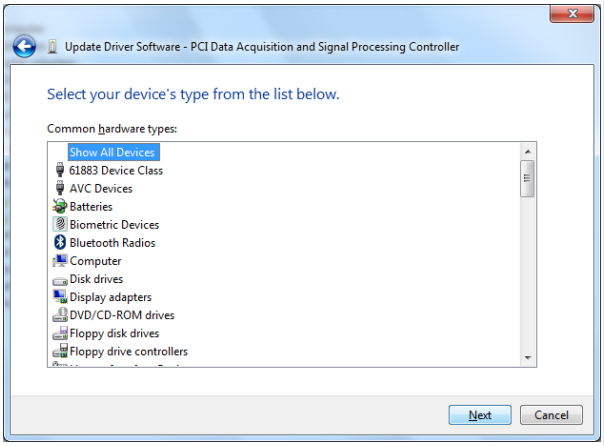
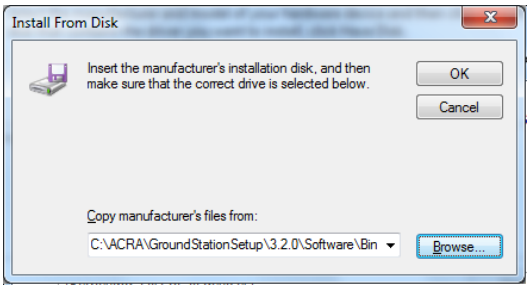
3. Click **Next**.
   It is not necessary to select a device type.

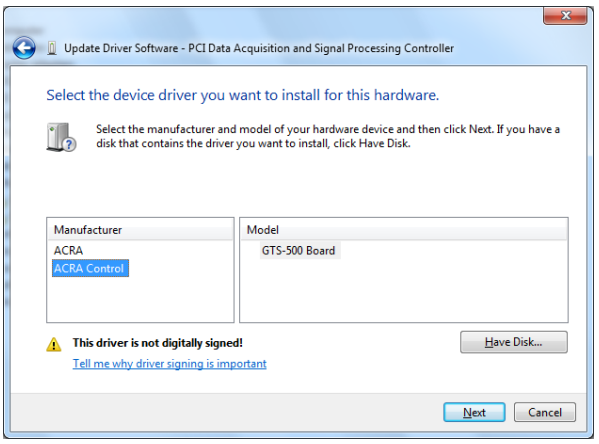


4. Click **Have Disk** and then browse to the following folder:
   C:\ACRA\GroundStationSetup\3.3.0\Software\Bin

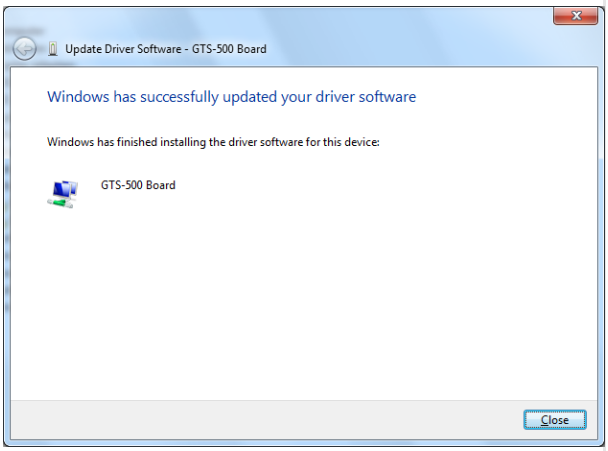
   NOTE: **C:\ACRA** is the default location.



5. Select **ACRA Control/GTS-500 Board** and then click **Next**.

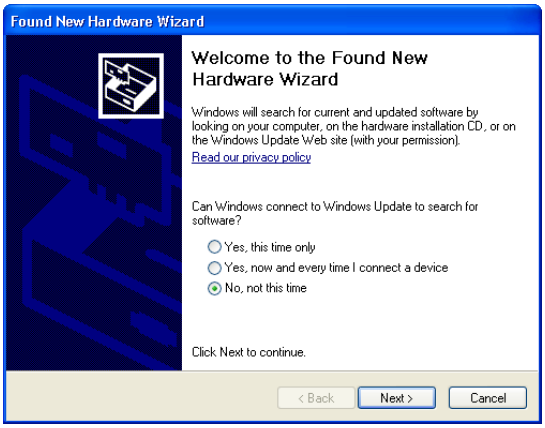


6. Click **Yes** to close the **Update Driver Warning** dialog box and then click **Close**.

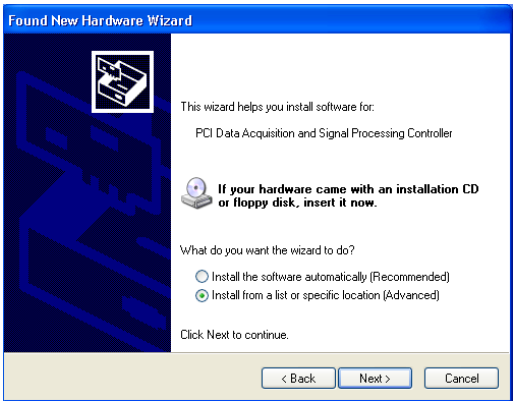


Resume Windows XP installation

1. Reconnect the power cable and start the computer.
2. The **Found New Hardware Wizard** dialog opens. (If this dialog does not appear then the GTS-500 board may not be properly inserted. Turn off the computer, then remove and firmly reseat the GTS-500 board.) Select **No, not this time** and click **Next**.



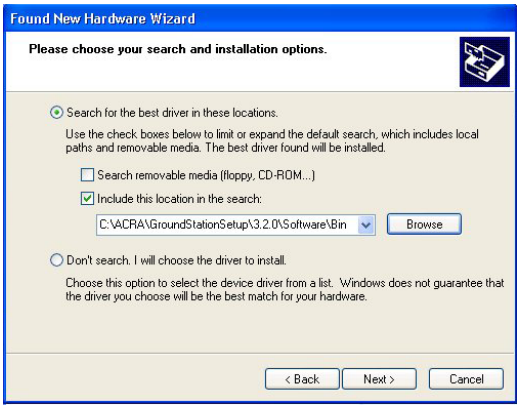
3. Select **Install from a specific location (Advanced)** and click **Next**.



4. Select the **Include this location in the search** check box and browse to the location where the **plda.inf** file was copied to and click **Next**. **C:\ACRA\GroundStationSetup\3.3.0\Software\Bin**

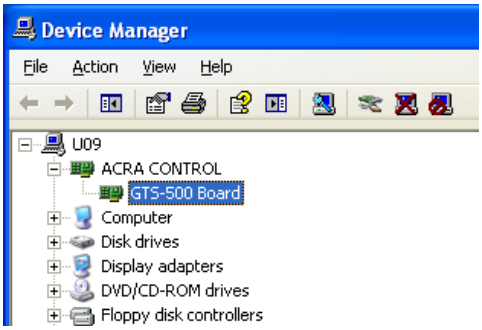
   NOTE: C:\ACRA is the default location.

5. If a previous GTS-500 board was installed, you are prompted. In this case, select **GTS-500 Board** and click **Next**.
6. Click **Finish** to complete the installation.



Verify the installation

1. In **Windows Explorer**, right-click **My Computer** and select **Properties**.
2. On the **Hardware** tab, click **Device Manager**.
3. To verify the installation, look for an **ACRA CONTROL** PCI icon with a sub-PCI icon labelled **GTS-500 Board**. If the PCI icon is not listed, try reseating the GTS-500 board. That is, power off the computer, remove the GTS-500 board and reseat it. If the board is still not shown in Device Manager, contact Curtiss Wright support (acra-support@curtisswright.com).



DAS Studio 3 software installation

To install DAS Studio 3, refer to the “installation_guide.pdf” in the Documentation folder of the supplied DAS Studio 3 software CD.

GS Works 8 software installation (optional)

To install GS Works 8, refer to the “GS_Works8_ReleaseNotes.pdf” in the root of the GS Works 8 software CD (not supplied).

Connect cable inputs

The supplied cable allows access to common signals used in bench testing and most applications. The cable is terminated with BNC connectors. Refer to the *Ground Station Cables* data sheet for pinout signal descriptions.

WARNING: The use of third party mating connectors on GTS-500 boards may result in damage to the mating connector. Such damage would incur out of warranty repair costs.

GTS-500 board settings overview

For details on the GTS-500 board status LEDs, setup options, I/O specifications, and connector pinout, refer to the respective GTS-500 board data sheet.

Chapter 3
SETTING UP THE GTS-500 BOARD USING DAS STUDIO 3

DAS Studio 3 software is used to set up and manage ground station hardware. It enables flight test engineers to visualize their mission specifics in an integrated display environment.

NOTE: DAS Studio 3 may not be compatible with some GTS-500 boards; refer to the respective data sheet for details.

Using DAS Studio 3

DAS Studio 3 lets you discover the system, program the card and view the status of the card. To open DAS Studio 3, go to **Start**, **All Programs, DAS Studio 3x** and then click **DAS Studio.**

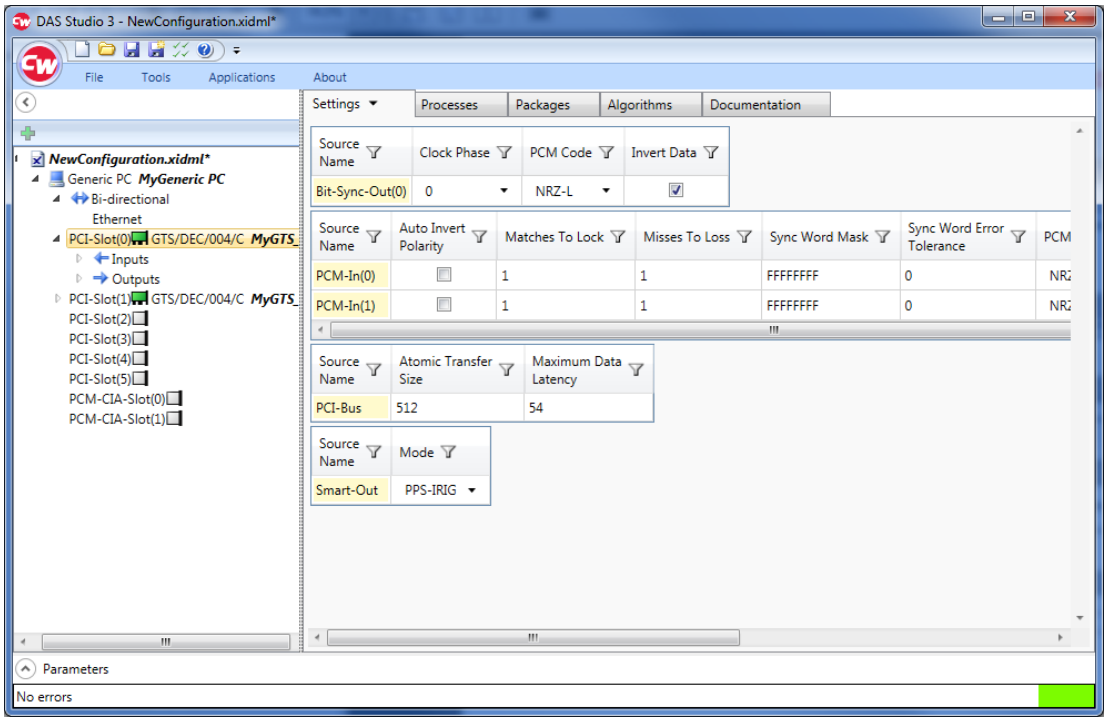


Figure 1: DAS Studio 3 interface overview

NOTE: The configuration shown in the previous figure reflects a sample setup for a GTS/DEC/004. A similar setup can be configured for any GTS-500 board using DAS Studio 3.

NOTE: For more information on using DAS Studio 3, refer to the *DAS Studio 3 User Manual* which can be found under the Documentation folder on the DAS Studio 3 software CD.

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Chapter 4
Developing code for the GTS-500 board using GTS SDK 3

Note: This chapter is intended only for developers to read. If you are not developing code, see “Setting up the GTS-500 board using DAS Studio 3” on page 11 or “Setting up the GTS-500 board using GS Works 8” on page 15.

Note: GTS SDK 2 may not be compatible with some GTS-500 boards; refer to the respective data sheet for details.

GTS SDK 3 includes APIs for system definition, programming, real-time data access, and documentation with detailed examples.

GTS SDK 3 provides developers and system integrators with a toolkit for generating XidML® metadata files and programming the card. It also offers real-time access to decommutated data with time tags and status registers.

For further information, see the documents described in the following table. (You can search for these documents in the default folder where drivers are installed: C:\ACRA\GroundStationSetup\3.3.0)

Table 2: Related documentation

Document	Description
C:\ACRA\GroundStationSetup\3.3.0\Software\ProgrammingAPI\Docs**ProgrammingAndRealTimeAPI.doc**	Programming API and Real-time API reference manual
C:\ACRA\GroundStationSetup\3.3.0\Software\SystemDefinitionAPI\Docs**ProgrammersReference.doc**	System definition API reference manual

Using GTS SDK 3

GTS SDK 3 can be used to set up and acquire PCM data according to the type of ground station board. GTS SDK 3 has the following three interfaces:

System definition interface

The system definition interface allows you to create a default definition or load a definition from a XidML file. Once created, the definition can be programmatically modified to change the settings required. The definition loaded into memory can be either passed directly to the hardware setup interface or saved to a XidML file for use later.

Programming interface

Setup is performed by loading a XidML file. Where applicable, this XidML file must contain settings for the bit synchronizer, the frame decommutation engine and the PCM frame setup. A minor frame loopback tester is provided in the hardware for testing without an external PCM stream. The test frame is based on the frame setup for decommutation and includes counters.

Real-time interface

The real-time interface controls the GTS-500 board at run time and receives PCM frame data through a callback function. The callback includes items such as frame data (as an array), IRIG time stamps, frame count, frame lock status, buffer fill level, and a buffer overflow flag. For further information, see the documents described in Table 2 on page 13.

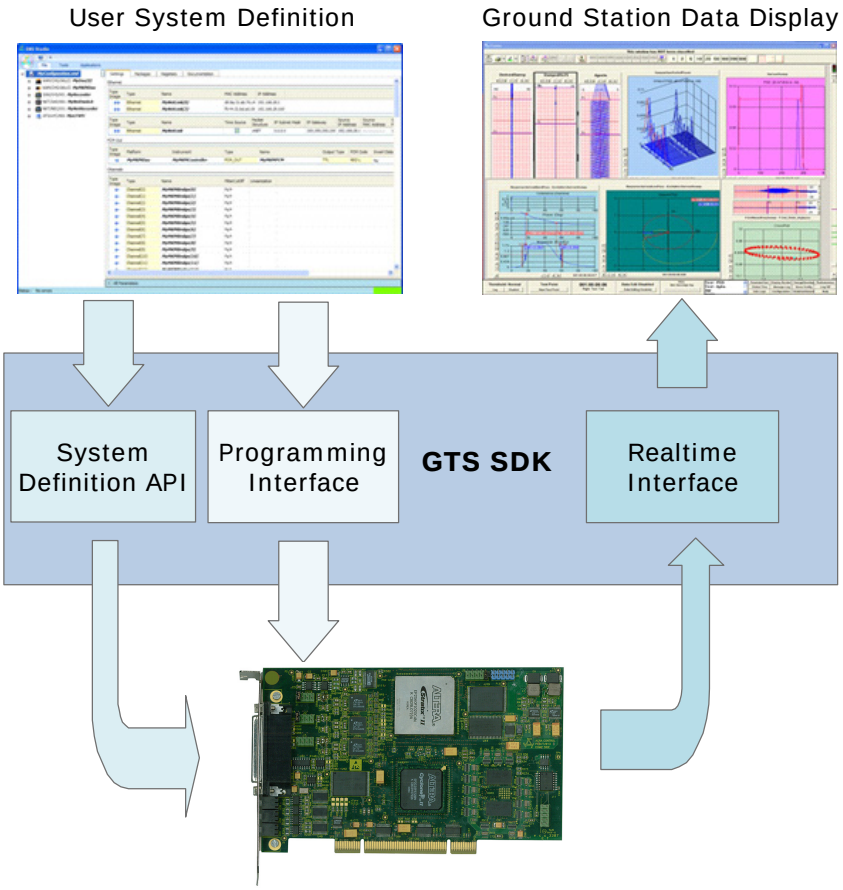


Figure 2: GTS SDK 3 API data flow

For details on programming languages that are supported, see the following table. (You can search for the sample codes in the default folder where drivers are installed: C:\ACRA\DASStudio.)

Table 3: Supported programming languages

Language	Description
C:\ACRA\GroundStationSetup\3.3.0\Software\ProgrammingAPI\Sample\Borland\CPP	Sample code for **CodeGear C++ 2007**; includes samples for calling .NET assembly via COM
C:\ACRA\GroundStationSetup\3.3.0\Software\ProgrammingAPI\Sample\VisualStudio\CPP	Sample code for **MS Visual Studio C++, C++/CLI**; includes samples for calling native Windows DLL
C:\ACRA\GroundStationSetup\3.3.0\Software\ProgrammingAPI\Sample\VisualStudio\CSharp	Sample code for **MS Visual Studio C# Net**; includes samples for calling native Windows DLL

Chapter 5
SETTING UP THE GTS-500 BOARD USING GS WORKS 8

GS Works 8 is a real-time and post-test display and analysis software suite based on SYMVIONICS, Inc. IADS, which supports multi-disciplinary testing. GS Works 8 software facilitates real-time mission analysis and raises situational awareness, safety monitoring, and test point clearance capabilities to a new level. This is accomplished by utilizing tools previously available only within post-test environments.

NOTE: GS Works 8 may not be compatible with some GTS-500 boards; refer to the respective data sheet for details.

GS Works 8 licensing

Before using GS Works 8, you need to request a license. Browse to the **Steps to obtain a license key** document on the GS Works 8 CD and follow the product license instructions.

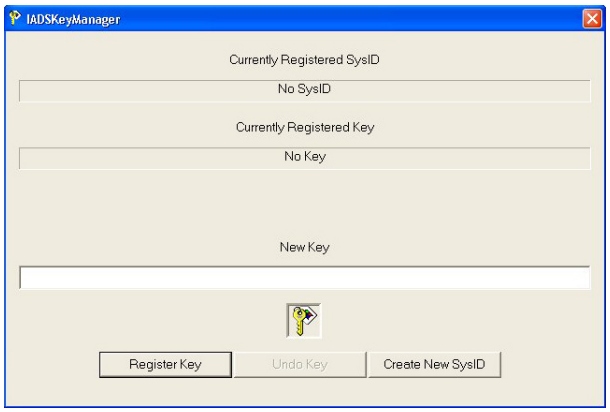
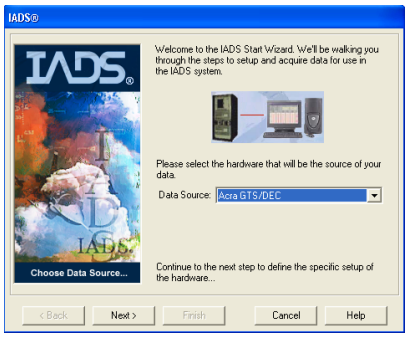


Figure 3: GS Works 8 product license

Using GS Works 8

GS Works 8 enables you to customize displays, parameter definitions, analysis options, and test setup in a matter of seconds.

1. To open GS Works 8, go to **Start**, All **Programs**, **IADS** and then click **GSWorks**.
2. From the Data Source drop-down menu, select **AcraGTSDEC**.



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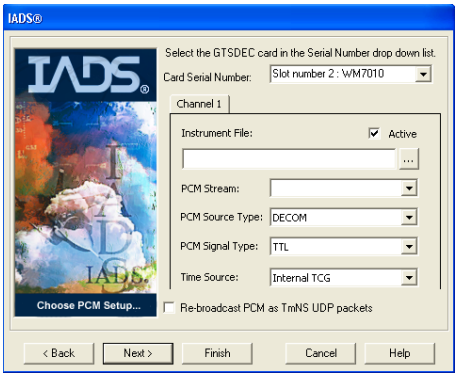
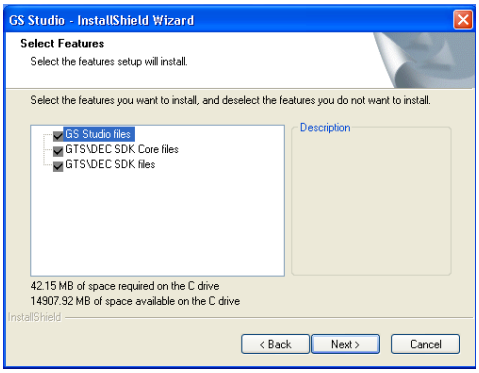
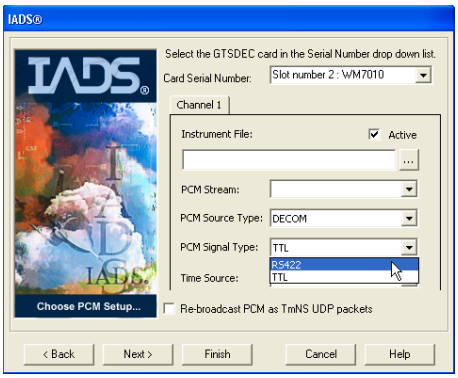
3. If more then one board is in the PC, select the GTS-500 board you want from the Card Serial Number drop-down menu.
4. Under **Instrument File,** browse to your .xml file. The same .xml was used to set up the system you are analyzing.
5. Select the **PCM Stream** from the drop-down menu. This is a stream defined in your .xml file.



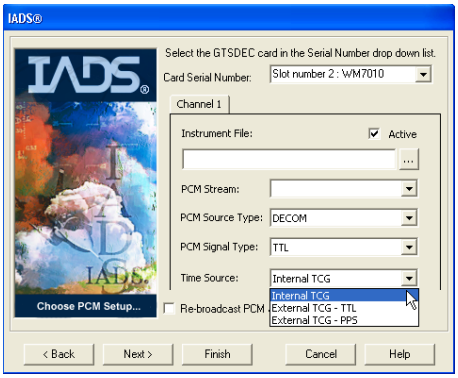
6. Select **DECOM** from the **PCM Source Type** drop-down menu.



7. Select a **PCM Signal Type** from the following options:
   TTL
   RS422



8. Select a **Time Source** from the following options:
   Internal TCG
   External TCG - TTL
   External TCG - PPS
9. Click **Next** and continue to follow the on-screen instructions.



NOTE: For more information on using GS Works 8, refer to the Symvionics User Manual that shipped with GS Works 8. Alternatively, contact Curtiss Wright support (acra-support@curtisswright.com) for specific information or training material.

Document part number: DOC/USG/016

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