sinclair®

ZX Spectrum®

MAKE-A-CHIP

SOFTWARE BY

Incognito Software Ltd.

CASSETTE
48K RAM

USER MANUAL FOR MAKE-A-CHIP

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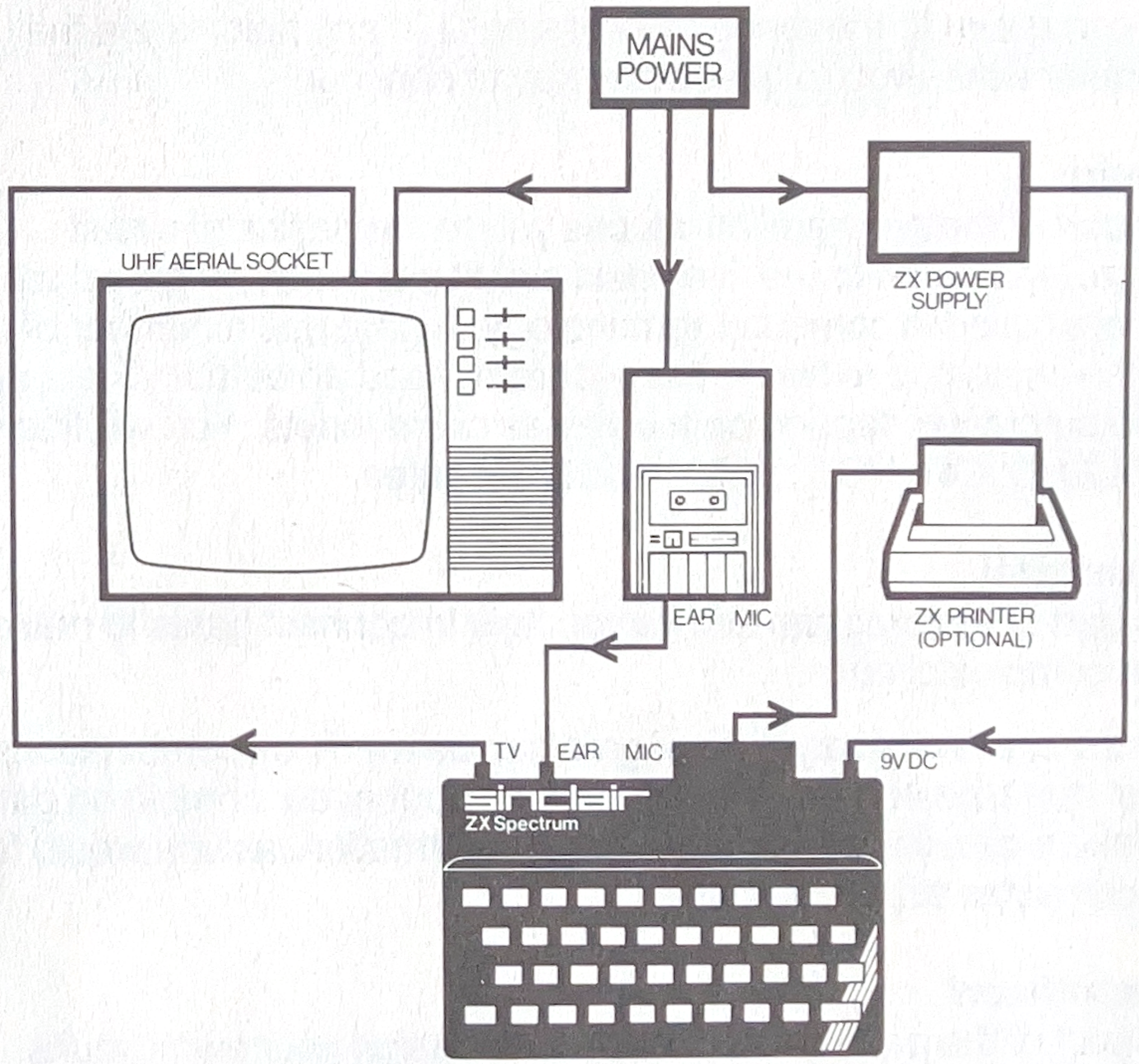
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Introduction

MAKE-A-CHIP enables you to explore some aspects of how your computer works. A computer is made up from a large number of electronic circuits. MAKE-A-CHIP will tell you about simple electronic circuits and the basic elements of circuit design, and show you examples of some circuits which are found inside your ZX Spectrum. The program also enables you to try your hand at circuit design. You can create your own circuits by combining the basic units, and then see how your circuits would work.

Operating instructions

Connect your ZX Spectrum as shown in the diagram.
Put the tape into your tape recorder and type the command
LOAD ""



How to connect your ZX Spectrum

Start your cassette player and then press the **ENTER** key. The program will load in five stages and then start running automatically.

If you stop the program and later want to start it again without reloading, give the command **GOTO 1.**

In no circumstances give the commands **RUN** or **CLEAR.**

Using the program

The program is in three parts. The first tells you about the basic elements of circuit design, the second shows you example circuits, and the third allows you to combine basic circuit elements and try out some of your own circuit designs.

When you have loaded the program, select your starting point. We recommend that the first time you run the program, you try each part in turn.

You can return to the menu by pressing **Q** at any point when the computer askes you to 'press any key to continue'.

1 Learn

This part of the program introduces you to the basics of circuit design, leading on to the five basic circuit elements, or 'gates' as they are called in computer terminology. A gate has a number of inputs – restricted to two in this program – and an output. The value of the output will depend on the values of the inputs. You will find out about AND, OR, NOT, NAND and NOR gates.

2 Example

This part of the program shows you how to connect gates to make more complex circuits.

You will see how every type of gate can be made by combinations of just one type of gate. You will then find out about combining gates to make a circuit which will remember information, as you would find in a computer store or register.

3 Experiment

This part of the program enables you to design your own circuits. Your circuit can contain up to 12 gates (AND, OR, NOT, NAND and NOR), four inputs and four outputs. At any stage you can go back to LEARN to see what a particular gate does, go back to EXAMPLE, or print your circuit.

When you have designed your circuit, you may give it some inputs and outputs. Your ZX Spectrum will then check that the circuit is valid; if it is not, it will show you what is wrong and you can correct it. When your circuit is valid, you can 'run' it, asking your Spectrum what the outputs would be for various input combinations. Alternatively, you can try to work out the outputs for a particular input combination, and your Spectrum will tell you if you are right. You can make a permanent record of your design by printing the circuit, showing the inputs and outputs.

Once you have run your circuit, you can then try running it again with different input or feedback values, modify it by adding more gates, or design a fresh circuit.

You can switch between the three main parts of the program at any time; without losing the circuit you are developing.