

Commonly Used	Commonly used blocks
Continuous	Define continuous states
Discontinuities	Define discontinuous states
Discrete	Define discrete states
Logic and Bit Operations	Perform logic and bit operations
Lookup Tables	Support lookup tables
Math Operations	Perform math operations
Model Verification	Perform model verification
Model-Wide Utilities	Support model-wide operations
Ports & Subsystems	Support ports and subsystems
Signal Attributes	Support signal attributes
Signal Routing	Support signal routing
Sinks	Receive output from other blocks
Sources	Input to other blocks
User-Defined Functions	Support custom functions
Additional Math & Discrete	Provide additional math and discrete support

Commonly Used Blocks

Bus Creator	Create signal bus
Bus Selector	Select signals from incoming bus
Constant	Generate constant value
Data Type Conversion	Convert input signal to specified data type
Demux	Extract and output elements of vector signal
Discrete-Time Integrator	Perform discrete-time integration or accumulation of signal
Gain	Multiply input by constant
Ground	Ground unconnected input port
Inport	Create input port for subsystem or external input
Integrator, Integrator Limited	Integrate signal
Logical Operator	Perform specified logical operation on input
Mux	Combine several input signals into vector
Outport	Create output port for subsystem or external output
Product	Multiply and divide scalars and nonscalars or multiply and invert matrices
Relational Operator	Perform specified relational operation on inputs
Saturation	Limit range of signal
Scope and Floating Scope	Display signals generated during simulation
Subsystem, Atomic Subsystem, Nonvirtual Subsystem, CodeReuse Subsystem	Represent system within another system
Sum, Add, Subtract, Sum of Elements	Add or subtract inputs
Switch	Switch output between first input and third input based on value of second input
Terminator	Terminate unconnected output port
Unit Delay	Delay signal one sample period
Vector Concatenate, Matrix Concatenate	Concatenate input signals of same data type to create contiguous output signal

Continuous

Derivative	Output time derivative of input
Integrator, Integrator Limited	Integrate signal
PID Controller	Simulate continuous- or discrete-time PID controllers
PID Controller (2 DOF)	Simulate continuous- or discrete-time two-degree-of-freedom PID controllers
Second-Order Integrator, Second-Order Integrator Limited	Integrate input signal twice
State-Space	Implement linear state-space system
Transfer Fcn	Model linear system by transfer function
Transport Delay	Delay input by given amount of time
Variable Time Delay, Variable Transport Delay	Delay input by variable amount of time
Zero-Pole	Model system by zero-pole-gain transfer function

Discontinuities

Backlash	Model behavior of system with play
Coulomb and Viscous Friction	Model discontinuity at zero, with linear gain elsewhere
Dead Zone	Provide region of zero output
Dead Zone Dynamic	Set inputs within bounds to zero
Hit Crossing	Detect crossing point
Quantizer	Discretize input at specified interval
Rate Limiter	Limit rate of change of signal
Rate Limiter Dynamic	Limit rising and falling rates of signal
Relay	Switch output between two constants
Saturation	Limit range of signal
Saturation Dynamic	Bound range of input
Wrap To Zero	Set output to zero if input is above threshold

Discrete

Delay	Delay input signal by fixed or variable sample periods
Difference	Calculate change in signal over one time step
Discrete Derivative	Compute discrete-time derivative
Discrete Filter	Model Infinite Impulse Response (IIR) direct form II filters
Discrete FIR Filter	Model FIR filters
Discrete State-Space	Implement discrete state-space system
Discrete Transfer Fcn	Implement discrete transfer function
Discrete Zero-Pole	Model system defined by zeros and poles of discrete transfer function
Discrete-Time Integrator	Perform discrete-time integration or accumulation of signal
First-Order Hold	Implement first-order sample-and-hold
Memory	Output input from previous time step
PID Controller	Simulate continuous- or discrete-time PID controllers
PID Controller (2 DOF)	Simulate continuous- or discrete-time two-degree-of-freedom PID controllers
Tapped Delay	Delay scalar signal multiple sample periods and output all delayed versions
Transfer Fcn First Order	Implement discrete-time first order transfer function
Transfer Fcn Lead or Lag	Implement discrete-time lead or lag compensator
Transfer Fcn Real Zero	Implement discrete-time transfer function that has real zero and no pole
Unit Delay	Delay signal one sample period
Zero-Order Hold	Implement zero-order hold of one sample period

Logic and Bit Operations

Bit Clear	Set specified bit of stored integer to zero
Bit Set	Set specified bit of stored integer to one
Bitwise Operator	Specified bitwise operation on inputs
Combinatorial Logic	Implement truth table
Compare To Constant	Determine how signal compares to specified constant
Compare To Zero	Determine how signal compares to zero
Detect Change	Detect change in signal value
Detect Decrease	Detect decrease in signal value
Detect Fall Negative	Detect falling edge when signal value decreases to strictly negative value, and its previous value was nonnegative
Detect Fall Nonpositive	Detect falling edge when signal value decreases to nonpositive value, and its previous value was strictly positive
Detect Increase	Detect increase in signal value
Detect Rise Nonnegative	Detect rising edge when signal value increases to nonnegative value, and its previous value was strictly negative
Detect Rise Positive	Detect rising edge when signal value increases to strictly positive value, and its previous value was nonpositive
Extract Bits	Output selection of contiguous bits from input signal
Interval Test	Determine if signal is in specified interval
Interval Test Dynamic	Determine if signal is in specified interval
Logical Operator	Perform specified logical operation on input
Relational Operator	Perform specified relational operation on inputs
Shift Arithmetic	Shift bits or binary point of signal

Lookup Tables

1-D Lookup Table	Approximate one-dimensional function
2-D Lookup Table	Approximate two-dimensional function
Direct Lookup Table (n-D)	Index into N-dimensional table to retrieve element, column, or 2-D matrix
Interpolation Using Prelookup	Use precalculated index and fraction values to accelerate approximation of N-dimensional function
Lookup Table Dynamic	Approximate one-dimensional function using dynamic table
n-D Lookup Table	Approximate N-dimensional function
Prelookup	Compute index and fraction for Interpolation Using Prelookup block
Sine, Cosine	Implement fixed-point sine or cosine wave using lookup table approach that exploits quarter wave symmetry

Math Operations

Abs	Output absolute value of input
Algebraic Constraint	Constrain input signal to zero
Assignment	Assign values to specified elements of signal
Bias	Add bias to input
Complex to Magnitude-Angle	Compute magnitude and/or phase angle of complex signal
Complex to Real-Imag	Output real and imaginary parts of complex input signal
Divide	Divide one input by another
Dot Product	Generate dot product of two vectors
Find	Find nonzero elements in array
Gain	Multiply input by constant
Magnitude-Angle to Complex	Convert magnitude and/or a phase angle signal to complex signal
Math Function	Perform mathematical function

MinMax	Output minimum or maximum input value
MinMax Running Resettable	Determine minimum or maximum of signal over time
Permute Dimensions	Rearrange dimensions of multidimensional array dimensions
Polynomial	Perform evaluation of polynomial coefficients on input values
Product	Multiply and divide scalars and nonscalars or multiply and invert matrices
Product of Elements	Copy or invert one scalar input, or collapse one nonscalar input
Real-Imag to Complex	Convert real and/or imaginary inputs to complex signal
Reshape	Change dimensionality of signal
Rounding Function	Apply rounding function to signal
Sign	Indicate sign of input
Sine Wave Function	Generate sine wave, using external signal as time source
Slider Gain	Vary scalar gain using slider
Sqrt, Signed Sqrt, Reciprocal Sqrt	Calculate square root, signed square root, or reciprocal of square root
Squeeze	Remove singleton dimensions from multidimensional signal
Sum, Add, Subtract, Sum of Elements	Add or subtract inputs
Trigonometric Function	Specified trigonometric function on input
Unary Minus	Negate input
Vector Concatenate, Matrix Concatenate	Concatenate input signals of same data type to create contiguous output signal
Weighted Sample Time Math	Support calculations involving sample time

Model Verification

Assertion	Check whether signal is zero
Check Discrete Gradient	Check that absolute value of difference between successive samples of discrete signal is less than upper bound
Check Dynamic Gap	Check that gap of possibly varying width occurs in range of signal's amplitudes
Check Dynamic Lower Bound	Check that one signal is always less than another signal
Check Dynamic Range	Check that signal falls inside range of amplitudes that varies from time step to time step
Check Dynamic Upper Bound	Check that one signal is always greater than another signal
Check Input Resolution	Check that input signal has specified resolution
Check Static Gap	Check that gap exists in signal's range of amplitudes
Check Static Lower Bound	Check that signal is greater than (or optionally equal to) static lower bound
Check Static Range	Check that signal falls inside fixed range of amplitudes
Check Static Upper Bound	Check that signal is less than (or optionally equal to) static upper bound

Model-Wide Utilities

Block Support Table	View data type support for Simulink blocks
DocBlock	Create text that documents model and save text with model
Model Info	Display revision control information in model
Timed-Based Linearization	Generate linear models in base workspace at specific times
Trigger-Based Linearization	Generate linear models in base workspace when triggered

Ports & Subsystems

Trigger	Add trigger port to model or subsystem
Action Port	Implement Action subsystems used in if and switch control flow statements
Configurable Subsystem	Represent any block selected from user-specified library of blocks
Enable	Add enabling port to system
Enabled and Triggered Subsystem	Represent subsystem whose execution is enabled and triggered by external input
Enabled Subsystem	Represent subsystem whose execution is enabled by external input
For Each	Enable blocks inside For Each Subsystem to process elements or subarrays of input signal independently
For Each Subsystem	Repeatedly perform algorithm on each element or subarray of input signal and concatenate results
For Iterator	Repeatedly execute contents of subsystem at current time step until iteration variable exceeds specified iteration limit
For Iterator Subsystem	Represent subsystem that executes repeatedly during simulation time step
Function-Call Feedback Latch	Break feedback loop involving data signals between function-call blocks
Function-Call Generator	Execute function-call subsystem specified number of times at specified rate
Function-Call Split	Provide junction for splitting function-call signal
Function-Call Subsystem	Represent subsystem that can be invoked as function by another block
If	Model if-else control flow
If Action Subsystem	Represent subsystem whose execution is triggered by If block
Inport	Create input port for subsystem or external input
Model, Model Variants	Include model as block in another model
Output	Create output port for subsystem or external output

Subsystem, Atomic Subsystem, Nonvirtual Subsystem, CodeReuse Subsystem	Represent system within another system
Switch Case	Implement C-like switch control flow statement
Switch Case Action Subsystem	Represent subsystem whose execution is triggered by Switch Case block
Triggered Subsystem	Represent subsystem whose execution is triggered by external input
Variant Subsystem	Represent a subsystem with multiple subsystems
While Iterator	Repeatedly execute contents of subsystem at current time step while condition is satisfied
While Iterator Subsystem	Represent subsystem that executes repeatedly while condition is satisfied during simulation time step
Signal Attributes	
Signal Specification	Specify desired dimensions, sample time, data type, numeric type, and other attributes of signal
Bus to Vector	Convert virtual bus to vector
Data Type Conversion	Convert input signal to specified data type
Data Type Conversion Inherited	Convert from one data type to another using inherited data type and scaling
Data Type Duplicate	Force all inputs to same data type
Data Type Propagation	Set data type and scaling of propagated signal based on information from reference signals
Data Type Scaling Strip	Remove scaling and map to built in integer
IC	Set initial value of signal
Probe	Output signal attributes, including width, dimensionality, sample time, and complex signal flag
Rate Transition	Handle transfer of data between blocks operating at different rates
Signal Conversion	Convert signal to new type without altering signal values
Weighted Sample Time	Support calculations involving sample time
Width	Output width of input vector

Signal Routing

Bus Assignment	Replace specified bus elements
Bus Creator	Create signal bus
Bus Selector	Select signals from incoming bus
Data Store Memory	Define data store
Data Store Read	Read data from data store
Data Store Write	Write data to data store
Demux	Extract and output elements of vector signal
Environment Controller	Create branches of block diagram that apply only to simulation or only to code generation
From	Accept input from Goto block
Goto	Pass block input to From blocks
Goto Tag Visibility	Define scope of Goto block tag
Index Vector	Switch output between different inputs based on value of first input
Manual Switch	Switch between two inputs
Merge	Combine multiple signals into single signal
Multiport Switch	Choose between multiple block inputs
Mux	Combine several input signals into vector
Selector	Select input elements from vector, matrix, or multidimensional signal
Switch	Switch output between first input and third input based on value of second input
Vector Concatenate, Matrix Concatenate	Concatenate input signals of same data type to create contiguous output signal

Sinks

Display	Show value of input
Outport	Create output port for subsystem or external output
Scope and Floating Scope	Display signals generated during simulation
Stop Simulation	Stop simulation when input is nonzero
Terminator	Terminate unconnected output port
To File	Write data to file
To Workspace	Write data to MATLAB workspace
XY Graph	Display X-Y plot of signals using MATLAB figure window

Sources

Band-Limited White Noise	Introduce white noise into continuous system
Chirp Signal	Generate sine wave with increasing frequency
Clock	Display and provide simulation time
Constant	Generate constant value
Counter Free-Running	Count up and overflow back to zero after reaching maximum value for specified number of bits
Counter Limited	Count up and wrap back to zero after outputting specified upper limit
Digital Clock	Output simulation time at specified sampling interval
Enumerated Constant	Generate enumerated constant value
From File	Read data from MAT-file
From Workspace	Read data from workspace
Ground	Ground unconnected input port
Inport	Create input port for subsystem or external input
Pulse Generator	Generate square wave pulses at regular intervals
Ramp	Generate constantly increasing or decreasing signal

Random Number	Generate normally distributed random numbers
Repeating Sequence	Generate arbitrarily shaped periodic signal
Repeating Sequence Interpolated	Output discrete-time sequence and repeat, interpolating between data points
Repeating Sequence Stair	Output and repeat discrete time sequence
Signal Builder	Create and generate interchangeable groups of signals whose waveforms are piecewise linear
Signal Generator	Generate various waveforms
Sine Wave	Generate sine wave, using simulation time as time source
Step	Generate step function
Uniform Random Number	Generate uniformly distributed random numbers
User-Defined Functions	
Fcn	Apply specified expression to input
Interpreted MATLAB Function	Apply MATLAB function or expression to input
Level-2 MATLAB S-Function	Use Level-2 MATLAB S-function in model
MATLAB Function	Include MATLAB code in models that generate embeddable C code
S-Function	Include S-function in model
S-Function Builder	Create S-function from C code that you provide

Additional Math & Discrete

Additional Discrete	Provide additional discrete math support
Additional Math: Increment — Decrement	Increment or decrement value of signal by one

Additional Discrete

Fixed-Point State-Space	Implement discrete-time state space
Transfer Fcn Direct Form II	Implement Direct Form II realization of transfer function
Transfer Fcn Direct Form II Time Varying	Implement time varying Direct Form II realization of transfer function
Unit Delay Enabled	Delay signal one sample period, if external enable signal is on
Unit Delay Enabled External IC	Delay signal one sample period, if external enable signal is on, with external initial condition
Unit Delay Enabled Resettable	Delay signal one sample period, if external enable signal is on, with external Boolean reset
Unit Delay Enabled Resettable External IC	Delay signal one sample period, if external enable signal is on, with external Boolean reset and initial condition
Unit Delay External IC	Delay signal one sample period, with external initial condition
Unit Delay Resettable	Delay signal one sample period, with external Boolean reset
Unit Delay Resettable External IC	Delay signal one sample period, with external Boolean reset and initial condition
Unit Delay With Preview Enabled	Output signal and signal delayed by one sample period, if external enable signal is on
Unit Delay With Preview Enabled Resettable	Output signal and signal delayed by one sample period, if external enable signal is on, with external reset
Unit Delay With Preview Enabled Resettable External RV	Output signal and signal delayed by one sample period, if external enable signal is on, with external RV reset
Unit Delay With Preview Resettable	Output signal and signal delayed by one sample period, with external reset
Unit Delay With Preview Resettable External RV	Output signal and signal delayed by one sample period, with external RV reset

Additional Math: Increment — Decrement

Decrement Real World	Decrease real world value of signal by one
Decrement Stored Integer	Decrease stored integer value of signal by one
Decrement Time To Zero	Decrease real-world value of signal by sample time, but only to zero
Decrement To Zero	Decrease real-world value of signal by one, but only to zero
Increment Real World	Increase real world value of signal by one
Increment Stored Integer	Increase stored integer value of signal by one