M051 CEC Protocol Implementation

Example Code Introduction for 32-bit NuMicro® Family

Information

Application	This code uses M051 to send and receive CEC command
BSP Version	M051 Series BSP CMSIS v3.01.001
Hardware	**NuTiny-SDK-M051**

1 Function Description

This example code implements CEC protocol with P3.3 and TIMER3 of M051 MCU. User should connect P3.3 with pull high resister to CEC line of HDMI bus. Then he can send CEC command or data to other device through the CEC line and receive other device's CEC command and data. Once the CEC address matched, M051 will acknowledge the sender automatically.

2 Code Description

Send CEC command:

```
/*  send CEC command: Standby*/
   SendCECCommand(Standby);


/**
 * @brief This function is send CEC command
 * @param[in] CECCommand, command index
 * @return none
 * @note this functun is called when user want to send CEC command
  */
void SendCECCommand(uint8_t CECCommand)
{
   while (u8CECTRStatus != CECIdle);     //wait CEC bus enter idle state, then start transmit
   switch (CECCommand)
   {
        case    Standby:       //
          au8CECTxData[1] = Standby;
          u8CECTxLength = 2;              //total data length should be send
          SendData(u8CECTxLength);
          while (u8CECTRStatus != CECIdle);  //waitting CEC data transfer over, customer can run their code,  and
                                             check this flag in main loop
          printf("ACKbit=:0x %x, \n", u16CECAckFlag);
          break;
   }
}
```

Check CEC received data:

```
/* if  protocol stack received a CEC package, it will setting u8CECGetData to 1, user program should check this
flag in their main loop and process the data */
   if (u8CECGetData)       //received  CEC data from CEC line
   {
      u8CECGetData = 0;
      printf("Received:");

      for (j = 0; j < u8CECRxLength; j++)
         printf("%x, ", au8CECRxData[j]);              //print received data
         printf(" \n");
         CECDecoderCommand();       //decoder received CEC command
    }
```

3 Hardware and Software environment

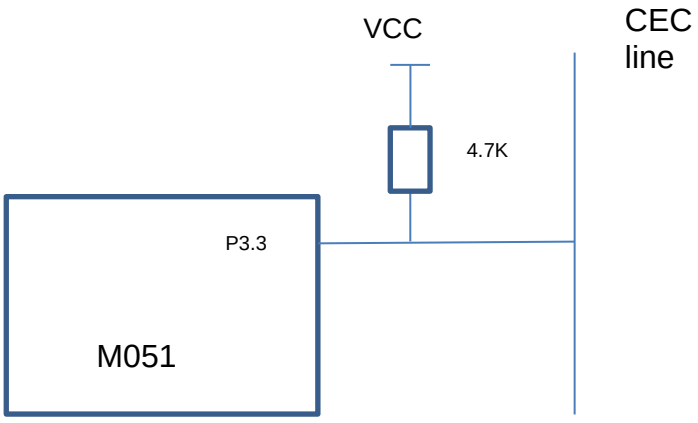
Software Environment

- BSP version
  - M051 Series BSP CMSIS v3.01.001
- Project Name
  - Smpl_CEC.uvproj

Hardware Environment

- Circuit components
  - **NuTiny-SDK-M051**
- Diagram

The CEC bus has arbitration function just like I2C, so we should set the CEC pin as open drain mode with pull up resister, then connect the CEC pin to HDMI bus's CEC line



4 Directory Information

- EC_M051_CEC_V1.00
  - Library: Sample code header and source files.
    - CMSIS: Cortex® Microcontroller Software Interface Standard (CMSIS) V4.5.0 defined by ARM® Corp.
    - Device: CMSIS compliant device header file.
    - StdDriver: All peripheral driver header and source files.
  - SampleCode
    - Example: Source file of example code.

5 How to execute this sample code

1. Support Keil MDK uVersion 4.6 or later
2. Browsing into sample code folder by Directory Information (section 4) and double click M051_CEC.uvproj
3. Enter Keil compile mode
   a. Build
   b. Download
   c. Start/Stop debug session
4. Enter debug mode
   a. Run

6 Revision History

Date	Revision	Description
Sep. 25, 2019	1.00	1. Initially issued.

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