



## Anten'it Microwave Design and Prototyping Kit for RF & Microwave Engineers

### TEST YOUR IDEAS RAPIDLY!

Microwave engineers generally use electromagnetic simulation software to design the passive microwave components. The microstrip components are easier to prototype where 3D components such as waveguide components need to use conventional fabrication methods.

There are 3D printers but 3D printed plastics are not efficiently metalized to have robust metal pieces and the metal printers have high cost. They also need to purchase materials to prototype each component. The reusable blocks in Anten'it kits eliminates the purchasing of materials for prototypes. It is easy to test your ideas and prototype easily by connecting the building blocks into each other. After you finish your work, you can disconnect the blocks and use them for another component.

There are 3D CAD model examples of different microstrip and waveguide components within the kit. Microwave engineers can import the CAD models to any simulation software and model the complex structures before building them as hardware. There are also CST Studio models that can directly be used in the kit.

There are datasheet booklet and microwave component building instructions within the kit. You can select the appropriate component for your application, follow the building instructions and build the component. There is no need to be a microwave engineer to follow the steps. This is also useful for junior engineers to understand the characteristics of the components without any fabrication cost.



The waveguide blocks in the Anten'it Microwave Design and Prototyping Kits are the same as Anten'it Antenna Design and Prototyping Kit. This lets you combine both kits and build more complex structures such as RF Front Ends. For example, an engineer can build a magic tee with the microwave kit and build horn antennas with the antenna kit, combine both components and have a monopulse antenna system.

Both antenna and microwave kits include the model files, so it is easy to model the structure in the simulation environment, optimize the structure and then build with the hardware blocks.

Research and development needs to test your ideas rapidly and check if they are appropriate for the application. The reusable blocks of this kit eliminates the loss of time and cost to check your ideas.

Anten'it can be ordered via distributors in [www.antenit.com](http://www.antenit.com) or [sales@antenit.com](mailto:sales@antenit.com)

Anten'it is a patent pending product of Antenom Antenna Technologies

### Two Typical Applications of Anten'it Microwave Design and Prototyping Kit

#### 1– Design your novel Microwave components

Design your microwave component via analytical calculations or simulation tools

Build it with Anten'it Microwave Design & Prototyping Kit

Iterate your design by adding or removing blocks

Dismount the blocks and re-use them for another project

#### 2– Build the Microwave Components by following the steps in Microwave Building Instructions

Select the microwave component for your application

Check Microwave Datasheet Booklet to find the appropriate component for your application

Check Microwave Building Instructions and build the component by following the steps

Use the microwave component

Dismount the blocks and re-use them for another microwave component requirement

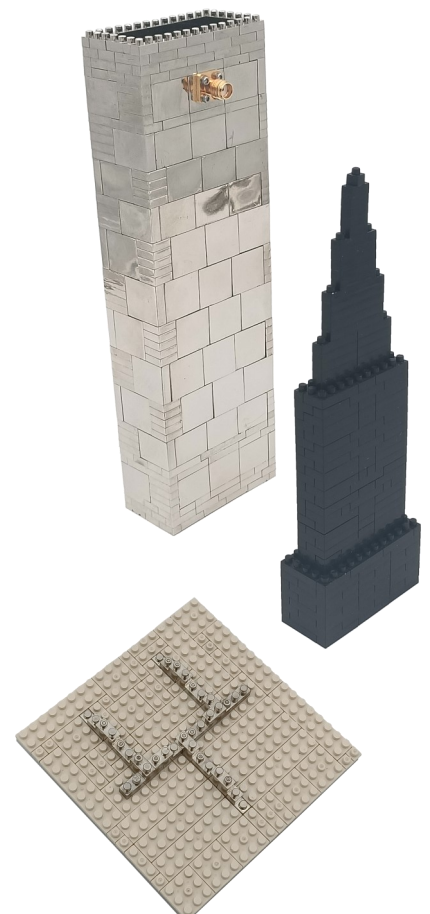


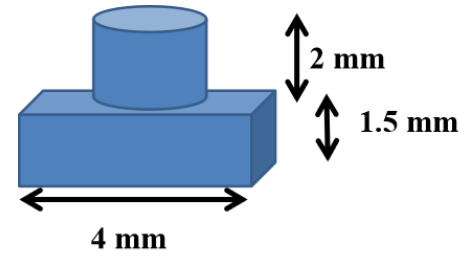
## Anten'it Antenna Design and Prototyping Kit for RF & Microwave Engineers

### ADVANTAGES FOR RF & MICROWAVE ENGINEERS

Anten'it microwave design and prototyping kit provides advantages to RF & microwave engineers:

1. It saves material costs for prototyping because microwave blocks are reusable.
2. It saves machining costs for prototyping.
3. It saves machining duration for prototyping because microwave blocks can be mounted easily by hands.
4. It saves material purchasing duration because there are already metal cells, 3 different kinds of dielectric cells, ground planes and connectors in Anten'it kits.
5. It decreases the design duration dramatically.
6. It can be used for novel designs.
7. The waveguide components have high costs and you need to purchase different components for each frequency range. This kit lets you build waveguide components and change the parameters by changing the physical dimensions of the structure.
8. If you want to use it within a simulation program, you can import the block models or example component models and design the component in the simulation environment. You can follow the model and build the hardware easily.
9. It can be used for conceptual designs.
10. There are many datasheets with measured results in the datasheet booklet and microwave building instructions including how to build those components step by step. You can follow the steps, build the components. This is a useful method for urgent needs.
11. When other departments such as radar, signal processing, systems engineering etc. ask for microwave components or systems for their applications, you can easily build and supply them. This generally provides them with a better understanding of their requirements. Remember that system engineers also need to iterate their designs.
12. You can build microwave components for academic purposes (journals, conferences, books).
13. You can teach microwave design easily to your newly graduated colleagues and interns.





## Theoretical Background Behind Anten'it Kits

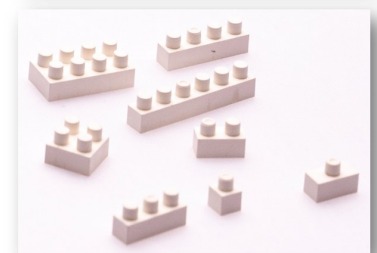
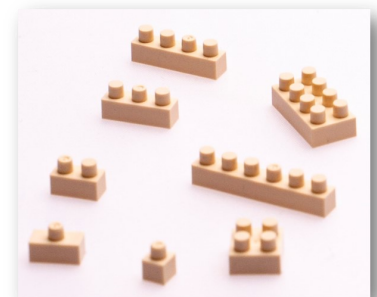
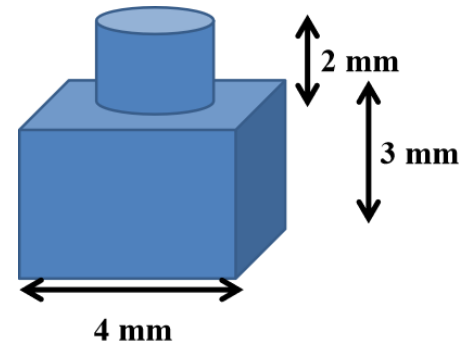
### HARDWARE MESH CELLS

Electromagnetic simulation programs generally include CAD interfaces. When the designers draw a solid structure in the CAD interface, simulation programs discretize the solid structure into small pieces called “mesh cells”. Maxwell equations are calculated within each mesh cell by using numerical methods such as method of moments (MOM), finite-difference time-domain (FDTD), finite element method (FEM) etc. Each numerical method uses different mesh cell shapes.

FDTD type of simulation programs use cubic mesh cells. In order to get accurate results, the mesh cell dimensions are selected lower than wavelength/10.

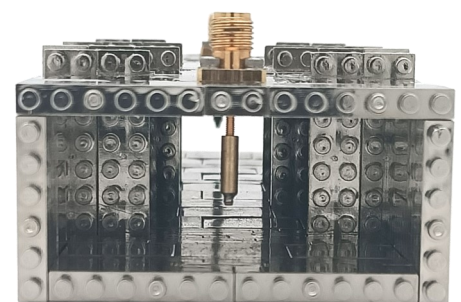
Anten'it Microwave Kits use brick-type hardware cells. Brick types of mesh cells are very similar to cubic shapes. There are two resolutions in this kit. One of them is 4 mm (length) X 4 mm (width) X 3 mm (height) and the other one is 1.5 mm height with the same length and width. The largest dimension 4 mm corresponds to  $\lambda/12.5$  at 6 GHz. 6 GHz is the highest frequency of Anten'it kits.

The hardware mesh cells provide students and researchers to design their passive microwave components directly in front of a network analyzer. They can start their design with calculations and iterate by adding or removing cells (bricks).



### CONTENT OF MICROWAVE DESIGN AND PROTOTYPING KIT

1. Metal Blocks
2. Dielectric Blocks with 3 different dielectric constants and colours
3. Ground Planes
4. Connectors
5. Electromagnetic Absorber Blocks
6. Cables
7. Adapters
8. 50 ohm Terminations
9. Removers
10. Case
11. Microwave Datasheet Booklet & Building Instructions
12. Anten'it User Manual



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