

The designer using certain "design rules" prepares a piece of art work called a "composite". This drawing (Figure 4c) simulates the discrete components and interconnecting paths by representative patterns. These patterns, in turn, will represent areas of diffusion and paths of electron flow in the silicon chip. The designer is much more than that of a skillful draftsman. A good designer must "build-in" specific performance characteristic, reliability and the repeatability needed for high volume manufacturing.

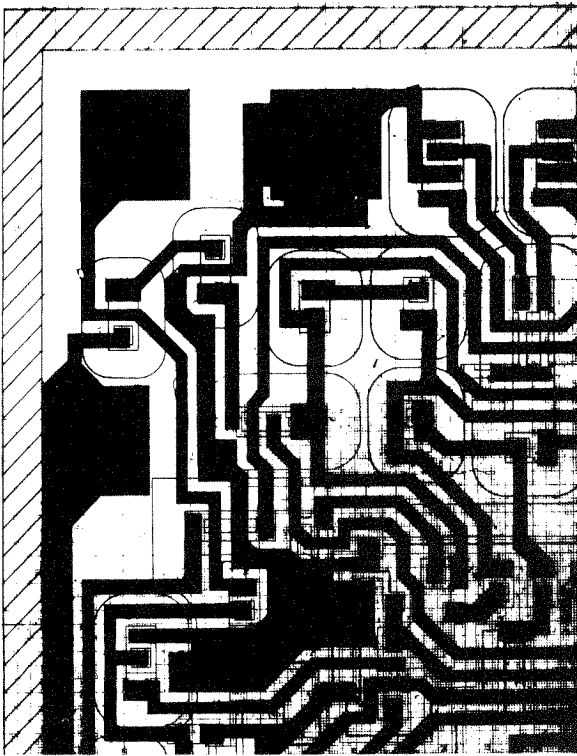


Figure 4c. Section of AM/FM composite drawing.

Figure 4d shows the completed AM/FM IC which is the electrical equivalent to all the electronics as shown in Figure 4a.

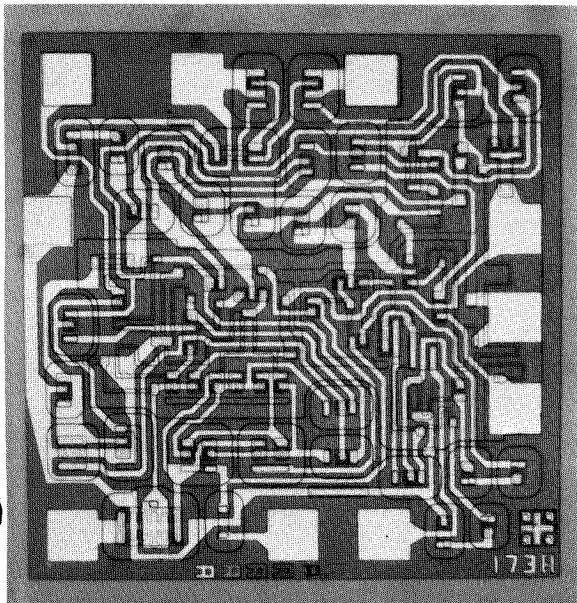


Figure 4d. AM/FM finished circuit.

## Microphotography

The second step in the manufacture is commonly referred to as "mask making." The composite drawing is reconstructed or "cut" out of mylar in a series of drawings 30 x 30 inches square (Figure 5a) to as large as 60 x 80 inches square. Each piece of art represents discrete elements or parts that will be diffused into the IC. This artwork is reduced 40 times by a high precision camera onto a 2 x 2 glass plate (Figure 5b).

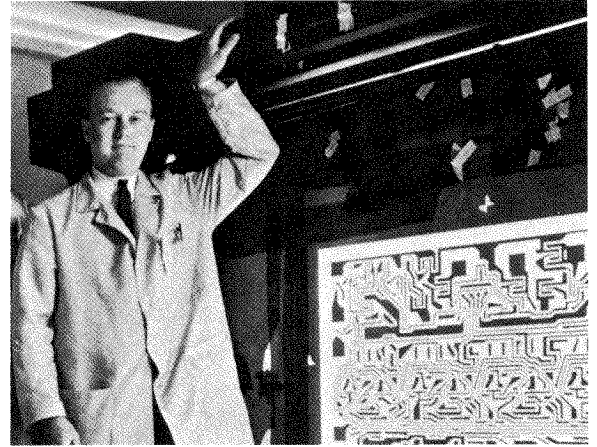


Figure 5a. Mylar mask or up-size artwork.

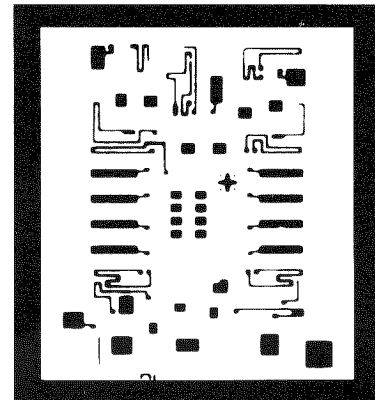


Figure 5b. First glass plate reduction of artwork.

This 2 x 2 plate is again reduced 10 times by a "step and repeat" camera, to the glass plate shown in Figure 5c.

The pattern is repeated, photographically, on the plate as many as 1,500 times. Each integrated circuit, then, will have a series of masks and thus, a series of plates; one for the diodes, one for transistors, etc. Most ICs have from 3 to 6 masks.

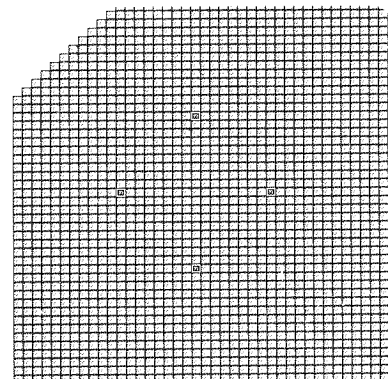


Figure 5c. Step-and-repeat of IC.