

Module Document: SLEW_LIMIT

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1 SLEW_LIMIT module documentation

This software module acts as a rate limiter. The rate at which the output (Out) changes towards the input (In) is limited to a set increment(Incr). This is used to control how rapidly inputs to a loop such as a voltage loop are allowed to change.

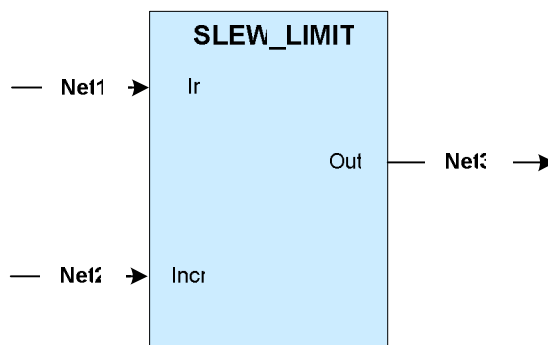


Figure 1. SLEW_LIMIT block

1.1 Module Properties

This section describes module properties, such as compatible devices, components, invocation etc. The SLEW_LIMIT module has the following dependencies:

Module	Dependency
CPU dependency	C28x
Device dependency	Any 28x device

Table 1. SLEW_LIMIT module dependencies

The SLEW_LIMIT module has the following components:

Component	Present
C-based initialization	No
ASM interrupt initialization	Yes
ASM runtime macro	Yes

Table 2 SLEW_LIMIT module components

Preliminary

The SLEW_LIMIT module has the following miscellaneous properties:

Property name	Property value
Multiple instance support	Yes
Reentrant	Yes
Accessible from 'C' environment	Yes
Full configuration from 'C' environment	Yes
Input / Output connection	Pointer to signal net.

Table 3. SLEW_LIMIT module miscellaneous properties

Component	Files
Macro source:	C:\tidcs\DPS_C280x\vXYZ ¹ \dplib280x\dplib280x.inc
C Interface:	C:\tidcs\DPS_C280x\vXYZ\dplib280x\dplib280x.h
C source	C:\tidcs\DPS_C280x\vXYZ\dplib280x\dplib280x.src
Object file archive	C:\tidcs\DPS_C280x\vXYZ\dplib280x\dplib280x.lib

Table 4. SLEW_LIMIT module component files

1.2 Module Input Definition

Input name	Description	Format	Range
SLEW_LIMIT_InX	Input	Pointer to 16-bit fixed point input data	Q15: [0, 1) or [-32768, 32767]
SLEW_LIMIT_IncrX	Input	Pointer to 16-bit fixed point input data	Q15: [0, 1) or [-32768, 32767]

(X is the instance number)

Table 5. SLEW_LIMIT terminal inputs

¹ The xyz represents the version number directory level. For instance, a 1.00 release would have v100 in its directory path, and v210 would indicate a release 2.10.

1.3 Module Output Definition

Output name	Description	Format	Range
SLEW_LIMIT_OutX	Output	Pointer to 16-bit fixed point input data	Q15: [0, 1) or [0, 32767]

(X is the instance number)

Table 6. SLEW_LIMIT terminal outputs

Preliminary

1.4 Module API Description: SLEW_LIMIT_INIT

Function Name: SLEW_LIMIT_INIT
Prototype: SLEW_LIMIT_INIT nInstance
Return value: None.
Preconditions: None

This function is the assembler initialization macro, and must be called prior to running the SLEW_LIMIT runtime macro, for proper operation of the runtime macro routine. This initialization routine must be executed as part of an assembler initialization routine. This macro routine declares variables, initializes variables to known values, and sets up constants for the runtime macro routines.

- **nInstance:** Specifies which instance is initialized.

Example: Call the SLEW_LIMIT_INIT to initialize SLEW_LIMIT module.

```
-----  
; ISR Initialization  
;-----  
_ISR_Init:  ...  
            ...  
            SLEW_LIMIT_INIT    1  
            LRETR
```

1.5 Module API Description: SLEW_LIMIT

Function Name: SLEW_LIMIT

Prototype: SLEW_LIMIT nInstance

Return value: None.

Preconditions: The following precondition must be satisfied:

- The ISR initialization macro SLEW_LIMIT_INIT must be instantiated in an assembler initialization routine, and the assembler init routine must run prior to this routine.

This function is the assembler run time macro, this routine performs the scaled inverse square computation.

- nInstance: Specifies which instance is run.

Example: Call the SLEW_LIMIT in an assembler ISR

```

;-----
; Runtime interrupt service routine
;-----
_ISR_Run:          CONTEXT_SAVE          ;call macro

;-----
; Run the SLEW_LIMIT instance 1
;-----
                SLEW_LIMIT    1
;-----
EXIT_ISR: ;Interrupt management before exit
;-----
                MOVW          DP,#ETCLR1>>6
                MOV           @ETCLR1,#0x01; Clear EPWM1 Int flag

;-----
; Restore context & return
;-----
                CONTEXT_REST
                IRET

```

1.6 Usage Example:

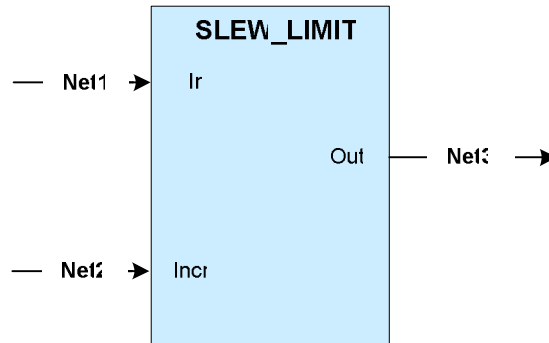


Figure 2. Connecting the SLEW_LIMIT module

Step1. Instantiate the INIT macro in assembly (this is one-time pass through code)

```
; Instantiate the init macro
SLEW_LIMIT_INIT 1
```

Step2. Instantiate the run time macro in assembly (this is usually looped or ISR code)

```
; "call" the runtime macro
SLEW_LIMIT 1
```

Step3. Declare signal nets to which the module will be connected

```
int16 Net1, Net2;
```

Step4. Declare the terminal pointers in C

```
// SLEW_LIMIT terminal pointers, external references
```

```
extern int16 *SLEW_LIMIT_In, *SLEW_LIMIT_Incr1, *SLEW_LIMIT_Out1;
```

Step5. "Connect" the module terminals to the Signal Nets in "C".

```
// SLEW_LIMIT connections
SLEW_LIMIT_In1 = &VpfcSet;
SLEW_LIMIT_Out1 = &VpfcSetSlewed;
SLEW_LIMIT_Incr1 = &VpfcSlewRate;
VpfcSlewRate = 100;
```