

IBDAP - User Manual

Armstart – Makers helping makers

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Introduction

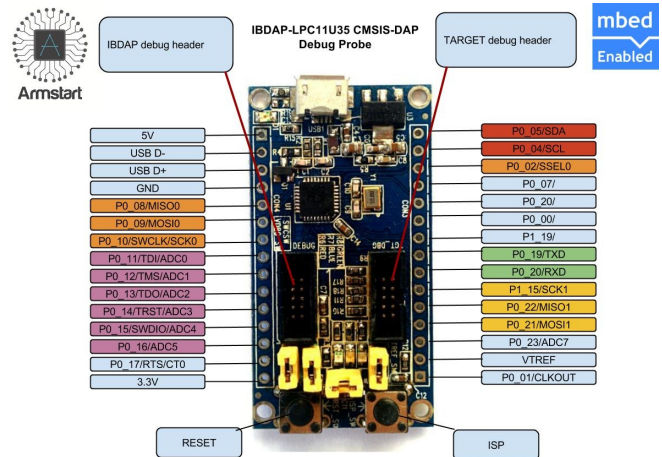
IBDAP is a fully CMSIS-DAP compatible debug adapter. It provides vendor independent debug interface between your PC over USB and target ARM device over JTAG/SWD pins. You can do functions like stepping, breakpoints, watch points and firmware programming etc. It's fully supported by Keil, OpenOCD, GNU GDB, IAR and other commonly used debugging tools.

Besides being functioning as a JTAG/SWD debug probe, IBDAP could also be used as a general development board. It has an ARM Cortex M0 processor running at 48Mhz and has peripherals like UART, I2C, SPI, USB. It can be used in many applications like USB audio devices, USB mouse/keyboards, USB mass storage devices, USB-TTL adapter device and many many more. Moreover, the 10-bit high precision ADC peripheral also makes IBDAP an ideal device for any sensor projects.

IBDAP Pinmap

IBDAP schematic is provided and can be downloaded from the following link:

https://s3.amazonaws.com/armstart/Debug+Tools/IBDAP-LPC11U35/IBDAP-LPC11U35_SCH.pdf



Features:

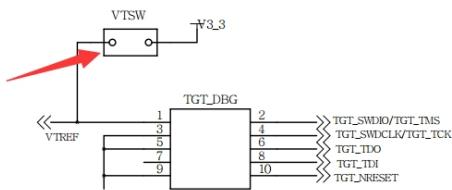
- NXP LPC11U35FH133/501 ARM Cortex M0 48Mhz processor
- 64kB Flash, 12kB RAM, 2kB EEPROM
- 1xUSART, 1xI2C, 2xSPI, 1xUSB2.0, 8xADC(10-bit), 26xGPIO
- Armstart GNU gcc-arm and make implementation of CMSIS-DAP with source codes provided.
- Supports mbed programming.

Supported target processors including but not limited to:

- NordicSemi nRF51822
- Atmel ARM Cortex-M series of processors
- NXP ARM Cortex-M series of processors
- Freescale ARM Cortex-M series of processors

IBDAP voltage levels and power supply

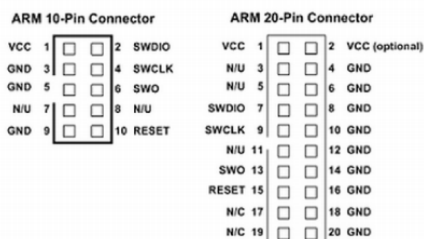
IBDAP supports target boards that run at 3.3V level. The VTSW jumper (please refer to schematic file) is used to enable or disable 3.3V direct power supply to the target board, a convenient way to provide powers directly from debug cable.



Target Debug

In case that the target board requires 20-pin 0.01" JTAG header or some none standard connector, you can always easily bridge the IBDAP TGT_DBG connector over using the IBDAPC10J20 ARM 20-pin 0.1" to Cortex 10-pin 0.05" JTAG/SWD Adapter.

<http://www.armstart.com/products/ibdap-cmsis-dap-itag-swd-firmware-debug-probe>



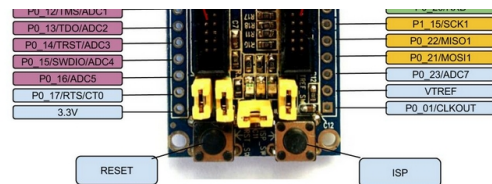
Using IBDAP as a CMSIS-DAP Debugger

Flash IBDAP firmware onto IBDAP board

By pressing RESET and ISP buttons at the same time and then release them, a USB mass storage device will be shown up with a single file "firmware.bin". Delete it and paste in the IBDAP-latest.bin file from below, then press RESET button again. Now Firmware flashing complete.

Firmware Binary: <https://s3.amazonaws.com/armstart/Debug+Tools/IBDAP-LPC11U35/IBDAP-latest.bin>

Firmware source code: <https://github.com/Armstart-com/IBDAP-CMSIS-DAP>



How to build IBDAP firmware from source

To building IBDAP CMSIS-DAP firmware you need Linux/Ubuntu. You also need to install GNU ARM embedded toolchain, which can be download from here:

<https://launchpad.net/gcc-arm-embedded>

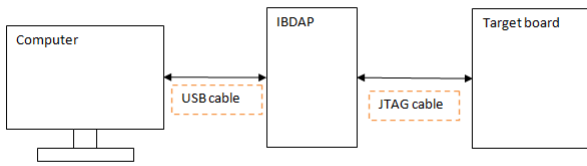
Open a Terminal and run the following command to build IBDAP.bin:

```
$ git clone https://github.com/Armstart-com/IBDAP-CMSIS-DAP.git
$ cd build/
$ make
```

How to use IBDAP to debug a target device

Connect IBDAP's TGT_DBG 10-pin header to the target board (note, VTREF pin at TGT_DBG provides 3.3V for the target board, but you can switch off by removing the corresponding jumper), connect IBDAP and PC via USB cable.

The target board should be connected to IBDAP before Keil/OpenOCD starts communication with it.



If your system is Windows, you should be able to see a USB HID device called "IBDAP-LPC11U35 CMSIS-DAP" in your control panel.



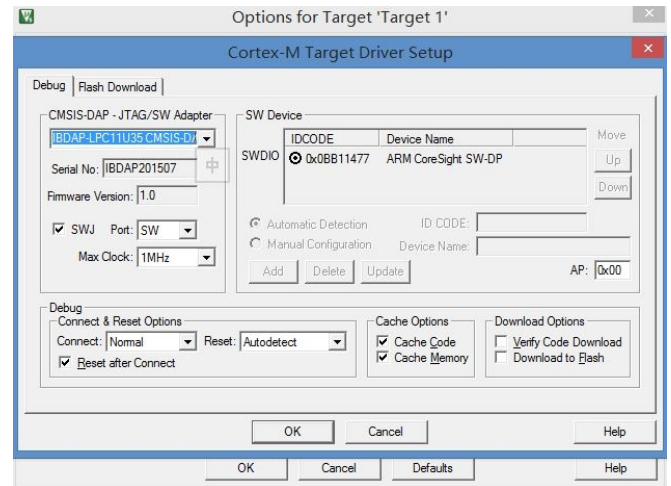
IBDAP-LPC11U35
5 CMSIS-DAP

5 / 8

If you are using Keil

From your Keil project, click on "Options for Target" button just besides the target, choose "Debug" tab, select use: "CMSIS-DAP Debugger", then click "settings", you should be able to see the "IBDAP-LPC11U35 CMSIS-DAP" device as the picture shown below, if yes, then we are all set.

Note: For some devices, nRF51822 for example, Keil doesn't have the correct Flash Erase algorithm for full-chip erase, if you have any issue flashing, please use OpenOCD method instead.



6 / 8

If you are using OpenOCD

OpenOCD can be installed on **Windows, Linux** and **Mac OS**. If you want to install the prebuilt binaries instead of building from source code yourself, you can download from sourceforge: <http://sourceforge.net/projects/gnuarmclipse/files/OpenOCD/>

If you prefer building from source code, please refer to the "How to build IBDAP firmware from source" section.

Here we used IB51822 as our target device to demonstrate how to flash firmware onto a nRF51822 BLE ARM Cortex M0 device..

First run the following command in a terminal to start OpenOCD:

```
$ openocd.exe -f interface/cmsis-dap.cfg -f target/nrf51.cfg
```

Then run telnet in another terminal to flash your firmware.hex onto IB51822:

```
$ telnet localhost 4444
> reset halt
> flash write_image erase /file/path/to/firmware.hex oxo
```

7 / 8

Use IBDAP as general development board

IBDAP uses NXP LPC11U35FHI33/501 ARM Cortex M0 chip, and LPCXpresso or mbed can be used to develop firmwares.

- LPCXpresso: <http://www.lpcware.com/lpcxpresso>
- mbed: <https://developer.mbed.org/>

For more information please refer to the corresponding websites.

8 / 8