

a DC potential produced in a discriminator or comparator circuit.

This being so, the receiver oscillator, while locked in terms of frequency, may not go through its forward and retrace cycles at the same instant as the scanning circuits at the transmitting end. The receiver oscillator may therefore trigger and produce the retrace scan at the instant when the transmitting equipment is only partway along a line.

When this happens, the picture is divided more or less as shown in figure 183, with the left and right hand portions of the picture transposed and the retrace blanking line down the centre of the screen.

### DEPENDS ON CIRCUIT

In the synchroguide circuit (Figure 175, October issue) the phase of the receiver oscillator is dependent on circuit components and configuration and special precautions are unnecessary apart from adhering to previously selected circuit values.

However, the picture information can be shifted relative to the raster by modifying the coupling network between the sawtooth output components and the grid of the control valve. In particular, the 15pF. capacitor shunting the .15meg. feedback resistor has a vital bearing on phase and is chosen to give optimum phase relationship and optimum picture positioning on the screen.

Without this component in the particular circuit, or with some other circumstance upsetting oscillator phase, the picture can become displaced bodily to one side, possibly enough for the retrace blanking bar to be seen. This can become a "fault" condition, which is not always recognised.

Minor displacement can usually be offset by suitable adjustment of the centering magnets but extreme setting of the magnets, made necessary by poor picture phasing, can lead to further trouble in that corners of the picture may be clipped by the "neck shadow" effect.

In the case of the reactance controlled oscillator shown in figure 181, a special adjustment is provided for picture phasing. This is the core in winding D-E-F on the synch. discriminator transformer. Having set the core in coil A-B-C for frequency lock, the core in D-E-F is adjusted to place the blanking bar beyond the mask and thus centralise the picture.

### "FOLD-OVER" EFFECTS

Over and above a simple displacement of the picture, incorrect oscillator phasing can produce visible "fold-over" effects, whereby portion of the picture appears to be folded over upon itself. This is most likely to be seen in receivers which do not incorporate automatic retrace blanking, to supplement the blanking pulse from the transmitter.

The normal condition is for the retrace period in the receiver to occur during the transmitted line blanking pulse, and to be shorter — or certainly no longer than the duration of this pulse.

This being so, the blanking pulse from the transmitter blanks out the beam so that retrace lines are not visible on the screen. By the time the blanking period terminates and the picture information recommences, the receiver forward scan is already in progress, so that the picture is displayed normally.

If the receiver retrace period begins too soon, while line information is being

## IN SYNCH. BUT OUT-OF-PHASE



Figure 183: This picture illustrates what happens when the horizontal oscillator is locked but in the wrong phase relationship. The receiver flyback occurs during the transmission of line information, while the transmitted blanking pulses appear down the centre of the screen as a black bar.

transmitted and before the blanking pulse arrives, there is a chance that the picture will appear to be folded upon itself, down the left hand side.

Conversely, if the receiver retrace is unduly delayed, so that it is still in progress when each new set of line information arrives, the left hand side of the picture will appear to be folded.

A still further condition is when the retrace time is too long. Folding may then be evident on both sides of the picture, phase adjustment serving only to decrease one foldover by increasing the other.

Remarks about synch. phasing do not hold in respect to the frame oscillator, because nearly all receivers use direct triggering for the frame circuit and correct phasing is more or less automatic. However, improper operating conditions can occur due to circuit faults which prolong the frame flyback period or grotesquely distort the scanning current through the yoke windings.

In such a case foldover can become evident along the top of the picture or extreme compression of one or more regions.

To be continued.

## A TWIN 10w. STEREO AMPLIFIER

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been corrected by altering values of the compensating components.

With this amount of feedback, a slight burst of oscillation was noticed at full output on very low frequencies, indicating that such alteration would be necessary to restore the original degree of stability. But it does indicate a safety margin of at least 10 db.

No low frequency oscillation was experienced at any time through the tests. A further oscillogram shows a sine wave at 50 cycles with 32 db of feedback and a measured output of a little over 10 watts.

The power output curve is extremely good. At 1 Kc the output for a clean sine wave is 11.3 watts per channel, and this continues without serious malformation up to 50 Kc. At 50 cycles output was 10 watts and at 30 cycles about 8 watts. This is a very good performance.

The input sensitivity for full output is 180 millivolts.

Our tests have been carried out in conjunction with the stereo control unit recently described, and it can be considered the standard type for use with crystal pick-ups which are likely to be the most popular and least expensive for some time to come.

With this unit, and checked with a stereo test record, essentially flat response is obtained between 40 cycles and 10 Kc. with some small variations up or down associated with crystal pick-ups. The unit itself is a few db down at 20 Kc. but for all practical purposes this is not significant.

If the control unit is used, its output plug can be wired to conform with that of the amplifier. The unit was designed originally for use with two separate amplifiers, and that is why two output connectors were included in it.