Do It with a Kimsi!

What's this—S-100 boards with a KIM? Forethought Products makes it easy.

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In the realm of microprocessors the name of the game seems to be expansion! An expanded system allows the user to incorporate the additional memory required to run the more sophisticated programs that are available for KIM, such as Microsoft BASIC or an assembler.

After owning a KIM for over a year, I finally got bit by the expansion bug. I wanted to run BASIC and add a video display system. The cost of the expansion and the boards required was an important factor since I have a multitude of expensive hobbies and I wish to remain in the good graces of the lovely girl to whom I am married. The price of the motherboard and power supply required for the additional memory was, of course, important. A greater consideration was the cost of the boards that were going to be used to expand the system.

After reading the advertisements in various magazines and comparing prices of memory boards, I decided to go with the S-100 bus. The popularity of the S-100 bus will continue to bring the prices down in the future as more companies are attracted to this lucrative market. The best overall expansion system appears to be the Kimsi, which provides the required interface circuitry along with memory decoding that allows use of KIM's 1K of on-board memory. It also allows use of most of the S-100 boards currently available and provides regulation for the 5 volt and 12 volt power for KIM.

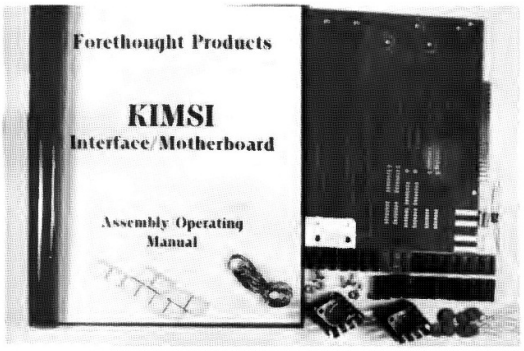
The Kimsi kit sells for $125 and goes together with relative ease. There are no MOS or CMOS integrated circuits that are easily damaged by static electricity. All of the integrated circuits are socketed, and the board has a solder mask on the foil side to help prevent solder bridges between the runs. These factors and a complete instruction manual make for easy assembly of the board. The system was functional in about three hours.

The Kimsi motherboard is delivered with one S-100 connector and has provisions for seven more. A word of caution about the installation of the connector: Make sure it is seated properly against the motherboard before you solder it in place. If it is installed incorrectly, it is all but impossible to fix. It should also be noted at this point that the Kimsi board must be insulated from the metal frame if installed in a cabinet. This is done by installing insulated extruded washers on the mounting screws that fasten the Kimsi board to the case.

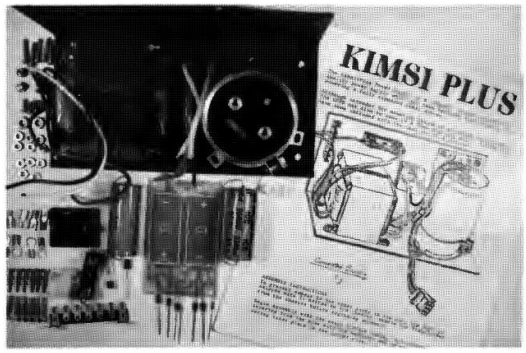
The Kimsi Plus power supply is an excellent addition to the system. Of course, a power supply could be built to power the S-100 system, but this unit in kit form at $69.50 is really a good investment. The supply is an open frame type and is designed so the physical height is the same as the total height of the Kimsi with the standard S-100 board installed.

The power supply is quite hefty, capable of supplying +8 V dc at 10 Amps, +16 volts at 1 Amp and −16 volts at 1 Amp. The transformer is capable of 16 Amps, and the 30 Amp rectifier delivers full power output without forced-air cooling. Previously, KIM was running on a home-brew supply that put out +5 volts at 2 Amps and +12 volts at about 1 Amp.

I encountered considerable difficulty getting the tape to load and dump. Addition of the Kimsi Plus power supply completely solved the problems. The power supply, like the Kimsi, is easy to build. I suggest that when wiring the power supply connector, you use large



1. Kimsi interface/motherboard kit.



2. Kimsi Plus power supply kit.

enough wire on the +8 volt line to handle at least 8 Amps. This allows for additional boards to be installed in the future.

Two methods can be used to connect KIM to Kimsi—either directly through two 22/44 pin connectors, soldered back to back, or by a ribbon cable with 22/44 connectors soldered to each end. There are two more connections to be made—the decode enable signal and the +12 volt supply for tape operation, which is made from the expansion connector to the application connector on the KIM board. I found the cleanest way to jumper these connections was to hard-wire pins 19 and 20 on the expansion connector to k and n on the application connector of the KIM board. I initially used a ribbon cable to connect the KIM to Kimsi and constructed one about ten inches long with connectors on each end.

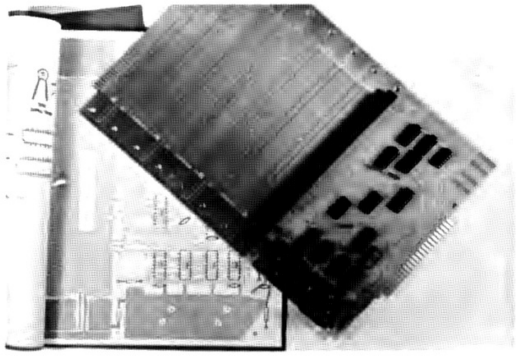
When I brought up the system and tried to run the memory/cable test program supplied in Kimsi documentation, the Vector Graphic 8K memory board I had installed did not pass the test. The cable was then shortened to five inches, and the test ran perfectly. This was necessary because there is no buffering in the Kimsi of the address and data lines going to KIM. Excessive cable length may cause crosstalk and interfere with the data transmission. The other problem that may occur is propagation delay.

Propagation delay will cause the signals arriving at the CPU to be slowed down so they do not arrive in time for proper processing. This problem is a function of cable length, the timing tolerance of the CPU and the crystal frequency tolerance in KIM. The Kimsi instruction manual suggests lowering the frequency of the clock from 1 MHz to approximately 980 kHz to alleviate the problem when exceedingly long cables are used. The frequency of the clock in KIM could be changed by using a crystal with a lower frequency or installing an RC network instead of the crystal as illustrated on page 43 of the KIM hardware manual.

The Kimsi and Kimsi Plus power supply will provide the flexibility of the S-100 bus combined with the advantages of the 6502 processor to make for an excellent low-priced system. The entire cost for this system, which includes KIM, Kimsi, Kimsi Plus power supply, video-monitor, 8K memory, video board and keyboard, is less than $1000. This may seem to be a little more expensive than a PET or Radio Shack system. However, the number and different types of S-100 boards available provide a versatile microprocessor system.

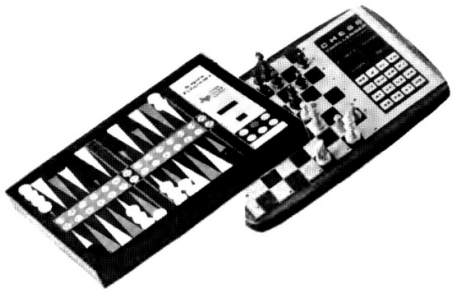
If you plan further expansion, Kimsi and Kimsi Plus are available from:

Forethought Products
PO Box 8066
Coburg OR 97401
(503) 485-8575■



3. Completed Kimsi Board.

Special Christmas Offering for the professional



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