

AD3000

```
OpenDialog->InitialDir = SWSettings.ActArchiveDirectory;  
OpenDialog->Filter      = LanguageValues->GetLanguageString( "FileArchiveOpenFilter" );  
OpenDialog->FilterIndex = 1;  
OpenDialog->DefaultExt = "ar3";  
OpenDialog->FileName   = "";
```

```
if (!OpenDialog->Execute()) {  
    ArchiveName = OpenDialog->FileName;  
    SWSettings.ActArchiveDirectory = ExtractFilePath( OpenDialog->FileName );  
    return;  
}  
  
ShellCursorWait();  
  
FileName = SWSettings.TempDirectory; if ( FileName.LastDelimiter( "\\\" ) != FileName )  
    FileName += ExtractFileName( ArchiveName );  
FileName = ChangeFileExt( FileName, ".EXP" );  
  
BusyForm->DescriptionText = "Decompressing...";  
ret = DecompressData( ArchiveName, FileName );  
BusyForm->MachDichWomAcker();  
if ( ret ) {  
    ShellCursorWait();  
    DisplayError( "UnarchiveData", ret, ArchiveName+" in "+FileName );  
    return;  
}  
  
ret = DecompressData( FileName );  
if ( ret ) {  
    ShellCursorWait();  
    DisplayError( "UnarchiveData - Load Experiment", ret, FileName );  
    return;  
}  
if ( ret ) {  
    DisplayError( "UnarchiveData - Load Experiment", ret, FileName );  
    return;  
}  
if ( ret ) {  
    DisplayError( "UnarchiveData - Load Experiment", ret, FileName );  
    return;  
}
```

Telecom
Testing

Data
Acquisition



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AD3000 Data Acquisition System

Flexible data acquisition system for a wide range of different measurement tasks

→ Features

- modular multi-channel measurement system
- 14 bit resolution
- up to 100 MHz sample rate
- up to 2 GByte memory per channel
- fibre optical isolation for each channel possible
- master/slave operation supported
- integrated processor system for each channel to support real time analysis
- segmented operation with up to 1.5 Mio segments possible
- pre- und posttrigger also available for segmented operation
- real time mask test and trigger even at 100 Mhz sample rate
- independent operational modes for each channel!
- online analysis while measurement is running
- customizable SW with integrated compiler and formula editor
- full remote control via GigabitEthernet network (COM/DCOM, Webservice)
- capability to switch the language at run time
- integrated report generator



→ Global Overview

The AD3000 is a compact PCI based modular data acquisition system. The great difference to standard cPCI data acquisition cards is the fact that these usually use a common time base and the same type of preamps as well as a memory commonly used by all channels on one card. Due to the open concept of the AD3000 the differences between the classic measurement equipment as oscilloscope, transient recorder, data acquisition system or logic analyzer are vanishing. The AD3000 merges all these different measurement devices to one unique system.

Each cPCI card comprises four acquisition channels, each with its **own time base**, own trigger and 2 GByte RAM per channel. These four acquisition channels can be assembled independently from each other. As an example it could be used with three 14 bit analog modules and one 14 channel digital module to combine a 100 Mhz precision oscilloscope on channel 1 with a 100 MHz transient recorder on channel 2 which is waiting for a specific trigger event. At the same time channel 3 is working as a recorder at lower frequencies while the digital module is working as a 14 channel logic analyzer.

Fast hardware is used to enable the online visualization and analysis of data already recorded while the acquisition is still running. **All available amplifiers can either be integrated directly into the AD3000 system or connected to the system via fibre optic cables. Thus the AD3000 can be used for potential free measurement applications and this, due to specifically shielded probes, even in extremely electromagnetically polluted environments.**

A Software developed specifically for this system enables ultrafast navigation through data of GByte size as well as extensive online visualization and analysis capabilities.

Each acquisition channel has its own dedicated processor for real time critical applications.

If needed, the system can inform the user about occurred trigger events via email.

Specifications, terms and conditions are subjects to change without notice

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➔ Operational Modes

Oscilloscope

Typically an oscilloscope visualizes signals in an 8x10 grid. The acquisition of the signals can be continuously triggered or untriggered. The typical oscilloscope capabilities like immediate monitor refresh, XY-display, online mathematics, mask tests, eye diagrams, norm- or auto-trigger

or even the detection of spikes between measurement cycles are also available on the AD3000 system.

Fast signal edges can be shown with higher intensity so that it looks like a typical analog oscilloscope display.

Transient Recorder

Due to the immense trigger capabilities and the very big memory of up to 2 GByte per channel the AD3000 is predestined of the acquisition of transients. The memory can be split into segments with free definable pre- and post-trigger ranges which allows an almost gapless

acquisition of transient events. Each segment has its own start and trigger timestamp. The gap between two subsequent segments is only 40 ns! Events which are acquired can already be displayed while the measurement is still running.

Recorder

Measurement data can be acquired continuously. While acquiring, the data can already be visualized in the GUI and if necessary used for calculations and mathematics. In addition, while

the acquisition is running stored data can already be analyzed and documented. Internal HW allows realtime calculation of the data.

Logical Analyzer

If equipped with the 14 channel digital module the AD3000 system can be used as a logical analyzer. The typical functionalities like definable signal level, free trigger patterns or the composition of several signals to a signal bus are not missing.

The time correlation between digital and analog signals is always guaranteed. The flexible software enables the simultaneous view of analog and digital signals with a correct timing correlation.

Hard Disk Streaming Mode

If equipped with a hard disk streaming module the data from all other channels on the card can be directly written to external hard disks. This direct streaming is done via an serial ATA interface to ensure full streaming of all data independent from any Windows or backplane

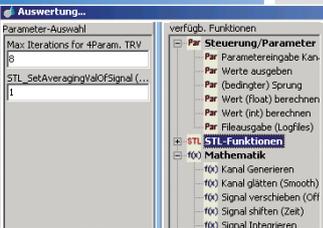
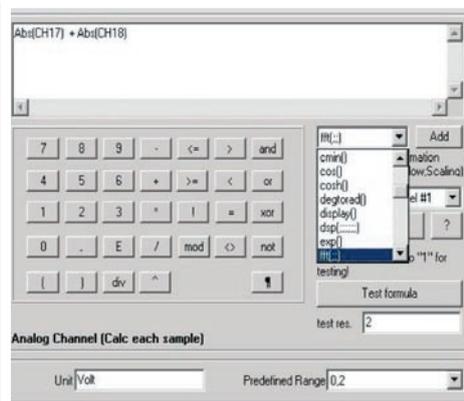
driver bottleneck.

Three independent hard disks can be connected to the streaming module, to spend a hard disk for each channel. This avoids the sharing of data transfer between channels which is common for other systems.



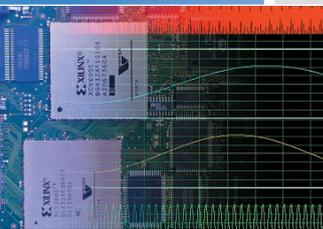
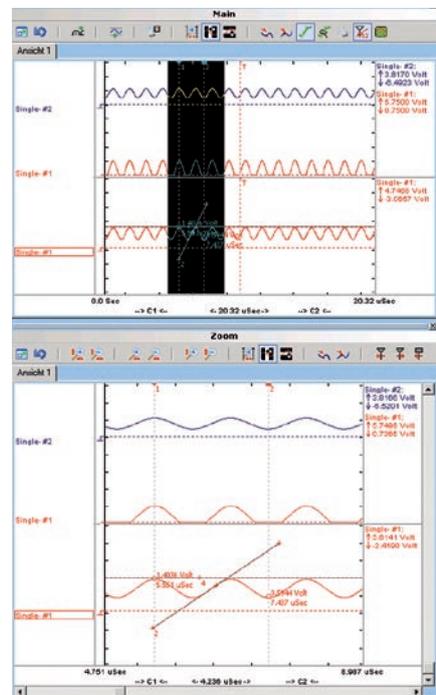
➔ User Definable Calculations

Besides the extensive mathematical functions like FFT, digital filter, SIN, COS, RMS, etc. a high-performance formula interpreter is available for online analysis. It is as easy to use as a pocket calculator and allows the definition of mathematical derived channels. Even conditional calculations defined by If, Goto or IfGoto statements are possible. Already derived mathematical channels can be used for further calculations with/for other channels.



➔ Online Visualization

An extremely high-performance graphical display allows a flexible visualization of the data. Signals can be displayed like a standard oscilloscope or the traces can be split into vertical ranges. For each shown signal trace a free scalable y-axis is available. The simultaneous view of analog and digital signals can be easily created. Enhanced functions as the overlay of different signals, free zooming or intensity control depending on the wave form are also provided for the user. Each separate view supports full docking capabilities.



➔ Data Handling

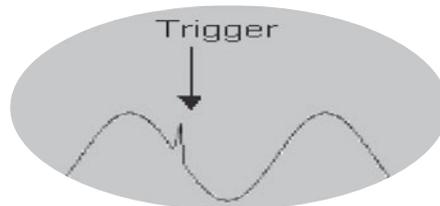
One of the most significant characteristics of the AD3000 system is its big memory of two GByte per acquisition channel. If this enormous memory is not used then it can be divided into smaller segments. Each segment can have its own pre- and post-trigger area. Also information like measurement start time, trigger time etc

are stored for each segment separately. Up to 2,000,000 segments can be handled. These segments can be overlapped in the display for jitter applications and eye diagrams. Programmable sequences enable the search for signal form deviations from a predefined mask as well as statistical analysis on all segments.



➔ Troubleshooting

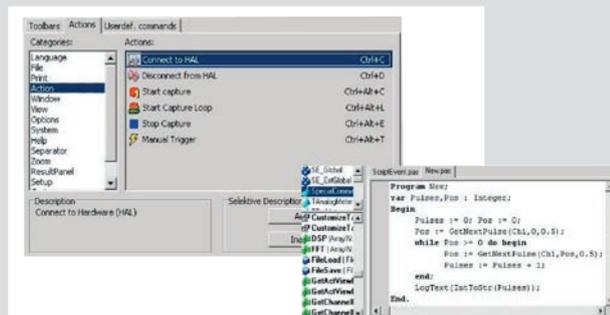
For troubleshooting purposes the extensive trigger capabilities of the system can be used. Even a spike detection is implemented. In this mode all spikes with a minimum width of 10ns or more are detected. This detection is absolutely independent of the sampling rate. A rise time trigger is also available enabling the detection of spikes or triggering on spikes.



➔ Customization

The more functions a system offers the more complex is the usability. To ease the handling of an even complex system the graphical user interface (GUI) of the AD3000 can be configured by the user. Each user can define the toolbar with those functions which are of interest for him. However, even a complex system may not cover all specific needs of a user. To enhance the functionality the AD3000 system comprises an internal compiler so that every user can define his own functions. These user defined functions can be made available in the GUI via „Drag and Drop“.

There is no need to recompile the main software. If it is for example necessary to count the pulses in a digital data stream a small routine of just a few lines of code is needed to enhance the system functionality.



➔ Dual Monitor

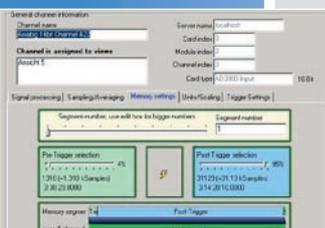
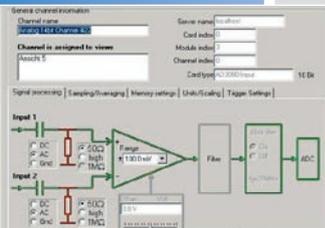
Especially for multi channel systems one monitor may be too small to visualize all the things needed. The different windows which are opened may overlap. The AD3000 enables docking capabilities to support an additional monitor. One could be used to visualize measurement data and the other shows the settings and special measurement results.



➔ Limit / Mask Tests

To survey specific signal parameters like frequency, fall- and rise time, signal jitter, overshoot or noise the limit test function or the mask test function can be used. Freely definable signals or measured signals can be used as upper or lower limits. The measured signal is then

compared with the defined masks and violations are detected. The result can be shown on the screen or can cause an event like storing the related data and settings or sending an email to indicate a violation.

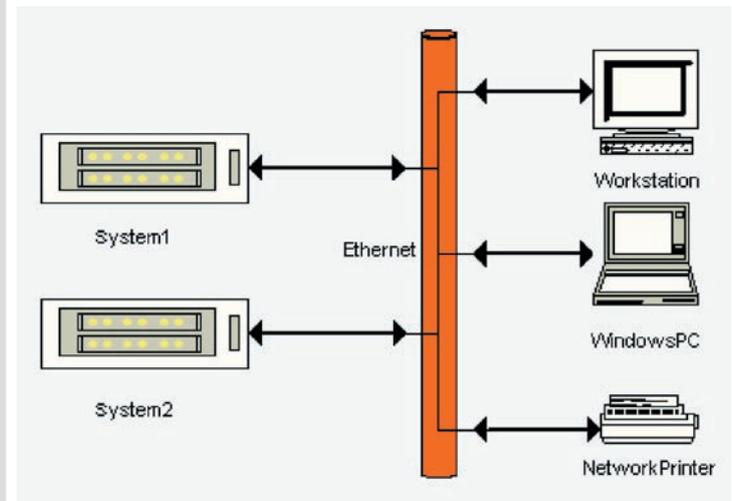


➔ Gigabit Ethernet Interface

The communication with the AD3000 data acquisition system is based on a client/server architecture. The AD3000 system comprises the server which can be accessed by one or more clients through an ethernet interface. As soon as a client is connecting to one of the modules of the system this module is locked and can not be controlled by another client. Other clients can only read from this module.

This enables different clients to share data but only one client is able to control and configure the module. Screenshots or complete measurement protocols can be printed out on every installed printer in the network. The remote control of the system is also done via the ethernet interface. The AD3000 currently supports two standard interfaces.

The functions for the AD3000 measurement systems are all encapsulated and can be



accessed via the Windows specific COM/DCOM interface. This enables the communication between the AD3000 system and standard applications like Word or Excel without the need of any additional driver. For communications with other operating systems e.g. Linux a platform independent Webserver was implemented. With this interface a standard browser or a 'web client' can be used to control the AD3000 even worldwide via internet.

➔ Trigger

The AD3000 offers a wide range of trigger capabilities. Each channel of the AD3000 has its own trigger engine which is correlated to a channel specific time base. This enables the user to make absolutely different measurements on different channels on one and the same board. Each channel has its own trigger features like edge, level, pulse width, rise time and counters. The level-, event counter- and timing conditions can be combined flexibly with each other and also with an external trigger. When using the segment mode, more than 2.000.000 single shots can be done with 250.000 shots per second.

