PC Compatible Computer

Now that we've introduced you to the HiTech PC-compatible computer, let's see how it's put together.

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Part 2 WHEN WE LEFT OFF last time, we were just getting ready to configure the motherboard. The first step is to set the configuration switch SW1, which is a DIP switch that is made up of eight separate switches that we'll call SW1-1–SW1-8.

As we showed you last month, for our configuration the switches should be set as follows:

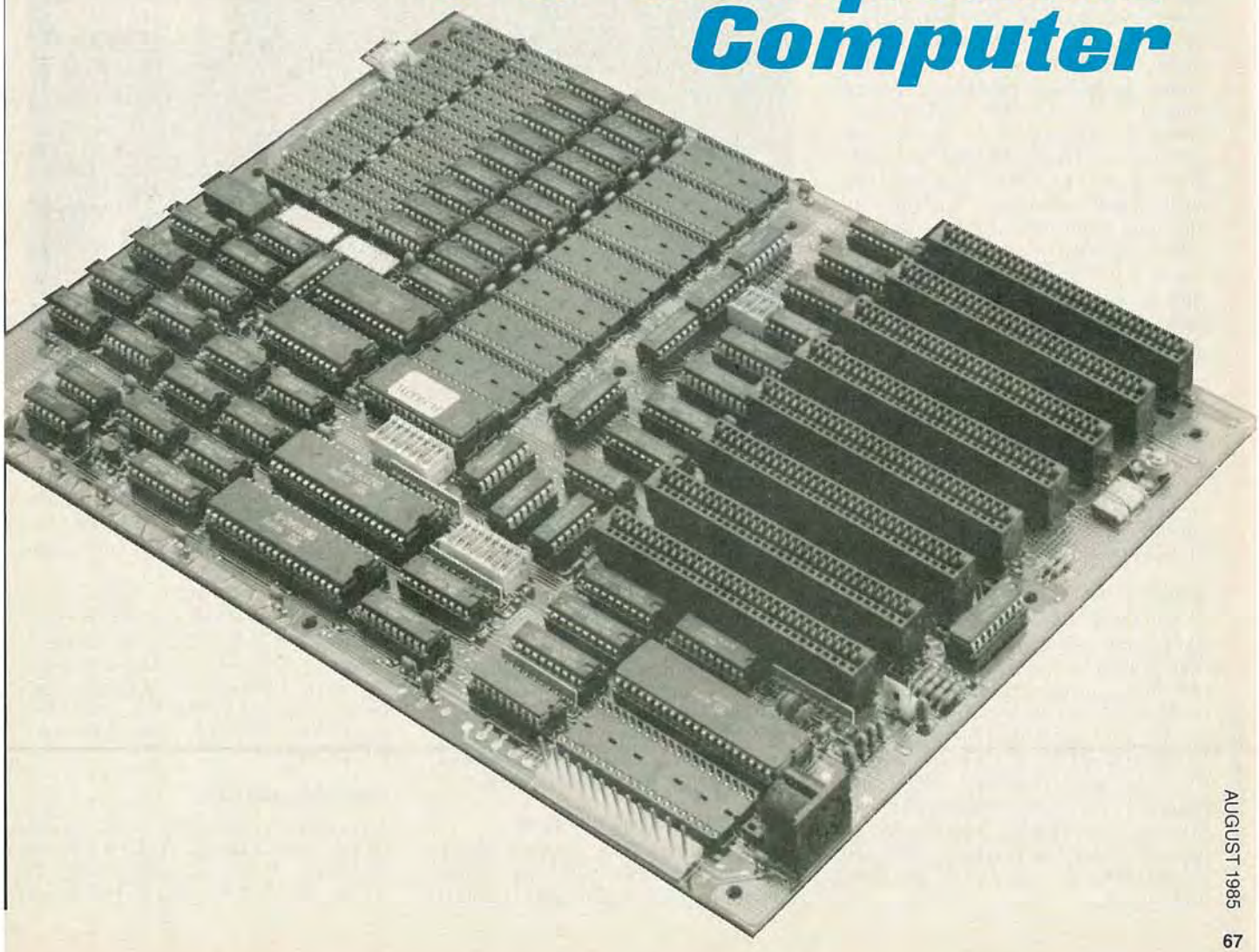
- SW1-1: OFF.
- SW1-2: ON.
- SW1-3: OFF.
- SW1-4: ON.
- SW1-5: OFF.
- SW1-6: OFF.
- SW1-7: OFF.
- SW1-8: ON.

Switch SW1-1 is always off for normal operation, while SW1-2 is on unless an 8087 co-processor is being used.

Switches SW1-3 and SW1-4 are set depending on how much memory is installed. For 128K, they should be set off and on respectively. For 192K, they should be set on and off, respectively. For 256K, they should both be off.

Switches SW1-5 and SW1-6 are set depending on the display adapter used. They should both be on if no display adapter is used. If a color/graphics adapter (with 40×20 resolution) is used, SW1-5 should be off, but SW1-6 on. For a resolution of 80×25, those settings should be reversed. If both adapters are used, or if a monochrome adapter is used, both SW1-5 and SW1-6 should be off.

Switches SW1-7 and SW1-8 are set de-



pending on how many floppy-disk drives are installed. For 1 drive, both should be on. For 2 drives, SW1-7 should be off, but SW1-8 should be on. For 3 drives, SW1-7 should be on, but SW1-8 should be off. For 4 drives, both should be off.

Two other DIP switches are located on the motherboard. Those switches are not numbered but their locations are labeled "FOR RAM EXPANSION" in Fig. 4. (For your convenience, Fig. 4, which appeared last time, will be repeated here.) Unless you have the necessary expertise to implement alternative ROM/EPROM's, don't disturb the settings.

Now it's time to insert the BIOS ROM in position U35. Be sure to observe the orientation of the notch or dot indicating pin 1.

Now that you have completed the switching configuration process, you're almost ready to install the board in the case. Before you do, locate the jumper block JP1. (See Fig 4.) If you are using the HiTech Power Supply, ensure that a jumper is in place from pins 2 to 3. That jumper enables the on-board power-on reset. If you are using the IBM power supply, install the jumper from pins 1 to 2.

The system board is now ready to be installed. It will be secured by a locking-type, plastic stand-offs and two, 6-32 × 1/4-inch screws. As noted in Fig. 4, one screw will be mounted with an insulating washer separating it from the component side of the board. With the case positioned as shown in Fig. 3 (see the July 1985 issue of **Radio-Electronics**), slide the system board in from the left and line up the plastic locking-type stand offs with the holes in the board. Those stand-offs will slide in their mounts making this task easier. When you have lined the board up and the stand-offs protrude through the holes, press down to lock the board into place.

Refer again to Fig. 4 and install the screw without the insulating washer where shown (point A). In a similar manner install the screw with the insulating washer where shown (point B). Take the two-wire cable coming from the speaker and plug it into the on-board connector as also shown in Fig. 4. That completes the installation of the system board.

Configuring the disk drive

If you have not done so already, carefully unpack the floppy-disk drive. Position the drive as shown in Fig. 6 and locate the power connector and the data-cable connector. Using a screwdriver, gently pry out resistor pack RA1 and discard it; it is not required for use with the HiTech PC. Next, move the jumpers; they should be at the HS and DS1 positions. That's all there is to configuring your floppy-disk drive. If you have purchased a second disk drive, configure it in exactly the same manner.

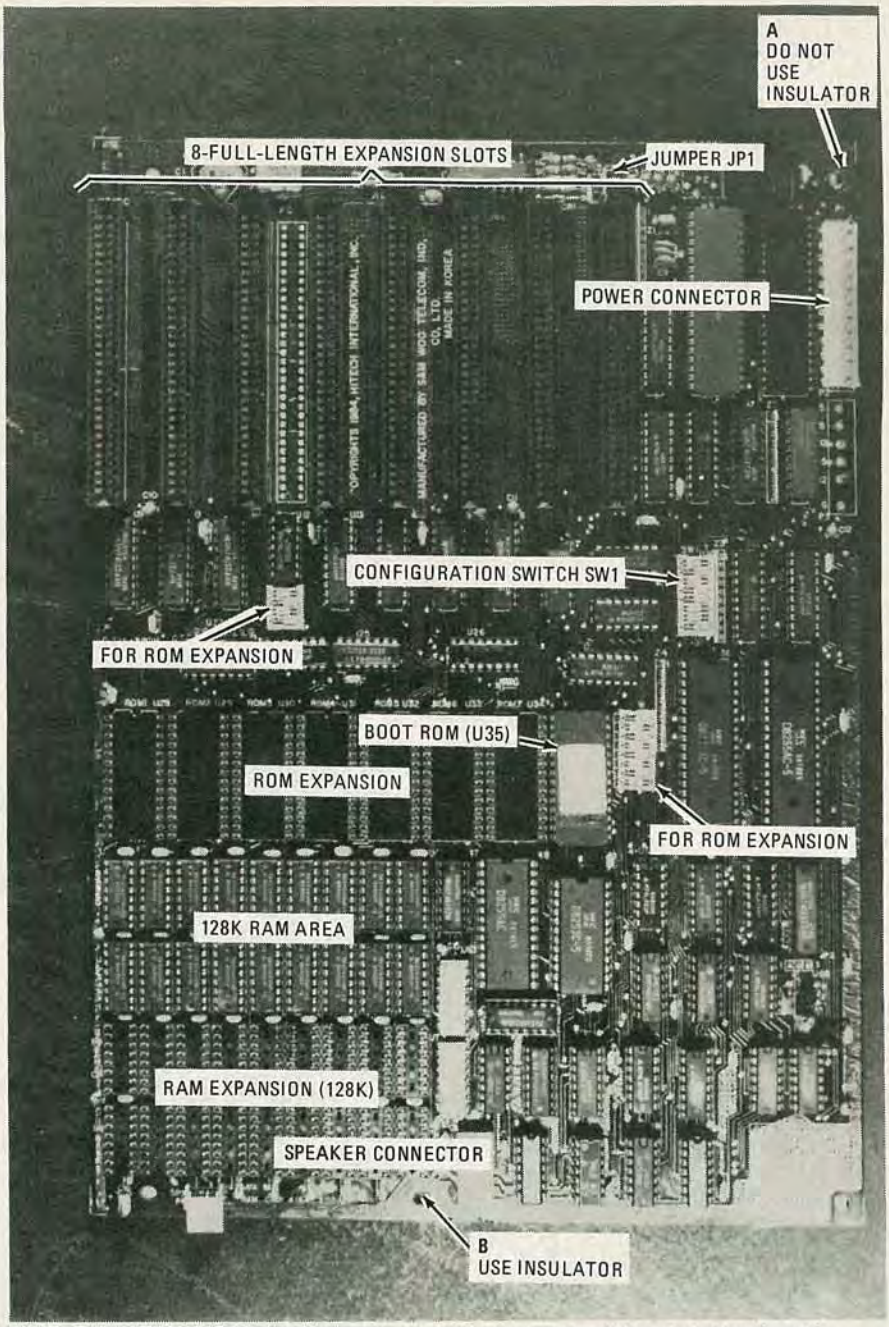


FIG. 4—THE HITECH MOTHERBOARD and some of the features you'll have to be familiar with.

You are now ready to install the floppy-disk drive in the case. Pop out the lower of the two plastic drive faceplates and carefully insert the disk drive, component-side down, through the front of the case. Secure the disk drive using two 6-32 × 1/4-inch screws in the slots (bracket) and tapped holes (disk drive) ensuring that the drive front is lined up with the front of the panel. The direction-indicating arrow on the front of the disk drive should be pointing up. That's all there is to installing the drive. If you have purchased a second disk drive, install it in a similar manner.

Installing the hard-disk drive

Your hard-disk drive, despite its name, is fragile. You should take whatever precautions are necessary to prevent it from jarring or dropping. (Damage can occur if it's dropped from heights as little as two inches!) Unpack the disk drive and remove the plastic front panel cover from your computer.

Refer to Fig. 7 and gently slide the drive into the right-hand side opening (as viewed from the front). Using the supplied mounting screws, secure the drive to the bracket as shown in the drawing. That completes the installation of the drive proper. The next step is to install the controller card.

Hard-disk controller

If you have not done so already, unpack the hard-disk controller card and position it in front of you as shown in Fig. 8. Locate the DIP configuration switch

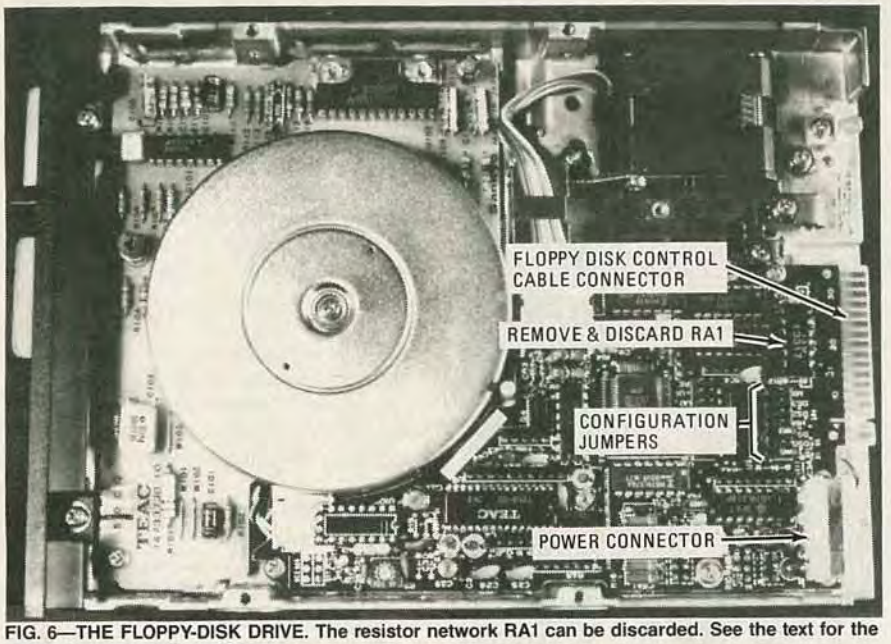


FIG. 6—THE FLOPPY-DISK DRIVE. The resistor network RA1 can be discarded. See the text for the proper jumper configuration.

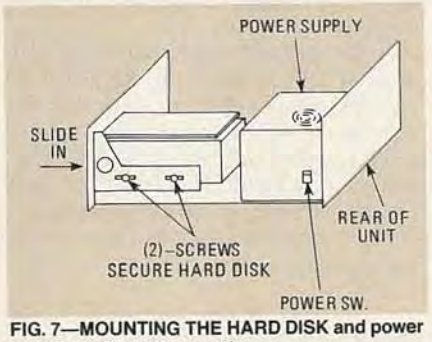


FIG. 7—MOUNTING THE HARD DISK and power supply is straightforward.

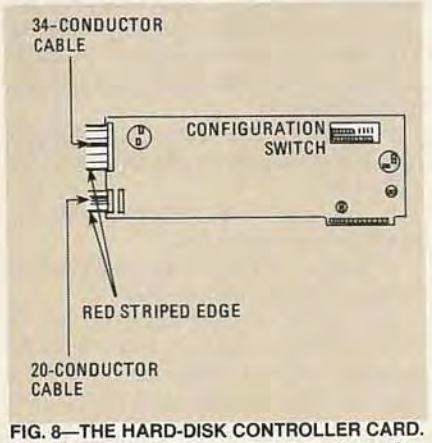


FIG. 8—THE HARD-DISK CONTROLLER CARD. The first four positions of the configuration switch should be set to off, and the last four should be set on.

SW1. (Note that this SW1 is *not* the same SW1 that we set on the system board.) The controller supplied with your computer is capable of accepting hard disks ranging in capacity from 10MB to 30MB. SW1 configures the card to the drive installed. In our case, we will be installing and configuring this card for a 10MB disk, so set SW1-1 through SW1-4 off and SW1-5 through SW1-8 on. That's all you have to do to configure the controller card. Don't change any jumpers on the card. You're now ready to install it, using Fig. 9 as a guide.

Using the supplied cables, plug the 20-pin and 34-pin cables into the card as shown with the red striped end of the cables pointing down toward the card-edge connector. Insert the card into a vacant slot near the hard-disk drive and route the cables as shown toward the hard disk. You will have to remove one of the back slot covers to install the card; save the screw and use it to secure the card with the cable end pointing towards the computer's front panel. Connect the remaining ends of the cables to the hard-disk drive. They are keyed and can only be inserted in the proper manner. Your hard-disk drive and controller card are now installed. We will format the disk shortly.

Installing the power supply

Position the power supply so that the power switch is located to the right rear (as viewed from the front) and protrudes from the rear right hand side of the case. (Refer to Figs. 7 and 10.) Turn the case around and line up the four mounting holes with their corresponding holes in the rear panel. Using four 6-32 × 1-inch round-headed screws, secure the power supply to the rear of the case. Locate the two cable assemblies and connect them to the motherboard as shown. In a similar manner, connect one of the two, 4-line cable assemblies to the rear of the hard disk drive. The assembly's connector is keyed and can only be inserted the correct way.

The remaining 4-line cable assembly will be connected in a similar manner to the floppy disk drive. If you are using two drives, use the y-adapter and carefully match the color codes of the wires and crimp the adapter in place.

The adapter cards

Now it's time to install a color-graphics/monochrome display card and a flop-

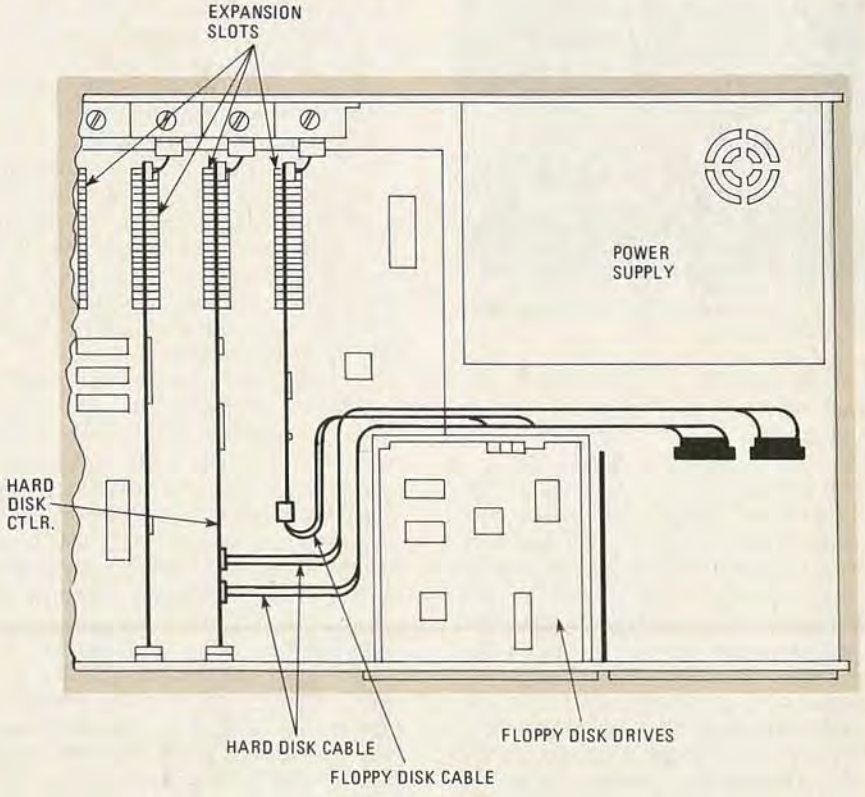


FIG. 9—ROUTING THE RIBBON CABLES for the disk drives is easy if you follow the layout shown.

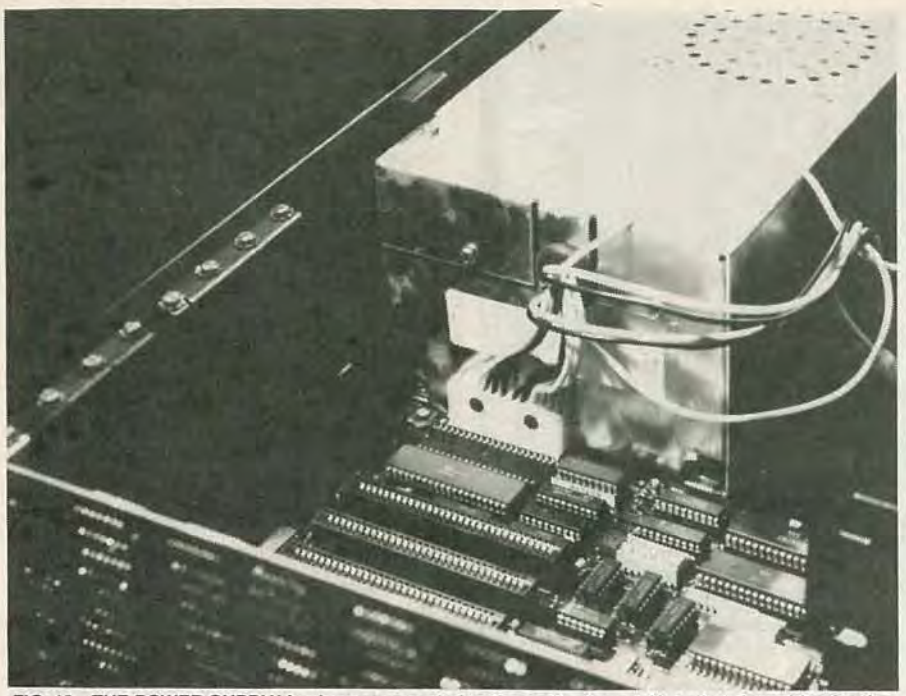


FIG. 10—THE POWER SUPPLY is shown connected to the motherboard. Note that the cables for the floppy- and hard-disk drives are not shown.

FIG. 11—THE COLOR graphics/monochrome adapter is fully compatible with the IBM system.

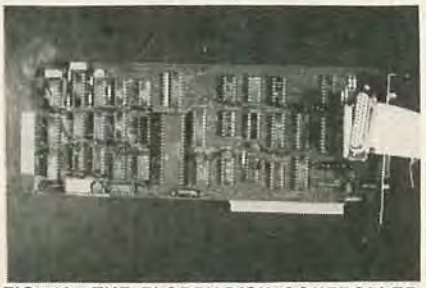


FIG. 12—THE FLOPPY-DISK CONTROLLER adapter shown here also comes equipped with a parallel printer port.

py-disk controller/parallel printer card. Each of those cards is packaged separately with necessary cables and instructions as to use. The color-graphics/monochrome display card shown in Fig. 11 should be installed in the first (leftmost) expansion slot with the two connectors—one for RGB color, the other for composite video—visible from the rear. Remove the screw holding the rear panel cover corresponding to the first slot (right as viewed from the front). Discard the panel cover but retain the screw; it will be used later to secure the adapter card. Position the card with the connectors to the rear and press down firmly. Secure the rear panel bracket.

The last adapter card we'll install is the floppy-disk controller card with a parallel printer port. Remove the third and eighth rear panel covers and save the screws. The left-most opening will be used for the DB25 parallel printer port connector. The remaining (third) opening will be filled with the expansion-drive connector.

Refer to Fig. 12, the controller/printer adapter. The only required configuration would be to change the position of the jumper located nearest the card edge fingers. The purpose and possibilities of that configuration change are more than adequately covered in the documentation that comes with the card and will not be repeated here.

Position the card so that the gold fingers on the long edge of the board are directly above the connector and ensure that the plate attached to the board lines up with the now open rear slot. Firmly press the board down into the connector and replace the screw removed previously to hold the board in place.

Take the cable supplied and place it between the floppy-disk drive(s) and the controller card with the red edge of the cable pointed to the top of the computer. If you are using only one drive, locate the connector at the fold of the cable and press the connector onto the bottom disk drive. The red line should be visible toward the left as seen from the front of the computer (on the disk drive). If you are using a second floppy drive, position the connector at the split end of the cable in a similar manner and press this connector onto the top disk drive. The remaining connector located at the long end of the cable should be connected to the card adapter with the red edge line pointing to the top or up. Route this cable as shown previously in Figure 9. That completes the installation of the floppy disk controller. To mount the DB25 parallel printer port, fasten this connector to the (supplied) bracket with the hardware supplied. Position that connector and bracket in the last opening and secure it with the remaining screw removed previously.

We're now ready to close up the case and try things out! Slip the case cover on from the front and secure with the four 6-32 × ¾-inch black flat head screws. Plug the connector from the keyboard into the socket located on the rear of the cabinet. Figure 13 shows the completed system which is also available ready to use under the name SAM 2001.

The "smoke test"

Now hook up your monitor, plug everything in, slip your operating-system disk into drive A (the top drive), and turn the computer on. The screen display will show the self-test in progress. When the self-test is complete, it will instruct you to insert your system diskette in the drive and to press any key.

At the system prompt, you might wish to enter DIR followed by RETURN to view the contents of your system disk. For detailed information on your system disk and the various uses of the utilities it contains, consult the literature that comes with the diskette, or any of the many fine books available on the MS-DOS operating system.

Formatting the hard disk

Now that everything seems to be working right, it's time to format the hard disk. Leave your DOS disk in drive A and enter "FDISK" followed by a return. A menu will present you with a number of options. Select Option 1 .

In response to the prompt asking if you want to use the entire fixed disk for DOS, answer NO .

In response to the prompt asking for partition size, enter 303.

In response to the prompt asking for the starting cylinder number, enter 0.

Hit the ESC (Escape) key to return you to the FDISK options. In order to make the partition active so that the system will load the DOS on power-up, select option 2.

View the partition data and double check it. You will be prompted to enter the number of the partition you want to make active. Select 1. Then hit the ESC key to return to the FDISK options. Use the ESC key again to return to DOS.

Reboot your system by hitting CTRL ALT DEL (the control, alternate and delete keys) simultaneously.

Next we'll use the DOS command FORMAT to initialize the hard disk's directory. First type "FORMAT C:/S."

ADD-ON BOARD SUPPLIERS

ABM Computer Systems
3 Whatney
Irvine, CA 92714
714-859-6531

Apstek Inc.
2636 Walnut Hill Lane Suite 335
Dallas TX 75229
214-357-5288

AST Research, Inc.
2121 Alton Ave.
Irvine, CA 92714
714-863-1333

Byad, Inc.
95 W. Algonquin Road
Arlington Heights, IL 60005
312-228-3400

Chrislin Industries, Inc.
31352 Via Colina Suite 1
Westlake Village, CA 91362
213-991-2254

IDE Associates, Inc.
7 Oak Park Drive
Bedford, MA 01730
800-257-5027

MA Systems
2015 O'Tolle Ave.
San Jose, CA 95131
408-943-0596

Maynard Electronics
430 E. Semoran Blvd.
Casselberry, FL 32707
305-331-6402

Microlog, Inc
222 Route 59
Suffern, NY 10901
901-368-0353

Orchard Technology
47790 Westinghouse Drive
Fremount, CA 94539
415-490-8586

Personal Computer Products, Inc.
11590 W. Bernardo Court
San Diego, CA 92127
619-485-8411

Persyst
17862 Fitch
Irvine, CA 92714
714-660-1010

Profit Systems, Inc.
30200 Telegraph Rd. Suite 132
Birmingham, MI 48010
313-647-5010

Quadram
4355 International Blvd.
Norcross, GA 30093
404-923-6666

Tecmar
6225 Cochran Rd.
Bolon, OH 44139-3377
216-349-0600

ORDERING INFORMATION

The following are available from HiTech International, Department R-E, 1180 Miraloma Way Suite M, Sunnyvale, CA 94086.

Part No.	Description	Price
RE-PCB W/IC	Motherboard with 128K RAM	$525.00
RE-PS-130	130-watt power supply	175.00
RE-ROM	BIOS ROM	35.00
RE-CASE	Case (complete)	150.00
RE-5150	enhanced keyboard	150.00
RE-MON/DIS	RGB video card	175.00
RE-DISK DR.	Teac 360K disk drive	125.00
RE-CTRL-A	Disk controller/parallel port	175.00
RE-HARD DISK	10 megabyte drive with controller	650.00
RE-YAD	Y Adapter (to attach two drives)	5.00
	Total*:	2165.00

*Note that due to last-minute price changes by both IBM and HiTech, the price difference between their two compatible computers does not live up to the $2000 claimed on last month's cover.

FIG. 13—THE COMPLETE HITECH COMPUTER is available fully assembled as the *Sam 2001*.

You'll be prompted to hit any key to begin formatting drive C. When you do, don't be surprised at the amount of time required to format the hard disk. You will be able to tell that the hard disk is working by the drive indicator light being illuminated. When formatting is complete, a status report will be displayed telling you the total disk space, the space marked as defective, and the space currently allocated to files. Note that the amount of space marked as defective must be ZERO. If any bad bytes are found, you should contact HiTech International.

As we have seen, the DOS command FORMAT is required to setup the hard disk, it also initializes it. Initialization could be disastrous if used at the wrong time. The same command is also used to format the floppy disks, so if you used it in error, the hard disk could in fact be erased. To prevent that from happening, change the name FORMAT.COM to FMT.COM. To do so type "RENAME FORMAT.COM FMT.COM."

Next create a batch file to format floppy diskettes. To do so type: "COPY CON: FORMAT.BAT FMT A%1." Then hit the F6 key. That program will enable you to format a diskette or to format and place DOS on your diskette. To only format the diskette type FORMAT; to both format and add DOS, type FORMAT/S.

That completes the formatting and configuration of your hard disk. You are now ready to enjoy your system.

Add-ons, etc.

One of the advantages of building your own system is the ability to tailor accessories to your needs. There are a lot of companies making accessories for the IBM PC/XT and anything that fits the IBM, will work in your HiTech computer. To offer you some assistance, we are including a list of suppliers of accessories that will permit memory expansion, additional ports (serial, parallel, game, etc.) and the ability to configure additional memory as a RAM disk. **R-E**