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SMART CONTRACT

Security Audit Report

Customer: The Alien Boy

Website: TheAlienBoyDAO.com

Platform: Ethereum Language: Solidity

Date: September 10th, 2021

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THIS IS SECURITY AUDIT REPORT DOCUMENT AND WHICH MAY CONTAIN INFORMATION WHICH IS CONFIDENTIAL. WHICH INCLUDES ANY POTENTIAL VULNERABILITIES AND MALICIOUS CODES WHICH CAN BE USED TO EXPLOIT THE SOFTWARE. THIS MUST BE REFERRED INTERNALLY AND ONLY SHOULD BE MADE AVAILABLE TO THE PUBLIC AFTER ISSUES ARE RESOLVED.

Introduction

EtherAuthority was contracted by the The Alien Boy DAO team to perform the Security audit of The Alien Boy Token smart contract code. The audit has been performed using manual analysis as well as using automated software tools. This report presents all the findings regarding the audit performed on September 10th, 2021.

The purpose of this audit was to address the following:

- Ensure that all claimed functions exist and function correctly.
- Identify any security vulnerabilities that may be present in the smart contract.

Project Background

The Alien Boy Blast is a Play2Earn game for Android and iOS based on The Alien Boy NFT collection. Built with Unity, it's a modern day version of those popular Bubble Shooter games. Players earn The Alien Boy Token \$BOY, a decentralized meme token with gaming and governance to vote in The Alien Boy DAO.

Audit scope

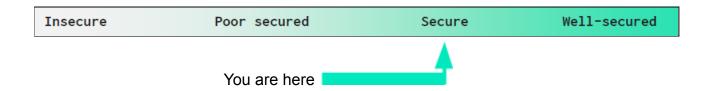
Name	Code Review and Security Analysis Report for The Alien Boy Token Smart Contract	
Platform	Ethereum / Solidity	
File	TheAlienBoyToken.sol	
File MD5 Hash	1DE48D73FB40A222EF005BB2990D2F5E	
Online Code	https://etherscan.io/address/0x01b00a312933be9a2bc2c 6f229b9dd872ac2a62a#code	
Audit Date	September 10th, 2021	

Claimed Smart Contract Features

Claimed Feature Detail	Our Observation	
Tokenomics: Name: The Alien Boy Symbol: BOY Decimals: 9 Total supply:1 Quadrillion Minting: Unlimited	YES, This is valid. Unlimited token minting is not good for tokenomics.	
The Alien Boy Token contract has the following features: • ERC20 Compliance; • Higher degree of control by owner - safeguard functionality; • SafeMath implementation; • Burnable and minting; • user whitelisting; • Airdrop (active and passive); • built-in buy/sell functions; • Token swap functionality (implemented for	YES, This is valid. Owner wallet private key must be handled securely. If that is compromised, then it will create lots of discrepancies.	
future use).		

Audit Summary

According to the standard audit assessment, Customer's solidity smart contracts are "Secured". This token contract contains owner control, which does not make it fully decentralized.



We used various tools like Slither, Solhint and Remix IDE. At the same time this finding is based on critical analysis of the manual audit.

All issues found during automated analysis were manually reviewed and applicable vulnerabilities are presented in the Audit overview section. General overview is presented in AS-IS section and all identified issues can be found in the Audit overview section.

We found 0 critical, 0 high, 0 medium and 1 low and some very low level issues.

Investors Advice: Technical audit of the smart contract does not guarantee the ethical nature of the project. Any owner controlled functions should be executed by the owner with responsibility. All investors/users are advised to do their due diligence before investing in the project.

Technical Quick Stats

Main Category	Subcategory	Result
Contract	Solidity version not specified	Passed
Programming	Solidity version too old	Moderated
	Integer overflow/underflow	Passed
	Function input parameters lack of check	Passed
	Function input parameters check bypass	Passed
	Function access control lacks management	Passed
	Critical operation lacks event log	Passed
	Human/contract checks bypass	Passed
	Random number generation/use vulnerability	Passed
	Fallback function misuse	Passed
	Race condition	Passed
	Logical vulnerability	Passed
	Features claimed	Passed
	Other programming issues	Passed
Code	Function visibility not explicitly declared	Passed
Specification	Var. storage location not explicitly declared	Passed
	Use keywords/functions to be deprecated	Passed
	Unused code	Passed
Gas Optimization	"Out of Gas" Issue	Passed
	High consumption 'for/while' loop	Moderated
	High consumption 'storage' storage	Passed
	Assert() misuse	Passed
Business Risk	The maximum limit for mintage not set	Not Passed
	"Short Address" Attack	Passed
	"Double Spend" Attack	Passed

Overall Audit Result: PASSED

Code Quality

This audit scope has 1 smart contract file. Smart contracts also contain Libraries, Smart

contracts, inherits and Interfaces. These are compact and well written contracts.

The libraries in The Alien Boy are part of its logical algorithm. A library is a different type of

smart contract that contains reusable code. Once deployed on the blockchain (only once),

it is assigned a specific address and its properties / methods can be reused many times by

other contracts in the Alien boy token.

The Alien Boy Token team has not provided scenario and unit test scripts, which would

have helped to determine the integrity of the code in an automated way.

Code parts are **well** commented on smart contracts.

Documentation

We were given The Alien Boy Token smart contract code in the form of an Etherscan web

link. The hash of that code is mentioned above in the table.

As mentioned above, code parts are **well** commented. So it is easy to quickly understand

the programming flow as well as complex code logic. Comments are very helpful in

understanding the overall architecture of the protocol.

Another source of information was its official website https://thealienboydao.com/ which

provided rich information about the project architecture and tokenomics.

Use of Dependencies

As per our observation, the libraries are used in this smart contract infrastructure that are

based on well known industry standard open source projects. And their core code blocks

are written well.

Apart from libraries, its functions are not used in external smart contract calls.

AS-IS overview

(1) Inherited contracts

(a) owned

(2) Usages

(a) using SafeMath for uint256;

(3) Events

- (a) event Transfer(address indexed from, address indexed to, uint256 value);
- (b) event Burn(address indexed from, uint256 value);
- (c) event FrozenAccounts(address target, bool frozen);
- (d) event Approval(address indexed from, address indexed spender, uint256 value);
- (e) event TokenSwap(address indexed user, uint256 value);

(4) Functions

SI.	Functions	Type	Observation	Conclusion
1	_transfer	internal	Passed	No Issue
2	transfer	write	Passed	No Issue
3	transferFrom	write	Passed	No Issue
4	approve	write	Passed	No Issue
5	constructor	read	Passed	No Issue
6	burn	write	Passed	No Issue
7	burnFrom	write	Passed	No Issue
8	freezeAccount	write	access only Owner	No Issue
9	mintToken	write	access only Owner	Unlimited Minting
10	manualWithdrawTokens	write	access only Owner	No Issue
11	manualWithdrawEther	write	access only Owner	No Issue
12	changeSafeguardStatus	write	access only Owner	No Issue
13	changeTokenSwapStatus	write	access only Owner	No Issue
14	startNewPassiveAirDrop	write	access only Owner	No Issue
15	stopPassiveAirDropComplet ely	write	access only Owner	No Issue
16	claimPassiveAirdrop	write	Passed	No Issue

17	changePassiveAirdropAmo unt	write	access only Owner	No Issue
18	isContract	read	Passed	No Issue
19	updateAirdropFee	write	access only Owner	No Issue
20	airdropACTIVE	write	access only Owner	No Issue
21	changeWhitelistingStatus	write	access only Owner	No Issue
22	whitelistUser	write	access only Owner	No Issue
23	whitelistManyUsers	write	access only Owner	No Issue
24	setPrices	write	access only Owner	No Issue
25	buyTokens	write	Passed	No Issue
26	sellTokens	write	Passed	No Issue
27	onlyOwner	modifier	Passed	No Issue
28	transferOwnership	write	access only Owner	No Issue
29	acceptOwnership	write	Passed	No Issue

Severity Definitions

Risk Level	Description	
Critical	Critical vulnerabilities are usually straightforward to exploit and can lead to token loss etc.	
High	High-level vulnerabilities are difficult to exploit; however, they also have significant impact on smart contract execution, e.g. public access to crucial	
Medium	Medium-level vulnerabilities are important to fix; however, they can't lead to tokens lose	
Low	Low-level vulnerabilities are mostly related to outdated, unused etc. code snippets, that can't have significant impact on execution	
Lowest / Code Style / Best Practice	Lowest-level vulnerabilities, code style violations and info statements can't affect smart contract execution and can be ignored.	

Audit Findings

Critical

No Critical severity vulnerabilities were found.

High

No High severity vulnerabilities were found.

Medium

No Medium severity vulnerabilities were found.

Low

(1) maximum minting limit is not set

```
function mintToken(address target, uint256 mintedAmount) onlyOwner public {
   balanceOf[target] = balanceOf[target].add(mintedAmount);
   totalSupply = totalSupply.add(mintedAmount);
   emit Transfer(address(0), target, mintedAmount);
}
```

Unlimited token minting is considered bad for tokenomics. This can dilute the token value over time.

Resolution: We suggest either remove this functionality or set a maximum token limit.

Very Low / Informational / Best practices:

(1) Consider using the latest solidity compiler while deploying

```
v0.5.11+commit.22be8592
```

Although this does not create major security vulnerabilities, the latest solidity version has lots of improvements, so it's recommended to use the latest solidity version, which is 0.8.7 at the time of this audit.

(2) Approve of ERC20 standard:

To prevent attack vectors regarding approve() like the one described here:

https://docs.google.com/document/d/1YLPtQxZu1UAvO9cZ1O2RPXBbT0mooh4DYKjA_jp_-RLM, clients SHOULD make sure to create user interfaces in such a way that they set the allowance first to 0 before setting it to another value for the same spender. THOUGH the contract itself shouldn't enforce it, to allow backwards compatibility with contracts deployed before

(3) All functions which are not called internally, must be declared as external. It is more efficient as sometimes it saves some gas.

https://ethereum.stackexchange.com/guestions/19380/external-vs-public-best-practices

Centralization

These smart contracts have some functions which can be executed by the Admin (Owner) only. If the admin wallet private key would be compromised, then it would create trouble. Following are Admin functions:

- freezeAccount: The Owner can `freeze? Prevent | Allow` `target` from sending & receiving tokens.
- mintToken: The Owner can create `mintedAmount` tokens and send them to `target`.
- manualWithdrawTokens: The Owner can transfer tokens from the contract to the owner address.
- manualWithdrawEther: The Owner wants to transfer Ether from the contract to the owner address.
- changeSafeguardStatus: The Owner can change safeguard status on or off.
- changeTokenSwapStatus: The Owner can allow admins to start or stop token swaps.
- startNewPassiveAirDrop: The OWner can allow it to start a passive airdrop by admin only.
- stopPassiveAirDropCompletely: The Owner can access function will stop any ongoing passive airdrop.
- changePassiveAirdropAmount: This function allows admin to change the amount users will be getting while claiming airdrop.
- updateAirdropFee: This function allows admin to update the airdrop fee. He can put zero as well if no fee is charged.
- airdropACTIVE: The Owner can access and run an ACTIVE Airdrop.
- changeWhitelistingStatus: The Owner can change whitelisting status on or off.
- whitelistUser: The Owner can add a user address in whitelisted mapping.
- whitelistManyUsers: The Owner can access whitelist Many user addresses at once.
- setPrices: The Owner can allow users to buy tokens for `newBuyPrice` eth and sell tokens for `newSellPrice` eth.

Conclusion

We were given a contract code. And we have used all possible tests based on given

objects as files. We observed some issues in the smart contracts and those issues are not

critical ones. So, it's good to go to production.

Since possible test cases can be unlimited for such smart contracts protocol, we provide

no such guarantee of future outcomes. We have used all the latest static tools and manual

observations to cover maximum possible test cases to scan everything.

Smart contracts within the scope were manually reviewed and analyzed with static

analysis tools. Smart Contract's high-level description of functionality was presented in the

As-is overview section of the report.

Audit report contains all found security vulnerabilities and other issues in the reviewed

code.

Security state of the reviewed contract, based on standard audit procedure scope, is

"Secured".

Our Methodology

We like to work with a transparent process and make our reviews a collaborative effort.

The goals of our security audits are to improve the quality of systems we review and aim

for sufficient remediation to help protect users. The following is the methodology we use in

our security audit process.

Manual Code Review:

In manually reviewing all of the code, we look for any potential issues with code logic, error

handling, protocol and header parsing, cryptographic errors, and random number

generators. We also watch for areas where more defensive programming could reduce the

risk of future mistakes and speed up future audits. Although our primary focus is on the

in-scope code, we examine dependency code and behavior when it is relevant to a

particular line of investigation.

Vulnerability Analysis:

Our audit techniques included manual code analysis, user interface interaction, and

whitebox penetration testing. We look at the project's web site to get a high level

understanding of what functionality the software under review provides. We then meet with

the developers to gain an appreciation of their vision of the software. We install and use

the relevant software, exploring the user interactions and roles. While we do this, we

brainstorm threat models and attack surfaces. We read design documentation, review

other audit results, search for similar projects, examine source code dependencies, skim

open issue tickets, and generally investigate details other than the implementation.

Documenting Results:

We follow a conservative, transparent process for analyzing potential security vulnerabilities and seeing them through successful remediation. Whenever a potential issue is discovered, we immediately create an Issue entry for it in this document, even though we have not yet verified the feasibility and impact of the issue. This process is conservative because we document our suspicions early even if they are later shown to not represent exploitable vulnerabilities. We generally follow a process of first documenting the suspicion with unresolved questions, then confirming the issue through code analysis, live experimentation, or automated tests. Code analysis is the most tentative, and we strive to provide test code, log captures, or screenshots demonstrating our confirmation. After this we analyze the feasibility of an attack in a live system.

Suggested Solutions:

We search for immediate mitigations that live deployments can take, and finally we suggest the requirements for remediation engineering for future releases. The mitigation and remediation recommendations should be scrutinized by the developers and deployment engineers, and successful mitigation and remediation is an ongoing collaborative process after we deliver our report, and before the details are made public.

Disclaimers

EtherAuthority.io Disclaimer

EtherAuthority team has analyzed this smart contract in accordance with the best industry practices at the date of this report, in relation to: cybersecurity vulnerabilities and issues in smart contract source code, the details of which are disclosed in this report, (Source Code); the Source Code compilation, deployment and functionality (performing the intended functions).

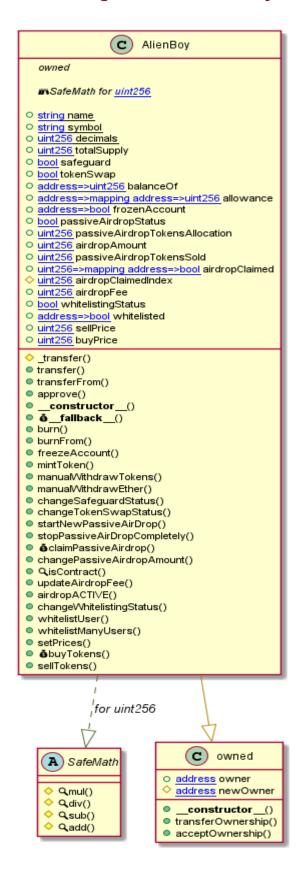
Due to the fact that the total number of test cases are unlimited, the audit makes no statements or warranties on security of the code. It also cannot be considered as a sufficient assessment regarding the utility and safety of the code, bugfree status or any other statements of the contract. While we have done our best in conducting the analysis and producing this report, it is important to note that you should not rely on this report only. We also suggest conducting a bug bounty program to confirm the high level of security of this smart contract.

Technical Disclaimer

Smart contracts are deployed and executed on the blockchain platform. The platform, its programming language, and other software related to the smart contract can have their own vulnerabilities that can lead to hacks. Thus, the audit can't guarantee explicit security of the audited smart contracts.

Appendix

Code Flow Diagram - TheAlienBoy Token



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Slither Results Log

Slither log >> TheAlienBoyToken.sol

```
INFO:Detectors:
owned.transferOwnership(address)._newOwner (TheAlienBoyToken.sol#51) lacks a zero-check on:
- newOwner = _newOwner (TheAlienBoyToken.sol#52)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#missing-zero-address-validation
    INFO:Detectors:
AlienBoy.isContract(address) (TheAlienBoyToken.sol#357-363) uses assembly
- INLINE ASM (TheAlienBoyToken.sol#359-361)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#assembly-usage
 INFO:Detectors:
AlienBoy.changeSafeguardStatus() (TheAlienBoyToken.sol#275-282) compares to a boolean constant:
    -safeguard == false (TheAlienBoyToken.sol#276)
AlienBoy.changeTokenSwapStatus() (TheAlienBoyToken.sol#287-294) compares to a boolean constant:
    -tokenSwap == false (TheAlienBoyToken.sol#288)
AlienBoy.changeWhitelistingStatus() (TheAlienBoyToken.sol#400-407) compares to a boolean constant:
    -whitelistingStatus == false (TheAlienBoyToken.sol#401)
AlienBoy.whitelistUser(address) (TheAlienBoyToken.sol#414-418) compares to a boolean constant:
    -require(bool)(whitelistingStatus == true) (TheAlienBoyToken.sol#415)
AlienBoy.whitelistManyUsers(address[]) (TheAlienBoyToken.sol#425-432) compares to a boolean constant:
    -require(bool)(whitelistingStatus == true) (TheAlienBoyToken.sol#426)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#boolean-equality
INFO:Detectors:
    INFO:Detectors:
    INFO:Detectors:
       SafeMath.div(uint256,uint256) (TheAlienBoyToken.sol#13-18) is never used and should be removed SafeMath.mul(uint256,uint256) (TheAlienBoyToken.sol#4-11) is never used and should be removed Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#dead-code
 Reference: https://github.com/cryitc/stither,wardy.
INFO:Detectors:
Contract owned (TheAlienBoyToken.sol#36-62) is not in CapWords
Parameter owned.transferOwnership(address). newOwner (TheAlienBoyToken.sol#151) is not in mixedCase
Parameter AlienBoy.transfer(address,uint256). to (TheAlienBoyToken.sol#136) is not in mixedCase
Parameter AlienBoy.transfer(address,uint256)._value (TheAlienBoyToken.sol#136) is not in mixedCase
Parameter AlienBoy.transferFrom(address,address,uint256)._from (TheAlienBoyToken.sol#158) is not in mixedCase
Parameter AlienBoy.transferFrom(address,address,uint256)._value (TheAlienBoyToken.sol#158) is not in mixedCase
Parameter AlienBoy.approve(address,uint256)._spender (TheAlienBoyToken.sol#173) is not in mixedCase
Parameter AlienBoy.approve(address,uint256)._value (TheAlienBoyToken.sol#173) is not in mixedCase
Parameter AlienBoy.burn(uint256)._value (TheAlienBoyToken.sol#173) is not in mixedCase
Parameter AlienBoy.burn(uint256)._value (TheAlienBoyToken.sol#220) is not in mixedCase
Parameter AlienBoy.burn(uint256)._yalue (TheAlienBoyToken.sol#220) is not in mixedCase
Parameter AlienBoy.burn(uint256)._from (TheAlienBoyToken.sol#220) is not in mixedCase
      Parameter AlienBoy.burnFrom(address.uint256)._from (TheAlienBoyToken.sol#220) is not in mixedCase
Parameter AlienBoy.burnFrom(address.uint256)._value (TheAlienBoyToken.sol#220) is not in mixedCase
Parameter AlienBoy.isContract(address)._address (TheAlienBoyToken.sol#357) is not in mixedCase
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#conformance-to-solidity-naming-conventions
     - AlienBoy.stopPassiveAirDropCompletely() (TheAlienBoyToken.sol#322-327)
claimPassiveAirdrop() should be declared external:
- AlienBoy.claimPassiveAirdrop() (TheAlienBoyToken.sol#333-345)
changePassiveAirdropAmount(uint256) should be declared external:
- AlienBoy.changePassiveAirdropAmount(uint256) (TheAlienBoyToken.sol#350-352)
updateAirdropFee(uint256) should be declared external:
- AlienBoy.updateAirdropFee(uint256) (TheAlienBoyToken.sol#368-370)
airdropACTIVE(address[],uint256) should be declared external:
- AlienBoy.airdropACTIVE(address[],uint256) (TheAlienBoyToken.sol#378-387)
changeWhitelistingStatus() should be declared external:
- AlienBoy.changeWhitelistingStatus() (TheAlienBoyToken.sol#400-407)
whitelistUser(address) should be declared external:
- AlienBoy.whitelistUser(address) (TheAlienBoyToken.sol#414-418)
whitelistManyUsers(address[]) should be declared external:
- AlienBoy.whitelistManyUsers(address[]) (TheAlienBoyToken.sol#425-432)
setPrices(uint256,uint256) should be declared external:
- AlienBoy.setPrices(uint256, uint256) (TheAlienBoyToken.sol#446-449)
```

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Solidity Static Analysis

TheAlienBoyToken.sol

Security

Transaction origin:

INTERNAL ERROR in module Transaction origin: can't convert undefined to object Pos: not available

Check-effects-interaction:

INTERNAL ERROR in module Check-effects-interaction: can't convert undefined to object Pos: not available

Inline assembly:

INTERNAL ERROR in module Inline assembly: can't convert undefined to object Pos: not available

Block timestamp:

INTERNAL ERROR in module Block timestamp: can't convert undefined to object Pos: not available

Low level calls:

INTERNAL ERROR in module Low level calls: can't convert undefined to object Pos: not available

Selfdestruct:

INTERNAL ERROR in module Selfdestruct: can't convert undefined to object Pos: not available

Gas & Economy

This on local calls:

INTERNAL ERROR in module This on local calls: can't convert undefined to object Pos: not available

Delete dynamic array:

INTERNAL ERROR in module Delete dynamic array: can't convert undefined to object Pos: not available

For loop over dynamic array:

INTERNAL ERROR in module For loop over dynamic array: can't convert undefined to object

Pos: not available

Ether transfer in loop:

INTERNAL ERROR in module Ether transfer in loop: can't convert undefined to object Pos: not available

ERC

ERC20:

INTERNAL ERROR in module ERC20: can't convert undefined to object Pos: not available

Miscellaneous

Constant/View/Pure functions:

INTERNAL ERROR in module Constant/View/Pure functions: can't convert undefined to object

Pos: not available

Similar variable names:

INTERNAL ERROR in module Similar variable names: can't convert undefined to object Pos: not available

No return:

INTERNAL ERROR in module No return: can't convert undefined to object Pos: not available

Guard conditions:

INTERNAL ERROR in module Guard conditions: can't convert undefined to object Pos: not available

String length:

INTERNAL ERROR in module String length: can't convert undefined to object Pos: not available

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Solhint Linter

TheAlienBoyToken.sol

```
TheAlienBoyToken.sol:22:0: Error: Parse error: extraneous input '*' expecting {<EOF>, 'pragma', 'import', 'from', 'abstract', 'contract', 'interface', 'library', 'struct', 'function', 'enum', 'address', 'mapping', 'calldata', 'var', 'bool', 'string', 'byte', 'callback', Int, Uint, Byte, Fixed, Ufixed, 'leave', 'payable', 'constructor', 'fallback', 'receive', Identifier}
```

Software analysis result:

These software reported many false positive results and some are informational issues. So, those issues can be safely ignored.



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