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GOOD PURITY

By understanding what is meant by "purity", and by following a specific procedure when adjusting a color television receiver, it is easy to obtain good purity.

The secret is in being familiar with the action of the various adjustments provided, and knowing how purity is accomplished, and how to prevent impurities by understanding how to deal with stray magnetic fields.

Purity

As related to color television *purity* is defined as a "uniform quality of the individual red, green, and blue fields."

In simple terms, good purity is obtained when the electron beams from the red, blue and green guns, pass through the shadow mask at the correct *angle* and light *only* their respective phosphor dots on the face of the color picture tube. *Perfect* purity is obtained when the electron beam strikes its associated phosphor dot squarely in the center. The red field for example, is "pure" when the raster emits *uniform* red light on all areas of the screen, with no contamination from either blue or green light.

Impurity

In contrast with good purity the condition of *impurity* is defined as a contamination of light output of one color field by either of the other colors. For example, the red field is "contaminated" when the electron beam from the *red gun* produces light from blue or green phosphor dots — causing an unwanted color effect on the screen. This condition may exist to partial extents especially near the outer edges of the raster.

The Procedure

Always make reference to the related service data for the complete step by step procedure when making adjustments on a color television receiver.

In general terms the procedure for obtaining purity is as follows:

Face the receiver directly North or South when performing purity adjustments—this insures more positive and more lasting purity when the set is placed in a normal viewing position.

Make sure *center convergence* is good before adjust-

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RCA'S 7" REEL TO REEL TAPE TRANSPORT

The mechanism for RCA's 7" reel to reel tape recorders are designed as the TRT-1 and TRT-2. These transports are capstan-drive, high-fidelity, three-speed, tape mechanisms.

The operation of the mechanism is controlled by four push-buttons, a slide button for pause, and a speed change knob. An automatic end-of-tape or broken tape shut off is incorporated in the deluxe version of this mechanism. The push-button controls are labeled REWIND, STOP, PLAY/RECORD, and FAST FORWARD.

The Rewind button moves the tape from the right hand reel to the left hand reel at a fast rate. The Play/Record button moves the tape from the left hand reel to the right hand reel with the tape against the heads at the speed to which the speed control has been set. The Fast Forward button moves the tape from the left hand reel to the right hand reel at a fast rate. The stop button shuts the transport off and releases the tape in the tape channel. The pause slide-button stops the movement of the tape but does not stop the motor; it should be used only in Play/Record.

"Play/Record"

When the Play/Record button is depressed, the pressure roller moves against the capstan shaft. Pressure pads also move against the play/record head and the tape guide. It also actuates a clutch lever assembly applying a light pressure to the take up pulley clutch to rotate the right hand turntable through the slip clutch. The motor drives the flywheel and capstan

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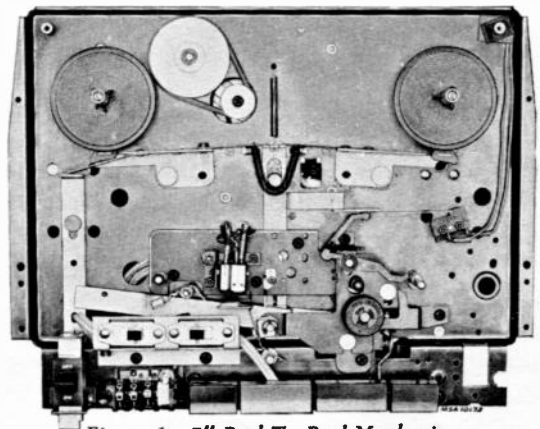

Figure 1—7" Reel To Reel Mechanism

RCA'S 7" REEL TO REEL TAPE TRANSPORT

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shaft through the flywheel drive belt and the takeup reel through the takeup drive belt. As the tape is propelled by the capstan and pressure roller the right hand turntable takes up the slack and the left hand turntable rotates counterclockwise due to the pull of the tape. Both the right and left turntable brakes are released—however, a special system actuated by the counterclockwise motion of the left hand turntable allows only the left hand turntable brake to be applied when the mechanism is stopped.

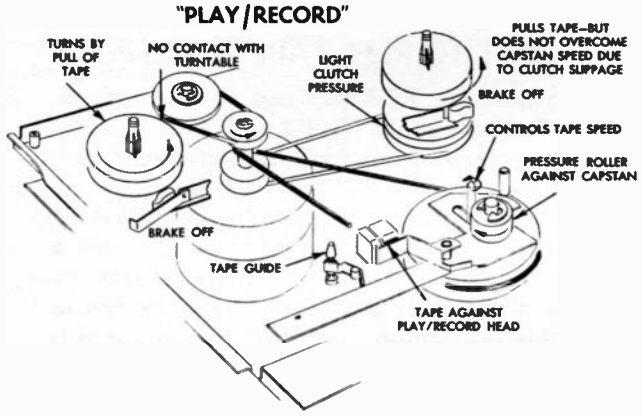


Figure 2—Simplified—"Play/Record"

"Pause"

When the pause lever is pushed the pressure roller moves away slightly from the capstan shaft. At the same time the left hand brake is applied to stop the movement of the tape.

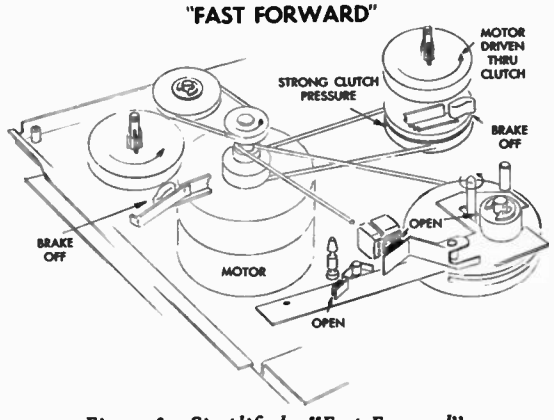


Figure 3—Simplified—"Fast Forward"

"Automatic Shut-Off"

When the tape is passing through the tape slot, the automatic shut-off lever rides against the tape in its "sensing" position. The passing of the end of the tape or the tape breaking places the shut-off lever in the "off" position. The motor is then shut off, but the mechanism, and controls remain in their same positions.

"Fast Forward"

Depressing the fast forward button applies a strong pressure to the take up clutch effectively locking the slip clutch. Simultaneously the stop button is released and the pressure roller moves away from the capstan shaft. This permits the tape to travel freely at high speed from the left hand reel to the right hand reel.

"Rewind"

Depressing the rewind button moves the rewind pulley and belt into contact with the left hand turntable drum. The rewind pulley is then driven directly from the motor by the rewind drive belt. At the same time the stop button is released and the pressure roller is moved away from the capstan shaft. Both brakes are off, but the clockwise movement of the left hand turntable now sets the mechanism so that the right hand brake is applied when the mechanism is stopped.

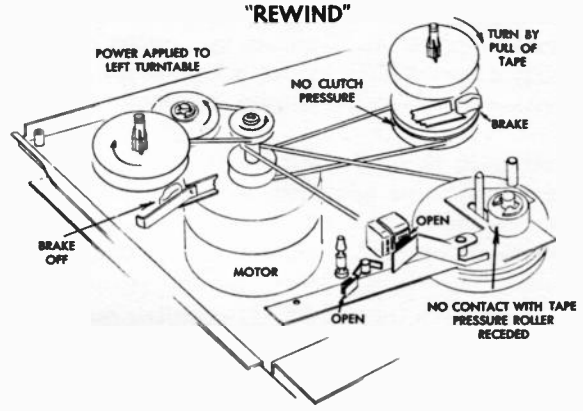


Figure 4—Simplified—"Rewind"

Cleaning

During normal operation, oxide from the tape can build up on the heads, tape guides, pressure roller, capstan, and pressure and drag pads as the tape passes over them. This build up of oxide can cause poor playbacks, weak recordings, distortion, poor erase, and up and down travel of the tape as it passes between the pressure roller and capstan. This oxide accumulation should be cleaned from these parts periodically.

Lubrication

The mechanism is properly lubricated as it leaves the factory and additional lubrication should not be necessary for a long period of time. Should the mechanism be disassembled or the need for lubrication become apparent, lubrication should be applied as follows:

The capstan and flywheel bearings, the clutch pulley bearings, the turntable bearings, the rewind idler pulley bearing and the clutch pressure bearing should be lubricated with a drop of Singer Sewing Machine Oil or equivalent.

"Cosmolube", "Sta-Put #512" or equivalent should be applied between the brake arms and the motorboard, between the pause lever and the motor board, and to all points of contact on the push button latching bar.

NOTE. Oil and grease must be kept off the pulleys, idler wheels, belt, clutch disc and felt, outer periphery of flywheel and all parts that might transfer oil and grease to them.

SOLID STATE

KCS 153 HORIZONTAL OSCILLATOR ADJUSTMENTS

The horizontal oscillator in the KCS 153 originates the 15,750 cycle waveform for use in developing a sweep waveform in the horizontal output stage. This stage uses an NPN transistor in the grounded emitter circuit; it is a blocking oscillator with refinements to obtain high stability of operation. Within certain limits the frequency is automatically corrected by an AFC correction voltage. The output of the oscillator is a square wave which is applied to the horizontal driver for further processing.

A high degree of stability is achieved by using *two* stabilizing coils. One coil, L101A is the familiar "sine wave" coil which stabilizes the oscillator OFF time. The other coil, L101B is used to introduce a higher frequency "ringing" (approximately 40 kc); this stabilizes the ON time of the oscillator.

The horizontal adjustments in the KCS 153 chassis are easily performed by following this step by step procedure:

NOTE: Always have the receiver turned OFF when connecting or disconnecting any test equipment or jumper cables.

Steps marked * indicate the power is removed while the connection or disconnection is made.

HORIZONTAL OSCILLATOR ADJUSTMENT (FIELD PROCEDURE)

*1. Connect a jumper from Q502 (collector) to ground.

*2. Connect a jumper from terminals AT to AU.

3. Adjust HORIZ HOLD (R580) for least sideway drift of picture.

*4. Remove jumper from terminals at AT and AU.

5. Adjust L101A for least sideway drift of picture.

*6. Remove jumper from Q502 (collector) to ground.

IMPORTANT

Adjustment of L101B is not a normal field service adjustment. The following "shop procedure" should be used when adjusting L101B.

HORIZONTAL OSCILLATOR ADJUSTMENT (SHOP PROCEDURE)

1. Perform steps 1 through 5 of field procedure.

*2. Connect oscilloscope to TP4.

3. Adjust L101B so that the ON time is about ½ the width of the OFF time.

*4. Remove Oscilloscope from TP4.

5. Readjust L101A to lock picture.

*6. Remove jumper from Q205 (collector) to ground.

WIDTH COIL ADJUSTMENT

At an AC input line voltage of 108 volts, adjust L107 (width coil) to fill screen with not more than ¼" overscan on both sides of the picture.

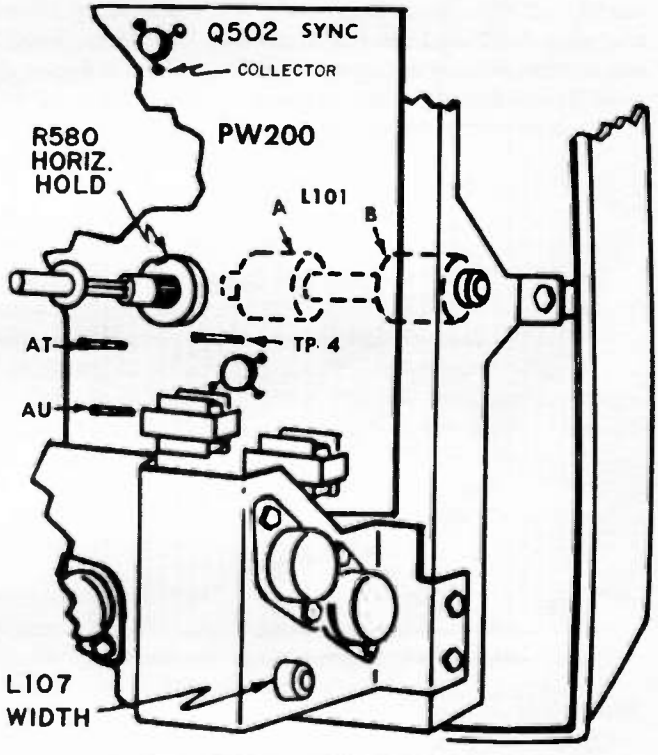


Figure 5—KCS 153 Horizontal Adjustments

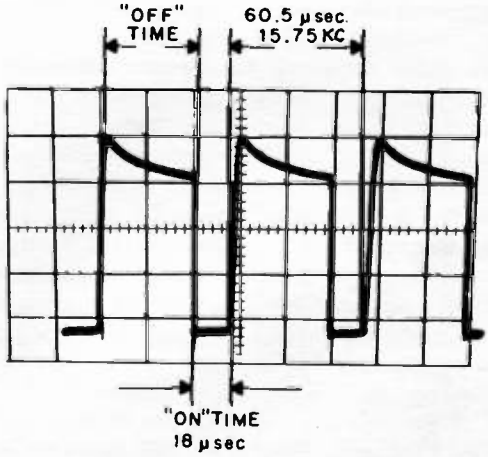


Figure 6—Waveform at TP4

GOOD PURITY

(Continued from page 1)

ing purity. If necessary, adjust purity as close as possible, recheck center convergence, then readjust purity.

Degauss — use either manual degaussing or automatic degaussing if the receiver is so equipped—this neutralizes any stray magnetic fields which can affect purity.

Obtain *center purity*—this is done with the deflection yoke moved back—the blue and green screens are turned *down* and the purity discs are adjusted to obtain a *red area* in the center of the screen.

Obtain *overall purity* — this is accomplished by physically positioning the yoke until a pure red field is displayed over the entire surface of the picture tube.. Check the related service data for instructions as to recommended warm up time and final position of the yoke.

While virtually every color receiver will respond readily to the above procedure, a discussion of stray magnetic fields and the importance of the North-South orientation during setup will be helpful in achieving good purity even in difficult cases.

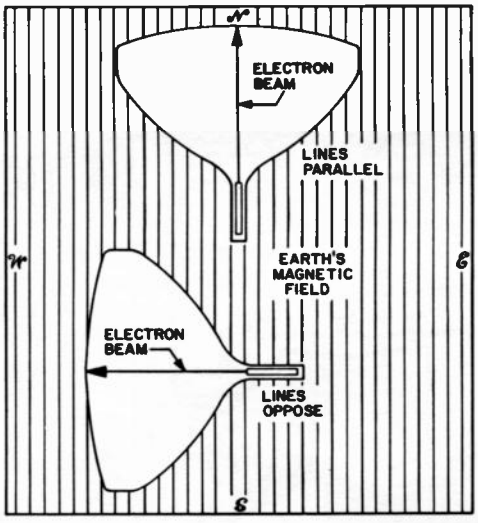


Figure 7—Picture tube placement in Earth's Magnetic Field.

Magnetic Influence

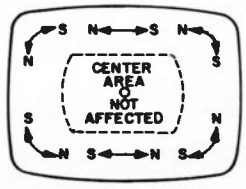
Electron beams, in their travel from the guns to the face of the picture tube are influenced (deflected) by magnetic fields of the deflection yoke, convergence magnet assemblies, and purity discs. These are *controllable* fields necessary for proper deflection, convergence, and purity. Now, consider unintentional deflection of the beams due to the *Earth's magnetic field.* The influence of this field must be considered, and provisions to lessen this influence is contained in the instrument—this permits relocation and orientation without the need for continuous readjustment of purity. The effect of the Earth's field is held to a minimum by the picture tube shield. If the magnetic properties of the shield are once realigned while in a specific field, it counteracts (or oppose) any change due to a new magnetic field. *Degaussing during initial* manufacture of the instrument aligns the *shadow mask* and *shield* to counteract effects of the Earth's magnetic field due to relocation of the receiver.

While the earth's magnetic field consists of both a vertical and horizontal component, the variations of the *vertical component* due to geographic area is constant and does not change its effect when the receiver is rotated. Initial degaussing cancels this effect.

When the receiver is rotated, however, the *intersection* angle of the *horizontal* component changes, causing a change in beam deflection.

In the west (or east) position, maximum vertical deflection of the beams occur, and the *center* area of the screen is highly influenced. If purity is set in the west position, and the instrument then oriented *east,* maximum travel of the electron beams occurs—from upper deflection extreme (west) to lower extreme (east). The possibility of *impurity* is great when the instrument is rotated under these setup conditions.

When facing north (or south), *the electron beams in the center-screen area* are parallel with the magnetic lines, and for all practical purposes *are not effected by the Earth's magnetic field;* beam deflection at the outer edges is influenced, but the amount of movement is minimum. Under these conditions, a more *exacting adjustment of purity can be obtained, both at the center and outer edges of the screen.* Adjusting purity in the north (or south) orientation, when beam deflection is minimum, lessens the chance of impurity when the instrument is rotated to any other position. *The chance of purity errors are actually cut in half, for movement of the electron beam will not extend to the extremes possible if purity is adjusted west, then the instrument is rotated east.*



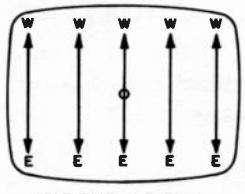


Figure 8—Relative Movement of Electron Beams

The advantage of using north or south orientation during purity adjustments will be more exact purity and more lasting purity. Also, better results from automatic degaussing will result permitting greater flexibility in the relocation of color receivers without the need for purity readjustment.

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