THE DESIGN OF SMALL FORM FACTOR OMCASE-F4 COMPUTER CASINGS WITH SFX DIMENSIONS THAT MADE OF ACRYLIC

Fernando Hans Pratama[1], Siti Maimunah[2]

[1,] Computer Engineering,[2] NSC Polytechnic Surabaya,
[1]xtrafe.xtd@gmail.com,

Abstract

OMcase-F4 is a mini Personal Computer (PC Case) casing design. It is very saving place with SFX size and dimensions of Mini ITX made of acrylic. It is contrary to the computer casing which generally has a standard M-ATX or even a Full ATX Tower which is quite space consuming. This design was made to provide options and variations for PC Builder candidates to use a smaller and more space-saving casing than the casing in general that is on the market and used by many people. The Omcase-F4 is 315 x 143 x 200 cm. The existence of OMcase-F4 casing is expected to make it easier for PC builders to arrange other components without consuming too much space and space and also without putting aside options for future customization.
Keywords: PC Case, ITX, SFX, Mini PC, Acrylic, Custom.

1. Introduction

Technological growth and development are increasingly advanced and fast. This factor automatically triggers us to work and develop faster too. The use of computerized systems in all fields is also increasing today. Not apart from that, the ease of use of technology is something that is popular and tends to be the choice of society in this millennial century which is considered more practical and simple. On the other hand, the use of computers with high performance and space saving is almost always contrary to the high price range which is not affordable by some people who have a limited budget to have a small and space-saving case. It is getting worse when most people consider computer case as something that is large and heavy. Some people prefer to buy a laptop that is lightweight and can be carried anywhere compared to a large and complicated Personal Computer Desktop. But of course Laptop components cannot be upgraded like personal computer desktop which is easier to upgrade on our computer device.

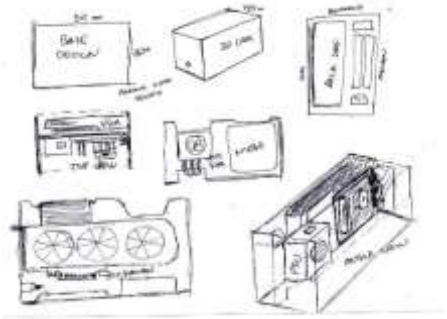
2. Discussion

2.1 Designing

This design provides a general overview and at the same time becomes the first step in making Small Form Factor Omcase-F4 Computer Casings with SFX dimensions made of Acrylic.

A. Early Draft Design

The purpose of this stage is to find out the general description of what shape and size the casing will be made later. This stage is a "concept art" photo file that still uses hand drawings as a delivery medium. The Size estimation measured using a ruler.



Picture 1. *Concept Art*

Context Diagram is a comprehensive picture of *Data Flow Diagrams* (DFD). There are 3 entities in this Context Diagram including employees, leaders and administrator.

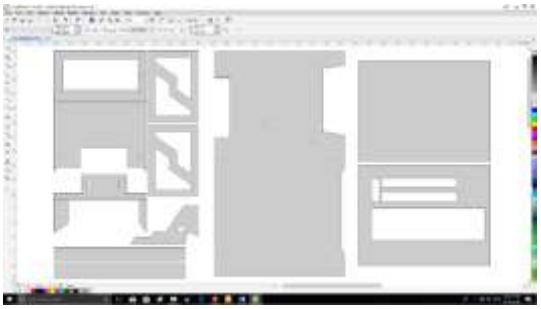
B. First Vector Design

Design of this vector image uses a software application "*Corel Draw Graphic Suite X7*" as the medium. The use of the previous series of *Corel Draw* version can also be used to do this design, but there may be a slight difference in the menu layout in the application to be used, which basically has the same basic function.

Picture 2. First Vector Design

C. Second Vector Design

Second Vector Design is a further development of the previous 1st Vector Design. We can see here estimation for setting the holes and measurements on the casing parts that the author did manually using the ruler.



Picture 3. Second Vector Design

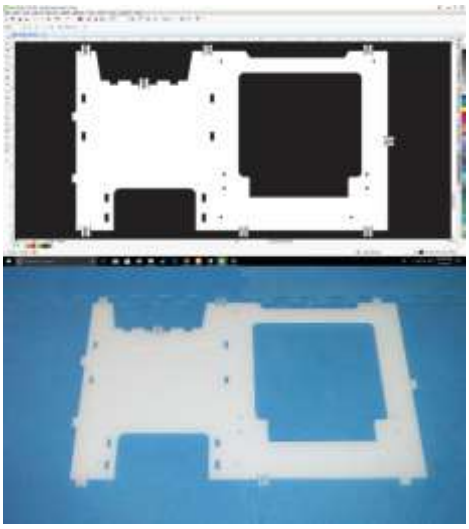
D. Simple Mockup

This simple mockup is an attempt to make a simple real form of the OMcase-F4 casing main frame. Here, the author uses cardboard as material after printing the 2nd vector design on blank paper to stick it to the cardboard and cut it according to the pattern using a cutter

Picture 4. Simple Mockup

E. *Main Frame* Design

Main frame is the main part that acts as a buffer point on the OMcase-F4 casing. This is because all components such as the motherboard, power supply, graphics card, and other components depend on the main frame. This section is very complex, because many holes must be set very precisely.



Picture 5.*Main Frame*

There are several other parts that need to be considered so that this casing can be assembled, including:

1) Front Panel
2) Back Panel
3) Bottom Panel
4) Top Panel
5) Side Panel
6) Power Supply Bracket
7) VGA I/O Lock
8) Bottom Feet
9) Loosening Tool

Some Support Components that are needed so that the system components can be applied to this case:

1) *PCI-E Riser Cable*
2) *PSU Power Extension Cable*
3) *Switch Power & Reset Button*
4) *Motherboard Spacer*
5) *Nuts and Bolts*

2.2 Implementation

At this stage the implementation of OMcase-F4 casing is done to become a full form and can be used as a chassis for the installation of computer system components. The casing assembly display can be seen as below:

Picture 5. Assembly Side View 1

Picture 6. Assembly Side View 2

2.3 Product Trial

At this stage the author conducts a trial phase on acrylic materials that have been designed and cut using laser cutting. Tests are done in order to find out whether all parts of the casing can be put together properly and all components of the computer builder can fit into it.

Before testing this case, there are things that must be considered; computer system components. Then the required hardware includes the following:

A. Hardware System

a) Power supply SFX Corsair SF 450 watt 80+ Gold
b) Motherboard AMD Biostar B350 GTN Mini ITX
c) Processor AMD Ryzen 3 1200 3.1Ghz AM4
d) Ram DDR4 Kingston Hyper-X Fury 2400 mhz 2x4GB
e) Heatsink AMD Stock Wraith Stealth Cooler
f) SSD Silicon Power S57 240GB Sata 2.5 inch
g) *VGA Card MSI Aero ITX Radeon RX-560 4GB*

B. Testing

At this stage the author conducts product trial as previously planned. The plan is to install computer parts on the chassis without run system:

Picture 7. Implementation from the right side

Picture 8. Implementation from the top side (front)

Picture 9. Implementation from the top side (the back)

Picture 10. Implementation from the left side

When installing components to the casing, the top panel must be removed to facilitate the installation process. The new top panel can be reassembled after all components are installed into the casing.

Picture 11. Final Build 1

Picture 10. Final Build 2

3. Conclusions and Suggestions

3.1 Conclusions

After going through the steps of designing and building devices up to the stage of computer components can be entered and run properly and correctly, it can be concluded that "Small Form Factor OMcase-F4 Computer Case with SFX Dimension" can help improve the efficiency of place and space in putting a computer system . It can be seen from the size of the author's M-ATX Standard casing which measures 390 x 185 x 370 mm, while OMcase-F4 has a size of 315 x 143 x 200 cm which has a size efficiency of up to 70% when compared to standard casing sizes in general. Another advantage is that with such a small size, OMcase-F4 does not affect the PC's performance at all. The temperature after 1 hour of use is around 67oC to 69oC. In addition, this casing also lets its users to personalizate and customize it.

3.2 Suggestions

The author realizes that the this manufacturing design is still far from perfect, that is why some of the things that the author suggests to improve this design are as follows:

a) Add a bracket to put a 2.5-inch hard drive
b) Add a USB 3.0 port on front of the casing
c) Add a bracket to additional fans inside or outside the chassis.
d) Add a VGA pole to sustain a heavy VGA card.
e) Make a Top Panel for a VGA Card with a higher dimension.

4. References:

Acrylic. 2013. *Pengertian Acrylic.* http://www.acrylicac.net/pengertian-acrylic/ diakses pada 28 Juli 2018.

Ali Zaky&SmitDev Community. 2007. *Cara MudahMerakit PC*. Jakarta : PT. Elex Media Computindo.

Ary Barokah. 2015. *Pengertian, Fungsi dan Jenis-Jenis Motherboard.* http://nekocyber.blogspot.com/2015/10/pengertian-dan-jenis-motherboard.html. Diakses pada 27 Juli 2018.

Ilham Gariansyah. 2013.*Jenis – jenis from factor komputer*. http://ilhamgariansyah.blogspot.com/2013/10/jenis-jenis-from-faktor-komputer.html. Diakses pada 26 Juli 2018.

Jubilee Enterprise. 2014. *Tip Trik CorelDraw X7*. Jakarta : PT. Elex Media Komputindo.

SaintsEnd. 2016. *Rear IO, ATX, mATX, mITX Drawing spec for custom komputer cases.* https://www.overclock.net/forum/15-case-mods/1587813-rear-io-*ATX*-m*ATX*-mitx-drawing-spec-custom-komputer-cases.html. Diakses Pada 12 Februari 2018.

Yusnan Solichin. 2013. *Definisi Pengertian Corel Draw.* http://grafisity.blogspot.com/2013/12/definisi-pengertian-corel-draw.html. Diakses pada 29 Juli 2018.

Zhul. 2018. *Pengertian, Jenis, dan Fungsi Casing Komputer (Lengkap).* https://www.jejakwaktu.com/*casing*-komputer/ . Diakses pada 26 Juli 2018.