

# Hypersignal Block Diagram Function List

## **1 Channel X Display**

Displays input from a single channel

## **1 to 2 Demultiplexer**

Demultiplexes one input channel to two channel output based on a select input

## **1 to 4 Demultiplexer**

Demultiplexes one channel input to four channel outputs based on two control inputs

## **1/3 Octave Band Analyzer**

Performs 1/3 octave band analysis on the input signal

## **1D to Matrix Converter**

Converts a 1 dimensional signal to a matrix

## **1st Order Butterworth Filter**

Performs 1st order Butterworth filtering on the input data based on some conditions

## **2 Channel X Display**

Displays two waveforms on one grid

## **2 to 1 Multiplexer**

Multiplexes two channel input to one channel output based on a select input

## **2 to 4 Decoder**

Decodes two binary (0,1) inputs to four 1-hot outputs

## **2-Channel Display**

Displays input from two channels in several display modes.

## **2-Sided Magnitude**

Calculates the double-sided magnitude of the complex input signal

## **2-Sided Phase**

Calculates double-sided ArcTangent of both the real and imaginary components of the complex input

## **4 Input AND**

Performs logical AND function on four input signals

## **4 Input Max**

Finds the maximum value for four inputs and channel number of the maximum value

## **4 Input OR**

Performs logical OR function on four input signals

## **4 to 1 Multiplexer**

Multiplexes four channel input to one channel output based on two control inputs

## **A-87.6 Decode**

Performs A law expansion on the input signal

## **A-87.6 Encode**

Performs A law compression on the input signal

## **Absolute Value**

Outputs the absolute value of the input signal

## **Accumulate**

Accumulates data values of all frames

## **Add**

Adds two input signals

## **ADPCM Decoder**

Adaptive Differential Pulse Code Modulation Decoder

## **ADPCM Encoder**

Adaptive Differential Pulse Code Modulation Encoder

## **AGC**

Automatic Gain Control

## **Alarm Clock**

Allows the user to set an alarm to go off at a specified time

## **Analog Meter**

Implements an analog meter control

## **Annunciator**

Changes appearance based on different threshold values

## **Arbitrary Signal Generator**

Generates an arbitrary waveform via a mouse

## **ArcCosine(x)**

Calculates the ArcCosine value of the input signal

## **ArcSine(x)**

Calculates the ArcSine value of the input signal

## ArcTangent(x)

Calculates the ArcTangent value of the input signal

## Arctangent(y/x)

Quadrant Arctangent (Atan2)

## Autocorrelation

Calculates the autocorrelation function of the input signal

## Averaged Periodogram

Calculates the averaged periodogram of the input signal

## Bartlett Window

Performs Bartlett windowing on the input signal

## BER

Compares the two input channels using the exclusive-or function to count bit errors and calculate bit error rate

## Biquad

Implements a biquad, and applies this to the input signal

## Bit Mask

Masks off user-specified bits in the input signal

## Bit Reverse

Reverses bits in each sample (MSB=>LSB, LSB=>MSB)

## Bitmap Display

Displays a selected bitmap

## Bitmap Read

Reads a Windows bitmap file and outputs the red, green and blue planes

## Blackman Window

Performs Blackman windowing on the input signal

## Boxcar Window

Performs Boxcar (Rectangle) windowing on the input signal

## Buffer

Buffers and outputs a specified number of the input samples

## CD Knob

CD Control Knob

## Center Clip

Clips the input signal by comparing it to two specified threshold levels

## Cepstrum

Calculates the cepstrum of the input signal

## Channel Information

Displays a channels information

## Channel Perturber

Injects bit errors into a digital channel at a specified error rate

## Chirp z-Transform

Calculates the chirp z-transform of the input signal

## Clip

Clips the data elements by comparing with two specified threshold levels

## Color Pattern Generator

Generate a color image (bleeds 5 colors horizontally)

## Command Switch

Switch for controlling (starting/stopping, etc.) worksheets, typically used for power switch

## Complex Cepstrum

Calculates the complex cepstrum of the input signal

## Complex Conjugate

Takes the complex conjugate of the input signal

## Complex Exponential Generator

Generates a complex exponential waveform

## Complex to Real

Converts the complex input values to the corresponding real and imaginary values

## Concatenate

Concatenates two input frames into one output frame

## Constant Generator

Generates a constant (DC) waveform

## Convert

Converts input data from integer to floating point, or from floating point to integer

## Convert Character to String

Converts input character arrays to a string

## Convert Number to Character String

Converts input numbers to a character string

## Convolution

Convolves two input signals together

## Correlation

Cross-correlates two input channel signals

## Cosine Generator

Generates a cosine waveform

## Cosine(X)

Calculates the cosine value of each element of an input signal

## Covariance

Calculates the cross-covariance for two different inputs or auto-covariance for two identical inputs

## Create Color

Takes three inputs red, green, and blue and creates a color

## Data Display

Data Display for viewing data in multiple text formats - allows pasting to other windows applications

## Daub4

Calculates the discrete wavelet transform of an input signal with 4 Daubechies coefficients

## Daub6

Calculates the discrete wavelet transform of an input signal with 6 Daubechies coefficients

## dB Amplitude

Performs the function of  $20 \cdot \log_{10}(x)$

## dB Power

Performs the function of  $10 \cdot \log_{10}(x)$

## DCT

Calculates the discrete cosine transform of an input signal

## De-interleave 2 Channels

Separates one channel input into two channel output

## De-interleave 3 Channels

Separates one channel input into three channel output

## De-interleave 4 Channels

Separates one channel into four channel output

## De-interleave 5 Channels

Separates one channel input into five channel output

## De-Interleave 8 Channels

De-interleaves, or separates, one interleaved channel into eight channels

## Dead Band

Forces a specified range to be 0

## Decimal to Binary

Decimal to Binary conversion block function

## Decimate

Decimates an input signal

## Delay

Delays input by specified number of samples

## DFT

Calculates the discrete Fourier transform of the input signal

## Difference Equation

Difference Equation Function

## Differentiate

Differentiates the input signal

## Digital Display

Displays the input signal using digital numbers

## Divide

Divides one signal by another

## DTMF Keypad

DTMF Keypad

## Dynamic Frame Pad

Pads buffers with previous frame values

## Equal

Checks for Equal condition and controls the block connected to this block

## Event Counter

Calculates the number of times a particular event happens

## Exponential

Calculates the exponential function of the input signal

## Exponential Fit

Performs exponential curve fitting on the input signal

## Extract Sample

Extracts sample from specified index of input data frame

## Fast Hartley Transform

Calculates the Fast Hartley Transform of the input signal

## FFT

Calculates the Fast Fourier Transform of the input signal

## File Read

This block reads an input file.

## File Write

Writes the input signal to a data file

## Find Substring

Find a substring

## FIR Filter

Applies an existing FIR filter to the input signal

## Five Input Add

Adds the corresponding elements of five input signals

## Five Position Toggle Switch

Five Position Vertical Toggle Switch

## Fixed Offset

Adds a specified offset value to each element of the input signal

## Four Freq. Goertzel Algorithm

Performs the Goertzel algorithm at four frequencies

## Four Input Add

Adds the corresponding elements of four input signals

## Frame Count

Counts the number of frames the simulation has run

## Frame Cumulative

Performs the frame cumulative function on input frame

## Frame Deinterleaver

Deinterleaves and outputs two frames from one input frame

## Frame Maximum

Finds the maximum of each frame of the input signal

## Frame Mean

Calculates the mean for each frame of the input signal

## Frame Minimum

Finds the minimum value for each frame of the input signal

## Frame Range

Calculates the range of values of the input frame

## Frame Shift

Shifts frame sample right or left

## Frame Size

Extracts the framesize of the input signal

## Frame Standard Deviation

Calculates the frame standard deviation of the input signal

## Frame Variance

Calculates the frame variance of the input signal

## Framesize Conversion

Converts input framesize from one value to another, which can be less than, equal or greater in size

## Framesize Expander or Compressor

Converts (by expanding/compressing) data with an input framesize to a given output framesize

## Frequency Zoom

Calculates the magnitude (frequency) of the input signal at any frequency range with any frequency step

## Function Generator

Function Generator Control Front Panel

## Gain

Multiplies each element of the input signal by a constant

## Gaussian Generator

Generates a Gaussian waveform

## Gaussian Window

Performs Gaussian windowing on the input signal

## General Gaussian Generator

Generates a gaussian waveform with a specified mean and variance

## General Knob

General knob used for offsets, etc.

## Generate Character String

Sends a character string out its output channel

## Global Cumulative

Performs the global cumulative function

## Global Frame Mean

Performs the mean calculation on a sample by sample basis for all frames

### **Global Maximum**

Finds the maximum value of all data passed through this block

### **Global Mean**

Calculates the mean of all data passed through this block

### **Global Minimum**

Finds the minimum value of all data passed through this block

### **Global Range**

Calculates the range of values of the all input frames

### **Global Standard Deviation**

Calculates the standard deviation of all data passed through this block

### **Global Variable**

Global Variable to allow dynamic assignment, or placeholder, function

### **Global Variance**

Calculates the variance of all data passed through this block

### **Goertzel Algorithm**

Calculates the frequency domain magnitude at the specified frequency

### **Greater Than**

Checks for Greater Than condition to control the block connected to this block

### **Greater Than / Equal**

Checks for Greater Than/Equal condition to control the block connected to this block

### **Hamming Window**

Performs Hamming windowing on the input signal

### **Hanning Window**

Performs Hanning windowing on the input signal

### **Hilbert Transform**

Calculates the Hilbert transform of the input signal

### **Histogram**

Calculates the histogram of the input signal

### **Horizontal Bar Chart**

Horizontal bar chart

### **Horizontal Bar Graph**

Graph data horizontally

### **Horizontal Slider**

Horizontal slider control

### **Hyperbolic Cos(x)**

Calculates the Hyperbolic Cosine value of each element of the input signal

### **Hyperbolic Sin(x)**

Calculates the Hyperbolic Sine of the input signal

### **Hyperbolic Tan(x)**

Calculates the Hyperbolic Tangent value of the input signal

### **IF-ELSE/COUNTER**

Checks for IF-ELSE (with counter) condition to control the block connected to this block

### **IIR Filter**

Applies an existing IIR filter to the input signal

### **Impulse Generator**

Generates a unit impulse with the specified delay sample

### **Impulsive Noise Generator**

Generates an impulse noise waveform

### **In Range**

Checks to see if a value is between a range

### **Integrate**

Integrates the input signal

### **Integrate and Dump**

Performs integrate and dump

### **Interleave 2 Channels**

Interleaves two channel inputs to one channel output

### **Interleave 3 Channels**

Interleaves three channel inputs to one channel output

### **Interleave 4 Channels**

Interleaves four channel inputs to one channel output

### **Interleave 5 Channels**

Interleaves five channel inputs to one channel output

## Interleave 8 channels

Interleaves, or combines, eight channels into one

## Internet Receiver

Receive data through the internet

## Internet Transceiver

Transmit and receive data from the internet

## Internet Transmitter

Transmit data through the internet

## Interpolate

Interpolates the input signal

## Inverse DCT

Calculates the inverse discrete cosine transform of the input signal

## Inverse DFT

Calculates the inverse Discrete Fourier Transform of the input signal

## Inverse Fast Hartley Transform

Calculates the inverse Fast Hartley Transform of the input signal

## Inverse FFT

Calculates the inverse Fast Fourier Transform of the input signal

## Inverse Hilbert Transform

Calculates the inverse Hilbert transform of the input signal

## Keyboard Receiver

Receive keyboard input and output it

## Keypad

Implements a keypad control

## Knob

Implements a knob control

## Leaky LMS Adaptive Filter

Performs a leaky least mean square adaptive filter on the input signal

## LED

User control LED which gets set when a threshold is reached

## LED

Simple two bitmap LED control

## LED Button

Simple LED Button

## LED Meter

LED Meter indicator

## LED Meter

Implements a light emitting diode meter control

## Less Than

Checks for Less Than condition to control the block connected to this block

## Less Than / Equal

Checks for Less Than/Equal condition to control the block connected to this block

## Linear Fit

Performs a Linear curve fit to the input signal

## Linear Predictive Coding

Calculates the LPC coefficients based on the autocorrelation of the input signal

## LMS Adaptive Filter

Performs a Least Mean Square adaptive filter on the input signal

## Log

Calculates the natural logarithm (base e) value of each element of the input signal

## Log10

Calculates the common logarithm (base 10) value of each element of the input signal

## Logical AND

Performs logical AND function on two input signals

## Logical NAND

Performs logical NAND function on two input signals

## Logical NOR

Performs logical NOR function on two input signals

## Logical NOT

Performs the logical NOT function on the input signal

## Logical OR

Performs logical OR function on two input signals

## Logical XOR

Performs logical XOR (Exclusive-OR) function on two input signals

## Logx(y)

Calculates the logarithm (base x) value of each element of the input signal

## Loop Counter

Performs the Loop Counter operation to control the block connected to this block

## Loop Filter

Performs first order loop filtering on the input data

## Magnitude

Calculates the magnitude of the complex input signal

## Matrix Addition

Adds two matrices

## Matrix Generator by manual entry

Generates a manually entered matrix

## Matrix Invert

Matrix Invert

## Matrix Multiply

Multiplies two matrices

## Matrix Order

Outputs the row and column values of a matrix

## Matrix Scale

Multiply a matrix by a scalar value

## Matrix Subtraction

Subtracts two matrices

## Matrix to 1D Converter

Converts matrix data into 1 dimensional data

## Median Filter

Performs the median filter on the input signal

## Modulus

Divides the input frame of data with the Modulus value

## Momentary Button

Output different values when the button is in the pressed or non-pressed state

## Multiply

Multiplies the corresponding elements of two input signals

## NCO

Numerically Controlled Oscillator - generates sinusoidal signals with frequencies governed by the amplitude of the input signal

## Noise Generator

Generates a noise waveform with normal distribution

## Not

Creates the logical opposite of the input signal.

## Not Equal

Checks for Not Equal condition to control the block connected to this block

## Notch Filter

Performs the notch filter

## Numeric Indicator

Numeric display to display a single value

## Octave Band Analyzer

Performs an octave band analysis on the input signal

## Offset

Adds the element of channel 1 to each element of channel 0

## Ones Complement

Performs ones complement bit conversion on each element of the input signal

## Pad

Pads the output frame with the specified pad value

## Peak Extractor

Finds peaks within a frame of data, either by position or magnitude

## Peak Hold

Holds the peak value for each frame sample globally or for a number of frames

## Periodogram

Calculates the periodogram of the input signal

## Phase

Calculates the ArcTangent of both the real and imaginary component of the complex input

## Phase Decoder

Decodes the phase angle into data bits

## Phase Locked Loop



Used to effectively discriminate between a feedback frequency and the input signal

## **Polar to Rectangular**

Converts polar to rectangular

## **Polynomial Fit**

Performs a polynomial curve fit to the input data

## **Pow**

Calculates the user specified exponent (power) value of the input signal

## **Power Spectrum**

Performs an average in time across frames

## **PRN Generator**

Generates a pseudo random noise waveform

## **Product**

Outputs the product of all input frame samples

## **Pulse Train Generator**

Generates a pulse train

## **Quantizer**

Limits (quantizes) the number of bits of precision in the input signal

## **Ramp Generator**

Generates a ramp waveform

## **Read Com Port**

Reads the input data from the specified com port

## **Real to Complex**

Converts real and imaginary values into the corresponding complex values

## **Reciprocal**

Calculates the  $1/x$  value for a data sample  $x$

## **Rectangular to Polar**

Converts rectangular to polar

## **Rectify**

Performs either half or full wave rectification on the input signal

## **Replace Sample**

Replaces sample with input value at specified index

## **Replace Subset**

Replaces a subset of data at a specified location within a frame

## **Reverse**

The Reverse block outputs the input data in reverse order.

## **RGB Display**

Displays an image in RGB format

## **Root Mean Square**

Calculates the frame root mean square of the input signal

## **Rotate**

Rotates input frame data by specified number

## **Sample Rate**

This block obtains the sample rate information from the input channel

## **Sample-and-Hold**

Performs sample-and-hold based on the input sampling clock

## **Saramaki Window**

Performs Saramaki windowing on the input signal

## **Sawtooth Generator**

Generates a sawtooth signal

## **Scale**

Multiplies or scales each element of channel 0 by the first value of channel 1

## **Schmidt Trigger**

Schmidt Trigger

## **Scrolling Buffer**

Buffers and scrolls input data

## **Search**

Searches input data frame for specified value

## **Serial Command Receiver**

Receives commands from serial port

## **Shift Left**

Applies a user-specified left shift to each data value of the input frame

## **Shift Right**

Applies a user-specified right shift to each data value of the input frame



## Sign

Provides the arithmetic sign of the data, either +1, or -1.

## Sinc(x)

Calculates the Sinc ( $\sin x/x$ ) value of the input signal

## Sine Generator

Generates a sine waveform

## Sine(x)

Calculates the sine value of the input signal

## Single Channel Display

Displays input from a single channel in several different display modes

## Sort

Sorts the input data of each frame

## Sound Card A/D

Sound card A/D

## Sound Card D/A

Sound Card D/A

## Spectral Inversion

Performs a spectral inversion (flipping spectrum) in the time domain

## Spectrogram

Displays input from a single channel using color denoting amplitude

## Split

Splits input frame into two output frames

## Square

Calculates the square of the input signal

## Square Root

Calculates the square root of the input signal

## Square Wave Generator

Generates a square wave

## Static Array (buffer)

Array used for holding results and feeding other blocks (ignores Data Ready condition)

## Strobe

Finds the amplitude of the signal at the given index (zero-based) within the frame

## Subset

The Subset block outputs a subset of the input data.

## Subtract

Subtracts the corresponding elements of channel 1 input from channel 0 input

## Sum

Outputs the sum of the input data frame values

## Sweep (Chirp) Generator

Generates a sweep (Chirp) waveform

## Table Lookup

Performs a table lookup function

## Tangent(x)

Calculates the tangent value of the input signal

## Tap Weight Buffer

Filter Tap Weight Buffer for Adaptive Filtering

## Terminate Block Diagram

Stops simulation at this block

## Text Display

Text display block

## Three Input Add

Adds the corresponding elements of three input signals

## Three Position Toggle Switch

Three position vertical toggle switch

## Threshold

Examines the input data and outputs zero if the data is not greater than the specified threshold

## Time Sweep Control Knob

Time Sweep Control Knob

## Timer

Generates a pulse or level change at a specified time interval

## Toggle Button

User control button used to create an alternating 0/1 output value

## Transfer Function

Performs the division of two frequency domain signals

## Triangle Wave Generator

Generates a triangle waveform

## Triggered Buffer

Buffers input data when the selected trigger criteria is met

## Zero Crossing

Calculates the number of zero crossings in an input signal

## Two Position Toggle Switch

Two position vertical toggle switch

## u-255 Decode

Performs the u-255 decode function on the input signal

## u-255 Encode

Performs the u-255 encode function

## Variable Bandpass Filter

Performs the variable bandpass filter on the input signal

## Variable Notch Filter

Variable Notch Filter

## Variable Signal Generator

Generates a signal based on the given equation

## Vertical Bar Chart

Vertical bar chart

## Vertical Bar Graph

Graph data vertically

## Vertical Scaling Knob

General knob used for vertical trace control, etc.

## Vertical Slider

Vertical slider control

## Virtual Delay

Initializes a recursive loop

## Waveform Editor

Dynamically edit an incoming waveform

## Welch Window

Performs Welch windowing on the input signal

## Write Com Port

Sends the input data out of the specified port

## XY Display

Displays two channel signals using two orthogonal axes

## XY Display with Intensity

XY Display with an intensity value