Here Is What You'll Find

Inside the New Color TV Sets

By Robert Gorman

COLOR receivers are simple and should be within the economic reach of the great mass of the purchasing public,” declared the Federal Communications Commission when it okayed the Columbia Broadcasting System’s proposals for color television.

One way to make a color receiver is to build onto a present black-and-white set. CBS colorcasts can be received in black-and-white on any set if an adapter is added to it. Colors can be seen by adding a converter with color wheel to an adapted set. Or a slave unit consisting of a separate picture tube and color wheel can be connected up to an ordinary TV set to bring in color pictures.

But manufacturers are rushing now to present receivers, but has added circuit to keep color wheel synchronized with transmitter.
produce combination sets that will receive either colorcasts or black-and-white on the same screen. One of the first of these to be disclosed is the CBS-Columbia console (in some places also trade-named "Air King"), shown on this and the facing page. It is made by a subsidiary of the color-championing Columbia Broadcasting System.

**How it works.** When a color picture is televised in the studio, filters at the camera separate the picture's red, blue and green components. These individual color "fields" are transmitted as a rapid succession of black-and-white images. They are sent out at a rate of 144 a second.

To put this picture together in the receiver, a spinning color wheel passes over these black-and-white pictures at exactly the same rate. In Air King receivers, the wheel is driven by a motor that's linked to the wheel shaft with a toothed belt.

This specially designed induction motor can hold to a fairly constant speed. By itself, though, it probably wouldn't stay for long in exact step with the transmitter. To keep it locked in, the receiver uses an ingenious comparison circuit that gets its timing orders from the incoming pictures.

**Wheel-speed control.** A small segmented disk called an alternator is attached to the color-wheel shaft. As it turns, it cuts through the magnetic field of a tone generator. It interrupts the field at about 144 times a second.

This, together with the incoming picture pulses, gives two sets of 144-cycle tones. Both are fed to a control circuit and electronically compared. So long as they are the same, nothing happens. But any difference between them results in a voltage that is fed to a special transformer called a saturable reactor. The reactor immediately responds by modifying the power that drives the motor, speeding or slowing the wheel until it keeps exact pace with the incoming picture.

**Wheel-phase control.** Like a rookie who marches at the same pace as his squad but out of step, the color disk in a receiver can still be wrong. It can spot the green segment in front of the picture tube when the red one should be there. When you turn the set on, the wheel may join the parade at the right speed—but out of phase.

The answer to this is comparatively simple. When a green-haired singer shows up, you just touch the phasing switch on the control panel. This causes the color.
drive to skip a beat, bringing the right
color segment into place at the right mo-
ment. (Since there are three colors in-
volved, the singer may look even queerer
the first time you touch the switch. But
just keep at it and she'll turn the right
color).

Two wheels used. Having succeeded in
coloring the picture, the designers of the
combination receiver were faced with a
poser: what do you do with the color
wheel when you want to watch a regular
black-and-white program? Pivoting mounts
to swing the whole rig out of the way would
be bulky and cumbersome.

They licked this problem by using two
wheels. Half of each one is clear plastic.
The other half is divided into color seg-
ments. Each wheel turns on the same shaft,
secured to it by hubs that use a clever
centrifugal locking device. When the
wheels spin, they are locked 180 degrees
apart so the colored part of one masks the
clear part of the other. In this state they
amount to a single, complete color wheel.
But when they stop, the centrifugal hubs
and a brake bring the wheels to rest with
the clear sections lined up in front of the
tube face for black-and-white viewing.

This combination receiver uses a 10-
inch tube, magnified by a built-in lens to
12½ inches. It'll retail for about $500, with
a companion model in a plainer cabinet go-
ing for around $400.