Introduction

Welcome! And thank you for taking the time to review the contents of this distribution CD.

If you already have bought products from Microstar Laboratories, thank you for that, please let us know of any way you think we can improve on what we make or do. If, on the other hand, you do not know us that well, and you simply reached this point in a search for information about our products and services, take a break and congratulate yourself. You have arrived at exactly the right place.

You can access here all the user manuals that we publish. Keep the Help Topics Contents visible alongside this Overview so you can see the Help directory structure while you read the paragraphs below.

DAP Boards for USB

The xDAP line of Data Acquisition Processor systems combines a high performance analog interface with a speed-optimized USB host connection. This combination allows you to build uncompromising data acquisition systems with a laptop, or any other USB-connected Windows PC. The xDAP boards run DAPL 3000 onboard operating system.

Every DAP has onboard intelligence implemented as DAPL, a multitasking real-time operating system that runs the critical parts of an application free from PC- and network-related delays.

DAP Boards for PCI

All PCI DAP boards run DAPL 2000, the 32-bit implementation. The latest version of DAPL 2000 allows a developer to extend the range of DAPL by adding command modules. The manual for DAPL 4, the 16-bit implementation, follows the DAPL 2000 manual here for completeness.

PC applications communicate with DAPL through the DAPIO32 interface. Any 32-bit Windows programming language or application that can call DLL functions can use the services of the DAPIO32 interface to transfer commands and data to and from a DAP board.

iDSC Boards

The next online manual covers hardware and software for iDSC products: specialized DAPs with onboard filters. Each board combines brick-wall anti-aliasing filters on each of 8 simultaneously sampled channels with 16-bit data acquisition at a throughput of 1.2M samples per second: specifications intended for spectral analysis applications. The latest version of DSCview, the provided user interface, has improved graphing features; developers can access these and all other DSCview functions in an included software component and DLL for custom user interfaces written in languages like Visual Basic, Visual C++, Delphi, and C++Builder.

Signal Interface Modules

The family of signal interface (SI) modules provides isolation for analog I/O and digital I/O. Isolation eliminates ground loops between the measurement system and the signals to be measured. All of the SI modules are FPGA-based for flexibility.

DAPtools Software

The DAPtools Basic software bundle, included at no charge with every DAP, comprises all the software needed to install a DAP and to develop and run a PC-based data acquisition application.

DAPcell Basic Server implements a basic DAPIO32 interface as part of the DAPtools Basic software bundle. It includes all services required to take advantage of onboard intelligence. DAPcell Local Server implements a fuller DAPIO32 interface as part of the DAPtools Standard software bundle, described below; additional services include server side disk-logging and output data transfer.

The DAPcell Control Panel Application identifies the current hardware and software configuration and its various settings, and allows you to start and stop the DAPcell service.

The DAPtools Professional software bundle, described below, includes a full license for DAPstudio. If you have bought DAPtools Standard or DAPtools Basic, please use the included DAPstudio evaluation software as often as you wish. When you decide to use DAPstudio in your regular work, buy a full license.

DAP Measurement Studio

DAP Measurement Studio (DAPstudio), a PC application, provides user interface features without requiring any Windows programming. DAPstudio also offers a rich development environment: it presents you with each software tool you need at the very moment you need it, at every stage in the development process. DAPstudio lets you develop applications quickly and easily, using the full DAPL command set. In most cases you really need no other software to develop and run any application.

If you decide not to use DAPstudio in your regular work, then use DAPview for Windows. This PC application, like DAPstudio, provides user interface features without requiring Windows programming. It does not provide as complete a development environment as DAPstudio, however, and you will miss that if you need to write explicit DAPL commands. All DAPtools software bundles include DAPview for Windows.

Although you can use either DAPstudio or DAPview for Windows as a user interface, you always can construct your own user interface, developing it in any Windows programming language (or application) that can call DLL functions – and therefore the functions offered by DAPcell. You also can, with the DAPtools Standard software bundle described below, use a third-party user interface like LabVIEW – or write one yourself in any language that supports ActiveX.

Whatever alternative user interface you end up with, make sure that along the way you do use DAPstudio or DAPview for Windows. For application prototyping and proof of concept, nothing beats simple, solid, and made-for-the-job: all attributes of DAPview for Windows – and of its successor product, DAPstudio.

FGen for Windows, another PC application, makes it easy to generate digital filters that do exactly what you want them to do. DAPL includes three ready-to-use DSP filtering commands: FIRFILTER, FIRLOWPASS, and RAVERAGE. FGen outputs a vector of coefficients to use as a parameter in the FIRFILTER command.

The software described so far above, distributed on the same CD as this documentation, allows you to develop and run a DAP-based PC data acquisition system.

You may want more. The DAPtools Standard software bundle, product MSDTSxxx, adds DAPtools for HP VEE32, DAPtools for LabVIEW, DAPtools for MATLAB, DAPtools OCX, DAPcell Local Server, FGen for Windows (version 2), and DAPL IFM (IIR Filter Module).

Each of the first three allows you to use the related third-party software - to enhance it, even, with the onboard intelligence of a DAP.

DAPcell Local Server offers the features of DAPcell Basic Server in the idiom of client/server software architecture. Server software interacts with DAPL running on the DAP board to deliver data acquisition services to client software

running on the (local) PC: Agilent/HP VEE32, LabVIEW, VB, etc. DAPcell also acts as a vehicle for additional services provided by Microstar Laboratories; high-speed disk transfers to and from the DAP, the first of these bundled services, allow 1) continuous logging to disk at the maximum acquisition rate, and 2) output of continuous arbitrary waveforms at the maximum DAC update rate.

The upgrade to FGen for Windows gives this application the look and feel of DSCview: an intuitive graphical approach to filter design, with immediate feedback on the characteristics of the filter as the parameters change.

DAPL IFM, an IIR filter module, permanently extends the installed DAPL command set with an onboard digital implementation of the five classic filter types: Bessel, Butterworth, Chebyshev, Inverse Chebyshev, and Elliptic. A single command, named for the filter type, specifies the filter in just one line - with a common syntax shared by all five commands.

DAPL IFM provides you with a simple way to specify onboard IIR filters that run in real time and continuously filter sampled data. With this extension, DAPL now can filter the data on any channels using any mix of the five classic filter types. The filters operate independently, and filter may have different parameters. The new IIR filters complement the existing FIR filters built into DAPL.

The DAPtools Professional software bundle, product MSDTPxxx, adds even more to the above: as well as everything in MSDTSxxx, it includes the Developer's Toolkit for DAPL, and DAPcell Network Server.

Developer's Toolkit for DAPL

The first of these gives you all you need to extend the DAPL command set with one or more custom commands, written by you in C, and packaged into a command module installed on your system as permanent extension. DAPL, as delivered, has 100+ commands optimized for standard data acquisition or control procedures. To define exactly what a DAP has to do in any given application often requires only as few as six to a dozen of these commands, combined in a listing with some repetition and variation. A practiced developer can see where to replace several lines in a listing, and can do something about it: express the algorithm in C, wrap it in some supplied code, and compile it as a custom command.

The Developer's Toolkit for DAPL, version 5.0, not only lets you build several of your own application-specific DAPL commands into one or more command modules to extend the range of DAPL, but also gives you leverage on another class of software: compiler-provided IDE implementations. With this same IDE software, designed for building applications intended to run on a PC under Windows, you now can build applications to run on a data acquisition board under its own real-time operating system. The chapter *Compiling and Downloading* in the manual for the Developer's Toolkit for DAPL gives details and examples.

DAPcell Network Server allows you to implement an application across a network, while DAPL on every DAP board protects the application from PC- and network-related delays. DAPcell Network Server extends the territory defined by DAPcell Local Server: server software interacts with DAPL running on one or more DAP boards installed in a PC to deliver data acquisition services to client software on that PC *or on any PC on the network*.

If you ordered either optional software bundle, then this distribution CD contains that too.

The remaining Help file directories contain hardware manuals for DAP boards and accessories: DAP boards for the PCI bus, DAP boards for the ISA bus, and accessories for both these categories, and, finally, e-Series DAP boards. Accessories documentation primarily describes the many external boards and the backplane-equipped 19" industrial racks that house most of them.

The last directory contains hardware manuals for e-Series DAP boards: products no longer in general production but still in use at some customer sites.