User's Guide

Hyperception, Inc.

Hypersignal ®

Advanced Visual Design Software for Windows ™

Block Diagram/RIDE Evaluation

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Getting Started

Congratulations! With your copy of Hypersignal Block Diagram/RIDE Evaluation software, you will soon be introduced to a powerful visual DSP design environment. This Block Diagram/RIDE Evaluation is intended to serve as an introduction to our popular Hypersignal visual DSP design products.

Visual DSP design is a methodology of developing DSP algorithms and systems graphically by simply connecting functional block icons together with point-and-click methods. As you will see from this evaluation, algorithms can be built-up extremely quickly and efficiently. For those of you who are using a selected DSP board, you will be able to create real-time implementations and experience an incredibly efficient means of graphical programming.

This user manual will provide the basic information needed to run the Block Diagram/RIDE Evaluation. This chapter provides software installation instructions, steps to take first, and an overview of the Block Diagram/RIDE Evaluation tools and commands which are available. Further chapters will provide tutorial and reference information, including block function descriptions.

NOTE: The Evaluation software contains some restrictions and limitations not found in our Hypersignal RIDE and Block Diagram products. ***Not all functions are available in the Block Digram/RIDE Evaluation version!***

Installation

Installation of the Hypersignal Block Diagram/RIDE Evaluation software requires a CD-ROM drive and a hard drive partition with approximately fifteen megabytes of available space. Follow these directions to install the Evaluation software on your hard disk.

To install Block Diagram/RIDE Evaluation

1. Make sure that your computer and monitor are turned on and that you have installed Microsoft Windows 95. *Note*: If you are using Windows 3.1x then you will need to have WIN32S installed to run the Block Diagram/RIDE Evaluation software. A copy of WIN32S is included on the CD-ROM.

2. Insert the Hypersignal Evaluation CD-ROM disk into the CD-ROM drive. The installation program should begin automatically unless the CD-ROM Autoplay option has been disabled.

If the Autorun feature has been disabled, you can begin manual installation by following steps 3 & 4 below:

3. Move the mouse pointer to Run... on the Start menu and click once to choose the Run command. The Run dialog box will appear on your screen.

4. In the Command Line box, type **d:\blkeval\setup** and choose the OK button.

5. As the Block Diagram/RIDE Evaluation is installed, follow the instructions on your screen. The installation program will automatically detect whether or not you have enough space available on your hard drive.

NOTE: The RIDE Evaluation software will allow you to install only one real-time DSP board driver. You will have an opportunity during the installation setup to choose from a list of DSP board drivers. You should select the board driver which corresponds to the DSP hardware installed in your PC.
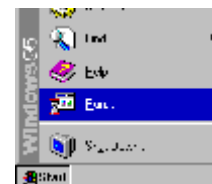
Verify DSP Board Operation

Hypersignal RIDE real-time functions will not operate correctly if the wrong board driver is installed, or if the DSP board is not in the PC or has a conflict with other hardware in the system.

If you are using the Hypersignal RIDE Evaluation choose the Real-time Driver Setup command. Selection of this command will result in the appearance of a dialog box which allows you to choose setup information such as base I/O address, memory configuration, and interrupt selection for the DSP board.

You can determine whether or not the DSP board is responding at the chosen base I/O address by using the Test button.

This feature will attempt to find the board at the address you've selected. If the board is found, the test operation will continue by writing to memory on the board, and reading from memory on the board. If the test is successful, then the board is correctly responding to the driver, and the verification of the real-time driver is complete.

If the board does not respond, there may be a conflict at the chosen base I/O address, or there may be some jumper settings which must be made to the DSP board other than the factory default settings for the board (these jumper settings are described in the real-time driver Help file for those boards which require jumper modifications). You may have to try the board at another base I/O address to eliminate any conflict with other boards already in your PC.

What to Do First

Start by trying the example worksheets provided, or create your own by following the tutorial section.

After you have installed Block Diagram/RIDE Evaluation on your computer, (and verified that the DSP board is responding correctly for RIDE Evaluation users), then you're ready to get started. There are several ways in which you can begin using the Evaluation software. You can jump right in and start by running some of the sample worksheets which have been provided with the software. Or you may feel more comfortable by working your way through the tutorial section in Chapter 1 to get acquainted with Block Diagram/RIDE Evaluation's features.

If you're using RIDE Evaluation with a DSP board you will probably want to check out the Chapter 3, Real-Time Guide. This chapter provides some useful instructions and explanations for using the real-time block functions. No matter which method of beginning suits your style, you'll still want to read through the remaining chapters of the user manual for additional information and tips.

A Tutorial

This chapter is designed to get you up and running with the Block Diagram/RIDE Evaluation software as quickly as possible. Several of the more commonly used commands will be presented here, as are some of the common steps used in creating block worksheets. It's recommended that in addition to this section, you read through the rest of this user manual for further information.
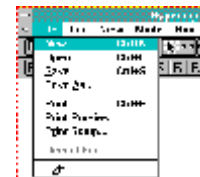
The steps listed in this tutorial show how to:

1. Start a new block worksheet session

2. Select block functions

3. Establish data flow connections

4. Change a block's parameters

5. Run the worksheet

6. Use edit cut/copy/paste/undo functions

7. Use hierarchy in a worksheet

Starting a Block Diagram Session

The first step in creating a block diagram with this Evaluation is to start a new worksheet. A worksheet is a window which serves as a work space for your applications, and may be thought of being like a piece of paper in which a block diagram may be drawn. Each worksheet can contain many function and display blocks arranged in a structured block diagram algorithm.

Many worksheets can be opened and maintained while in the Block Diagram/RIDE Evaluation environment, but only the worksheet chosen as the *active* worksheet can be executed. The active worksheet filename is displayed in the application caption bar. Choosing the File menu New command will cause an empty worksheet to be loaded. The worksheet will appear as a window with a caption bar labeled 'Worksheet1'. It is in this window where you will place your block functions.

Selecting Block Functions

Block functions can be selected with either the Block Function Selector tool or user-created floating toolbars.

Block functions can be placed onto the active worksheet by using the Block Function Selector tool. Choosing the Select Blocks... command will cause the Block Function Selector dialog box to appear.

Block functions are arranged into many different group categories. These categories are shown in the Group List box. Choosing a function group will cause all functions within that group to be added to the Function List box. Deselecting the group will remove all corresponding block functions from the Function List.
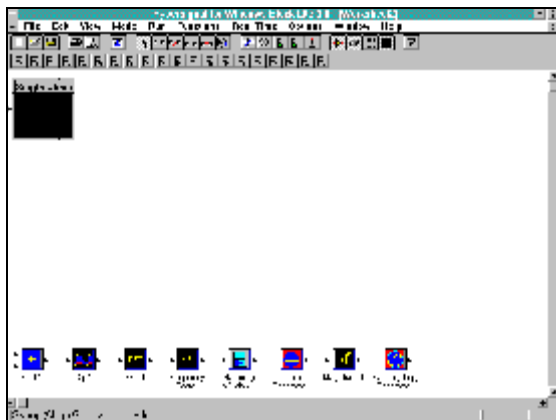
Choosing either the *Simulation* or *Real-Time* Library will allow you to select from either simulation or real-time block functions.

By selecting the *Add to Worksheet* button all blocks in the Function List will be added to the *active* worksheet. Single block functions can be selected into the worksheet by double-clicking the block function name. Upon selection of the desired block functions, the associated icons will appear in the worksheet.

Blocks can also be copied and pasted with use of the Edit menu commands.
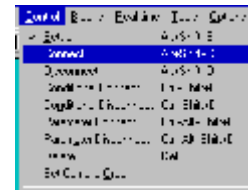
When you are done selecting blocks, you should click on the close button. You may add more blocks later so you don't have to choose all blocks at once.

NOTE: The Evaluation software contains only a very small subset of block functions. Our Hypersignal RIDE and Block Diagram products offer a comprehensive powerful block function library which consists of hundreds of blocks, and also include the Block Wizard tool which lets you create your own.

Block function icons will appear in the active worksheet when selected.

Establishing the Data Flow

Once you have selected the block functions onto the worksheet you will need to establish the block diagram's data flow. This is accomplished by using the mouse to arrange the block icons in the worksheet to form an algorithm or process. The business of establishing the data flow relationship among blocks is typically referred to as "connecting" blocks.

Using the Right mouse button during connection will allow you to connect a single source block to many destination blocks without re-establishing the source block.

When the blocks have been positioned on the worksheet, you need to connect the blocks to form the algorithm. This is done while operating in the Connect mode. Block Diagram/RIDE can be placed into Connect mode by selecting the Control menu connect command. When this mode is selected, the mouse cursor will change to a target cursor labeled either 'SOURCE' when choosing a source block icon, or 'DEST' when choosing a destination block icon. Positioning the target cursor over a block function and clicking the left mouse button will cause a connection to be made. If the cursor is labeled CONNECT, then placing the cursor in the right-half of a block will specify a Source connection and a cursor in the left-half of a block will define a destination connection.

Block connections can be made from both Source-Destination and Destination-Source directions.

Once the blocks in the worksheet have been connected, the worksheet needs to be compiled. Compilation determines the order in which individual blocks will execute, and can be performed through use of the Compile menu command. Compilation of the worksheet should be done after all block functions have been positioned and connected. In the case of real-time worksheets, code is also linked and downloaded to your DSP board automatically.

First position the block function icons in the worksheet, and then connect them together to establish the data flow.

Changing a Block's Parameters

In most cases you will want to select the setup parameters for the block functions in your worksheet. You can modify the setup parameters for a block function by first double-clicking the block function icon with the left mouse button. This will cause the block's setup parameter dialog box to appear if the box has any parameters which can be changed. The setup parameters are dependent upon the block function chosen. Parameters can also be changed by other block functions which have been connected with a Parameter connection. Selecting the dialog box OK button will keep any changes made.

Running the Worksheet

After you have arranged the block icons and established the data flow by connecting the blocks together you can run the worksheet. Block Diagram/RIDE Evaluation run commands can be located in the Control menu.
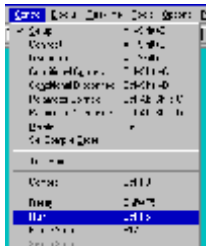
The Run menu command will cause the active worksheet to be executed. Block Diagram/RIDE Evaluation will continue to run the active worksheet until you halt its execution through use of the Stop menu command.

If the Show Status selection has been made, then each block function in the worksheet will be highlighted as it is executed. A red highlight box around a block function is used to indicate a successful execution of the block. A yellow highlight box is used to indicate a warning message; for example, when a block has not been connected and the worksheet is run, a warning yellow highlight is issued.
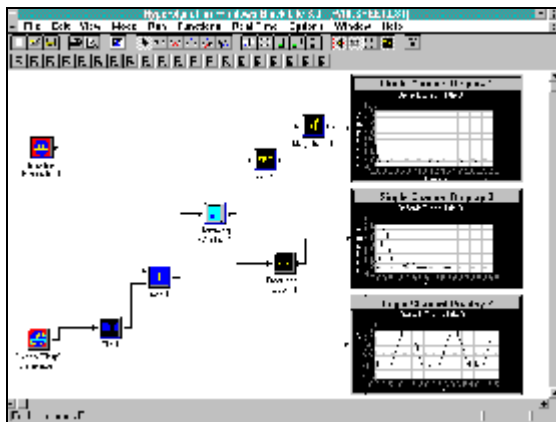
Using Edit Cut/Copy/Paste/Undo

The edit menu commands are used to cut, copy and paste block(s) between the active Block Diagram/RIDE worksheet and other opened worksheets. You can quickly duplicate a single block or several blocks by using the edit commands Copy and Paste. An Undo command is also provided to reverse the last edit menu command's action.
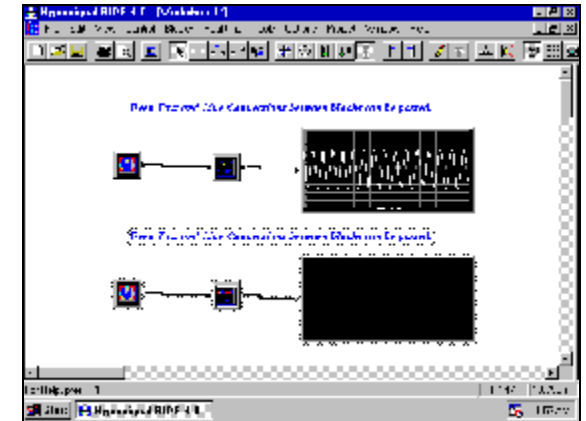
Using Hierarchy in a Worksheet

Hierarchical design is allowed with the standard version of Block Diagram/RIDE. This allows for a worksheet containing many blocks to be used itself as a block within another higher-level worksheet, and that higher level worksheet in turn may be used within an even higher-level worksheet, and so on. This effectively allows for n-level hierarchical design. Within a worksheet which is to be utilized as an inserted hierarchy block within a higher-level worksheet, the worksheet must typically add either external inputs or external outputs via the external I/O bars which are available from the main menu. Attaching data flow lines to/from these external I/O bars will allow the access of data to/from this worksheet after the worksheet is later inserted into a higher-level worksheet. When executing these top-level worksheet with hierarchy blocks, when the inserted hierarchy block is executed, execution control is passed to the inserted hierarchy block, where the execution of all blocks within that inserted hierarchy block's associated worksheet are executed prior to the release of execution control back to the higher-level worksheet for all of its other blocks execution. Double clicking on an inserted

hierarchy block will bring the associated worksheet for that block to the foreground, allowing users to visualize its internal structure. Keep in mind, if running a 16-bit version of Windows, that the limitation in the USER module's local heap size (64K) may prevent large numbers of blocks contained within many levels of hierarchy from loading.

Any block worksheet which has been inserted into another block worksheet is referred to as a Hierarchy Block Worksheet or Hierarchy Block. The hierarchy block must have been created (typically with external inputs/outputs) and saved as a worksheet with file extension .LSS. At the time the worksheet was saved, it was added to the block function menu under a user-selected library, group, and function menu name. This block may then be used in worksheets just as any other block (hierarchical, or not) by selecting it from the Block Function Selector. The Block Function Selector also has both a toolbar icon (second from the left) and a keyboard accelerator control (Ctrl+B). Hierarchy block worksheets must be designed with external connections if data is to be sent to/from or for communication with other block functions.

You can use the View menu's Project Tabs command to show the project tab for Hierarchy. This will allow you to easily track all of the blocks used in your block diagram design.
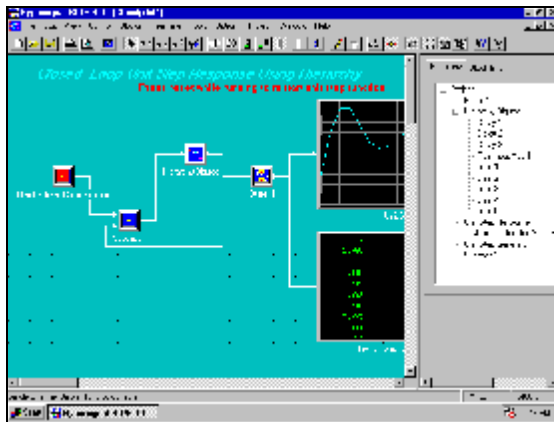
NOTE: Hierarchy worksheets cannot be saved in the evaluation version. You can use predefined Hierarchy worksheets which have been included with the evaluation to try out hierarchy. These hierarchy blocks can be selected from the Hierarchy Library within the Block Function Selector.

Reference Guide

This chapter will discuss the user features of the Block Diagram/RIDE Evaluation software. This material will allow you to take advantage of Hypersignal's many powerful features.

Some key components covered in this section are:

- Block Diagram/RIDE Evaluation Work Area

- Menu Commands

- Creating Custom Toolbars & Menus

NOTE: This section is intended to provide a high-level description of the features available in the Evaluation software, and does not offer the more detailed information which is available with the actual product version.

Work Area

The Block Diagram/RIDE Evaluation Work Area is used to organize individual block worksheets. The work area is located between the menu toolbar and the status bar located at the bottom of the application. The work area initially appears as white in color. The work area can be sized by dragging the corners of the Block Diagram/RIDE Evaluation window, or set to full-screen by clicking the maximize button.

The Work Area is used to organize many different block worksheets.

It is important to remember that the work area is used as a means of organizing block worksheets, and is not an area to connect block function icons.

When you first run Block Diagram/RIDE Evaluation, the program will automatically create an empty block worksheet and place it into the work area.

**A block worksheet is used to hold the block functions which make up the algorithm.**

Block Diagram/RIDE Evaluation allows you to create individual block worksheets which are used as a work space for your simulation and real-time block diagrams. The block

worksheet itself is a window which can be sized by dragging the corners of the worksheet, minimized by selecting the minimize box in its upper-right corner, restored by double-clicking the minimized block worksheet icon, and closed by selecting the worksheet's system menu close command.

Each block worksheet contains a caption bar which will allow you to identify a worksheet from others in the work area.
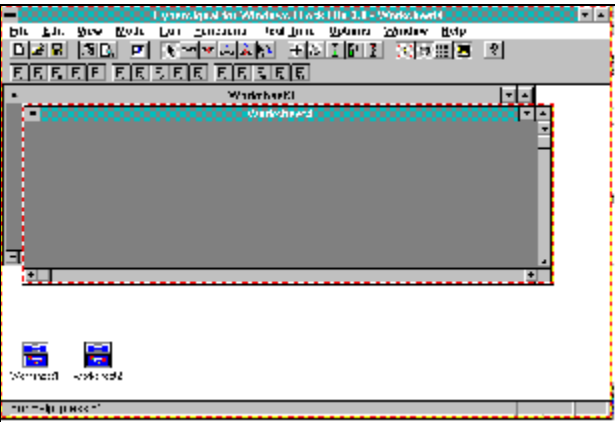
Block Diagram/RIDE Evaluation supports many block worksheets. However, only one worksheet can be *active* at a given time. When you run Block Diagram/RIDE Evaluation only the active block worksheet will be processed. It is important to keep track of which worksheet is active. The active block worksheet has the window focus and has a highlighted caption bar. To select a block worksheet as the active worksheet, simply select the desired worksheet with a single-click of the mouse.

Menu Commands

The Block Diagram/RIDE Evaluation menu commands are located beneath the window caption bar and are arranged as selectable pull-down menus, each of which has a list of submenu commands.

In addition to the menu commands, a toolbar with selectable button commands is available. The toolbar can be found right below the menu commands. The toolbar commands will perform exactly as their menu command counterparts, but provide an alternative method of command selection.

Menu commands are organized into the following groups: *File*, *Edit*, *View*, *Control*, *Blocks*, *Real-Time*, *Tools*, *Options*, *Projects*, *Window*, and *Help*.

The Block Diagram/RIDE Evaluation menu commands are shown below along with a brief command description. The tutorial section in Chapter 1 demonstrates how to use several of these commands.

File Commands

New	creates an empty worksheet
Open	opens an existing worksheet file
Close	closes a worksheet
Save	saves a worksheet to a file
Save As...	saves a worksheet to a new file
Print	allows worksheets to be printed
Print Preview	worksheet will appear as when printed
Print Setup...	printer selection and setup
Send...	Send the worksheet via e-mail
Recent File	choose from last four sessions
Exit	quit the application

Edit Commands

Undo	undo last block function command
Redo	redo the previous undo command
Cut	remove selected block functions
Copy	copy selected blocks to buffer
Paste	paste block functions from buffer

View Commands

Toolbar	removes / returns toolbar
Status Bar	removes / returns status bar
Customized Toolbars	show/hide custom toolbars
3D Icons	display icons as 3D when selected
Channel Arrows	display channel arrows
Channel Labels	display channel labels
Block Labels	display block labels
Line Labels	display line labels
User Controls	maximize/minimize user controls
Project Tabs	show worksheet project tabs
Zoom...	specify zoom level for printing

Control Commands

Worksheet execution is established through use of the Control commands.

Setup	allows blocks to be positioned
Connect	allows blocks to be connected
Disconnect	allows blocks to be disconnected
Cnd. Connect	connect block as operator
Cnd. Disconnect	disconnect operator block
Parameter Connect	parameter connection mode
Parameter Disconnect	parameter disconnection mode
Delete	allows block function to be deleted
Set Compile Order	overide of compilation order
Text Box	annotation insertion utility
Compile	compile block connection scheme
Reset	reset the worksheet
Run	run the active worksheet continuously
Frame Step	run for set number of frames
Single Step	single-step through each block
Stop	halt execution of the worksheet
Set Frame Step...	choose number of frames to run
Show Status	turn-on / turn-off status messages

Blocks Command

Blocks can be selected by the Function Selection Tool.

Select Blocks...	gets function selection tool
Add New Block...	allows user-created blocks to be added
Auto Build Menu	re-build of function libraries

Real-time Commands

Real-Time commands allow control over the selected DSP board.

> NOTE: The RIDE Evaluation real-time menu commands are discussed in the Chapter 3 Real-Time Guide.

Tools Commands

Block Diagram and RIDE allow you to execute other external applications from a menu command.

Block Wizard	executes Block Wizard
C Code Generator	executes C Code Generator
Filter Design	executes Filter Design
Calculator	brings up Windows Calculator
User Defined Tools	user-specified applications
Customize Tools...	custom control over Tool menu

Options Commands

There are several user options which can be selected to customize worksheet displays.

External I/O	specify external connections
Stop on Warning	halt when warning issued
3 Dimensional Icon	display 3-D block icons
Channel Arrows	use channel arrows
Maximize User Controls	control icons are maximized

Maximize Displays	icon / window display control
Snap to Grid	blocks are placed on boundaries
Set Grid Parameters	grid scaling options
Set Colors	choose custom color schemes

Project Commands

Project attributes can be set for each worksheet.

Undo Buffer Size...	determines how far to 'undo'
Variables...	specify global variables
Previous Level	go up one level in hierarchy
Security/Permissions...	specify security for worksheet

Window Commands

Worksheets can be conveniently placed in the work area.

Cascade	cascade all window worksheets
Tile Horizontally	tile all worksheets horizontally
Tile Vertically	tile all worksheets vertically
Arrange Icons	arrange all iconized worksheets
Refresh Display	redisplay active worksheet
Close All	close all worksheets

Help Commands

Context sensitive help is available for Hypersignal products.

Contents	help topics
Search for Help On...	search for a subject
How to Use Help...	help on using help utility
Block Function Reference	block reference
Block Diagram Tutorial	on-line tutorial
Real-time Driver...	real-time driver help
Hyperception Internet Links	Internet Links
Product Upgrades/Info...	upgrade information
Third Party Opportunities	creation of new block libraries
About...	system information

Creating Custom Toolbars & Menus

You can create your own customized toolbars by using the Customize Toolbars... menu option. Simply select the desired block function icons from the dialog box and drag them to a location outside the dialog box. You can add to existing toolbars by placing the icon on top of the toolbar. Double-clicking on the resulting toolbar will allow further customization.

You can create a custom menu selection by using the right mouse button. By selecting the Customize... option which appears when you click the right mouse button you can add menu commands which you use often. Once added, further selection can be made through use of the right mouse button.
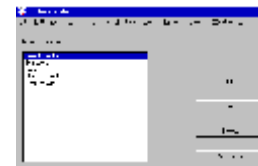
Real-time Guide

Hypersignal RIDE is a visual environment optimized for the design, implementation, and analysis of DSP algorithms and systems. The power of this environment is that its visual nature and support for plug-in, real-time DSP boards allow DSP applications to be generated very quickly with little or no software coding required. This chapter will discuss how you can use your RIDE Evaluation to experience this real-time environment. The three key components covered in this section are:

- Real-Time Driver

- Real-Time Menu Commands

- Using Real-Time Blocks

Real-Time Driver

Hypersignal RIDE allows for high-level block diagram real-time design with complete control over low-level design and analysis.

Real-time support in Hypersignal is made possible by a true, Windows-compatible board driver designed by Hyperception. The real-time driver is installed automatically during the installation of RIDE Evaluation.

The real-time driver is used by RIDE Evaluation to perform all PC to DSP communications.

The real-time driver handles all communications with and control of the DSP hardware from the PC environment. RIDE Evaluation communicates with the installed board driver without having to handle the DSP-specifics. Real-time block functions in a RIDE Evaluation worksheet do nothing more than communicate with the DSP board driver and other blocks to transmit data flow information. The DSP board driver performs the linking of COFF object files, downloading of code, data, and parameters to the DSP memory, controlling the execution of the DSP, and monitoring DSP activity.

Features of the real-time board driver

- Support for multiple boards and DSPs

- Dynamic linking of external libraries

- User control of memory map

- DSP interrupt hooking

- Semaphore support for multi-rate processing

- Symbolic debugging support

- Resource allocation information

- Code profiling capability

- Direct output to COFF and EPROM files

NOTE: Not all real-time driver options are active in the RIDE Evaluation version, but are available in our Hypersignal RIDE and RIDE Lite products.

Real-Time Menu Commands

The real-time menu commands provide you with a means to retrieve relevant information about your real-time algorithm from the DSP board, select global settings, configure the driver for use with the DSP board, and run a self-test to verify that the board and driver are communicating.

The real-time menu commands will allow you access to information about your real-time algorithm.

The RIDE Evaluation real-time menu commands are listed below along with a brief explanation as to their use.

Default Driver...

Allows selection of the default real-time driver to be used.

Load with Default Driver

All real-time worksheets will use the default driver when this option is selected.

Driver Files

Allows for selection of Help, Initialization, Output, and Revision History.

Driver Globals...

The Driver Globals command is used to select options that are global to a specific DSP resource.

Driver Setup...

This real-time menu command allows you to select the proper configuration for each DSP resource in your system.

Driver Utilities...

Board specific utilities

Link Files...

The Link Files command is used to select the files required by the DSP board driver's built-in linker to allocate memory and resolve external references.

Import File...

The Import File command is used to import executable, object, and symbolic information files.

Export Application...

The Export Application command is used to export the current real-time block diagram design to an executable DSP application that can be ported to an embedded system or other platform.

Memory

The Memory command is used to perform various DSP memory-related functions: Copy, Dump, Fill, Load, Plot, Search, Map, and Usage.

Symbols...

This command is used to display the symbolic information for all blocks that are selected in the real-time worksheet.

Profile...

This command is used to display the profiling information for all of the blocks that are selected to be profiled.

Syncs...

All block sync information is displayed.

Interrupts...

All block interrupt information is displayed.

Statistics...

This command can be used to display statistical information about the selected DSP resource.

DSP Control...

Allows direct control of the DSP (reset, execute)

Using Real-Time Blocks

A nice feature of the Hypersignal Block Diagram visual design environment is that the user interface is the same for both real-time and simulation blocks. The PC-side real-time blocks in a RIDE Evaluation worksheet do nothing more than communicate with the DSP board driver and other blocks to transmit data flow information. Each PC-side real-time block has associated real-time object code. As is the case with simulation blocks, you can select the real-time block functions into a worksheet through the use of the Function Selector Tool. The blocks can then be arranged into place, and connected to establish a data flow.

Changing a block's settings is done in the same way as with simulation blocks; a double-click on the block icon will display the block's parameter settings. A real-time block's parameter settings allow you to change the block's function variables, select synchronized operation of the block function, tie the function to an interrupt, choose whether or not to profile the block, and choose the particular DSP on which the block will run.

In addition to the user parameters of the block function, there is also an information button control which will provide resource allocation information. When this button is selected, a Block Information dialog box will appear. The associated DSP code's location and size can be determined from this dialog box as well as the block's data buffer location, and block code profiling information.

Further DSP information such as application code profiling results and memory availability can be obtained by choosing the DSP Info button from the Block Information dialog box.

Data transfers from the DSP board to the PC can be set for either synchronous or asynchronous operation.

When using real-time block functions in a worksheet it is important to understand that the data computations are being performed by the DSP board. Unless a block's synchronous mode has been selected, the DSP board and the PC will run asynchronously. In this case, data uploaded for display may appear discontinuous even though it is continuous on the DSP board.

READ THIS NOTE!→

NOTE: When uploading data from DSP board you must use the RT DSP to PC upload block. A common mistake first-time users make is connecting a real-time block directly to a display block without first going through the DSP to PC upload block.

Function Library

Block Diagram/RIDE Evaluation contains a limited subset library from our Hypersignal products. This subset function library has been chosen to provide a design environment capable of demonstrating the features of the Block Diagram/RIDE product, and provide limited design functionality for the purpose of product evaluation. The block functions included with this Evaluation are arranged in this chapter alphabetically to facilitate the location of block information. Each reference listing will include a description of the block function. *Some functions have been scaled-back from the actual production versions.*

NOTE: The RIDE Evaluation software contains only a small subset of the block functions which are available with our Block Diagram and RIDE products. If you are interested in obtaining more processing power, please contact Hyperception for information on obtaining these products.

Function Library Description

The block functions listed below are included with the Evaluation version. Functions listed with an RT preceding the block name are real-time functions which are executed on a DSP board which resides inside of the PC. User-selectable parameters for these functions can be viewed by double-clicking on the block function icon.

The actual block functions included with the Evaluation software may change from time to time; the blocks listed here are a few of the basic functions included.

Arithmetic Functions

RT Absolute Value : This function performs the real-time absolute value of each data element in the input frame of data.

RT Addition : This block will perform real-time addition of the corresponding data elements of the input frames of data.

Real-time block functions are executed on a target DSP board, and not by the PC.

Real-time block functions are selected from the Real-time Library of the Block Selector Tool.

Simulation block functions are executed on the PC.

Simulation block functions are selected from the Simulation Library of the Block Selector Tool.

Display

Single-Channel Display : This simulation block is used when graphically displaying data. When displaying real-time data you will need to make use of a DSP to PC upload block.

DSP Functions

RT Magnitude : This block function will calculate the real-time magnitude of the input frame of data. This could be the complex output of the RT FFT block.

Hardware Functions

RT A/D Acquisition : Allows for real-time sampling of a real-world signal. When using this block you may need to set its SYNC OUT option. Any blocks using the A/D block as input may require that their SYNC IN be set as well. Only half-duplex operation is available in RIDE Evaluation.

Data Transfer Functions

RT DSP to PC Upload : This block will upload data from the target DSP board to the PC for subsequent simulation processing and/or display.

Signal Generators

RT Noise Generator : This block will generate a random noise signal of specified length and amplitude. Random seed can be user-selected.

RT Sine Generator : This block will generate a sine waveform of specified length, frequency, and amplitude.

RT Sweep Generator : This block will generate a swept sine wave of specified length, minimum and maximum frequency ranges, and amplitude.

Transforms

RT FFT : This block function will compute the Fast Fourier Transform of the input frame of data. The resulting output data is of type complex. FFT size can be specified.

Windows Functions

RT Hamming Window : This block function will apply a Hamming window to the input frame of data.

Additional block functions may have been includ with your Evaluation and will not be listed here. Check with the on-line help for additional information on these blocks.
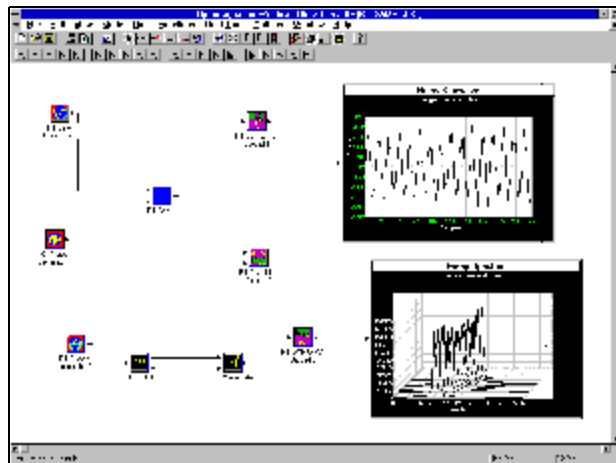
Sample Worksheets

We have included a few sample worksheets with Block Diagram/RIDE Evaluation to help you learn how to create your own block diagram worksheets. These examples are located on the examples subdirectory. Some example worksheets are shown in this chapter.

- Real-time D/A example

- FSK Generator example

- Parameter Connection example

- Steel Guitar real-time example

- User Control example

NOTE: When switching between real-time worksheets which have already been loaded you must first compile the newly selected worksheet before running it. This will allow the real-time algorithm to be downloaded to the DSP board. Failure to compile the worksheet will result in a mismatch between the algorithm represented in the worksheet and the actual algorithm on the DSP board.

Real-Time D/A Example

This worksheet implements a swept spectrum, performs signal arithmetic, and outputs stereo data to the DSP board's


FSK Generator Example

This example worksheet demonstrates how Block Diagram/RIDE Evaluation can be used to implement a simple FSK Generator. The resulting FSK modulated signal and its corresponding spectrum are displayed graphically.

Annotations can be added to a worksheet by using the Control menu's Text Box command.
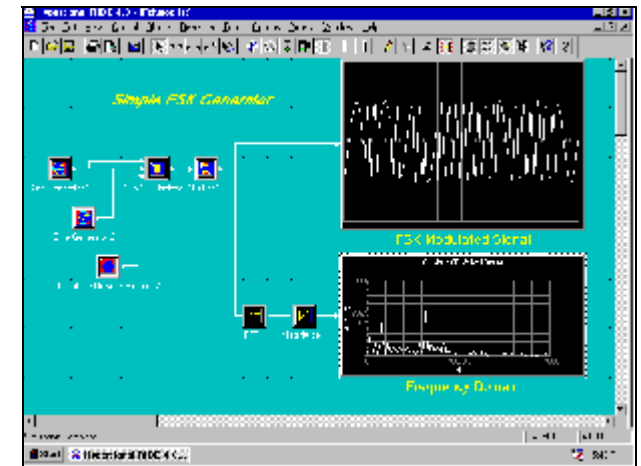
Parameter Connection Example

This example demonstrates a powerful feature of Block Diagram. Blocks can be used to control setup parameters of other block functions. Here, a sine wave is used to control the subset positioning of the noise signal.

The ability to control block function parameters through use of a parameter connection is a very powerful feature.
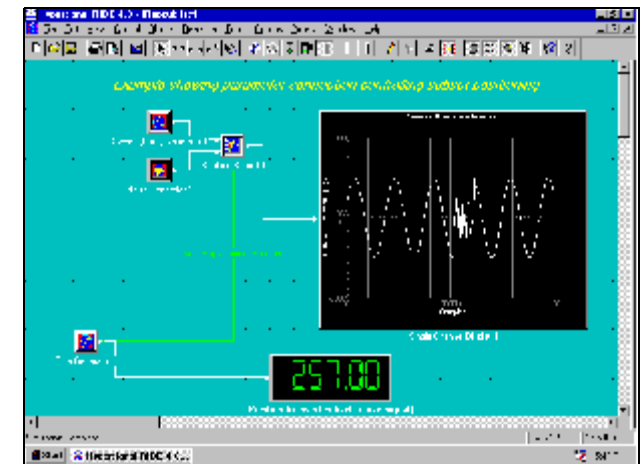
Steel Guitar D/A Example

This example makes use of delays and recursion to reproduce the sound of a steel guitar string being plucked. The resulting sound is played out through a D/A. By changing delay values, the sound can be altered.

The signals in this worksheet are being generated by the target DSP board, and then played out through the board's D/A converter.
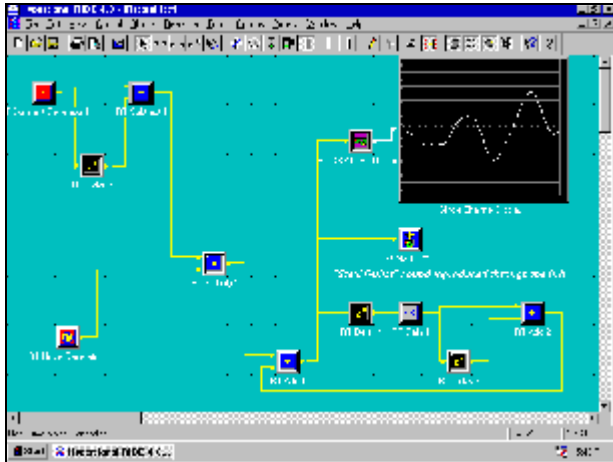

User Control Example

Here is an example which makes ues of a user control knob. In this case, the user control enables you to alter the frequency of the second sine waveform by using the mouse button to "turn" the knob.

User Controls can be selected in the Block Function Selector under the User Control Library.

User Controls can be maximized or minimized by selection of the View menu's User Control command.
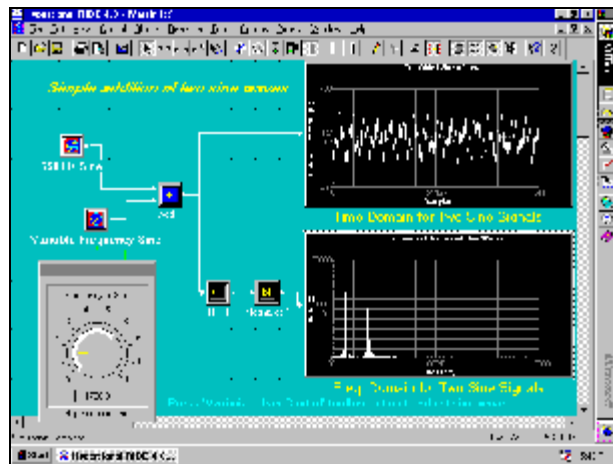
Ordering Information

If you've found that this Evaluation has been successful in demonstrating the power of the Hypersignal block diagram visual design system, then you may want to consider acquiring the full-featured Hypersignal RIDE or Block Diagram products.

Both the Hypersignal RIDE and Block Diagram products contain a much more extensive library of functions and have capabilities not found in the evaluation version. The Block Diagram product is an advanced tool with many blocks, and the capability of implementing hierarchical designs. The Hypersignal RIDE product adds real-time capability to Block Diagram. Both of these full-featured packages include a Filter Design utility, and the Block Wizard tool which lets you quickly and easily create your own custom block functions and add them to our larger, supplied block library.

Purchasing information for these two products is provided below (shipping is via Federal Express - shipping & handling charges not included in prices listed):

Part #	Product	US price	Int'l price
HSWN2000	Block Diagram	$1995.00	US $2394 + $100 fee
HSWN8000	Hypersignal RIDE	$3995.00	US $4794 + $100 fee

Orders may be placed by telephone, fax, or mailed to Hyperception. When placing an order with us, please refer to our product part numbers. Terms are NET 30 to most Government branches, academic organizations, and Fortune 500 companies. Should you have further questions regarding order placement, rush delivery, quotations and proforma invoices, or other items, please don't hesitate to contact us at (214) 343-8525. We encourage you to contact us for all of your DSP software, hardware, and system needs. We also offer excellent support via e-mail, web site, FTP, and our DSP BBS.

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Internet: info@hyperception.com * support@hyperception.com

FTP: ftp.netcom.com/pub/"Hy"/"Hyperception"

NOTE: For a limited time you will be able to receive either the Hypersignal RIDE or Block Diagram product at a reduced cost. A time-stamped coupon for a discount on purchase of a Hypersignal for Windows package has been included with this evaluation version. Don't miss out on this great opportunity. We look forward to working with you in the near future.