

Power Manager Integration

Wi-Fi Connectivity Engineering

Exported on 05/13/2025

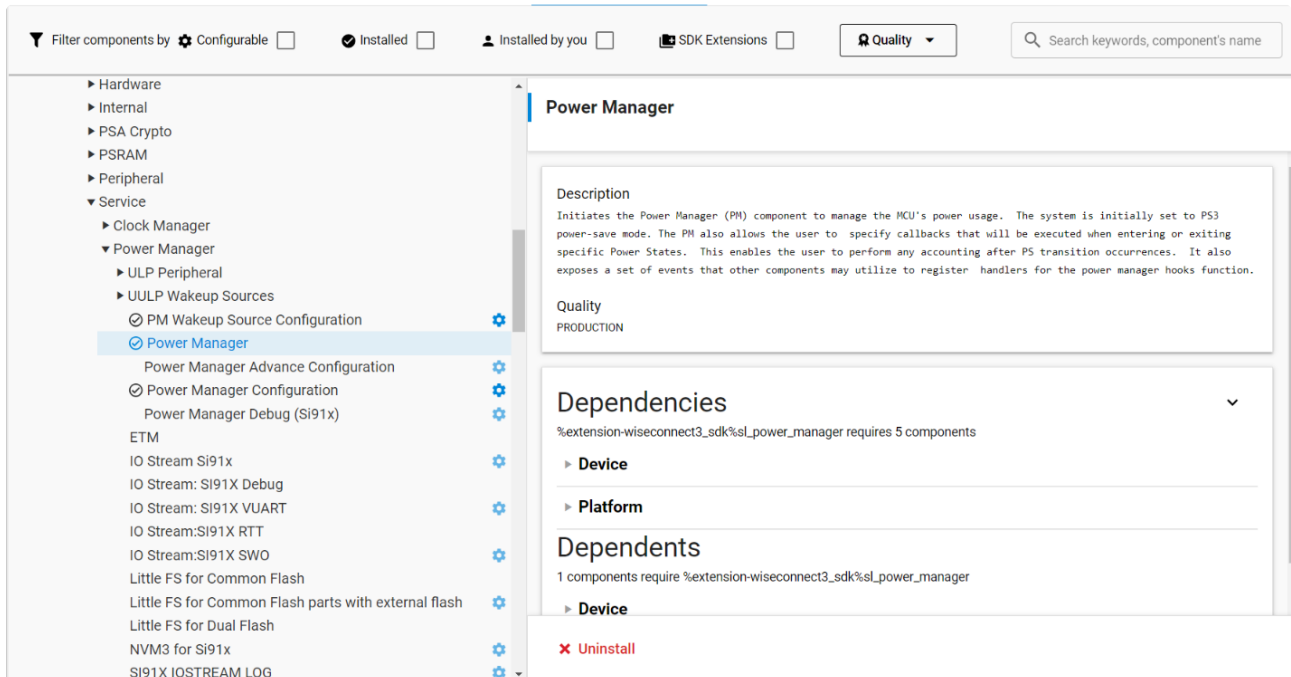
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1 Install Power Manager Component

Install Power Manager Component present under Software Components → Wiseconnect 3 SDK → Device → Si91x → MCU → Service → Power Manager.



This component fetches the power manager dependencies and contributes the event handler template.

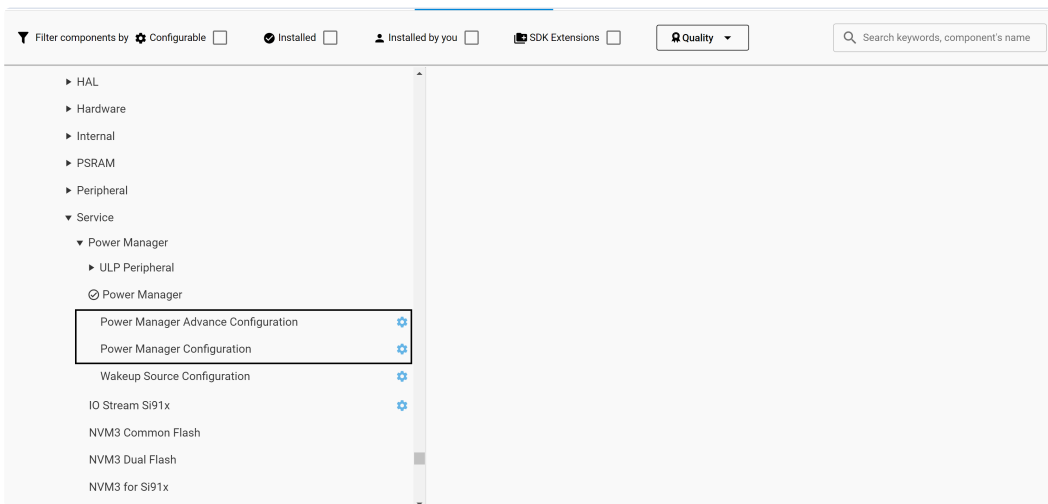
Event handler updates are triggered during state transitions, such as NVIC interrupts or context switches.

Power Manager service is initialized with the installation of this component, user intervention is not required for initializing the Power Manager service.

Note:- The Power Manager Configuration and Wakeup Source Configuration components are automatically installed along with the Power Manager component.

2 Install Power Manager Configuration Component

There are two components present under Software Components → Wiseconnect 3 SDK → Device → Si91x → MCU → Service → Power Manager



1 Power Manager Configuration Components

These components provide control over peripheral enable/disable and RAM retention.

These components contribute to the event handler with the parameter selected in UC and call the required APIs in the event handler template.

Peripheral and RAM retention is configured with the installation of this component, user intervention is not required.

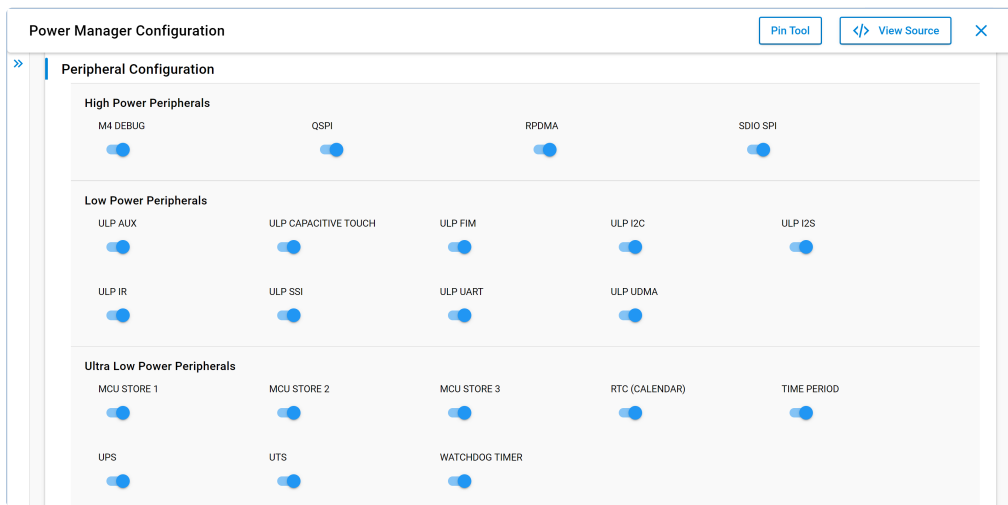
2.1 Power Manager Configuration

This component is a basic configuration component in which the user can select which peripherals need to be powered on/off according to the domain of the peripheral.

Peripheral Configuration includes:

- High Power Peripherals (PS4/PS3)
- Low Power Peripherals (PS2)
- Ultra Low Power Peripherals (All power states)

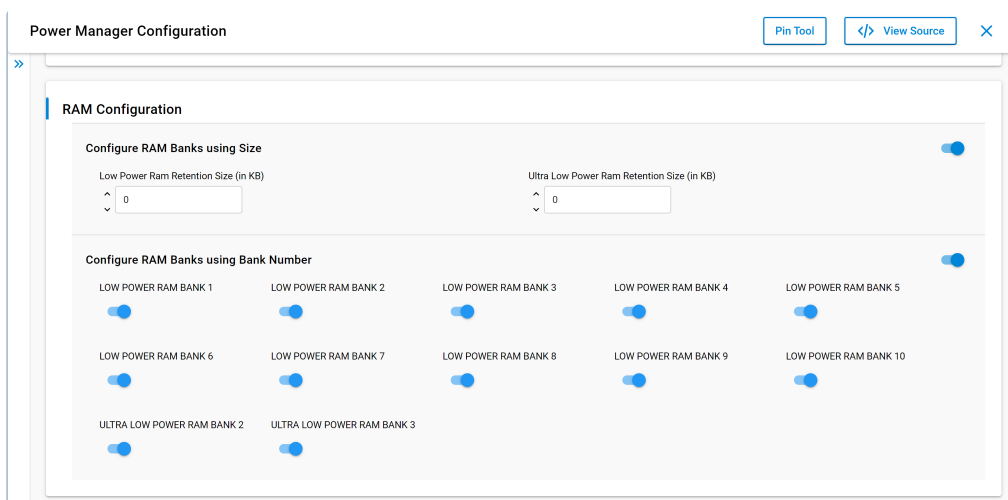
Note: If QSPI is turned off from High Power Peripheral then mcu cannot communicate with TA.



2 Power Manager Configuration: Peripheral Configuration

This component also provides configuration for RAM retention. Two options are provided to configure the RAM Banks i.e. using size or using bank number.

The user needs to select any one option. If both options are selected then the power manager service configures RAM using the bank number.



3 Power Manager Configuration: RAM Configuration

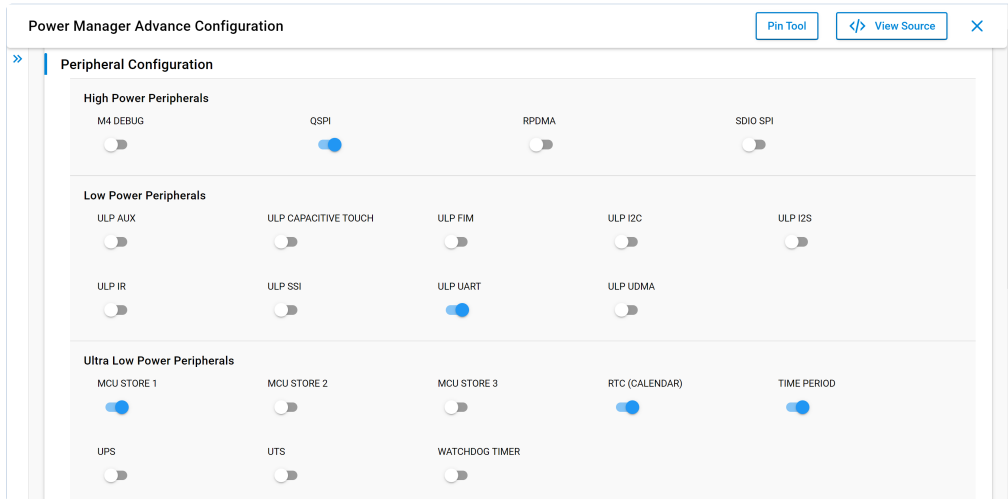
2.2 Power Manager Advance Configuration

This component is an advance configuration component in which the unwanted peripherals and RAM Banks are powered off. LDO configuration is also made to get the optimum power save current.

The user can still configure the peripheral configuration which includes:

- High Power Peripherals (PS4/PS3)
- Low Power Peripherals (PS2)
- Ultra Low Power Peripherals (All power states)

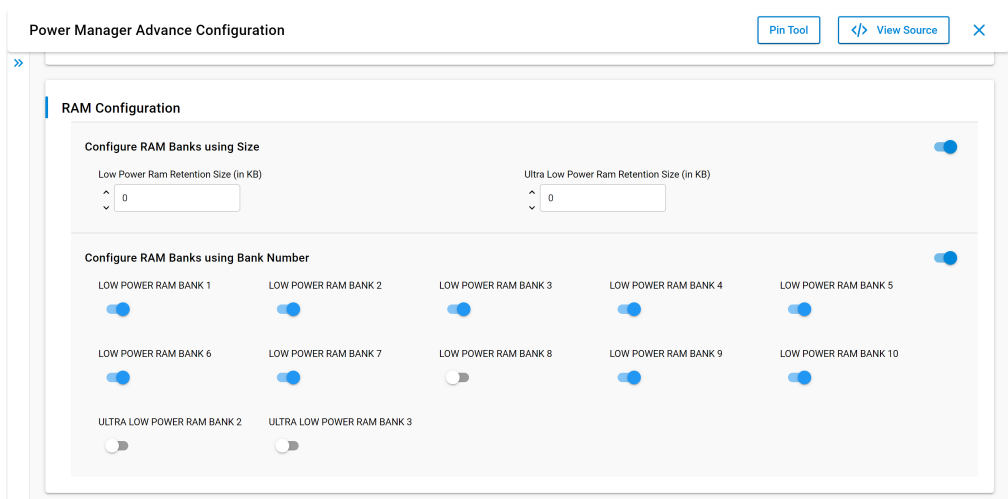
Note: MCU Current may vary as per the selection of peripherals in addition to the default configuration.



4 Power Manager Advance Configuration: Peripheral Configuration

The default configuration for RAM retention is already configured to provide the lowest mcu current but if it is required, the user can configure the RAM Banks using size or bank number.

Note: MCU Current may vary as per the selection of RAM Banks in addition to the default configuration.



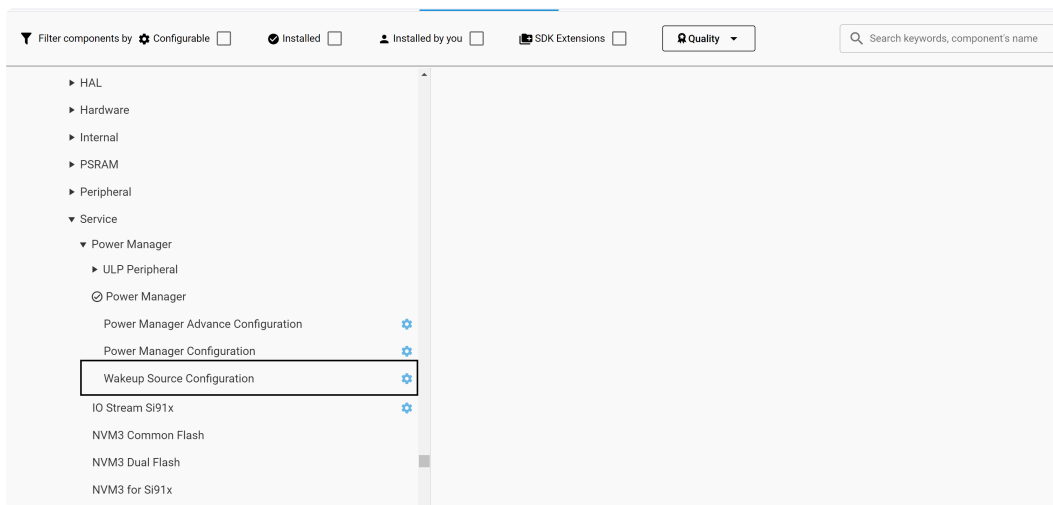
5 Power Manager Advance Configuration: RAM Configuration

3 Install Wakeup Source Configuration Component

Wakeup Source Configuration component is present under Software Components → Wiseconnect 3 SDK → Device → Si91x → MCU → Service → Power Manager

Refer to [Power Manager Low Power Component Installation](https://confluence.silabs.com/spaces/EN/pages/449746230/Power+Manager+Low+Power+Component+Installation)¹ for component installation of ULP peripheral/wake-up source

Note: To use the wakeup source configuration, it is mandatory to install components using the above method for the required peripherals.



6 Wakeup Source Configuration Component

This component provides the initialization and configuration for the NPSS wakeup sources used in PS4 sleep/PS3 sleep/PS2 sleep.

By default, the Alarm Wakeup source is configured with the 5-second alarm trigger

Calendar Wakeup

Second based wake-up source can be enabled using the toggle

Alarm based wake-up source can be enabled and configured in terms of seconds and milliseconds.

¹ <https://confluence.silabs.com/spaces/EN/pages/449746230/Power+Manager+Low+Power+Component+Installation>

The screenshot shows the 'PM Wakeup Source Configuration' window. On the left, a sidebar lists 'Calendar Wakeup', 'GPIO Wakeup', 'Deep Sleep Timer Wakeup', and 'Wireless Wakeup'. The 'Calendar Wakeup' section is selected and expanded. The main area shows 'Calendar Wakeup' with a toggle switch turned on. Below it, 'Enable Second Wakeup Source' is a disabled toggle, and 'Enable Alarm Wakeup Source' is an enabled toggle. To the right, 'Alarm Time (in milliseconds)' is set to 5000. Below these, 'GPIO Wakeup' and 'Deep Sleep Timer Wakeup' are shown as disabled toggles.

GPIO Wakeup

There are 4 NPSS GPIO available which can act as a wake-up source. Enabling the GPIO Wakeup allows the user to select the desired GPIO pin as a wakeup source.

The screenshot shows the 'PM Wakeup Source Configuration' window with 'GPIO Wakeup' selected in the sidebar. The main area shows 'Calendar Wakeup' as a disabled toggle. The 'GPIO Wakeup' section is expanded, showing four options: 'Enable NPSS GPIO 0', 'Enable NPSS GPIO 1', 'Enable NPSS GPIO 2', and 'Enable NPSS GPIO 3', all of which are disabled toggles. Below this, 'Deep Sleep Timer Wakeup' and 'Wireless Wakeup' are shown as disabled toggles.

Deep Sleep Timer

Deep Sleep Timer can be enabled using the toggle and the sleep time is also configurable.

Wakeup Source Configuration
Pin Tool
</> View Source
X

Calendar Wakeup

GPIO Wakeup

WDT Wakeup

Deep Sleep Timer Wakeup

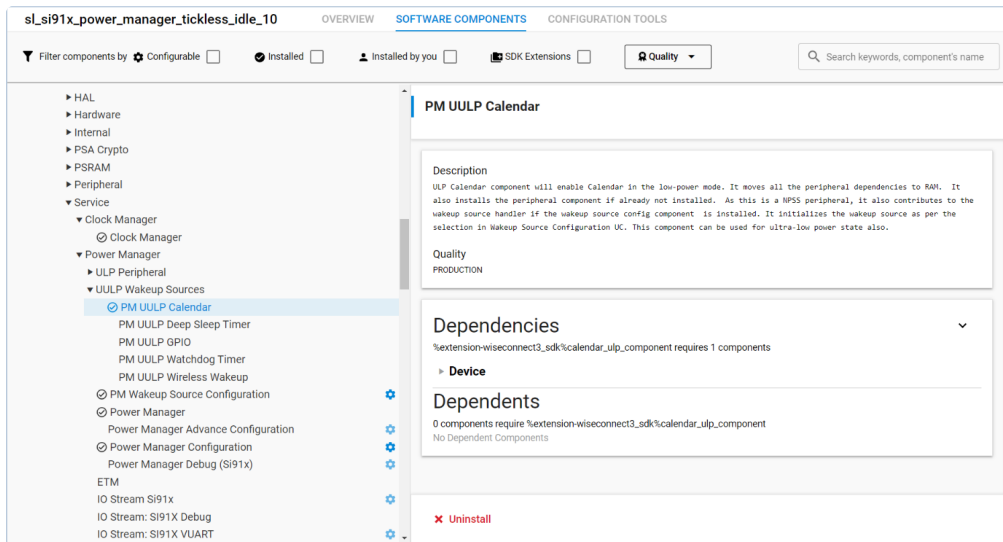
Sleep Time
500

Wireless Wakeup

7 Wakeup Source Configuration: Deep Sleep Timer

4 Install the NPSS peripheral component for the selected wake-up source

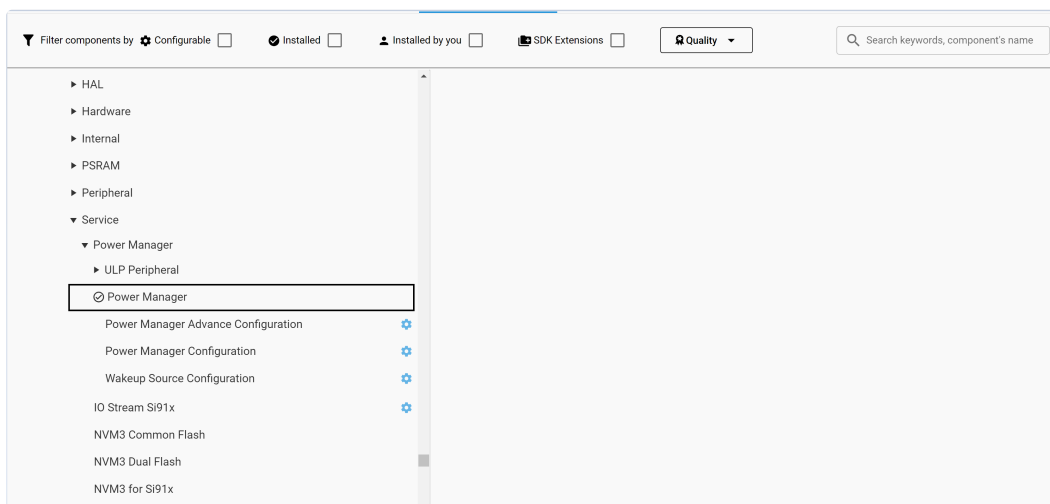
Install the components that are selected as a wakeup source.



5 Low Power Component Installation

5.1 Install Power Manager Component

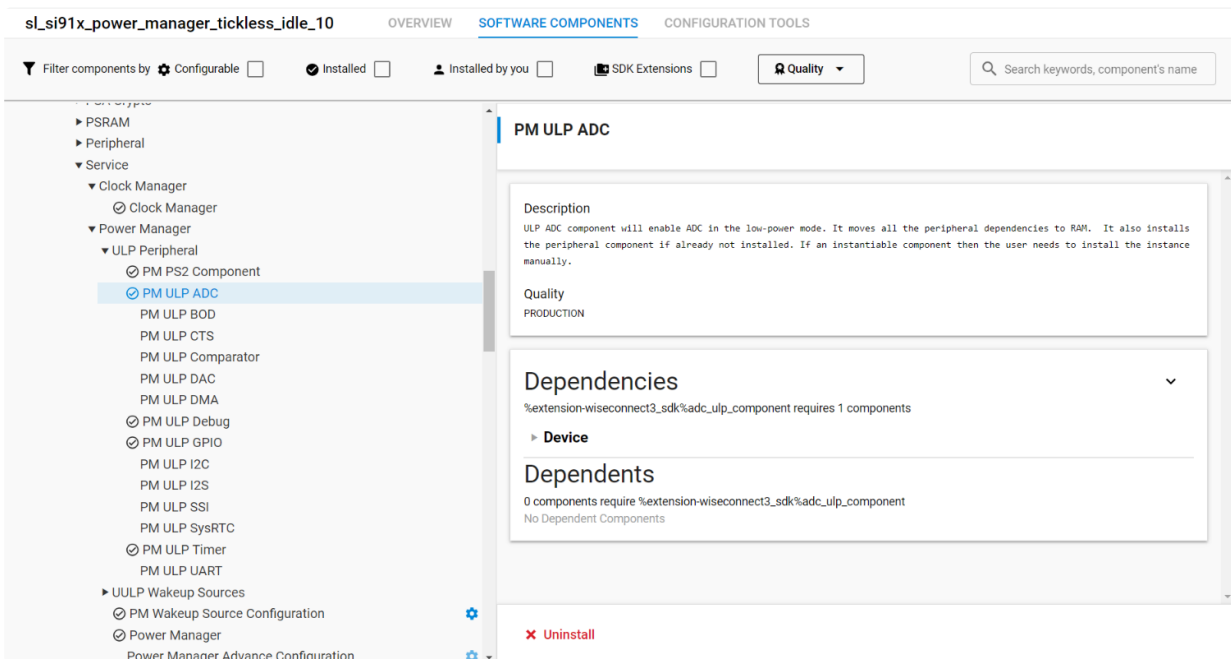
Install Power Manager Component present under Software Components → Wiseconnect 3 SDK → Device → Si91x → MCU → Service → Power Manager.



8 Power Manager Component

5.2 Navigate to the ULP Peripheral Section in the Software Components

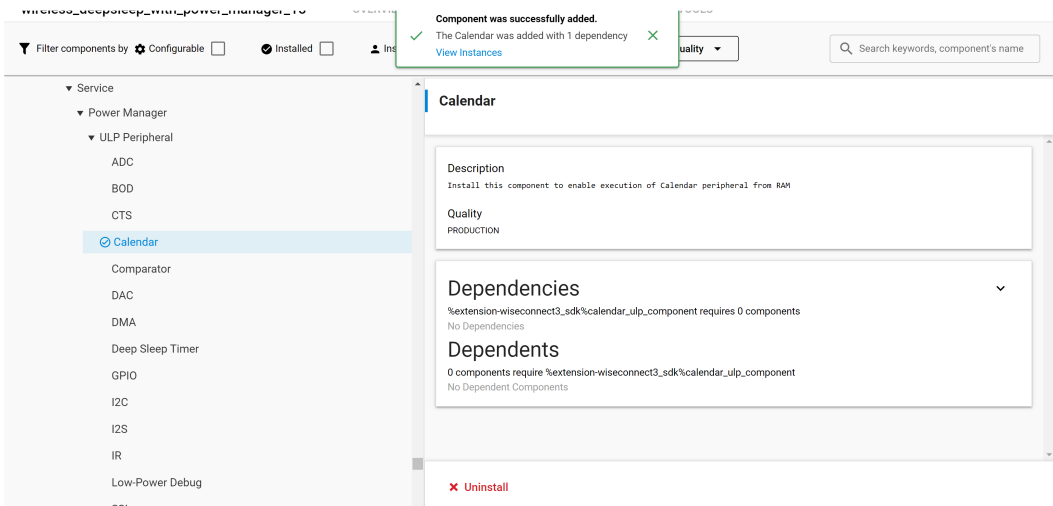
The ULP peripheral component list is present under Software Components → Wiseconnect 3 SDK → Device → Si91x → MCU → Service → Power Manager → ULP Peripheral



5.3 Install the required ULP Peripheral Component

Choose the desired component and install it.

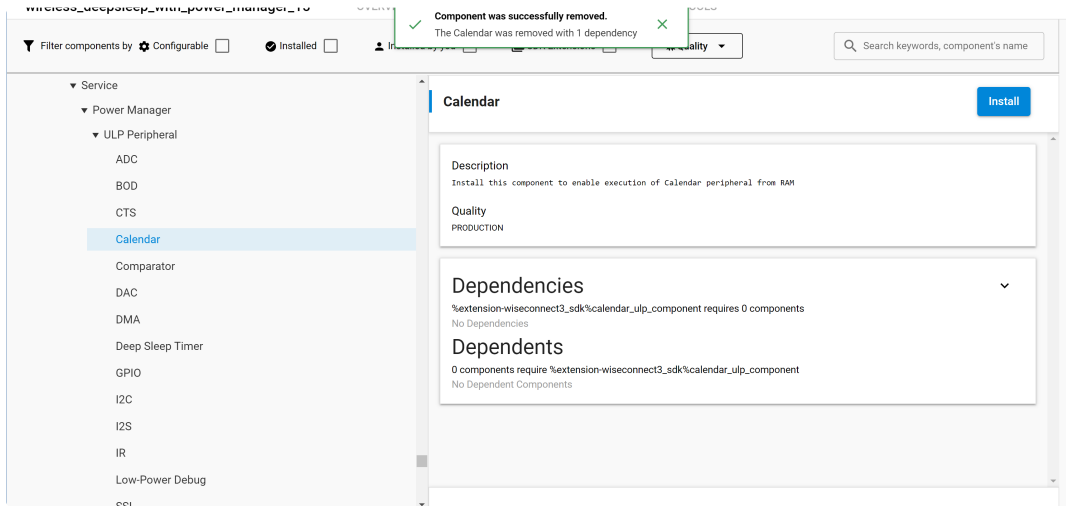
After installation, the basic required components and the dependencies of the peripheral are added to the RAM, i.e., excluded from the (.text) section and included in the (.data) section.



9 Installation of ULP Calendar Component

5.4 Uninstalling the ULP Peripheral Component

If any peripheral is no longer required, it can be uninstalled from the same path.



10 Un-Installation of ULP Calendar Component

Here the linker file will be reverted to the stage how it was before installing the component.

6 Example

6.1 Steps for PS2 state change

- Install Power Manager Component
- Install required low-power peripheral component (if required)
- Include Power Manager header file
- Call the below power manager API

```
#include "sl_si91x_power_manager.h"

void application_function(void)
{
    sl_si91x_power_manager_add_ps_requirement(SL_SI91X_POWER_MANGER_PS2);
}
```