



451PCBcom (PCB)

token

whitepaper v2.1.1



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1.- Intro

451PCBcom (PCB) is a token created by our non-profit association to promote, develop, make, reward, share and exchange open source hardware.

The PCB token is not an speculative token, it has a lot of utility functions in the real world for the members of our open source hardware community of supporters.

TRC-20 or XRC-20 are the basic code standards for a blockchain token to implement some minimal token functions using a smart contract. So PCB token is like a coupon created by our association for self-govern, and empower open source hardware users to interact with us, facilitating the open source hardware exchange, share and distribution, with rewards, utility and benefits to all the token holders.

The PCB token is distributed to our association members to use it as a tool to exchange open source hardware, rank and reward the community who support open source hardware and promote it in collaboration with us. It is utilized to obtain some external services necessary for the project maintenance and development.

When you hold PCB tokens, you are a member of our community of supporters, so you are collaborating to develop and make open source hardware, empowering our community to do it. Your support reputation rank depends on how many PCB tokens you hold.

When we send rewards to our community it is based on their PCB holder rank, knowledge and collaboration to make and promote open source hardware, and never by lucky or competitive games.

We don't know any other project of a tokenized open source hardware design and development at this moment. We will be happy to know about other open source hardware makers.

We are ready to develop our project entirely by ourselves as a DAO or an open source hardware company, but we are in partnership with some companies for to do the hard work with the hardware and other services for us. The future and our community is open. Join us.

2.- Utility

The PCB token is distributed to reward our community with tokens which can be held to win community reputation and it is utilized to participate in our community of open source hardware supporters within the decentralized blockchain ecosystem with the PCB token utility for file and code sharing, participate in message boards, forums, chats, holder ranking, to make proposals and to vote about decisions, to swap it with other members, to win open source hardware rewards and many things more. It is utilized to obtain some external services necessary for the project maintenance and development, when it is possible.

The PCB token can be exchanged for physical open source hardware and it can be utilized for a secure exchange of hardware, including between our community members of PCB token holders, who can design, make, hold, exchange and distribute open source hardware.

This PCB token of open source code is closing the process of open source hardware designed with open source code using this open source token to make, control and distribute the physical hardware made by our community of open source hardware supporters.

The circulating supply of PCB tokens rewarded to the community is related with the minimal amount of all physical Printed Circuit Boards ready for direct distribution to our community members. For more info, please read the 4th section: "PCB token".

One PCB token will be rewarded by 451pcb.com for one physical open source hardware Printed Circuit Board "451PCB Protoshield Board v2.1 for Arduino UNO" (shipping cost included). This process is manual and by mail now. An easy proof of PCB token ownership must be did for to claim the physical board, when the reward has been received, you must burn one PCB token or send it to us to continue claiming for more rewards.

In the near future, the PCB token could be exchanged for other open source hardware designs with more value and more components when the community vote for this, design it, make it, announce it in a new whitepaper version and get ready for distribution. The reward for a PCB token only can increase with new printed circuit board developments, so it will never decrease to old versions.

With this PCB token our community of supporters value the open source hardware designed by 451PCB or swap it between our community members who can utilize the PCB token to exchange open source hardware or tokens, including the option to utilize the smart contract in a deposit escrow accounts for the open source hardware swap, exchange, multisign and secure distribution.

3. - Roadmap

We will continue rewarding our community of supporters with free PCB tokens when the PCB token smart contract or the creator's account hold enough resources received and donated for to do it.

2018

- First version of the whitepaper approved.
- PCB Token creation and the start to test it.

2019

- Whitepaper v1.0 and v1.1 released.
- Whitepaper v1.2 released in English and Spanish.
- "451PCB Protoshield board v2" open source hardware released.
- Whitepaper v1.3 released in English and web page updates.
- PCB tokens and some physical boards of open source hardware distributed to our community of supporters and PCB token holders.

2020

- Web page and 451PCBcom (PCB) smart contract update released.
- Whitepaper v2 released in English.
- Release our voting system to self-organize: Postponed due to all serious proposals from the community were accepted.
- Release the open source hardware code of the "451PCB Protoshield board v2.1". Other open source hardware code by the community is welcome: Postponed till 2021 due our voluntary physical activity reduction in solidarity with the struggle against COVID-19 virus.
- We improved our web page, publishing more info about our open source hardware, documents, pictures and use examples for the

community and with their collaboration through our accounts on Twitter, Facebook, Telegram and Github.

- We distributed more PCB tokens and physical open source hardware boards to our community of supporters and PCB token holders.
- A DeFi project (Decentralized Finance) was created by the community to give more value to the PCB token and swap PCB tokens on JustSwap (SunSwap.com v1 now). Some community members and PCB holders support the created DeFi system on "SunSwap v1" adding some PCB tokens to secure the minimal funds in the decentralized liquidity pools for swaps.

2021

- Whitepaper v2 released in Spanish.
- Whitepaper v2.1 released in English and Spanish.
- Release the open source hardware code of the "451PCB Protoshield board v2.1".
- We continued distributing more PCB tokens and physical open source hardware boards to our support community who hold PCB tokens joining us.

2022

- Web page and projects documentation update.
- New project added to our web.
- We distributed some PCB tokens to reward our community.

2023

- Web page and projects documentation update.
- New PCB token XRC-20 deployed on IoTeX blockchain.
- We distributed some PCB tokens XRC-20 to reward our community.

2024-2025

- Web page and project documentation update.
- Whitepaper v2.1.1 released in English and Spanish.
- Continue developing all serious proposals from our community:
 - Projects developments and updates.
 - Web page and projects documentation update.

- We will continue distributing more PCB tokens to our support community when the PCB smart contract hold enough resources, we recommend exchange your tokens for boards and to make open source hardware projects for win more tokens:
 - Telegram, Facebook and Twitter Followers and Community:
 - 0 to 0.1 PCB tokens based on the task difficulty.
 - Make Projects, writings, pictures and images:
 - 0 to 1 PCB tokens based on quality.
 - Open Source Hardware and PCB Project Developers:
 - 0 to 10 PCB tokens based on the project quality or task difficulty.

4. - PCB Token

The PCB token total supply is mintable to 1 Million tokens with 8 decimals in each blockchain. The circulating supply is related with the amount of physical boards ready for direct distribution. This quantity must be bigger than the necessary amount of boards for to reward at the same time with one board to all the token holders with more than one PCB token. It secures a fast and direct distribution controlled by ourselves.

The PCB token creators addresses and the smart contract in the blockchains is under the control of 451PCB.COM community which is a NON-Profit association to promote open source hardware, art and technology.

The PCB token will be valid to claim your rewards as our printed circuit boards till one year from the announcement date of the project ends. That announcement will be made with a new and special whitepaper version.

All the token holder addresses and balances are public on the blockchain network, as the events of transfers and approvals, so the token activity can be checked by the community and we can't stop, block, decrease your balance of tokens, revert or change your transfers, your burns or yours approvals.

4.1 – TRON TRC-20 token

The 451PCBcom (PCB) TRC-20 token is being distributed on TRON blockchain to the community and has been deployed in this TRON smart contract address:

[TMBshXBbETM9UPU4XJPueJR1o8Pvm5NMDd](https://tronscan.org/#/token20/TMBshXBbETM9UPU4XJPueJR1o8Pvm5NMDd)

The PCB token TRC-20 smart contract info can be found and checked on tronscan.org:

<https://tronscan.org/#/token20/TMBshXBbETM9UPU4XJPueJR1o8Pvm5NMDd>

The PCB token Solidity code TRC-20 is open source code too:

<https://github.com/451PCBCOM/PCB-TRC20/blob/master/CODE/451PCBcom.sol>

The use of this PCB TRC-20 token have a 5% of the necessary execution cost of tron energy to be discounted to the user to avoid spam and other security purposes, and the other 95% of the energy cost is supported by the PCB token smart contract and the creator address, but only when hold enough energy and bandwidth or TRX donated for this project.

A typical PCB token transfer with enough energy on the smart contract will cost to the user between 1000 to 2000 units of energy and around 500 units of bandwidth, if the smart contract or the creator address don't hold energy. This amount of energy and bandwidth will be recovered in a short time, so the smart contract execution will be ever free for the user with some TRX frozen for energy and bandwidth. So you will need to burn some TRX for blockchain fees or hold enough TRX frozen for to transfer and exchange the PCB token for real printed circuit boards.

When the the smart contract or the creator haven't got the necessary energy or bandwidth with his frozen TRX, the contract execution will discount to the user an amount betetween 30000 and 40000 units of energy and 500 units of bandwidth or burn some TRX by the TRON blockchain to cover the fee of energy and bandwidth. It depends of the TRON blockchain network activity and execution fees. Energy donations to our smart contract to help to cover the execution fees will be ever welcome and rewarded.

We will ever try to cover the 95% of the TRC-20 PCB token smart contract execution fee with energy donated to the smart contract address by our members, but this energy is limited, may vary and it is reloaded daily. We recommend to check the smart contract energy to avoid fees before to execute it.

PCB token Transfers between PCB token holders need less energy, so we ever recommend to hold a little amount of PCB tokens.

Other smart contracts accepting PCB tokens for other functions as swap, exchange, stacking, DEX, DeFi, or all others, will consume different amounts of energy, bandwidth and TRX. The users, systems, companies or platforms developing, deploying and executing other smart contracts are the only responsible of their smart contract execution fees and it could be very different fees than our smart contract direct execution.

4.2 – IoTeX XRC-20 token

The 451PCBcom (PCB) XRC-20 token is being distributed on IoTeX blockchain to the community and have been deployed in this IoTeX smart contract address:

[io1hy2g549daj65zh2xrwgvyqsslm4ntxp4pfl002](https://iotexscan.io/token/io1hy2g549daj65zh2xrwgvyqsslm4ntxp4pfl002)

The PCB token XRC-20 smart contract info can be found and checked on iotexscan.io:

<https://iotexscan.io/token/io1hy2g549daj65zh2xrwgvyqsslm4ntxp4pfl002>

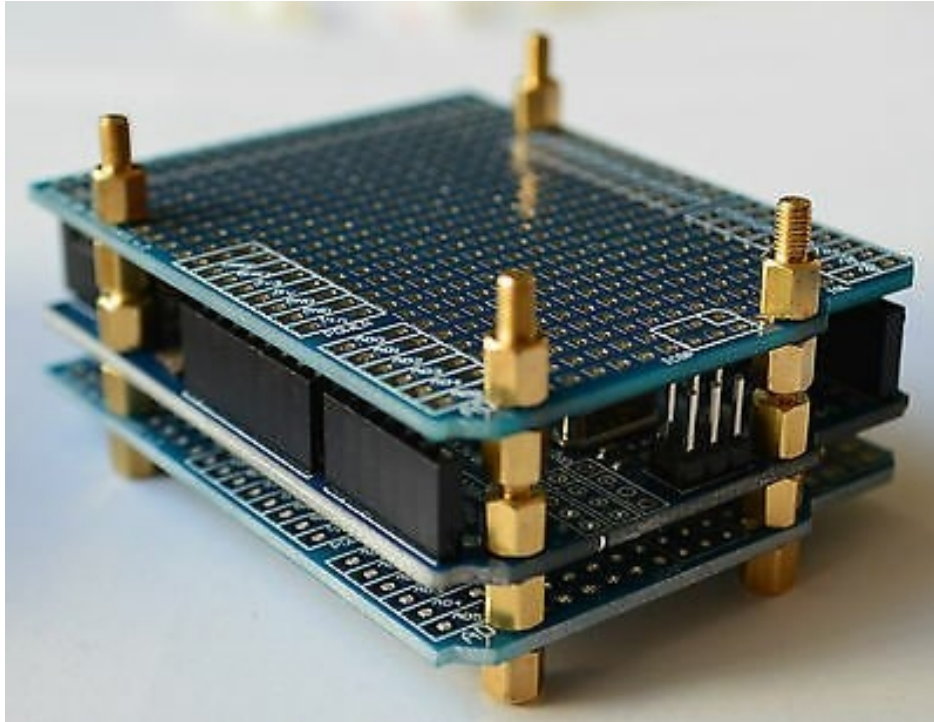
The PCB token Solidity XRC-20 code is open source code too:

<https://github.com/451PCBCOM/PCB-XRC20/blob/main/451PCBcom-XRC20.sol>

A PCB token transfer or other smart contract execution will cost to the user a little amount of IOTX to cover the contract execution fees. It depends of the IoTeX blockchain network activity. So you will need to burn some IOTX fees for transfer and exchange your XRC-20 PCB tokens for real printed circuit boards.

5.- The tokenized hardware

The “451PCB ProtoShield Board” v2.1 is a PCB made in FR-4, copper and HASL lead free finished, with solder mask and silk screen in both sides of the board. All the PCB physical boards are Pb free and ROSH compliant.



The board is only composed by the Printed Circuit Board, and the board materials value is increasing every year, and the manufacturing costs is increasing too, so the value of the boards is stable but increasing every year.

The physical PCB “451PCB Protoshield Board” is a very good reference value for the PCB token. More with the basic shipping costs of the boards included in the PCB token value which is stable but is increasing every year too.

All the “451PCB ProtoShield Board” source hardware code files are open source in a Github repository:

<https://github.com/451PCBCOM/Arduino-Protoshield-Board>

You can help us developing more documents related to the project and you will be rewarded with PCB tokens.

6.- About us

451PCB.COM is the legal web page of our non-profit association based in Spain to promote open source hardware, art and technology. 451PCB is self financed by our members donations and only when it will be necessary, with the open source hardware distribution to our members as an typical associated consumers group. We don't give financial or investment advice.

We make and tokenized an open source hardware desing, deploying and controlling smart contracts on blockchains to self-organizing our non-profit association and to promote open source hardware. We developed a voting system with PCB tokens to do it and it will be released and utilized when necessary.

Our community of members, users and supporters is conformed by the PCB token holders. The ranking of PCB token holders can be checked following the token info links indicated at the 4th section in this whitepaper: "PCB token".

We can't take actions against people who test our code, including when they are searching for code vulnerabilities, but our network providers will take their own actions. We can't give to them info or data related, because we don't log or store it.

451PCB.COM doesn't store the users private data. So, all user private data sent to us will be destroyed as soon as possible to preserve the user privacy rights and never shared with others. When we have access to data stored in other platforms it will be managed by their own rights and rules, but we will preserve it private for ever and it never will be shared, according to the applicable laws.

If you have any question about the 451PCBcom (PCB) token, don't hesitate to contact with us sending an e-mail to:

info@451pcb.com

For more info visit www.451pcb.com and join us.