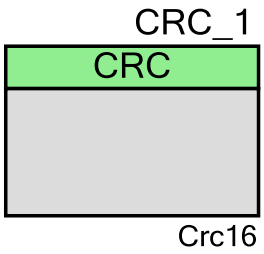
Cyclic Redundancy Check (PDL_CRC)

1.0

Features



- Enables the calculation in:
  - CCITT CRC16 Generator Polynomial: 0x1021
  - IEEE-802.3 CRC32 Generator Polynomial: 0x04C11DB7

General Description

The Peripheral Driver Library CRC (Cyclic Redundancy Check) component is an error detection system. The CRC code is a remainder after an input data string is divided by the pre-defined generator polynomial, assuming the input data string is a high order polynomial. Ordinarily, a data string is suffixed by a CRC code when being sent, and the received data is divided by a generator polynomial as described above. If the received data is dividable, it is judged that the data is correctly received.

This component uses firmware drivers from the PDL_CRC module, which is automatically added to your project after a successful build.

When to Use a PDL_CRC Component

Use the PDL_CRC component when you need the function block that provide calculation in CCITT CRC16 or IEEE-802.3 CRC32. In this module, the generator polynomial is fixed to the numeric values for those two modes; therefore, the CRC value based on other generator polynomials cannot be calculated.

Quick Start

1. Drag a PDL_CRC component from the Component Catalog FMx/Digital/Cyclic Redundancy Check folder onto your schematic. The placed instance takes the name CRC_1.
2. Double-click to open the component's Configure dialog.
3. On the **Basic** tab, set the following parameters:
   - mode of the calculation
   - result endian
   - initial value

4. Build the project to verify the correctness of your design. This will add the required PDL modules to the Workspace Explorer and generate the configuration data for the CRC_1 instance.
5. In the *main.c* file, initialize the peripheral and start the application.

```
#define BUFFER_SIZE (64u)/* Provide here a buffer capacity. */

uint32_t u32CRC_Val;/* The CRC calculation result will be in this integer */
uint8_t u8Count; /* Loop counter*/

/* The buffer which will contain the data which CRC need to calculate */
uint8_t u8DataBuffer[BUFFER_SIZE] = {0};

Crc_Init(&CRC_1_Config);

for(u8Count = 0;u8Count < BUFFER_SIZE; u8Count++)
{
   Crc_Push8(u8DataBuffer[u8Count]);
}

u32CRC_Val= Crc_ReadResult();
```

6. Build and program the device.

Component Parameters

The PDL_CRC component Configure dialog allows you to edit the configuration parameters for the component instance.

Basic Tab

This tab contains the component parameters used in the basic peripheral initialization settings.

Parameter Name	Description
bDataLittleEndian	CRC feed data byte order
bDataLsbFirst	CRC feed data bit order
bFinalXor	Return CRC result as an XOR value
bResultLittleEndian	CRC result byte order
bResultLsbFirst	CRC result bit order
bUseDma	Enable DMA terminal and trigger
enMode	Select 16- or 32-bit standard CRC
u32CrcInitValue	Initial value of the CRC

Component Usage

After a successful build, firmware drivers from the PDL_CRC module are added to your project in the pdl/drivers/crc folder. Pass the generated data structures to the associated PDL functions in your application initialization code to configure the peripheral.

Generated Data

The PDL_CRC component populates the following peripheral initialization data structure(s). The generated code is placed in C source and header files that are named after the instance of the component (e.g. *CRC_1_config.c*). Each variable is also prefixed with the instance name of the component.

Data Structure Type	Name	Description
stc_crc_config_t	CRC_1_Config	Configuration structure. Pass this to Crc_Init() in order to initialize the peripheral.

Once the component is initialized, the application code should use the peripheral functions provided in the referenced PDL files. Refer to the PDL documentation for the list of provided API functions. To access this document, right-click on the component symbol on the schematic and choose "**Open API Documentation…**" in the drop-down menu.

Data in RAM

The generated data may be placed in flash memory (const) or RAM. The former is the more memory-efficient choice if you do not wish to modify the configuration data at run-time. Under the **Built-In** tab of the Configure dialog set the parameter CONST_CONFIG to make your selection. The default option is to place the data in flash.

Code Examples and Application Notes

There are numerous code examples that include schematics and example code available online at the Cypress Code Examples web page.

Cypress also provides a number of application notes describing how FMx devices can be integrated into your design. You can access the Cypress Application Notes search web page at www.cypress.com/appnotes.

Industry Standards

The PDL_CRC component conforms to CCITT CRC16 and IEEE-802.3 CRC32 industry standards.

Resources

The PDL_CRC component uses the CRC (Cyclic Redundancy Check) peripheral block.

References

- FM0+ Family of 32-bit ARM® Cortex®-M0+ Microcontrollers Peripheral Manuals
- Cypress FM0+ Family of 32-bit ARM® Cortex®-M0+ Microcontrollers

Component Changes

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

Version	Description of Changes	Reason for Changes / Impact
1.0.a	Minor datasheet edits.	
1.0	Initial Version	