

User Guide

N32G030KxL7-STB Development Board Hardware User Guide

Introduction

The purpose of this document is to allow users to quickly familiarize themselves with N32G030K8L7-STB and N32G030K6L7-STB development board, understand the functions, instructions and precautions of the development board, so as to conduct MCU debugging and development based on the development board.

The use of N32G030K8L7-STB and N32G030K6L7-STB is the same, this article takes N32G030K8L7-STB as an example

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1 Hardware Development Instructions

1.1 Briefly

The N32G030K8L7-STB development board is used for sample development of 32-bit N32G030K8L7series chips of Nations Technology Co., Ltd. This document describes the functions, usage instructions and precautions of the N32G030K8L7-STB development board in detail.

1.2 Development board function

The main MCU chip of the development board is N32G030K8L7, and it is packaged with LQFP32 pins. The development board connects all functional interfaces to facilitate customer development.

1.3 Development board layout

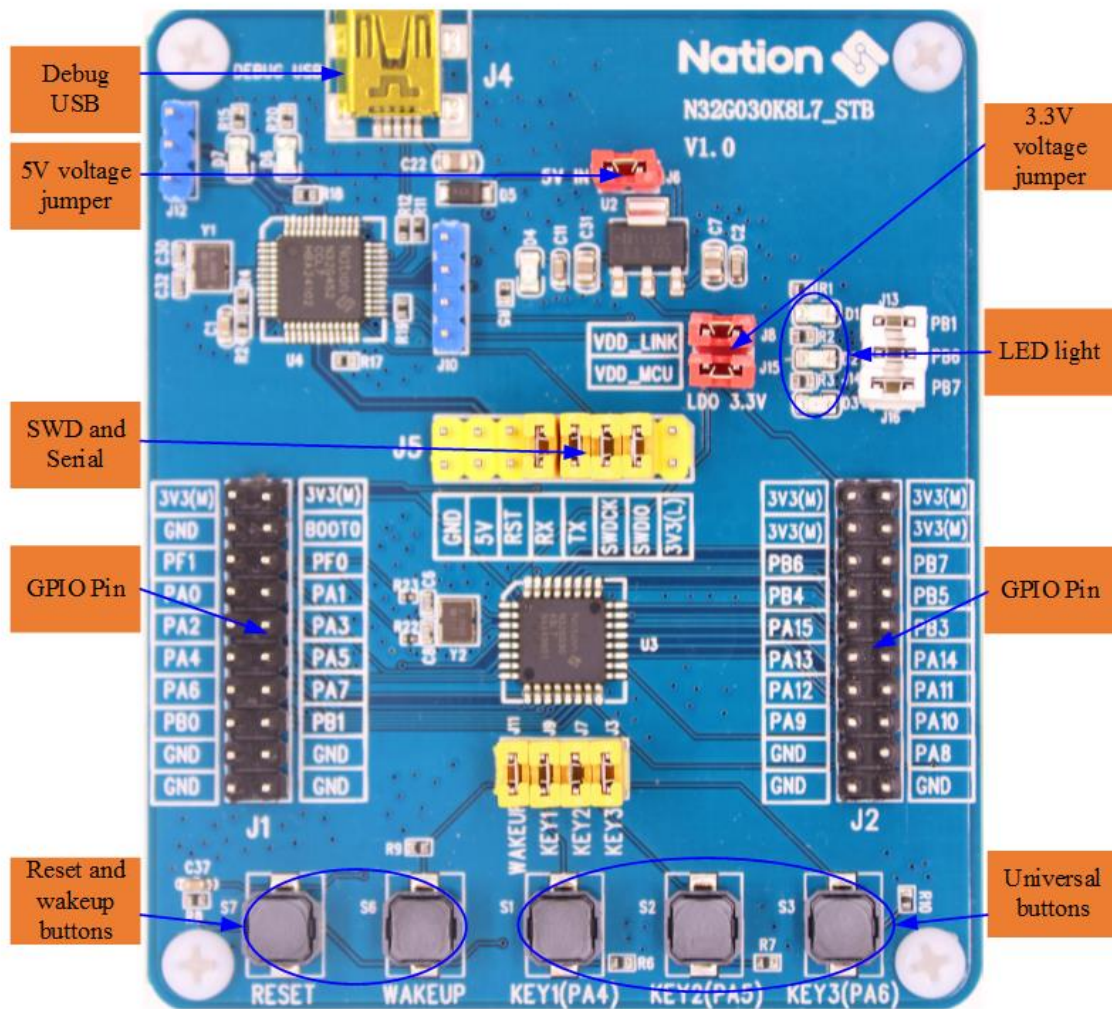


Figure 1-1 Development board layout

1) Power supply for the development board

The development board can be powered by DEBUG USB (J4), and connected to 3.3V LDO input port through J6 jumper.

2) Debug USB (J4)

Through the DEBUG USB interface of NS-LINK chip (U4), it can provide MCU program download debugging function, or connect the serial port of MCU to provide USB serial port function.

3) SWD interface and Serial port (J5)

SWD interface: SWDIO and SWDCK, used to download and debug the main MCU program, you can use ULINK2 or JLINK to download and debug the MCU, or you can short the SWDIO signal pin and the SWDCK signal pin with the jumper cap, and download the MCU through DEBUG USB debugging.

Serial port: MCU_TX and MCU_RX, used as serial port external signal, MCU's PA9 (TX) and PA10 (RX) are used as serial port, which can be connected to serial port devices separately, or the jumper cap can short the MCU_TX signal pin and the MCU_RX signal pin, Through the NS-LINK on the development board, the USB port is converted into a serial port, which is convenient for customers to use.

4) Reset and Wake Buttons (S7, S6)

S7 and S6 are the reset button and wake-up button respectively, Connect the chip's NRST pin and PA0-WKUP pin respectively for chip reset and wake-up functions.

5) Universal keys (S1, S2, S3)

S1, S2, and S3 are general buttons, which are connected to the pins PA4, PA5 and PA6 of the chip respectively.

6) BOOT (J1 PIN4)

J1 PIN4 is BOOT0 pin, which can be shorted to power and ground through jumper caps as needed.

7) GPIO (J1, J2)

The GPIO interface of the chip is all led out, and the 3.3V voltage and GND pins are also reserved on the pins, which is convenient for testing. For the specific definition of the interface, please refer to "DS_N32G030 Series Datasheet".

1.4 Development Board Jumper Instructions

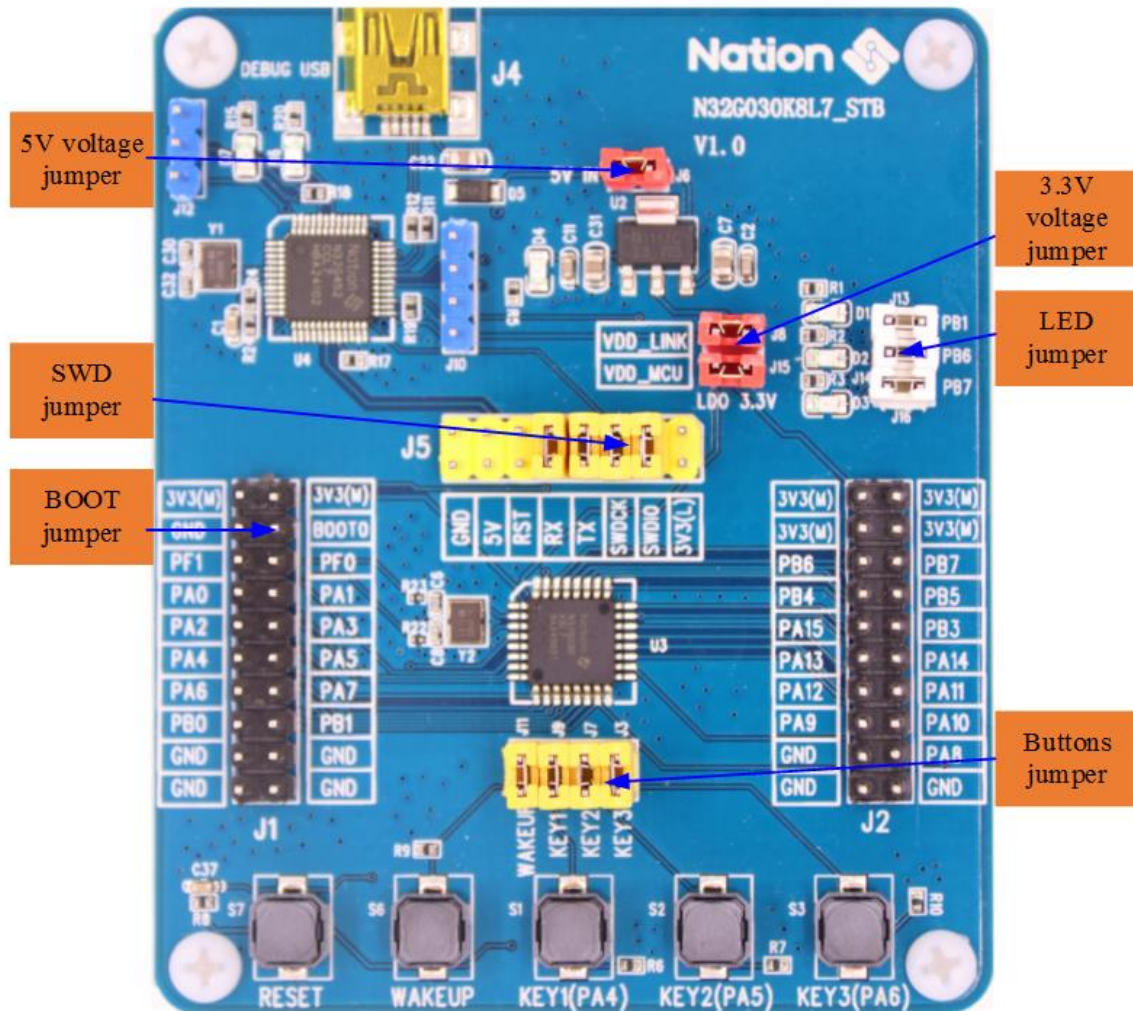


Figure 1-2 Development Board Jumper Description

Table 1-1 Development Board Jumper Description List

No.	Jumper bit number	Jumper function	Instructions for use
1	J6	5V input voltage jumper	The jumper J6 is used to connect the USB ports J4 to supply power to the LDO3.3V input port.
2	J8、J15	3.3V Power supply jumper	J8: Power supply 3.3V to NS-LINK MCU chip. J15: Power supply 3.3V to the main MCU chip.
3	J5	SWD jumper	Use NS-LINK to download the program to the MCU through the USB DEBUG port, you need to short-circuit the SWDIO signal pin and the SWDCK signal pin.
	J5	Serial jumper	When using NS-LINK as a serial port through the USB DEBUG port, you need to short-circuit the MCU_TX signal pin and the MCU_RX signal pin.
4	J1 PIN4	BOOT jumper	J1 PIN4: BOOT0.
5	J13、J14、J16	LED light jumper	LED light jumper to disconnect GPIO from LED J13: D1(PB1) J14: D2(PB6) J16: D3(PB7)
6	J3、J7、J9、J11	button jumper	Button jumper to disconnect the GPIO from the button J9: KEY1(PA4) J7: KEY2 (PA5) J3: KEY3(PA6) J11: WAKEUP(PA0)

1.5 Development board schematic

The schematic diagram of the N32G030K8L7-STB development board is described as follows (For details, please refer to "N32G030K8L7-STB_V1.0").

1) MCU connection

Refer to Figure 1-3 for the schematic diagram of the MCU connection. Each VDD pin of the MCU is

The schematic diagram illustrates the MCU board's internal components and connections. At the center is the **U3 N32G030K8L7** microcontroller. Key connections include:

- Power and Ground:** VDD and VSS pins are connected to the VDD_MCU and GND rails. A 0.1uF capacitor (C53) is placed near the VDD pin.
- Reset:** The NRST pin (pin 4) is connected to the NRST input of the MCU and to a pull-up resistor (R23) leading to PF0.
- Wakeup:** The PA0_WKUP pin (pin 6) is connected to the PA0 pin of the MCU and to a pull-up resistor (R22) leading to PF1.
- Crystal Oscillator:** An 8MHz crystal (Y2) is connected to pins 2 (VDD) and 3 (PF1-OSC_IN). Pin 1 (VDD) is connected to the VDD_MCU rail. Pin 4 (NRST) is connected to the NRST input. Pin 5 (VDDA) is connected to the VDD_MCU rail. Pin 6 (PA0_WKUP) is connected to the PA0 pin. Pin 7 (PA0) is connected to the PA0 pin. Pin 8 (PA2) is connected to the PA2 pin.
- Bootloader:** The BOOT0 pin (pin 31) is connected to the BOOT0 input of the MCU and to a pull-up resistor (R23) leading to PF0.
- Other Pins:** PA14, PA13, PA12, PA11, PA10, PA9, PA8, and VDD are connected to the VDD_MCU rail. PA15, PA14, PA13, PA12, PA11, PA10, PA9, PA8, and VDD are connected to the VDD_MCU rail.

The board also features two **HEAD2X10** connectors (J1 and J2) for external components. J1 connects to PF0, PF1, PA0, PA1, PA2, PA3, PA4, PA5, PA6, PA7, PA8, PA9, PA10, PA11, PA12, PA13, PA14, PA15, and VDD. J2 connects to PA8, PA11, PA14, PA15, PA16, PA17, PA18, PA19, PA20, PA21, PA22, PA23, PA24, PA25, PA26, PA27, PA28, PA29, PA30, PA31, PA32, PA33, PA34, PA35, PA36, PA37, PA38, PA39, PA40, PA41, PA42, PA43, PA44, PA45, PA46, PA47, PA48, PA49, PA50, PA51, PA52, PA53, PA54, PA55, PA56, PA57, PA58, PA59, PA60, PA61, PA62, PA63, PA64, PA65, PA66, PA67, PA68, PA69, PA70, PA71, PA72, PA73, PA74, PA75, PA76, PA77, PA78, PA79, PA80, PA81, PA82, PA83, PA84, PA85, PA86, PA87, PA88, PA89, PA90, PA91, PA92, PA93, PA94, PA95, PA96, PA97, PA98, PA99, PA100, PA101, PA102, PA103, PA104, PA105, PA106, PA107, PA108, PA109, PA110, PA111, PA112, PA113, PA114, PA115, PA116, PA117, PA118, PA119, PA120, PA121, PA122, PA123, PA124, PA125, PA126, PA127, PA128, PA129, PA130, PA131, PA132, PA133, PA134, PA135, PA136, PA137, PA138, PA139, PA140, PA141, PA142, PA143, PA144, PA145, PA146, PA147, PA148, PA149, PA150, PA151, PA152, PA153, PA154, PA155, PA156, PA157, PA158, PA159, PA160, PA161, PA162, PA163, PA164, PA165, PA166, PA167, PA168, PA169, PA170, PA171, PA172, PA173, PA174, PA175, PA176, PA177, PA178, PA179, PA180, PA181, PA182, PA183, PA184, PA185, PA186, PA187, PA188, PA189, PA190, PA191, PA192, PA193, PA194, PA195, PA196, PA197, PA198, PA199, PA200, PA201, PA202, PA203, PA204, PA205, PA206, PA207, PA208, PA209, PA210, PA211, PA212, PA213, PA214, PA215, PA216, PA217, PA218, PA219, PA220, PA221, PA222, PA223, PA224, PA225, PA226, PA227, PA228, PA229, PA230, PA231, PA232, PA233, PA234, PA235, PA236, PA237, PA238, PA239, PA240, PA241, PA242, PA243, PA244, PA245, PA246, PA247, PA248, PA249, PA250, PA251, PA252, PA253, PA254, PA255, PA256, PA257, PA258, PA259, PA260, PA261, PA262, PA263, PA264, PA265, PA266, PA267, PA268, PA269, PA270, PA271, PA272, PA273, PA274, PA275, PA276, PA277, PA278, PA279, PA280, PA281, PA282, PA283, PA284, PA285, PA286, PA287, PA288, PA289, PA290, PA291, PA292, PA293, PA294, PA295, PA296, PA297, PA298, PA299, PA300, PA301, PA302, PA303, PA304, PA305, PA306, PA307, PA308, PA309, PA310, PA311, PA312, PA313, PA314, PA315, PA316, PA317, PA318, PA319, PA320, PA321, PA322, PA323, PA324, PA325, PA326, PA327, PA328, PA329, PA330, PA331, PA332, PA333, PA334, PA335, PA336, PA337, PA338, PA339, PA340, PA341, PA342, PA343, PA344, PA345, PA346, PA347, PA348, PA349, PA350, PA351, PA352, PA353, PA354, PA355, PA356, PA357, PA358, PA359, PA360, PA361, PA362, PA363, PA364, PA365, PA366, PA367, PA368, PA369, PA370, PA371, PA372, PA373, PA374, PA375, PA376, PA377, PA378, PA379, PA380, PA381, PA382, PA383, PA384, PA385, PA386, PA387, PA388, PA389, PA390, PA391, PA392, PA393, PA394, PA395, PA396, PA397, PA398, PA399, PA400, PA401, PA402, PA403, PA404, PA405, PA406, PA407, PA408, PA409, PA410, PA411, PA412, PA413, PA414, PA415, PA416, PA417, PA418, PA419, PA420, PA421, PA422, PA423, PA424, PA425, PA426, PA427, PA428, PA429, PA430, PA431, PA432, PA433, PA434, PA435, PA436, PA437, PA438, PA439, PA440, PA441, PA442, PA443, PA444, PA445, PA446, PA447, PA448, PA449, PA450, PA451, PA452, PA453, PA454, PA455, PA456, PA457, PA458, PA459, PA460, PA461, PA462, PA463, PA464, PA465, PA466, PA467, PA468, PA469, PA470, PA471, PA472, PA473, PA474, PA475, PA476, PA477, PA478, PA479, PA480, PA481, PA482, PA483, PA484, PA485, PA486, PA487, PA488, PA489, PA490, PA491, PA492, PA493, PA494, PA495, PA496, PA497, PA498, PA499, PA500, PA501, PA502, PA503, PA504, PA505, PA506, PA507, PA508, PA509, PA510, PA511, PA512, PA513, PA514, PA515, PA516, PA517, PA518, PA519, PA520, PA521, PA522, PA523, PA524, PA525, PA526, PA527, PA528, PA529, PA530, PA531, PA532, PA533, PA534, PA535, PA536, PA537, PA538, PA539, PA540, PA541, PA542, PA543, PA544, PA545, PA546, PA547, PA548, PA549, PA550, PA551, PA552, PA553, PA554, PA555, PA556, PA557, PA558, PA559, PA560, PA561, PA562, PA563, PA564, PA565, PA566, PA567, PA568, PA569, PA570, PA571, PA572, PA573, PA574, PA575, PA576, PA577, PA578, PA579, PA580, PA581, PA582, PA583, PA584, PA585, PA586, PA587, PA588, PA589, PA590, PA591, PA592, PA593, PA594, PA595, PA596, PA597, PA598, PA599, PA600, PA601, PA602, PA603, PA604, PA605, PA606, PA607, PA608, PA609, PA610, PA611, PA612, PA613, PA614, PA615, PA616, PA617, PA618, PA619, PA620, PA621, PA622, PA623, PA624, PA625, PA626, PA627, PA628, PA629, PA630, PA631, PA632, PA633, PA634, PA635, PA636, PA637, PA638, PA639, PA640, PA641, PA642, PA643, PA644, PA645, PA646, PA647, PA648, PA649, PA650, PA651, PA652, PA653, PA654, PA655, PA656, PA657, PA658, PA659, PA660, PA661, PA662, PA663, PA664, PA665, PA666, PA667, PA668, PA669, PA670, PA671, PA672, PA673, PA674, PA675, PA676, PA677, PA678, PA679, PA680, PA681, PA682, PA683, PA684, PA685, PA686, PA687, PA688, PA689, PA690, PA691, PA692, PA693, PA694, PA695, PA696, PA697, PA698, PA699, PA700, PA701, PA702, PA703, PA704, PA705, PA706, PA707, PA708, PA709, PA710, PA711, PA712, PA713, PA714, PA715, PA716, PA717, PA718, PA719, PA720, PA721, PA72

2) Power Design

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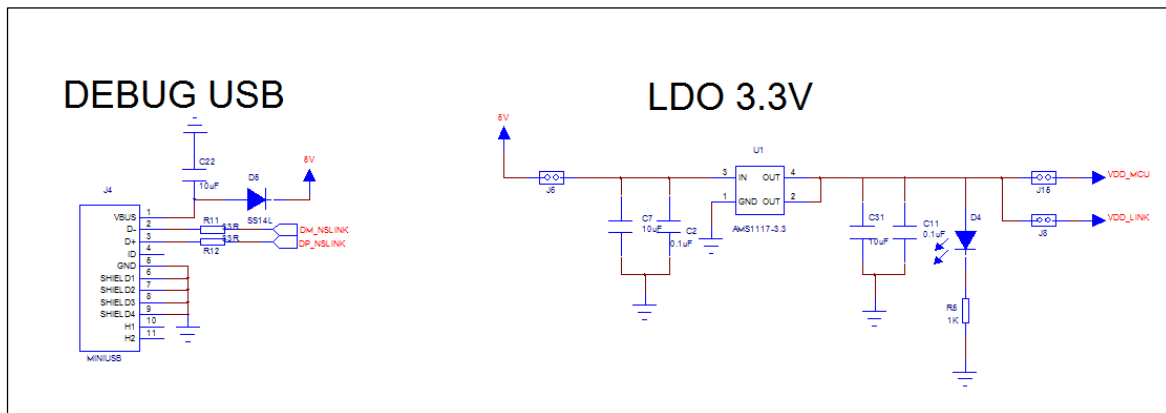


Figure 1-4 Power Design

3) button design

Refer to Figure 1-5 for the schematic diagram of the key design. There are a total of 5 keys, which are the three general keys, the MCU wake-up key and reset key.

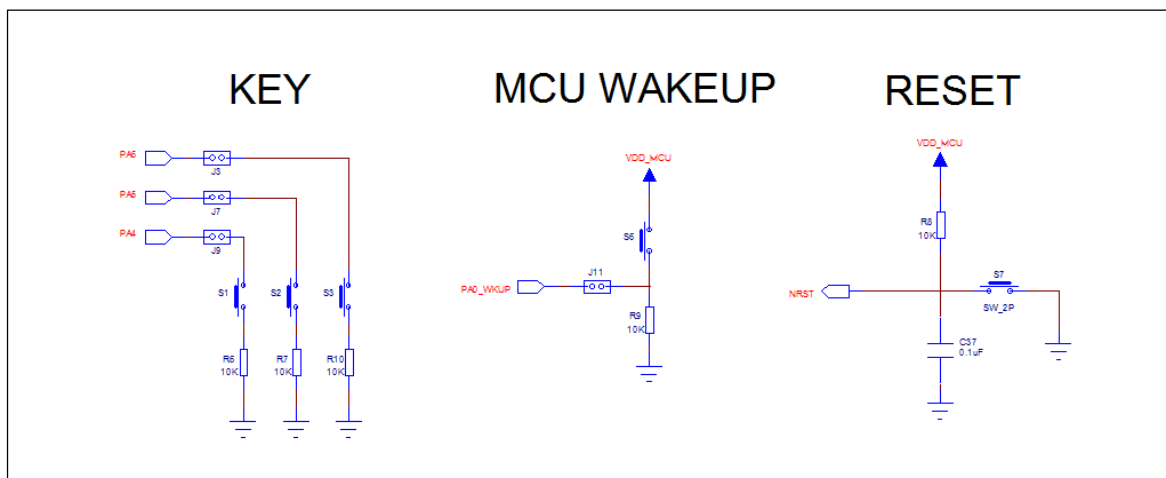


Figure 1-5 Button Design

4) LED light design

Refer to Figure 1-6 for the schematic diagram of LED light design. There are a total of 5 LED lights. D1, D2, and D3 are connected to PB1, PB6 and PB7 of the main MCU respectively, which can be used for debugging. D6 and D7 are used for NS-LINK MCU control to monitor the running status of NS-LINK.

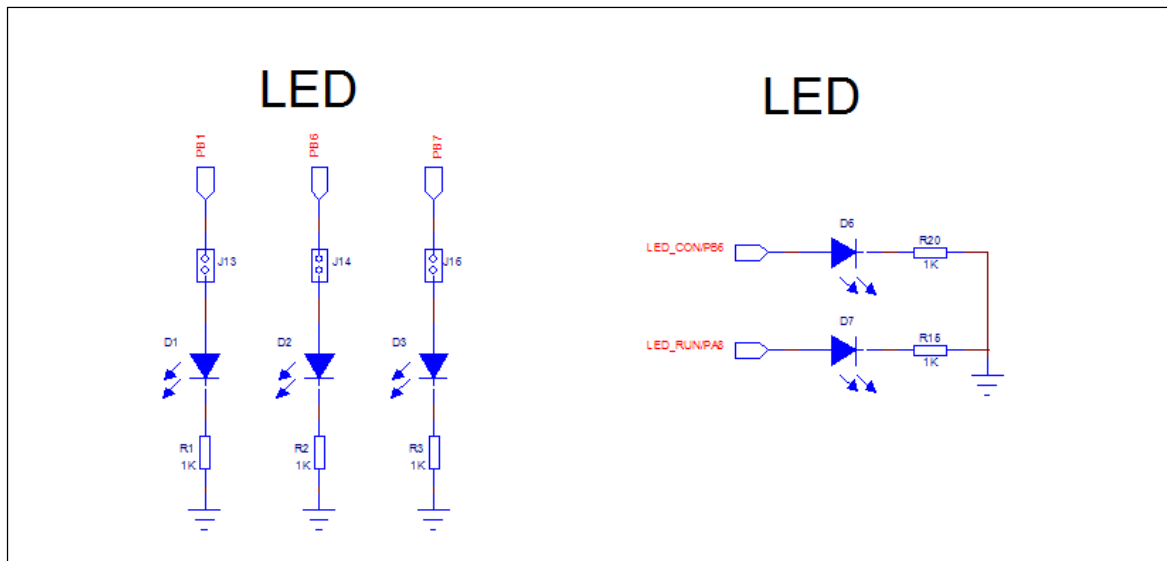


Figure 1-6 LED Light Design

5) crystal

Refer to Figure 1-7 for the crystal connection diagram. The chip has 8MHz external crystals.

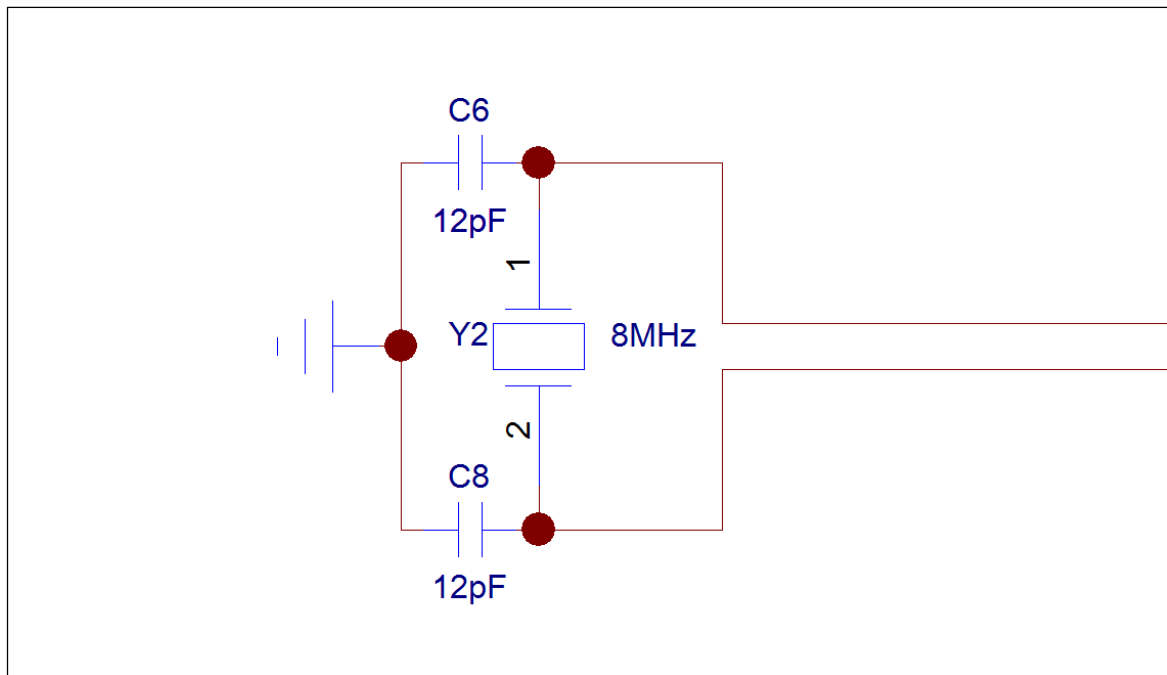


Figure 1-7 crystal design

6) NS-LINK

Refer to Figure 1-8 for the schematic diagram of NS-LINK. Users can directly connect the USB cable to

The image displays several circuit diagrams for the NS-LINK system:

- MCU:** A detailed schematic of the microcontroller unit. It includes a USB connector (J1) with pins for VBUS, D-, D+, GND, and RESET. The MCU is connected to various components including capacitors (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100), resistors (R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100), and a USB-to-UART bridge (U1). The MCU is also connected to a power supply (VDD) and ground (GND).
- DEBUG USB:** A schematic showing a USB-to-UART interface. It includes a USB connector (J1) with pins for VBUS, D-, D+, GND, and RESET. The interface is connected to a USB-to-UART bridge (U1) and a USB-to-UART bridge (U2).
- HEADER:** A schematic showing a multi-pin header connection. It includes a header connector (J1) with pins for VBUS, D-, D+, GND, and RESET. The header is connected to a multi-pin header (U1).
- LED:** A schematic showing an LED driver circuit. It includes an LED (U1) connected to a power supply (VDD) and ground (GND).

- **Description of peripheral devices:**

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2 Version history

Version	Date	Modify
V1.0	2020-07-25	Initial version

3 Notice

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