| IMPULSE | *Impulse Generator Module* |
|---|---|

**Description**

This module implements a periodic impulse function. The output variable *Out* is set to 0x00007FFF for 1 sampling period. The period of the output signal *Out* is specified by the input *Period.*

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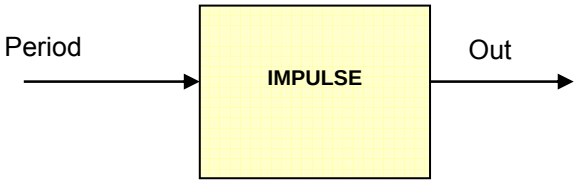


**Availability**

This IQ module is available in one interface format:

1) The C interface version

**Module Properties**

**Type:** Target Independent, Application Independent

**Target Devices:** x281x or x280x

**C Version File Names:** impulse.c, impulse.h

**IQmath library files for C:** IQmathLib.h, IQmath.lib

| Item | C version | Comments |
|---|---|---|
| Code Size□ (x281x/x280x) | 14/14 words | |
| Data RAM | 0 words• | |
| xDAIS ready | No | |
| XDAIS component | No | IALG layer not implemented |
| Multiple instances | Yes | |
| Reentrancy | Yes | |

• Each pre-initialized "_iq" IMPULSE structure consumes 8 words in the data memory

□ Code size mentioned here is the size of the ***calc()*** function

## C Interface

### Object Definition

The structure of IMPULSE object is defined by following structure definition

```
typedef struct { Uint32  Period;      // Input: Period of output in # of sampling cycles (Q0)
                 Uint32  Out;         // Output: Impulse output (0x00000000 or 0x00007FFF)
                 Uint32  Counter;     // Variable: Impulse generator counter (Q0)
                 void  (*calc)();     // Pointer to calculation function
               } IMPULSE;

typedef IMPULSE *IMPULSE_handle;
```

| Item | Name | Description | Format* | Range(Hex) |
|---|---|---|---|---|
| **Input** | Period | Period of output in # of sampling period | Q0 | 00000000-7FFFFFFF |
| **Output** | Out | Impulse output | Q0 | 0 or 00007FFF |
| **Internal** | Counter | Impulse generator counter | Q0 | 00000000-7FFFFFFF |

*GLOBAL_Q valued between 1 and 30 is defined in the IQmathLib.h header file.

### Special Constants and Data types

**IMPULSE**
The module definition is created as a data type. This makes it convenient to instance an interface to the impulse generator. To create multiple instances of the module simply declare variables of type IMPULSE.

**IMPULSE_handle**
User defined Data type of pointer to IMPULSE module

**IMPULSE_DEFAULTS**
Structure symbolic constant to initialize IMPULSE module. This provides the initial values to the terminal variables as well as method pointers.

### Methods

**void impulse_calc(IMPULSE_handle);**

This definition implements one method viz., the impulse generator computation function. The input argument to this function is the module handle.

### Module Usage

**Instantiation**
The following example instances two IMPULSE objects
IMPULSE ig1, ig2;

**Initialization**
To Instance pre-initialized objects
IMPULSE ig1 = IMPULSE_DEFAULTS;
IMPULSE ig2 = IMPULSE_DEFAULTS;

**Invoking the computation function**

```
ig1.calc(&ig1);
ig2.calc(&ig2);
```

**Example**

The following pseudo code provides the information about the module usage.

```
main()
{

}

void interrupt periodic_interrupt_isr()
{
        ig1.Period = input1;                    // Pass inputs to ig1
        ig2.Period = input2;                    // Pass inputs to ig2

        ig1.calc(&ig1);                         // Call compute function for ig1
        ig2.calc(&ig2);                         // Call compute function for ig2

        out1 = ig1.Out;                 // Access the outputs of ig1
        out2 = ig2.Out;                 // Access the outputs of ig2

}
```

**Technical Background**

Implements the following equation:

*Out* = 0x00007FFF, for t = n **.** Tout, n = 1, 2, 3, …….
= 0, otherwise
where,
Tout = Time period of output pulses = *Period* x Ts
Ts = Sampling time period