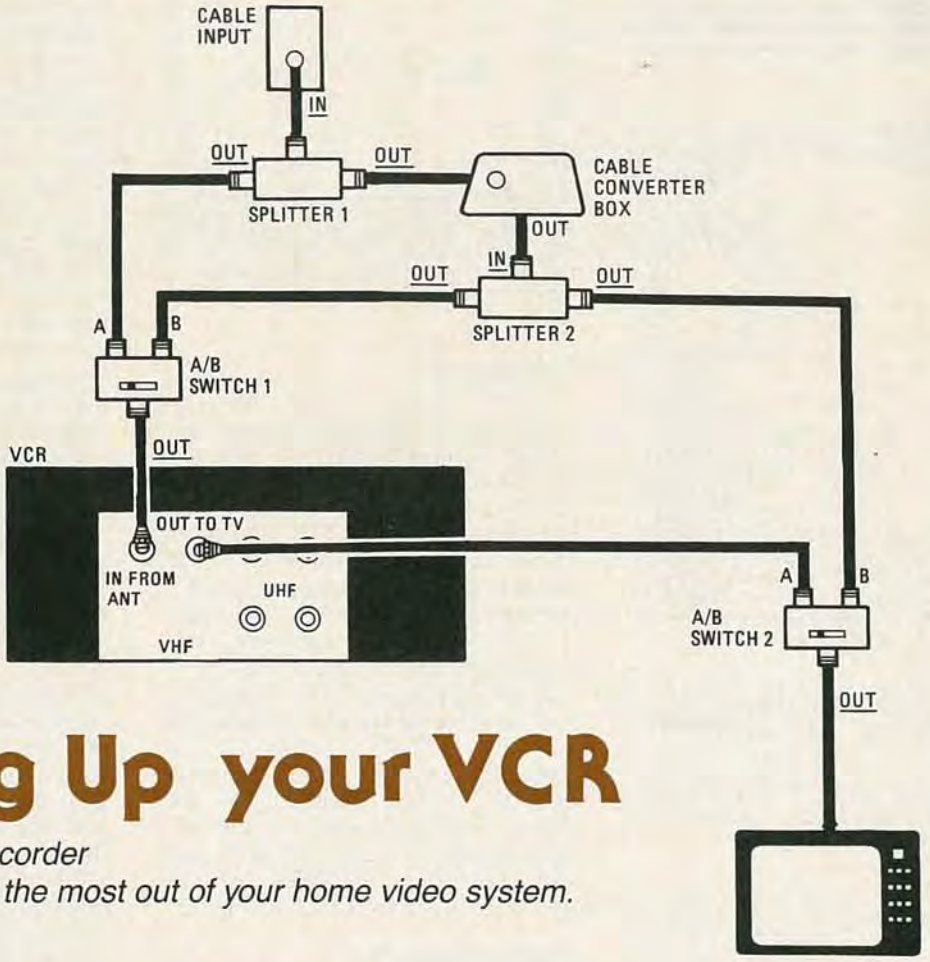

Hooking Up your VCR

Hook-up that video recorder the right way, and get the most out of your home video system.

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SO, YOU FINALLY BROKE DOWN AND bought yourself a VCR. Now that it's home, uncrated, and set up on a stand, it is time to hook it up to your antenna or cable system, and your TV. Sounds like a simple enough task, and maybe it is.

But then again, maybe it is not. That's especially true when you are dealing with cable-TV setups. Unless a cable-TV setup is wired correctly, you will lose one of the most attractive benefits of VCR ownership—the ability to watch one channel while recording another.

Finally, keep in mind that the VCR has a built in RF modulator. That, in essence, is a miniature TV transmitter. Thus, if the VCR is hooked up incorrectly—that is, its output is connected directly to a TV antenna—the output may very well be broadcast to your neighbors. That, of course, is a violation of FCC rules. And, it might get your neighbors annoyed if they don't care for your choice in programming.

In this article, we are going to show you the ins and outs of VCR hookups, ranging from the most simple to the very complicated. When we deal with cable hookups, both cable-ready and non-cable-ready, TV's and VCR's will be covered.

Tools of the trade

As with any other job, there are certain "tools" you will need to get things done right. In VCR hookups, those tools consist of the various cables, adapters, splitters, and switches that an installation might call for.

Figure 1 shows the two types of cable you might need. In Fig. 1-*a*, a length of 75-ohm coax cable is shown; in Fig. 1-*b*, a length of 300-ohm twin-lead is shown.

The coax is used to connect the VCR's 75-ohm VHF output terminal to the set. While most newer sets are provided with a 75-ohm cable input (F-connector), many still use the familiar 300-ohm, two screw-terminal inputs, for use with twin lead. In such cases, the coax must be terminated with a 75-ohm-to-300-ohm adaptor, such as the one shown in Fig. 2.

Most VCR's use 300-ohm two screw-terminal outputs for the UHF-out connection. As such, it is most convenient to use standard twin lead to route a UHF signal from the VCR to the TV.

For the most part, twin lead is also used as the lead-in wire from the antenna to the set. To adapt the twin lead for connection to a VCR's 75-ohm input, a 300-ohm-

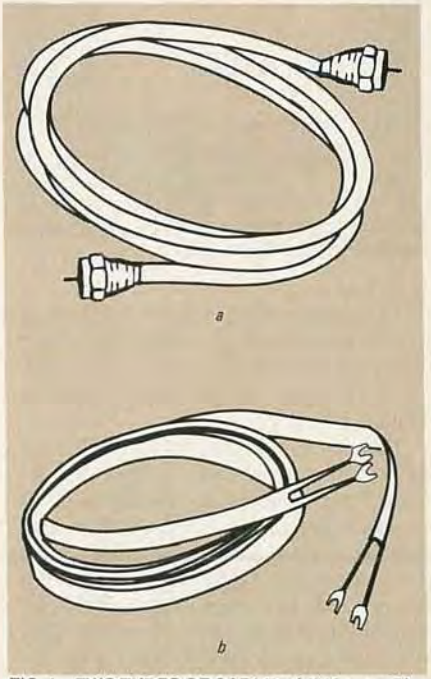

FIG. 1—TWO TYPES OF CABLE might be used in a home video setup. Those are 75-ohm coaxial cable, shown in *a*, or 300-ohm "twin-lead", shown in *b*.

FIG. 2—A 75-OHM-TO-300-OHM matching transformer or adaptor is used to connect a coaxial cable to the antenna input terminals at the back of a TV set.

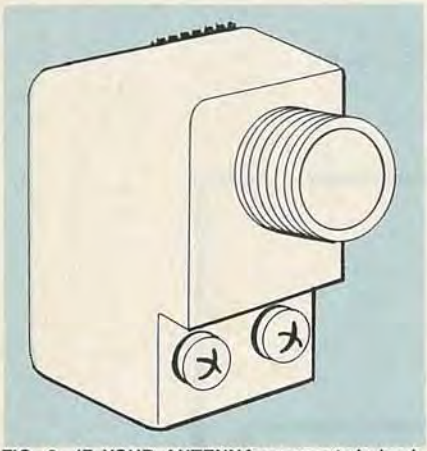

FIG. 3—IF YOUR ANTENNA uses a twin-lead down-lead, a 300-ohm-to-75-ohm adaptor is used to connect the down-lead to the VCR's 75-ohm antenna input terminal.

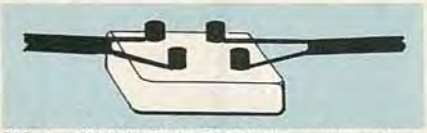

FIG. 4—AN ANTENNA BLOCK is used to splice two lengths of twin-lead together.

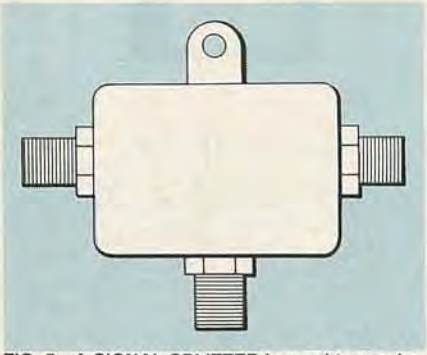

FIG. 5—A SIGNAL SPLITTER is used to send a signal to two different devices.

to-75-ohm matching transformer, such as the one shown in Fig. 3, is needed. Note that some installations use 75-ohm coax for the down-lead. In those set ups, no adaptor is needed.

There are a few other pieces of equipment that, in many cases, will prove valuable. Figure 4 shows an antenna block. It is used to splice two lengths of twin lead together. Figure 5 shows a splitter. That device is used to "split" a signal so that it can be fed to more than one device. And, finally, Fig. 6 shows an A/B switch. That is a two-position switch, used with 75-ohm coax. It is used to select between two signals or two devices.

And now on to the installations!

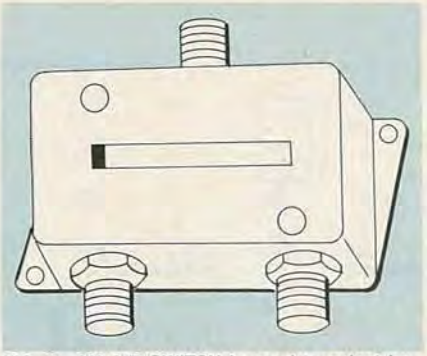

FIG. 6—AN A/B SWITCH is used to select between two different signal sources.

A simple start

Figure 7 shows just about the most basic of our VCR installations. It involves simply an antenna with a 75-ohm coax down-lead, a VCR, and a TV set. The down-lead is connected to the antenna-input terminal on the VCR. A length of 75-ohm coax is run from the VCR's VHF output to the TV's VHF input. If the TV does not have a 75-ohm coax VHF input, a 75-ohm-to 300-ohm transformer must be used between the cable and the set.

If your antenna uses a twin-lead down-lead, the down-lead must be terminated in a 300-ohm-to-75-ohm adaptor before it is connected to the VCR. For UHF reception, the twin-lead down-lead from the antenna is attached to the UHF input terminals on the VCR and a length of twin lead is run between the VCR's UHF output terminals and the TV's UHF input.

Cable installations

In the balance of this article, we'll turn our attention to the various cable installations that you might run into.

In cable installations, it is important to consider whether or not the set involved is "cable ready," and whether or not there are any premium channels (in cable-TV terminology, premium is another word for scrambled). Keep in mind that cable-ready sets are not capable of descrambling the premium services. For that you need a cable-company supplied descrambler, which is usually integrated with a conversion box. Cable-ready sets are good for viewing unscrambled services, and are handy to have in some of the more complex cable installations; that's because, as we'll soon see, they eliminate the need for a second conversion box.

As you might have gathered from the foregoing, descramblers and converters are not the same thing. Let's see what each is, and how they differ.

Early cable systems were capable of only supplying 12 channels of programming. That's because a standard television tuner is capable of receiving only 12 discrete frequencies in the 54–300 MHz VHF band. Granted, if UHF frequencies were used, an additional 68 channels of programming might be available. But, due to the high line losses at those frequencies (remember, it is *cable* TV we are talking about here), the use of UHF was impractical. In fact, if a cable system wanted to provide a UHF-TV station, it would have to downconvert the signal and send it out over the cable system on a VHF channel.

To add more channels of programming, cable operators resorted to the use of a converter box. A converter box is essentially an external tuner. It allows the selection of the frequencies "between" the channels. The selected frequency is then converted to a single VHF channel (usu-

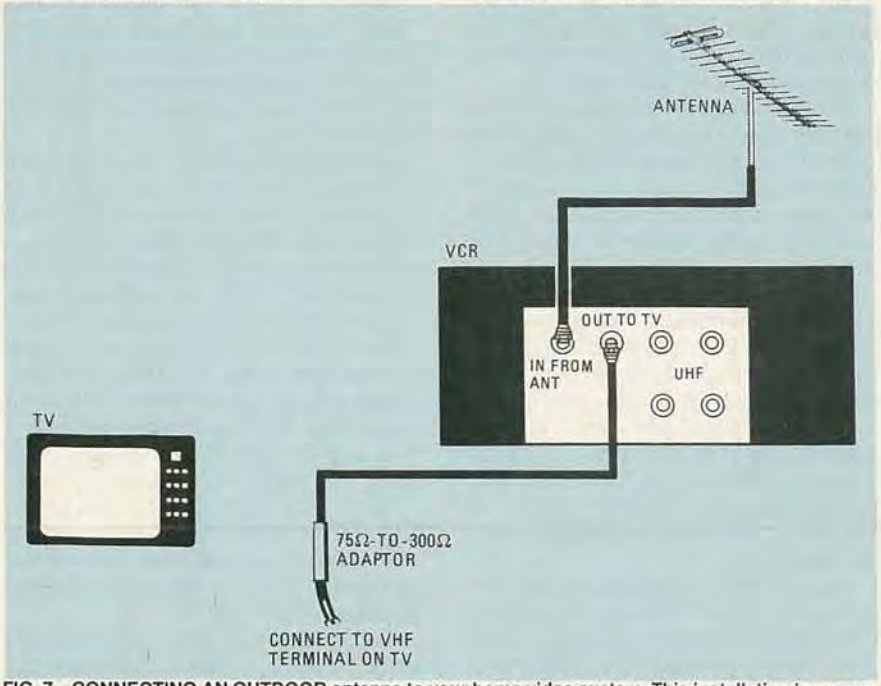

FIG. 7—CONNECTING AN OUTDOOR antenna to your home video system. This installation is among the most basic.

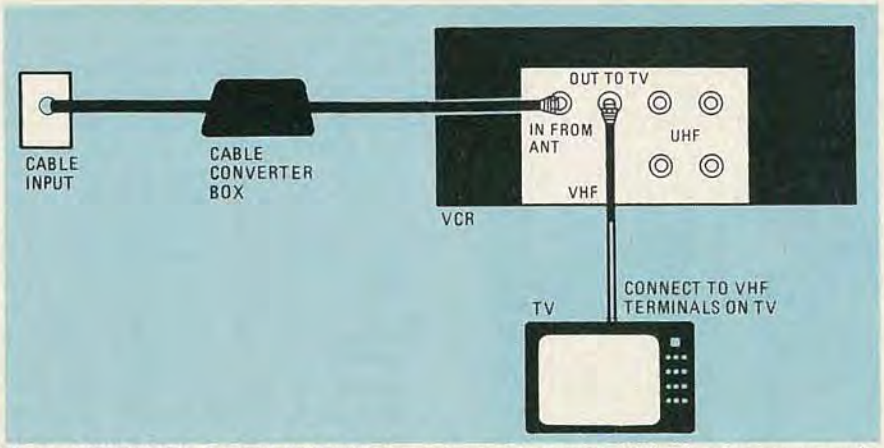

FIG. 8—CONNECTING A CABLE-TV FEED to your home video system. With this setup, you can only record and view the same scrambled or unscrambled signal.

ally either Channel 3 or 4) and fed by the converter to the set. Cable-ready sets are made "cable-ready" by using a tuner of the type found in cable converter-boxes.

Thus, essentially, a converter is a tuner that allows you to receive frequencies that are not available using a standard TV tuner. If the signal on a particular frequency is scrambled, the output of the converter will also be scrambled. That is, unless it is first fed to a descrambler.

Cable companies use many different scrambling/descrambling schemes, and for more information on them, you might want to refer to "Cable-TV Descrambling" in the February 1984 issue of **Radio-Electronics**. For our purposes, the descrambling scheme used is not important, just its result—the delivery of a normal, unscrambled TV signal to your set. For the installations discussed below, we will assume that the converter box in your cable-TV setup incorporates an appropriate descrambler.

Figure 8 shows the simplest cable installation; it allows an owner of a non-cable-ready set to view and record the same scrambled or unscrambled cable channel. (Note that 75-ohm coax is used throughout the installation. The cable signal is delivered from the cable output via that type of feed also. If your TV set does not have a 75-ohm input, you will need a 75-ohm-to-300-ohm adaptor. In all of the following installations, it will be assumed that coax is used, and that the lead to the TV is terminated properly.)

That installation robs you of one of the best features of a VCR—the ability to view one channel and record another. To do that, you need a more complex installation.

Owners of non-cable-ready sets may want to consider the installation shown in Fig. 9. That installation allows you to record one scrambled or unscrambled channel while watching another.

Let's trace that installation out. The signal from the cable system is fed into a two-way splitter. Each output of the splitter is fed into a separate converter box. The output from one box, labeled CONVERTER BOX 1 in Fig. 9, is fed into the VHF input on the VCR. From the VCR, the signal is fed to the TV through the A side of an A/B switch. The output of the second box, labeled CONVERTER BOX 2, is fed, via the B side of the A/B switch, to the set.

To record a scrambled or unscrambled channel, first set the output of the converter boxes to different channels (usually a choice of either Channel 3 or Channel 4 output is provided). Then set the channel selector on the VCR to the output channel selected for CONVERTER BOX 1. Next, select the channel to be recorded on that box. Finally, set the A/B switch to A and turn the TV selector to the output channel of the VCR (once again, that's most likely to be either Channel 3 or 4).

After you are sure that the desired channel is recording, you can switch the VCR output away from the set and view another channel via CONVERTER BOX 2. To do that, set the A/B switch to B. Then set the TV's channel selector to the output channel of CONVERTER BOX 2, and select the channel to be viewed on that converter.

Owners of cable-ready sets can eliminate one of the converter boxes used in the previous installation. That's possible because the cable-ready feature of the set allows you to view an unscrambled signal without the need for additional electronics. The required setup differs from the one in Fig. 9 only in that the converter box located between the splitter and the TV (via the A/B switch) has been removed.

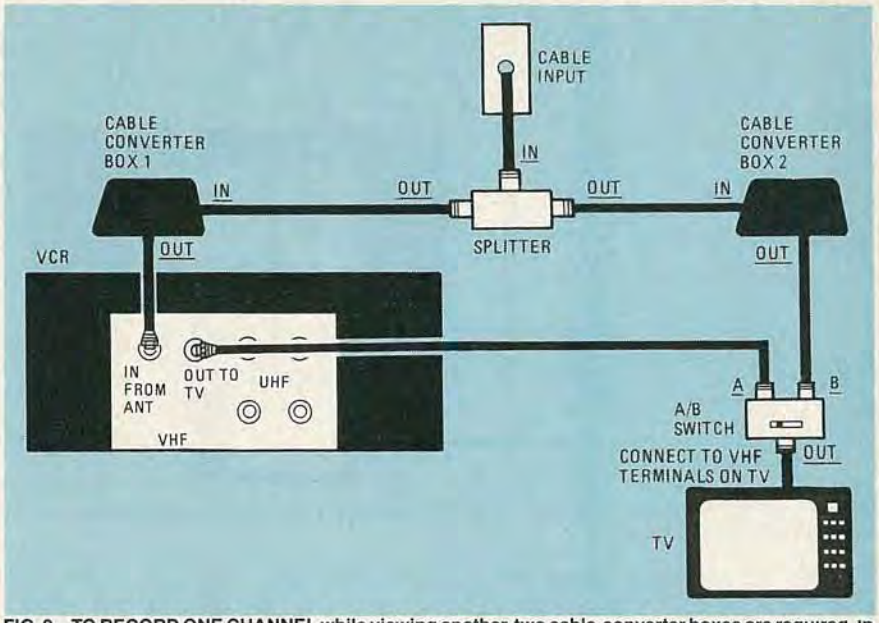

FIG. 9—TO RECORD ONE CHANNEL while viewing another, two cable-converter boxes are required. In this setup, the channels to be viewed may be either scrambled or unscrambled.

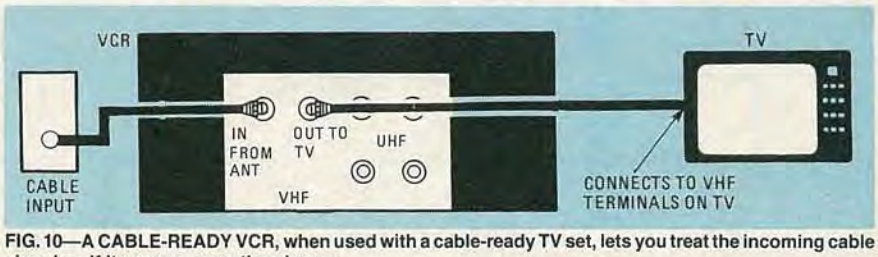

FIG. 10—A CABLE-READY VCR, when used with a cable-ready TV set, lets you treat the incoming cable signal as if it were an over-the-air one.

Cable-ready VCR's

In addition to cable-ready sets, many of the VCR's now on the market also feature cable-ready tuners. The following examples show some typical installations using that type of VCR.

If you do not wish to receive or record scrambled channels, a cable-ready VCR,

when used in tandem with a cable-ready TV set, can eliminate the need for a converter box altogether. Such an installation is shown in Fig. 10. If the TV set is not cable-ready, a converter box must also be installed between the VCR and the set.

That setup allows you to treat the cable signal just as you would an over-the-air one. In other words, all of the VCR's features, such as programability (the feature that allows a VCR to be preset to record one or more programs at some future time and date) and the ability to watch one channel while recording another, are retained. In fact, that setup is the only one that allows the VCR to retain its programability when used with a cable feed.

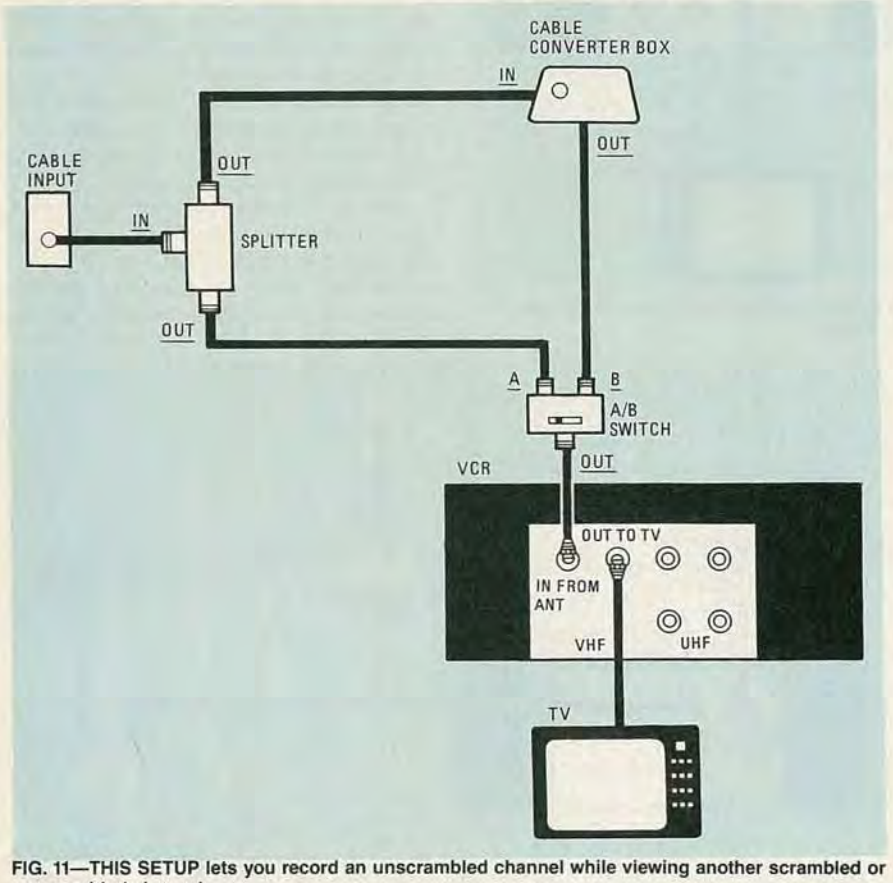

FIG. 11—THIS SETUP lets you record an unscrambled channel while viewing another scrambled or unscrambled channel.

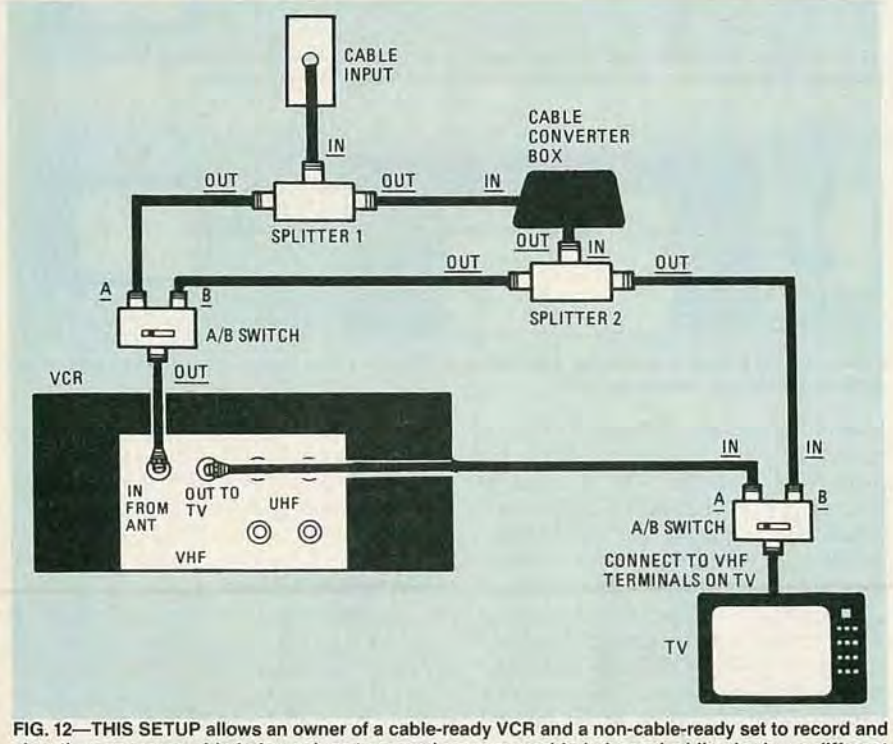

FIG. 12—THIS SETUP allows an owner of a cable-ready VCR and a non-cable-ready set to record and view the same scrambled channel, or to record an unscrambled channel while viewing a different scrambled or unscrambled channel.

As should be obvious by now, if you wish to record a scrambled channel, a descrambled signal must be provided to the VCR. That means placing the converter box just before the VCR input, as shown in Fig. 11. That setup, which is intended for use with a cable-ready VCR and set, will allow you to record and view the same scrambled channel, or record one unscrambled channel while viewing another.

Our last example deals with a cable-ready VCR and a non-cable-ready TV set. That installation, shown in Fig. 12, allows you to record and view the same scrambled channel, or to record an unscrambled channel while viewing a different channel that is either scrambled or unscrambled.

Let's trace that installation through. The cable input is first fed to SPLITTER 1. One output of that splitter is fed to the VCR via A/B SWITCH 1. The other output of the splitter is fed to a converter box. The output of the converter box is fed to SPLITTER 2. One output of that splitter is fed to the VCR via A/B SWITCH 1, while the other output is fed to the TV set via A/B SWITCH 2. The output of the VCR also is fed to the set via A/B SWITCH 2.

To record and view the same scrambled channel, first set A/B SWITCH 1 to B and A/B SWITCH 2 to A. Then, select the channel to be recorded and watched on the converter box, set the VCR to receive the output channel of the converter box, and set the TV to receive the VCR's output channel.

To record an unscrambled channel while watching another channel that is either scrambled or unscrambled, set both A/B switches to A. Select the channel to be recorded using the VCR's tuner. Once you've verified that the proper channel has been selected by monitoring it on the TV, set the VCR to record and set A/B SWITCH 2 to B. Set the TV to the output channel of the converter box and use that box to select the channel to be viewed.

There are, of course, many other ways to hook up a VCR system. But the ones we've shown here are among the simplest. Remember that it is best to use as few switches, splitters, and other devices as possible in an installation. That's because each device will cause some, albeit minimal, picture degradation due to their insertion losses. Also, the fewer the switches, splitters, or other devices in a circuit, the fewer the sites for potential problems. Finally, use good-quality components. For instance, a switch with poor isolation is good for little aside from producing headaches. **R-E**