C8X_DAQ DSP Data Acquisition Interface for Matlab
Version 1.0a

This software package permits direct DSP data acquisition from within the Matlab environment. Both 32-bit and 64-bit versions of Matlab are supported.

To use this interface, the C8X_DAQ.mexw32/C8X_DAQ.mexw64 file, the C8X_CONTROL_DLL32.dll/ C8X_CONTROL_DLL64.dll and the desired *.out file must be in a directory in the Matlab path, and the commands must be executed within that directory (or the full pathname to the *.out must be specified). **The 'init' command must be executed before any other commands are used.** The pathname in the sample m-files must be changed to match the actual location of the files.

This software requires that the host machine have the Microsoft Visual C++ 2010 SP1 Redistributable Package support software be installed. This can be downloaded from Microsoft if it is not already installed on your machine.

Supported DSPs and codecs are listed in the table below.

*.OUT file	Supported DSPs and codecs
AIC23_6713.OUT	6713 DSK onboard stereo codec. Sample rates supported are 96kHz, 88.2kHz, 48kHz, 44.1kHz, 32kHz, and 8kHz. The input source can be selected from line, microphone, or microphone with gain.
AIC3106_OMAP.OUT	LogicPD Zoom OMAP-L138 onboard stereo codec. Sample rates supported are 96kHz, 48kHz, 32kHz, 24kHz, 16kHz, 12kHz, and 8kHz. Only line input is available.
AIC3106_OMAP.OUT	TI LCDK OMAP-L138 onboard stereo codec. Sample rates supported are 96kHz, 48kHz, 32kHz, 24kHz, 16kHz, 12kHz, and 8kHz. The input source can be selected from line, microphone, or microphone with gain.

All ADC data values received from the DSP are normalized to +/- 1.0 for the maximum ADC range. All DAC data values sent to the DSP must be normalized in the same manner.

All Matlab-variables used as data transfer arguments to the commands (***X*** in the descriptions below) must be double-precision. Data is transferred to and from the variables in column-row order.

Command argument types are denoted as follows:

< >	optional argument
#	numeric argument
'arg'	text argument
X	Matlab double-precision variable

Command	Syntax	Description
Init	C8X_DAQ('Init', 'Filename', # PORT_NUMBER, # BAUDRATE_INDEX)	Initializes the C8X_DAQ software and the DSP board interface. The filename of the desired COFF file must be supplied. The PORT_NUMBER argument is used to specify which COM port will be used for the connection (i.e. 1-256). The BAUDRATE_INDEX argument must be set to match the baud rate of the DSP board. The possible values are listed at the end of this document.
Version	C8X_DAQ('Version')	Displays the version numbers of the C8X_DAQ.mexwXX, C8X_ControlXX.DLL, and the *.out files in use.
GetSettings	C8X_DAQ('GetSettings')	Displays the current settings in use.
LoopbackOn	C8X_DAQ('LoopbackOn')	Echoes audio input data directly to the output on supported hardware. Useful for monitoring the input.

LoopbackOff	C8X_DAQ(‘LoopbackOff’)	Turns off loopback.
QueueSize	X = C8X_DAQ(‘QueueSize’, #)	Sets the queue size to the value of the second argument, or the maximum queue size, whichever is less. Returns the actual queue size.
FlushQueues	C8X_DAQ(‘FlushQueues’)	Flushes the transmit and receive queues on the DSP.
FrameSize	X = C8X_DAQ(‘FrameSize’, #)	Sets the frame size to the value of the second argument, or the maximum frame size, whichever is less. The frame size must be set to an even number. Returns the actual frame size.
NumChannels	X = C8X_DAQ(‘NumChannels’, ‘arg’)	Activates all channel numbers contained in the text argument. For example, the argument ‘13’ would activate channels 1 and 3, all other channels would be inactive. Returns a binary mask value showing the active channels.
SampleRate	X = C8X_DAQ(‘SampleRate’, #)	Sets the sample rate to the achievable value closest to the second argument, bounded by the maximum/minimum sample rates. Returns the actual sample rate.
InputSource	C8X_DAQ(‘InputSource’, ‘arg’)	Sets the codec input source to one of three possibilities – ‘Line’, ‘Mic’, or ‘Mic+20’. Only available on DSPs with codec designs that support line input (Line), microphone input (Mic), or microphone input with 20db preamp gain (Mic+20).
TriggerMode	C8X_DAQ(‘TriggerMode’, ‘arg’)	Sets the trigger mode to one of three mode values – ‘Auto’, ‘Immediate’, or ‘Normal’. Note: In ‘Normal’ mode, the program will wait indefinitely for a trigger.
TriggerSlope	C8X_DAQ(‘TriggerSlope’, ‘arg’)	Sets the trigger slope to positive (‘+’) or negative (‘-‘).
TriggerValue	C8X_DAQ(‘TriggerValue’, #)	Sets the trigger value to the passed value. This should be a number such that –1.0 < x < +1.0.
TriggerChannel	C8X_DAQ(‘TriggerChannel’, #)	Sets the trigger channel to the passed value. Valid channel numbers are 1 through the maximum number of channels. Triggering works on active or inactive channels (see NumChannels).
GetFrame	C8X_DAQ(‘GetFrame’, X)	Gets a frame of data from the DSP, and returns it in the matrix X. The variable X must be the correct size for the number of channels and frame size selected. The data is organized on a column per channel basis.
GetFrame	X = C8X_DAQ(‘GetFrame’)	Gets a frame of data from the DSK, and returns it in the newly created matrix X. The data is organized on a column per channel basis.
CreateFrameBuffer	X = C8X_DAQ(‘CreateFrameBuffer’)	Creates a variable X of the correct size for the number of channels and frame size selected.
SendFrame	C8X_DAQ(‘SendFrame’, X)	Sends the frame of data in X to the DSP. X must be the correct size for the current frame size and number of channels.
SwapFrame	C8X_DAQ(‘SwapFrame’, X)	Sends the frame of data in X to the DSP, and then retrieves a frame of data from the DSP. X must be the correct size for the current frame size and number of channels.
DskTimeOut	C8X_DAQ(‘DspTimeOut’, #)	Sets the timeout value for the DSP to respond to a command to # seconds, up to a maximum of 300 (5 minutes). This only necessary when doing extremely large captures that will acquire more than 3 seconds of data.

Supported *BAUDRATE_INDEX* values:

0	OMAP-L138 at 115200 baud or DSK6XXXHPI daughtercard serial interface
1	OMAP-L138 at 230400 baud
2	OMAP-L138 at 460800 baud
3	OMAP-L138 at 921600 baud or DSK6XXXHPI daughtercard USB interface