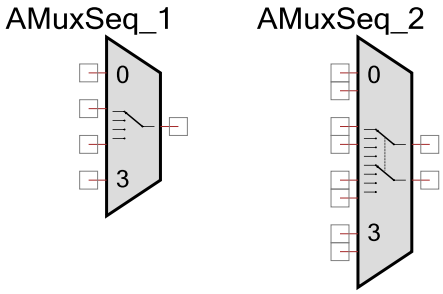
Analog Multiplexer Sequencer (AMuxSeq)

1.20

Features



- Single or differential inputs
- Adjustable between 2 and 32 inputs
- Software controlled
- Inputs may be pins or internal sources
- No simultaneous connections
- Bidirectional (passive)

General Description

The analog multiplexer sequencer (AMuxSeq) component is used to connect one analog signal at a time to a different common analog signal, by breaking and making connections in hookup-order sequence. The AMuxSeq is primarily used for time division multiplexing.

When to use an AMuxSeq

The AMuxSeq component should be used any time multiple analog signals must be multiplexed into a single source or destination. Since the AMuxSeq component is passive, it can be used to multiplex input or output signals.

The AMuxSeq has a simpler and faster API than the AMux. The AMuxSeq should be used instead of the AMux when multiple simultaneous connections are not required and the signals will always be accessed in the same order.

Input/Output Connections

This section describes the various input and output connections for the AMuxSeq. An asterisk (*) in the list of I/O's states that the I/O may be hidden on the symbol under the conditions listed in the description of that I/O.

A_N – Analog

The AMuxSeq is capable of having between 2 and 32 analog inputs. The paired inputs are present when the MuxType parameter is set to "Differential."

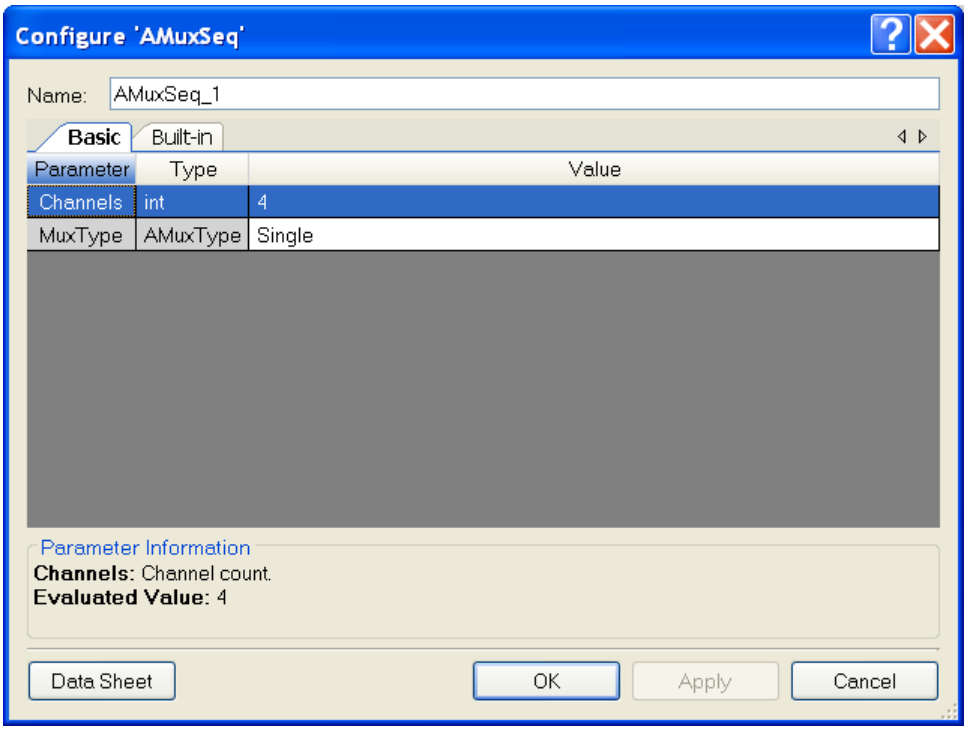
B – Analog

The “b” signal is the common connection. Whichever A_N signal is selected with the AMuxSeq_Next() function will be connected to this terminal. The paired outputs are present when the MuxType parameter is set to "Differential".

Parameters and Setup

Drag an AMuxSeq component onto your design and double-click it to open the Configure dialog.

Figure 1 Configure AMuxSeq Dialog



The AMuxSeq provides the following parameters.

Channels

This parameter selects the number of inputs or paired inputs depending on the MuxType. Any value between 2 and 32 may be selected.

MuxType

This parameter selects between a single input per connection “Single” and a dual input “Differential” input mux. A type “Single” is used when the input signals are all referenced to the same signal such as Vssa. In cases where two or more signals may have different signal

reference, the “Differential” option should be selected. The differential mode is most often used with an ADC that provides a differential input.

Placement

There are no placement specific options.

Resources

The AMuxSeq makes use of the individual switches that connect blocks to analog busses and analog busses that connect to pins.

Application Programming Interface

Application Programming Interface (API) routines allow you to configure the component using software. The following table lists and describes the interface to each function. The subsequent sections cover each function in more detail.

By default, PSoC Creator assigns the instance name "AMuxSeq_1" to the first instance of a component in a given design. You can rename the instance to any unique value that follows the syntactic rules for identifiers. The instance name becomes the prefix of every global function name, variable, and constant symbol. For readability, the instance name used in the following table is "AMuxSeq".

Function	Description
void AMuxSeq_Start(void)	Disconnects all inputs.
void AMuxSeq_Stop(void)	Disconnects all inputs.
void AMuxSeq_Next(void)	Disconnects the previous channel and connects the next one in the sequence. The first time AMuxSeq_Next is called the first channel of the sequence (starting at channel zero) is connected.
void AMuxSeq_DisconnectAll(void)	Disconnect all inputs.
int8 AMuxSeq_GetChannel(void)	The currently connected channel is returned. If no channel is connected returns -1.

void AMuxSeq_Start(void)

Description: Disconnects all inputs.

Parameters: None

Return Value: None

Side Effects: None

void AMuxSeq_Stop(void)

Description: Disconnects all inputs.

Parameters: None

Return Value: None

Side Effects: None

void AMuxSeq_Next(void)

Description: Disconnects the previous channel and connects the next one in the sequence. The first time AMuxSeq_Next is called the first channel of the sequence (starting at channel zero) is connected.

Parameters: None

Return Value: None

Side Effects: None

void AMuxSeq_DisconnectAll(void)

Description: This function disconnects all channels.

Parameters: None

Return Value: None

Side Effects: None

int8 AMuxSeq_GetChannel(void)

Description: The currently connected channel is returned. If no channel is connected returns -1.

Parameters: None

Return Value: The current channel or -1.

Side Effects: None

Sample Firmware Source Code

The following is a C language example demonstrating the basic functionality of the AMuxSeq component. This example assumes the component has been placed in a design with the default name "AMuxSeq_1."

Note If you rename your component you must also edit the example code as appropriate to match the component name you specify.

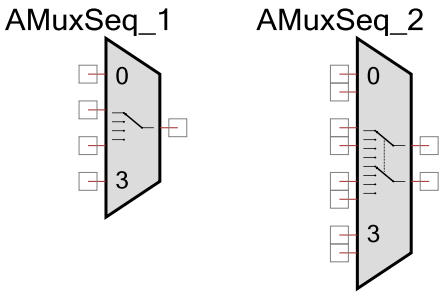
```
#include <device.h>

void main()
{
    AMuxSeq_1_Start();       /* Disconnects all channels */
    AMuxSeq_1_Next();        /* Connect channel 0 */
}
```

Functional Description

The AMuxSeq is controlled by firmware, not by hardware. Only one signal at a time may be connected to the common signal.

The following shows the flow for an AMuxSeq configured as "Single" and "Differential."



DC and AC Electrical Characteristics

The AMuxSeq will operate at all valid supply voltages.

5.0V/3.3V DC and AC Electrical Characteristics

Parameter	Typical	Min	Max	Units	Conditions and Notes
Input					
Input Voltage Range	---		Vss to Vdd	V	
Capacitance to ground	---		---	pF	
Series resistance	---		---	Ω	

Component Changes

This section lists the major changes in the component from the previous version.

Current Version	Description of Changes	Reason for Changes / Impact
1.20.d	Minor datasheet edit.	
1.20.c	Minor datasheet edit.	
1.20.b	Minor datasheet edit.	
1.20.a	Added information to the component that advertizes its compatibility with silicon revisions.	The tool reports an error/warning if the component is used on incompatible silicon. If this happens, update to a revision that supports your target device.
1.20	Updated the Symbol picture.	Updated to comply with corporate standard and indicate sequencing.
	Added the GetChannel API function.	To get currently connected channel.
	Added missing 'void' for functions with no arguments. Changed type of AMux channel variable from unsigned to signed integer because -1 is used to indicate that no channel is selected.	These changes addressed warnings about deprecated declaration that appeared during compilation with MDK and RVDS compilers.

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