Cyberscope

Audit Report

BitX Global Exchange

November 2023

Network	BSC
Address	0x1Bc7E9D6f424C49ade908Ce51Cf4c0D5bd600318
Audited by	© cyberscope

Analysis

● Critical ● Medium ● Minor / Informative ● Pass

Severity	Code	Description	Status
●	ST	Stops Transactions	Unresolved
●	OTUT	Transfers User's Tokens	Passed
●	ELFM	Exceeds Fees Limit	Passed
●	MT	Mints Tokens	Passed
●	BT	Burns Tokens	Passed
●	BC	Blacklists Addresses	Passed

Diagnostics

🔴 Critical 🟠 Medium ⚪ Minor / Informative

Severity	Code	Description	Status
🔴	TSD	Total Supply Diversion	Unresolved
🟠	CSD	Circulating Supply Discrepancy	Unresolved
⚪	FSA	Fixed Swap Address	Unresolved
⚪	DDP	Decimal Division Precision	Unresolved
⚪	RSD	Redundant Swap Duplication	Unresolved
⚪	MEE	Missing Events Emission	Unresolved
⚪	RED	Redundant Event Declaration	Unresolved
⚪	IDI	Immutable Declaration Improvement	Unresolved
⚪	L02	State Variables could be Declared Constant	Unresolved
⚪	L04	Conformance to Solidity Naming Conventions	Unresolved
⚪	L05	Unused State Variable	Unresolved
⚪	L14	Uninitialized Variables in Local Scope	Unresolved

Table of Contents

Review

Contract Name	BITX
Compiler Version	v0.8.17+commit.8df45f5f
Optimization	200 runs
Explorer	https://bscscan.com/address/0x1bc7e9d6f424c49ade908ce51cf4c0d5bd600318
Address	0x1bc7e9d6f424c49ade908ce51cf4c0d5bd600318
Network	BSC
Symbol	BITX
Decimals	9
Total Supply	420,000,000,000,000,000

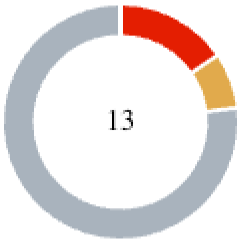
Audit Updates

Initial Audit	15 Nov 2023

Source Files

Filename	SHA256
BITX.sol	8ee39319bbb072b090030a34895cf6597e5965ab71cbc5a25bb18f6d0adcd60d

Findings Breakdown



●	Critical	2
●	Medium	1
●	Minor / Informative	10

Severity		Unresolved	Acknowledged	Resolved	Other
●	Critical	2	0	0	0
●	Medium	1	0	0	0
●	Minor / Informative	10	0	0	0

ST - Stops Transactions

Criticality	Critical
Location	BITX.sol#L625
Status	Unresolved

Description

The transactions are initially disabled for all users excluding the authorized addresses. The owner can enable the transactions for all users. Once the transactions are enabled the owner will not be able to disable them again.

```
if(!_isExcludedFromFees[from] && !_isExcludedFromFees[to]) {
    require(tradingEnabled, "Trading is not enabled yet");
}
```

Recommendation

The team should carefully manage the private keys of the owner's account. We strongly recommend a powerful security mechanism that will prevent a single user from accessing the contract admin functions. Some suggestions are:

- Introduce a multi-sign wallet so that many addresses will confirm the action.
- Introduce a governance model where users will vote about the actions.

TSD - Total Supply Diversion

Criticality	Critical
Location	BITX.sol#L694
Status	Unresolved

Description

The total supply of a token is the total number of tokens that have been created, while the balances of individual accounts represent the number of tokens that an account owns. The total supply and the balances of individual accounts are two separate concepts that are managed by different variables in a smart contract. These two entities should be equal to each other.

In the contract, the amount that is added to the total supply does not equal the amount that is added to the balances. As a result, the sum of balances is diverse from the total supply.

```
_tTotalVisual = _tTotalVisual - newTokenBalance;
```

Recommendation

The total supply and the balance variables are separate and independent from each other. The total supply represents the total number of tokens that have been created, while the balance mapping stores the number of tokens that each account owns. The sum of balances should always equal the total supply.

CSD - Circulating Supply Discrepancy

Criticality	Medium
Location	BITX.sol#L396
Status	Unresolved

Description

According to the ERC20 specification, the `totalSupply()` function should return the total supply of the token. The total supply should always equal the sum of the balances. The contract does not return the `totalSupply()`. Instead, the function returns the `totalSupply()` minus the amount that has been moved to the dead address. This amount is the circulating supply of the token. Many decentralized applications and tools are calculating many indicators like the circulating supply and market cap based on the `totalSupply()`. As a result, these applications will produce misleading results.

Additionally, this issue has another side effect that is described in detail in the TSD section.

```
function totalSupply() public view override returns (uint256) {
    return _tTotalVisual;
}
```

Recommendation

The `totalSupply()` should always equal the sum of the holder's balances. The contract should comply with this convention so that the decentralized applications will produce correct results.

FSA - Fixed Swap Address

Criticality	Minor / Informative
Location	BITX.sol#L344,345
Status	Unresolved

Description

The swap address is assigned once and it can not be changed. It is a common practice in decentralized exchanges to create new swap versions. A contract that cannot change the swap address may not be able to catch up to the upgrade. As a result, the contract will not be able to migrate to a new liquidity pool pair or decentralized exchange.

```
IUniswapV2Router02 _uniswapV2Router = IUniswapV2Router02(router);
uniswapV2Pair = IUniswapV2Factory(_uniswapV2Router.factory())
    .createPair(address(this), _uniswapV2Router.WETH());
uniswapV2Router = _uniswapV2Router;
```

Recommendation

The team is advised to add the ability to change the pair and router address in order to cover potential liquidity pool migrations. It would be better to support multiple pair addresses so the token will be able to have the same behavior in all the decentralized liquidity pairs.

RVD - Redundant Variable Declaration

Criticality	Minor / Informative
Location	BITX.sol#L314
Status	Unresolved

Description

There are code segments that could be optimized. A segment may be optimized so that it becomes a smaller size, consumes less memory, executes more rapidly, or performs fewer operations.

The contract declares certain variables that are not used in a meaningful way by the contract. As a result, these variables are redundant.

```
address private constant DEAD =
0x000000000000000000000000000000000000dEaD;
```

Recommendation

The team is advised to take these segments into consideration and rewrite them so the runtime will be more performant. That way it will improve the efficiency and performance of the source code and reduce the cost of executing it.

DDP - Decimal Division Precision

Criticality	Minor / Informative
Location	BITX.sol#L645,650
Status	Unresolved

Description

Division of decimal (fixed point) numbers can result in rounding errors due to the way that division is implemented in Solidity. Thus, it may produce issues with precise calculations with decimal numbers.

Solidity represents decimal numbers as integers, with the decimal point implied by the number of decimal places specified in the type (e.g. decimal with 18 decimal places). When a division is performed with decimal numbers, the result is also represented as an integer, with the decimal point implied by the number of decimal places in the type. This can lead to rounding errors, as the result may not be able to be accurately represented as an integer with the specified number of decimal places.

Hence, the splitted shares will not have the exact precision and some funds may not be calculated as expected.

```
uint256 buybackTokens = (contractTokenBalance * buybackShare) /
totalShare;
uint256 marketingTokens = (contractTokenBalance * marketingShare) /

totalShare;
```

Recommendation

The team is advised to take into consideration the rounding results that are produced from the solidity calculations. The contract could calculate the subtraction of the divided funds in the last calculation in order to avoid the division rounding issue.

RSD - Redundant Swap Duplication

Criticality	Minor / Informative
Location	BITX.sol#L646,651
Status	Unresolved

Description

The contract contains multiple swap methods that individually perform token swaps and transfer promotional amounts to specific addresses and features. This redundant duplication of code introduces unnecessary complexity and increases dramatically the gas consumption. By consolidating these operations into a single swap method, the contract can achieve better code readability, reduce gas costs, and improve overall efficiency.

```
if(totalShare > 0) {
    if(buybackShare > 0) {
        uint256 buybackTokens = (contractTokenBalance * buybackShare) /
totalShare;
        buyBackAndBurn(buybackTokens);
    }

    if(marketingShare > 0) {
        uint256 marketingTokens = (contractTokenBalance * marketingShare)
/ totalShare;
        swapAndSendMarketing(marketingTokens);
    }
}
```

Recommendation

A more optimized approach could be adopted to perform the token swap operation once for the total amount of tokens and distribute the proportional amounts to the corresponding addresses, eliminating the need for separate swaps.

MEE - Missing Events Emission

Criticality	Minor / Informative
Location	BITX.sol#L614
Status	Unresolved

Description

The contract performs actions and state mutations from external methods that do not result in the emission of events. Emitting events for significant actions is important as it allows external parties, such as wallets or dApps, to track and monitor the activity on the contract. Without these events, it may be difficult for external parties to accurately determine the current state of the contract.

```
tradingEnabled = true;
```

Recommendation

It is recommended to include events in the code that are triggered each time a significant action is taking place within the contract. These events should include relevant details such as the user's address and the nature of the action taken. By doing so, the contract will be more transparent and easily auditable by external parties. It will also help prevent potential issues or disputes that may arise in the future.

RED - Redundant Event Declaration

Criticality	Minor / Informative
Location	BITX.sol#L325,326,327,329
Status	Unresolved

Description

There are code segments that could be optimized. A segment may be optimized so that it becomes a smaller size, consumes less memory, executes more rapidly, or performs fewer operations.

The contract declares certain events in its code. However, these events are not emitted within the contract's functions. As a result, these declared events are redundant and serve no purpose within the contract's current implementation.

```
event MarketingWalletChanged(address marketingWallet);
event SwapEnabledUpdated(bool enabled);
event SwapAndLiquify(uint256 tokensSwapped, uint256 bnbReceived, uint256
tokensIntoLiqudity);
event SwapTokensAtAmountUpdated(uint256 amount);
```

Recommendation

The team is advised to take these segments into consideration and rewrite them so the runtime will be more performant. That way it will improve the efficiency and performance of the source code and reduce the cost of executing it.

IDI - Immutable Declaration Improvement

Criticality	Minor / Informative
Location	BITX.sol#L345,347,351,352,354,355,357,358,360,361,363,365,366
Status	Unresolved

Description

The contract declares state variables that their value is initialized once in the constructor and are not modified afterwards. The `immutable` is a special declaration for this kind of state variables that saves gas when it is defined.

```
uniswapV2Pair
uniswapV2Router
taxFeeonBuy
taxFeeonSell
buyBackFeeOnBuy
buyBackFeeOnSell
marketingFeeonBuy
marketingFeeonSell
totalBuyFees
totalSellFees
marketingWallet
swapEnabled
swapTokensAtAmount
```

Recommendation

By declaring a variable as immutable, the Solidity compiler is able to make certain optimizations. This can reduce the amount of storage and computation required by the contract, and make it more gas-efficient.

L02 - State Variables could be Declared Constant

Criticality	Minor / Informative
Location	BITX.sol#L286,287,288
Status	Unresolved

Description

State variables can be declared as constant using the constant keyword. This means that the value of the state variable cannot be changed after it has been set. Additionally, the constant variables decrease gas consumption of the corresponding transaction.

```
string private _name     = "BitX Exchange";
string private _symbol   = "BITX";
uint8  private _decimals = 9;
```

Recommendation

Constant state variables can be useful when the contract wants to ensure that the value of a state variable cannot be changed by any function in the contract. This can be useful for storing values that are important to the contract's behavior, such as the contract's address or the maximum number of times a certain function can be called. The team is advised to add the constant keyword to state variables that never change.

L04 - Conformance to Solidity Naming Conventions

Criticality	Minor / Informative
Location	BITX.sol#L105,106,122,141,292,558,562,566
Status	Unresolved

Description

The Solidity style guide is a set of guidelines for writing clean and consistent Solidity code. Adhering to a style guide can help improve the readability and maintainability of the Solidity code, making it easier for others to understand and work with.

The followings are a few key points from the Solidity style guide:

1. Use camelCase for function and variable names, with the first letter in lowercase (e.g., myVariable, updateCounter).
2. Use PascalCase for contract, struct, and enum names, with the first letter in uppercase (e.g., MyContract, UserStruct, ErrorEnum).
3. Use uppercase for constant variables and enums (e.g., MAX_VALUE, ERROR_CODE).
4. Use indentation to improve readability and structure.
5. Use spaces between operators and after commas.
6. Use comments to explain the purpose and behavior of the code.
7. Keep lines short (around 120 characters) to improve readability.

```
function DOMAIN_SEPARATOR() external view returns (bytes32);
function PERMIT_TYPEHASH() external pure returns (bytes32);
function MINIMUM_LIQUIDITY() external pure returns (uint);
function WETH() external pure returns (address);
uint256 internal _tTotalVisual = 420e15 * (10 ** _decimals);
uint256 _amount
```

Recommendation

By following the Solidity naming convention guidelines, the codebase increased the readability, maintainability, and makes it easier to work with.

Find more information on the Solidity documentation https://docs.soliditylang.org/en/v0.8.17/style-guide.html#naming-convention.

L05 - Unused State Variable

Criticality	Minor / Informative
Location	BITX.sol#L314
Status	Unresolved

Description

An unused state variable is a state variable that is declared in the contract, but is never used in any of the contract's functions. This can happen if the state variable was originally intended to be used, but was later removed or never used.

Unused state variables can create clutter in the contract and make it more difficult to understand and maintain. They can also increase the size of the contract and the cost of deploying and interacting with it.

```
address private constant DEAD = 0x000000000000000000000000000000000000dEaD;
```

Recommendation

To avoid creating unused state variables, it's important to carefully consider the state variables that are needed for the contract's functionality, and to remove any that are no longer needed. This can help improve the clarity and efficiency of the contract.

L14 - Uninitialized Variables in Local Scope

Criticality	Minor / Informative
Location	BITX.sol#L333
Status	Unresolved

Description

Using an uninitialized local variable can lead to unpredictable behavior and potentially cause errors in the contract. It's important to always initialize local variables with appropriate values before using them.

```
address router;
```

Recommendation

By initializing local variables before using them, the contract ensures that the functions behave as expected and avoid potential issues.

Functions Analysis

Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
Context	Implementation			
	_msgSender	Internal		
	_msgData	Internal		
Ownable	Implementation	Context		
		Public	✓	-
	owner	Public		-
	renounceOwnership	Public	✓	onlyOwner
IERC20	Interface			
	totalSupply	External		-
	balanceOf	External		-
	transfer	External	✓	-
	allowance	External		-
	approve	External	✓	-
	transferFrom	External	✓	-
Address	Library			

	sendValue	Internal	✓	
IUniswapV2Factory	Interface			
	feeTo	External		-
	feeToSetter	External		-
	getPair	External		-
	allPairs	External		-
	allPairsLength	External		-
	createPair	External	✓	-
	setFeeTo	External	✓	-
	setFeeToSetter	External	✓	-
IUniswapV2Pair	Interface			
	name	External		-
	symbol	External		-
	decimals	External		-
	totalSupply	External		-
	balanceOf	External		-
	allowance	External		-
	approve	External	✓	-
	transfer	External	✓	-
	transferFrom	External	✓	-
	DOMAIN_SEPARATOR	External		-

	PERMIT_TYPEHASH	External		-
	nonces	External		-
	permit	External	✓	-
	MINIMUM_LIQUIDITY	External		-
	factory	External		-
	token0	External		-
	token1	External		-
	getReserves	External		-
	price0CumulativeLast	External		-
	price1CumulativeLast	External		-
	kLast	External		-
	burn	External	✓	-
	swap	External	✓	-
	skim	External	✓	-
	sync	External	✓	-
	initialize	External	✓	-
IUniswapV2Router01	Interface			
	factory	External		-
	WETH	External		-
	addLiquidity	External	✓	-
	addLiquidityETH	External	Payable	-
	removeLiquidity	External	✓	-

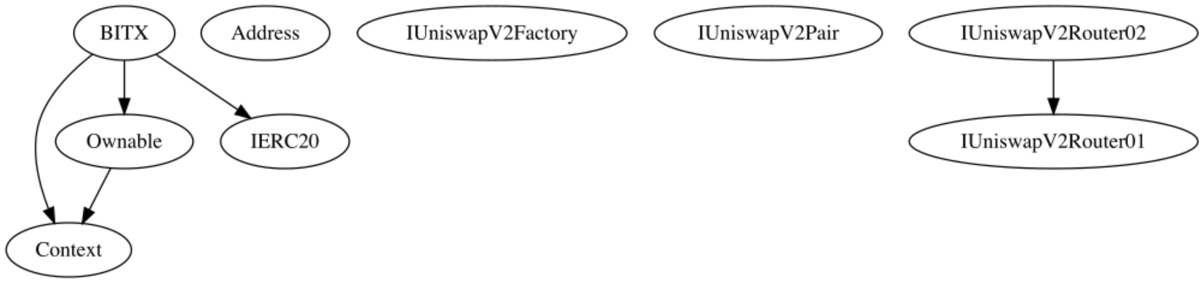
	removeLiquidityETH	External	✓	-
	removeLiquidityWithPermit	External	✓	-
	removeLiquidityETHWithPermit	External	✓	-
	swapExactTokensForTokens	External	✓	-
	swapTokensForExactTokens	External	✓	-
	swapExactETHForTokens	External	Payable	-
	swapTokensForExactETH	External	✓	-
	swapExactTokensForETH	External	✓	-
	swapETHForExactTokens	External	Payable	-
	quote	External		-
	getAmountOut	External		-
	getAmountIn	External		-
	getAmountsOut	External		-
	getAmountsIn	External		-
IUniswapV2Router02	Interface	IUniswapV2Router01		
	removeLiquidityETHSupportingFeeOnTransferTokens	External	✓	-
	removeLiquidityETHWithPermitSupportingFeeOnTransferTokens	External	✓	-
	swapExactTokensForTokensSupportingFeeOnTransferTokens	External	✓	-
	swapExactETHForTokensSupportingFeeOnTransferTokens	External	Payable	-
	swapExactTokensForETHSupportingFeeOnTransferTokens	External	✓	-

BITX	Implementation	Context, IERC20, Ownable		
		Public	✓	-
	name	Public		-
	symbol	Public		-
	decimals	Public		-
	totalSupply	Public		-
	balanceOf	Public		-
	transfer	Public	✓	-
	allowance	Public		-
	approve	Public	✓	-
	transferFrom	Public	✓	-
	increaseAllowance	Public	✓	-
	decreaseAllowance	Public	✓	-
	isExcludedFromReward	Public		-
	totalReflectionDistributed	Public		-
	deliver	Public	✓	-
	reflectionFromToken	Public		-
	tokenFromReflection	Public		-
	excludeFromReward	Public	✓	onlyOwner
	includeInReward	External	✓	onlyOwner
		External	Payable	-
	_reflectFee	Private	✓	
	_getValues	Private		

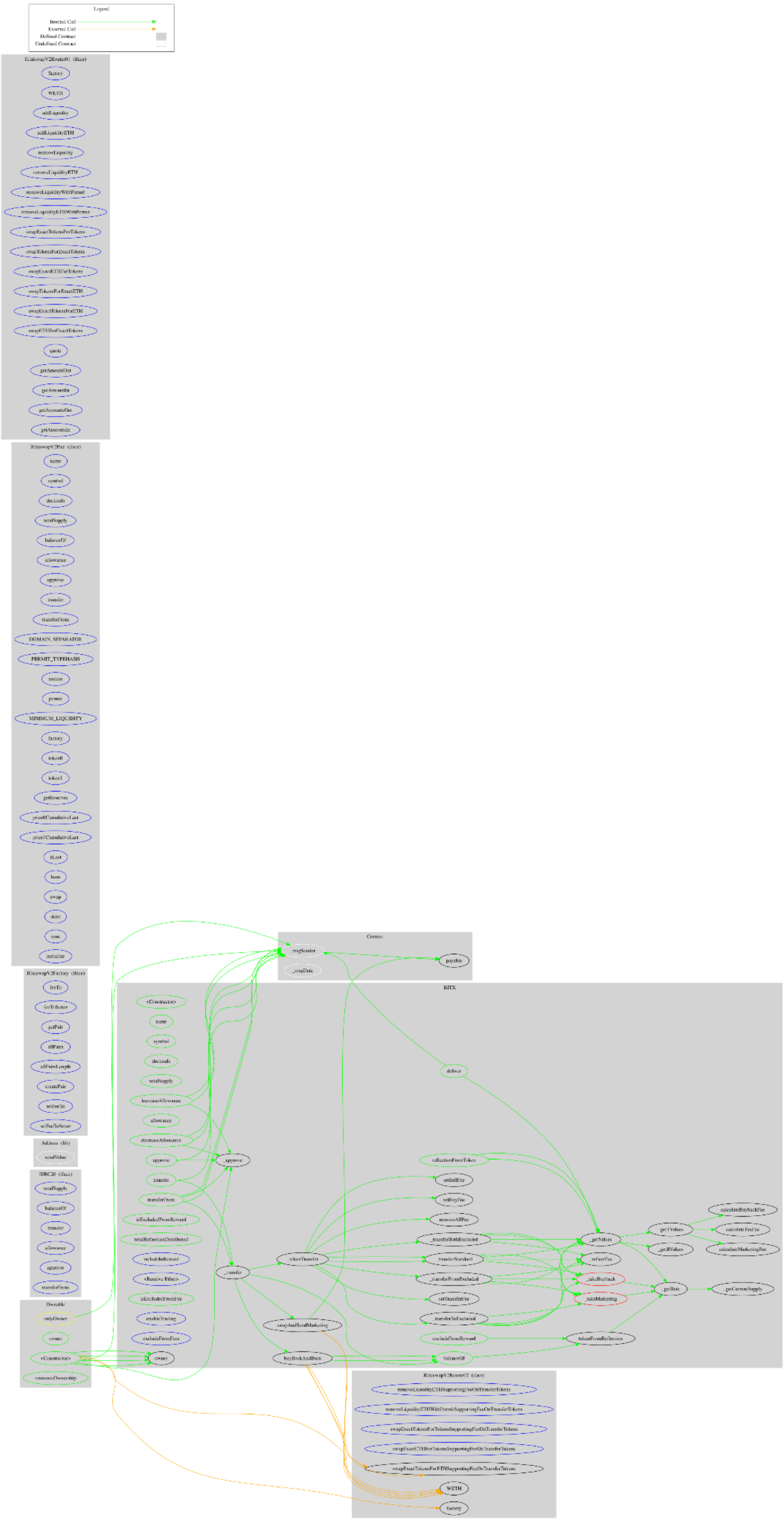
	_getTValues	Private		
	_getRValues	Private		
	_getRate	Private		
	_getCurrentSupply	Private		
	_takeBuyback	Private	✓	
	_takeMarketing	Private	✓	
	calculateTaxFee	Private		
	calculateBuybackFee	Private		
	calculateMarketingFee	Private		
	removeAllFee	Private	✓	
	setBuyFee	Private	✓	
	setSellFee	Private	✓	
	setTransferFee	Private	✓	
	isExcludedFromFee	Public		-
	_approve	Private	✓	
	enableTrading	External	✓	onlyOwner
	_transfer	Private	✓	
	buyBackAndBurn	Private	✓	
	swapAndSendMarketing	Private	✓	
	_tokenTransfer	Private	✓	
	_transferStandard	Private	✓	
	_transferToExcluded	Private	✓	
	_transferFromExcluded	Private	✓	

	_transferBothExcluded	Private	✓	
	excludeFromFees	External	✓	onlyOwner

Inheritance Graph



Flow Graph


Legend
Internal Call
External Call
Defined Contract
Undefined Contract
IUniswapV2Router01 (iface)
factory
WETH
addLiquidity
addLiquidityETH
removeLiquidity
removeLiquidityETH
removeLiquidityWithPermit
removeLiquidityETHWithPermit
swapExactTokensForTokens
swapTokensForExactTokens
swapExactETHForTokens
swapTokensForExactETH
swapExactTokensForETH
swapETHForExactTokens
quote
getAmountOut
getAmountIn
getAmountsOut
getAmountsIn
IUniswapV2Pair (iface)
name
symbol
decimals
totalSupply
balanceOf
allowance
approve
transfer
transferFrom
DOMAIN_SEPARATOR
PERMIT_TYPEHASH
nonces
permit
MINIMUM_LIQUIDITY
factory
token0
token1
getReserves
price0CumulativeLast
price1CumulativeLast
kLast
burn
swap
skim
sync
initialize
IUniswapV2Factory (iface)
feeTo
feeToSetter
getPair
allPairs
allPairsLength
createPair
setFeeTo
setFeeToSetter
Address (lib)
sendValue
IERC20 (iface)
totalSupply
balanceOf
transfer
allowance
approve
transferFrom
Ownable
onlyOwner
owner
<Constructor>
renounceOwnership
Context
_msgSender
_msgData
payable
BITX
<Constructor>
name
symbol
decimals
totalSupply
increaseAllowance
allowance
decreaseAllowance
approve
transfer
transferFrom
isExcludedFromReward
totalReflectionDistributed
includeInReward
<Receive Ether>
isExcludedFromFee
enableTrading
excludeFromFees
owner
_approve
_transfer
deliver
reflectionFromToken
setSellFee
setBuyFee
removeAllFee
_transferBothExcluded
_transferStandard
_transferFromExcluded
setTransferFee
_transferToExcluded
excludeFromReward
balanceOf
_tokenTransfer
swapAndSendMarketing
buyBackAndBurn
_getValues
_reflectFee
_takeBuyback
_takeMarketing
tokenFromReflection
_getTValues
_getRValues
_getRate
calculateBuybackFee
calculateTaxFee
calculateMarketingFee
_getCurrentSupply
IUniswapV2Router02 (iface)
removeLiquidityETHSupportingFeeOnTransferTokens
removeLiquidityETHWithPermitSupportingFeeOnTransferTokens
swapExactTokensForTokensSupportingFeeOnTransferTokens
swapExactETHForTokensSupportingFeeOnTransferTokens
swapExactTokensForETHSupportingFeeOnTransferTokens
WETH
factory

Summary

BitX Global Exchange contract implements a token mechanism. This audit investigates security issues, business logic concerns, and potential improvements. There are some functions that can be abused by the owner like stopping transactions. A multi-wallet signing pattern will provide security against potential hacks. The fees are locked at 5% on buy and sell fees and 10% on transfer fees.

Disclaimer

The information provided in this report does not constitute investment, financial or trading advice and you should not treat any of the document's content as such. This report may not be transmitted, disclosed, referred to or relied upon by any person for any purposes nor may copies be delivered to any other person other than the Company without Cyberscope's prior written consent. This report is not nor should be considered an "endorsement" or "disapproval" of any particular project or team. This report is not nor should be regarded as an indication of the economics or value of any "product" or "asset" created by any team or project that contracts Cyberscope to perform a security assessment. This document does not provide any warranty or guarantee regarding the absolute bug-free nature of the technology analyzed, nor do they provide any indication of the technologies proprietors' business, business model or legal compliance. This report should not be used in any way to make decisions around investment or involvement with any particular project. This report represents an extensive assessment process intending to help our customers increase the quality of their code while reducing the high level of risk presented by cryptographic tokens and blockchain technology.

Blockchain technology and cryptographic assets present a high level of ongoing risk Cyberscope's position is that each company and individual are responsible for their own due diligence and continuous security Cyberscope's goal is to help reduce the attack vectors and the high level of variance associated with utilizing new and consistently changing technologies and in no way claims any guarantee of security or functionality of the technology we agree to analyze. The assessment services provided by Cyberscope are subject to dependencies and are under continuing development. You agree that your access and/or use including but not limited to any services reports and materials will be at your sole risk on an as-is where-is and as-available basis Cryptographic tokens are emergent technologies and carry with them high levels of technical risk and uncertainty. The assessment reports could include false positives false negatives and other unpredictable results. The services may access and depend upon multiple layers of third parties.

About Cyberscope

Cyberscope is a blockchain cybersecurity company that was founded with the vision to make web3.0 a safer place for investors and developers. Since its launch, it has worked with thousands of projects and is estimated to have secured tens of millions of investors' funds.

Cyberscope is one of the leading smart contract audit firms in the crypto space and has built a high-profile network of clients and partners.

The Cyberscope team

https://www.cyberscope.io