AUTOMATIC CARRIER BALANCE CONTROL

RADIO CORPORATION OF AMERICA
ENGINEERING PRODUCTS DIVISION CAMDEN, N. J.

IB-36256

AUTOMATIC CARRIER BALANCE CONTROL

MI-40416

INSTRUCTIONS

Manufactured by
RADIO CORPORATION OF AMERICA
ENGINEERING PRODUCTS DIVISION
Camden 2, New Jersey, U.S.A.

Printed in U.S.A.

IB-36256

FIRST AID

WARNING!

Operation of electronic equipment involves the use of high voltages which are dangerous to life. Operating personnel must at all times observe all safety regulations. Do not change tubes or make adjustments inside the equipment with voltage supply on. Under certain conditions dangerous potentials may exist in circuits with power controls in the off position due to charges retained by capacitors, etc. To avoid casualties, always discharge and ground circuits prior to touching them.

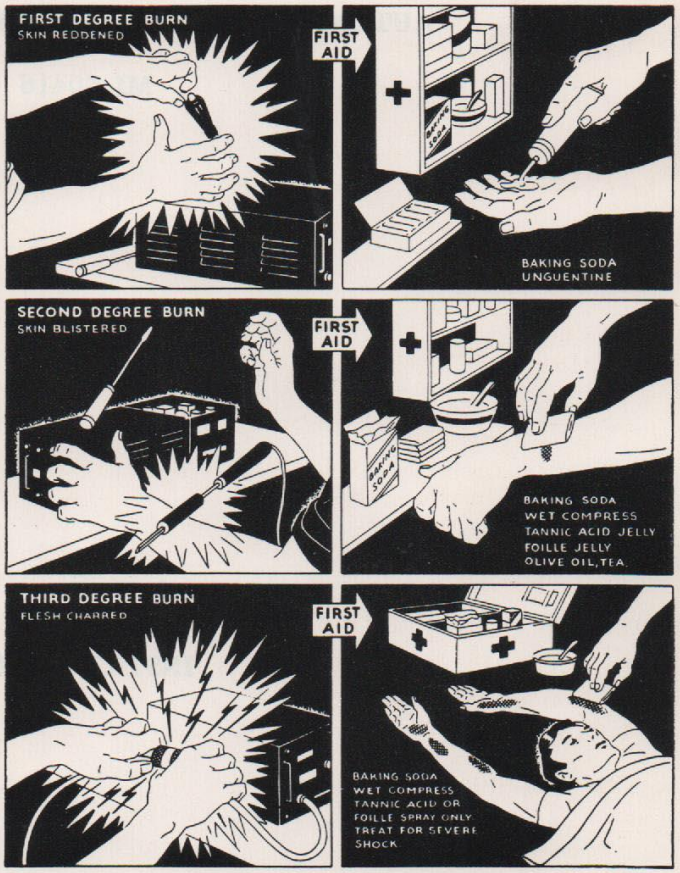
ABOUT FIRST AID

Personnel engaged in the installation, operation and maintenance of this equipment or similar equipment are urged to become familiar with the following rules both **in theory and in the practical application thereof.** It is the duty of every radioman to be prepared to give adequate First Aid and thereby prevent avoidable loss of life.

PRONE-PRESSURE METHOD OF RESUSCITATION

1. PROTECT YOURSELF with dry insulating material.
2. BREAK THE CIRCUIT by opening the power switch or by pulling the victim free of the live conductor.

DON'T TOUCH VICTIM WITH YOUR BARE HANDS UNTIL THE CIRCUIT IS BROKEN.



(A) (B) (C)

3. LAY PATIENT ON STOMACH, one arm extended, the other arm bent at elbow. Turn face outward resting on hand or forearm.
4. REMOVE FALSE TEETH, TOBACCO OR GUM from patient's mouth.
5. KNEEL STRADDLING PATIENTS THIGHS. See (A).
6. PLACE PALMS OF YOUR HANDS ON PATIENT'S BACK with little fingers just touching the lowest ribs.
7. WITH ARMS STRAIGHT, SWING FORWARD gradually bringing the weight of your body to bear upon the patient. See (B).
8. SWING BACKWARD IMMEDIATELY to relieve the pressure. See (C).
9. AFTER TWO SECONDS, SWING FORWARD AGAIN. Repeat twelve to fifteen times per minute.
10. WHILE ARTIFICIAL RESPIRATION IS CONTINUED, HAVE SOMEONE ELSE:
    (a) Loosen patient's clothing.
    (b) Send for doctor.
    (c) Keep patient warm.
11. IF PATIENT STOPS BREATHING, CONTINUE ARTIFICIAL RESPIRATION. Four hours or more may be required.
12. DO NOT GIVE LIQUIDS UNTIL PATIENT IS CONSCIOUS.

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ELECTRICAL SPECIFICATIONS

Power Requirements

A-C	117 volts, 50/60 cycles, 15 watts
D-C	280 volts, regulated, 20 ma.

Input Signals

Composite Color Signal (from Colorplexer)	1 volt (sync-to-white)
Subcarrier (from Colorplexer)	3.5 volts peak-to-peak
Horizontal Drive (bridging)	-4 volts peak-to-peak

Output Signals

I Correction Voltage	Variable
Q Correction Voltage	Variable

Tube Complement

Input Cathode Follower and Burst Amplifier	RCA Type 6AN8
Burst Keyer and Amplifier	RCA Type 6AW8
Subcarrier Amplifier	RCA Type 6AU6
Phase Discriminators	RCA Type 6AL5

MECHANICAL SPECIFICATIONS

Width	19 inches
Height	3-1/2 inches
Depth (overall)	9 inches
Weight (unpacked)	3 pounds

EQUIPMENT

The RCA Automatic Carrier Balance Control is supplied as MI-40416 and includes the following items:

1. Automatic Carrier Balance Control chassis including all tubes in place.
2. Suitable package containing necessary hardware for making interconnections to Colorplexer.
3. Suitable package containing necessary hardware for making optional mounting arrangement

RECOMMENDED TEST EQUIPMENT

The following test equipment is recommended to facilitate adjustment and maintenance of the RCA Automatic Carrier Balance Control:

VoltOhmyst, RCA Type WV-97A

Oscilloscope, RCA Type TO-524D

DESCRIPTION

GENERAL

The RCA Automatic Carrier Balance Control has been designed for use in conjunction with the RCA Type TX-1A or TX-1B Colorplexer. The unit, shown in block diagram form in Figure 1, provides a means for automatically balancing out any unwanted subcarrier components (3.58 mc.) present at the outputs of the I and Q modulators in the colorplexer due to modulator unbalance. This eliminates the necessity of constant manual adjustment of the I and Q carrier balance controls on the colorplexer during operation. In effect, the unit adds a feedback loop to the colorplexer. Feedback, in general, is an excellent technique for improving stability but the greatest weakness of the technique is a tendency for circuits to mask their own problems (tube aging etc.) until an actual failure is experienced. This weakness has been overcome in the automatic carrier balance control by the addition of a control (trimmer capacitor, C23) for checking marginal performance. This control also provides a rapid check of the condition of the feedback loop so that failures may be detected safely in advance.

Furnished in chassis form, it may be mounted either directly beneath the colorplexer or, if rack space is unavailable, supported by adapters behind the colorplexer chassis.

Ideally, the output signal voltages from the I and Q balanced modulators (V7, V8, V9, and V10) in the colorplexer should consist solely of the product of the two input signals, i.e., the sidebands resulting from the modulation of the video by the subcarrier frequency. To accomplish this, individual balance adjustments are provided in the modulators. Dual video balance controls are used in the common cathode circuits of the modulators to permit both differential gain and a-c impedance adjustments to be made. The carrier balance control in the clamp circuit of each modulator provides positive bias control for one clamp and its function is to balance the tube electron streams so that both tubes in the doubly balanced modulator circuitry will have equal transconductances from the suppressor grids to plates.

During operation very little video signal unbalance occurs. However, due to variances in the transconductances of the modulator tubes, frequent re-adjustment of the carrier balance controls is required. The automatic carrier balance control provides instantaneous correction voltages for maintaining carrier balance in the modulators.

A six-contact plug and coaxial connectors at the rear of the chassis provide for the connection of all necessary input power and horizontal drive signals.

CIRCUITS

Refer to the schematic diagram, Figure 7, during subsequent circuit description. The color signal from the colorplexer is capacitively coupled to the input stage, V1A, which functions as a cathode follower. Output from V1A is passed on to the burst amplifier, V1B. This tube is held at cutoff, during trace time, by the average voltage developed across the cathode circuit. It conducts only during the horizontal blanking time (prior to color synchronizing burst,) so that only the unbalanced subcarrier signal components are amplified. The second burst amplifier stage, V2A, functions in the same manner.

By applying negative horizontal driving pulses to the keyer grid, V2B, the keyer will be cut off. This results in the generation of a sharp positive pulse, by means of the ringing circuit (L3, C13, CR1), at the plate of the keyer tube. Output from the keyer tube is directly coupled to the grids of the burst amplifiers (V1B and V2A) and causes them to conduct thus amplifying the unbalanced subcarrier information. Transformer coupling is employed between tubes V1B and V2A. The secondary of L1 is tuned by C23 and the adjustable core to 3.58 mc. so that the signal applied to the grid of V2A consists solely of the subcarrier components present on the input signal due to unbalanced conditions in the colorplexer.

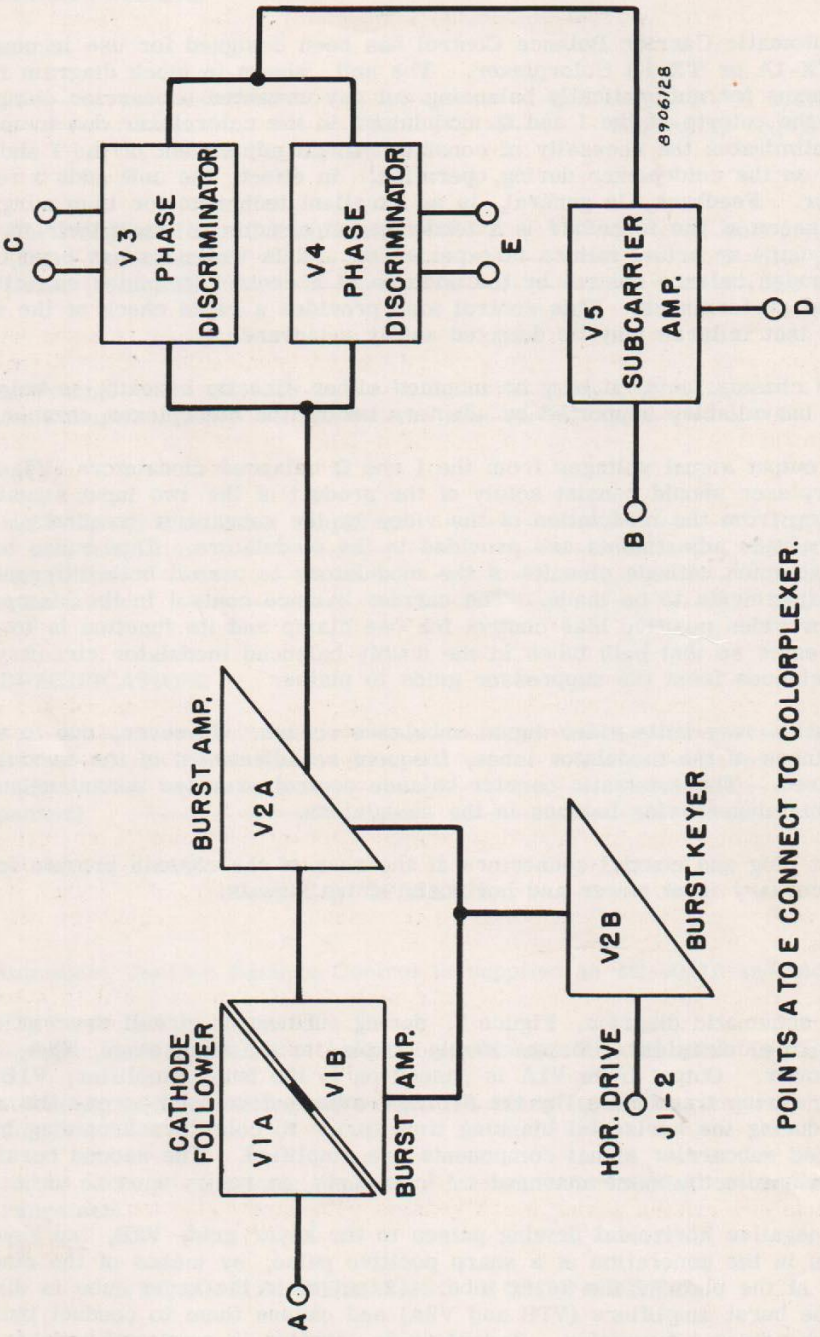

Figure 1 - Block Diagram, Automatic Carrier Balance Control

Output from V2A is transformer coupled to the input of the two bridge-type discriminator circuits by means of L2. The secondary of L2 is center-tapped to permit opposite polarity signals to be developed at terminals A and D. The voltage at A is capacitively coupled through C8 and C10 to a plate of each diode while that at D is coupled through C9 and C11 to a cathode. Tube V3 provides the correcting voltage for the I modulator in the colorplexer while V4 performs the same function for the Q modulator.

The reference subcarrier signal obtained from the colorplexer is capacitively coupled to the grid of the subcarrier amplifier, V5. The output of this tube is capacitively coupled to pins 1 and 2 of V3, and through a phase shifting network to pins 1 and 2 of V4. If the output signal from the colorplexer is perfectly balanced, there will be no extraneous subcarrier signal components present at the output of tube V2A, therefore no signal voltage will be developed across transformer L2. Under these conditions the discriminator circuits will be in a balanced state and the effective voltage at the junctions of R14, R15, and R16, R17, will be zero. Hence, no corrective voltage will be applied to the colorplexer.

If unbalance occurs in the colorplexer, unwanted subcarrier signal voltages will appear at the input to the discriminator diodes. This results in an unbalancing of the discriminator circuits and a d-c voltage is produced at the junctions of the diode load resistors R14, R15, and R16, R17. This voltage is applied (in series with that at the I and Q carrier balance control potentiometers) to the clamp return of the modulator tubes in the colorplexer. Therefore, any change in the I or Q carrier balance is instantly overcome and balance is automatically maintained.

INSTALLATION

The RCA Automatic Carrier Balance Control is shipped completely wired and assembled with all tubes in place. The shipping container should be carefully unpacked and its contents checked with the enclosed packing list to make certain all components have been received in good condition.

The unit has been designed for mounting directly beneath the colorplexer in a standard 19-inch cabinet rack. Do not attempt to mount the control chassis above the colorplexer as this is not feasible due to the critical length and position of the coaxial cable signal leads. If rack space is limited an optional method of mounting the control chassis behind the colorplexer may be employed using the following procedure:

1. Fasten hinge (MI-40416 Item 3A) and plate (MI-40416 Item 3B) to automatic carrier balance chassis as illustrated in Figure 2, utilizing the screws, washers, and nuts (MI-40416 Items 3C, 3D, 3E, and 3F) supplied.

2. Mount the chassis as shown in Figure 2 and spot four holes (two on each side) in rack frame.

3. Drill four 0.228" diameter holes (No. 3 drill) in rack frame at the level ascertained in step 2 and attach chassis with hardware supplied.

POWER CONNECTIONS

Connect the a-c line to terminals 1 and 2 of J3. Connect the positive side of a well-regulated source of 280 volts d-c, such as the RCA Type 580-D Power Supply, to terminal 4 of J3. Connect the negative side to terminal 6.

The power supply must be capable of supplying at least 20 ma.

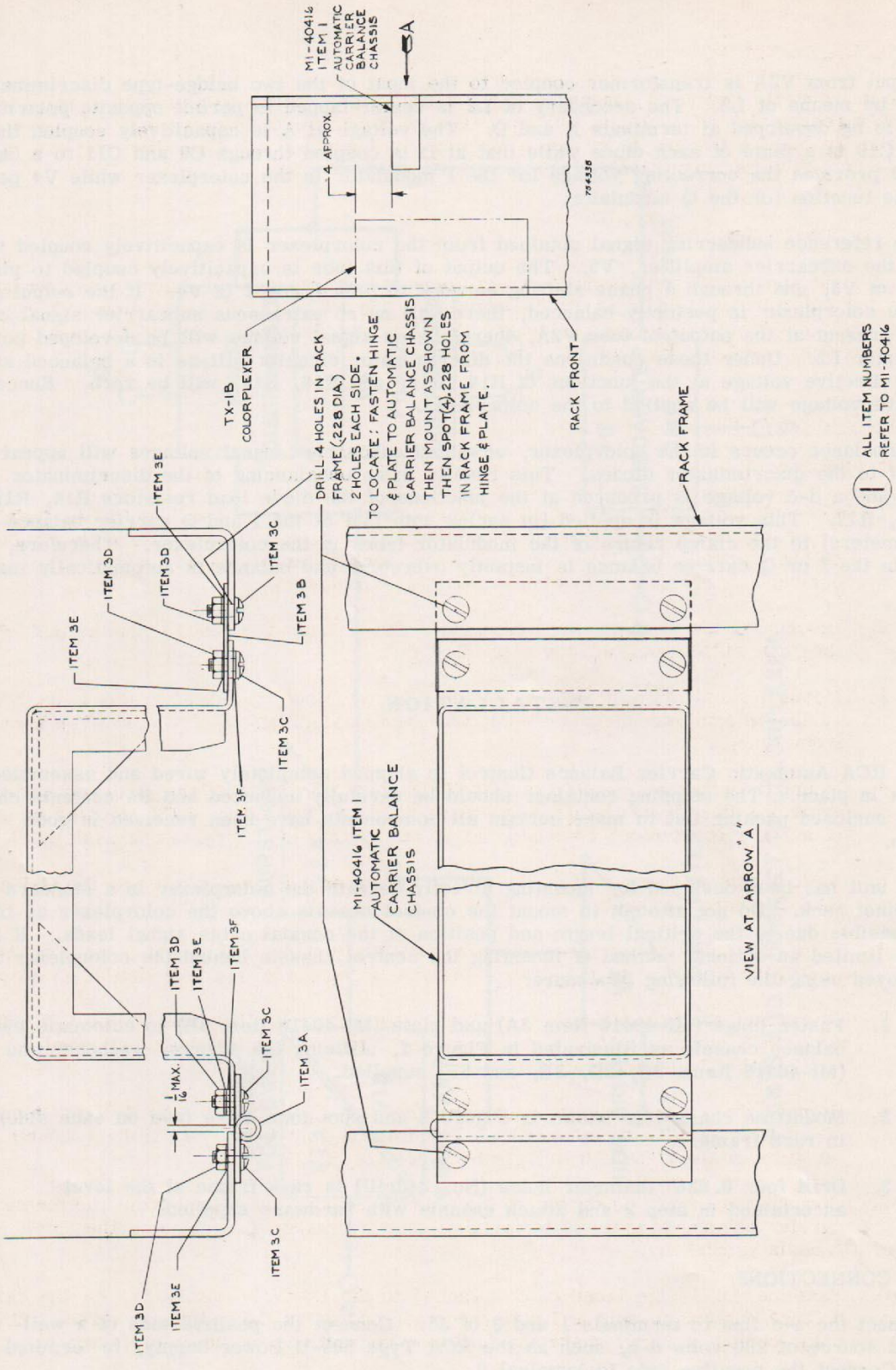

Figure 2 - Installation Diagram

LINE VOLTAGE SETTING

With an accurate voltmeter, measure the a-c line voltage input at terminals 1 and 2 of input power receptacle, P3. Adjust the input taps on the filament transformer, T1, by connecting the tap lead to the proper primary terminal, either 2, 3, or 4 for line voltages of 109, 117, or 125 volts respectively.

SIGNAL CONNECTIONS

Signal input and output connections, except horizontal drive, are all made to appropriate points in the colorplexer circuitry. As indicated in Figure 7, symbol designation will vary depending upon the type of colorplexer in use, therefore the following outline has been divided into two sections; one for each type of colorplexer.

Type TX-1A Colorplexer

Refer to Figure 5.

1. Connect horizontal drive signals from the colorplexer to the HOR DRIVE jack, J1 or J2, by bridging through from the unused horizontal drive jack (J9 or J24) on the colorplexer. Terminate the other jack (if not used) on the carrier balance control with a 75-ohm coaxial termination plug.

2. Disconnect the 18 mmf. grid capacitor, C154, from the control-grid circuit of the first video amplifier tube, pin 2 - V22.

3. Mount a stand-off post (MI-40416 Item 2H) utilizing the mounting screw available on the colorplexer chassis at coil L5 (located slightly left of center when viewed from rear).

4. Mount the other stand-off post (MI-40416 Item 2B) by using the mounting screw available directly beneath the Q PHASE trimmer capacitor, C135 (located in center of subcarrier shielded compartment at left bottom of colorplexer chassis).

5. Drill a hole utilizing a No. 43 drill at the upper left-hand corner of the Q VID BAL 2 control bracket.

6. Using the self-tapping screw supplied (MI-40416 Item 2F), mount a terminal board (MI-40416 Item 2E) to the control bracket by means of the hole drilled in step 3.

7. Disconnect the two precision resistors from the center terminal of the Q CARRIER BALANCE control, R176, and connect them to the terminal board attached to the Q VID BAL 2 control bracket.

8. Remove the jumper wire connected between the right-hand terminal of the terminal board (located directly above the I VID BAL 2 control bracket) and the center terminal of the I CARRIER BALANCE control, R171.

9. Connect the center conductor of the shorter coaxial cable lead from the automatic carrier balance chassis to terminal D of transformer T2. Ground the shield to a chassis ground lug.

10. Examine the 4-wire laced cable attached to the IN-OUT switch, S1, on the carrier balance control chassis and note the color-coding on the individual wires. With the color-coding in mind, make the following connections to the colorplexer:

    a. Connect the wire attached to the lower left-hand terminal of switch S1 to the center terminal of the Q CARRIER BALANCE control, R176.

b. Connect the wire attached to the upper left-hand terminal of S1 to the center terminal of the I CARRIER BALANCE control, R171.

c. Connect the wire attached to the lower center terminal of S1 to the terminal board mounted on the Q VID BAL 2 control bracket.

d. Connect the wire attached to the upper center terminal of S1 to the terminal board located directly above the I VID BAL 2 control bracket.

11. Connect the center conductor of the long coaxial cable lead from the automatic carrier balance control chassis to pin 2 of tube socket, XV22. Ground the shield to a chassis ground lug.

12. Using the hardward (MI-40416 Items 2A, D, J, K, L) and cable clamps (MI-40416 Items 2C and 2I) supplied, secure wires and cables to posts as shown in Figure 5.

Type TX-1B Colorplexer

Refer to Figure 6.

1. Connect horizontal drive signals from the colorplexer to the HOR DRIVE jack, J1 or J2, by bridging through from the unused horizontal drive jack (J9 or J24) on the colorplexer. Terminate the other jack (if not used) on the carrier balance control with a 75-ohm coaxial termination plug.

2. Disconnect the 6.9 mmf. grid capacitor, C38, from the control-grid circuit of the first video amplifier tube, pin 2 - V22.

3. Mount a stand-off post (MI-40416 Item 2H) utilizing the mounting screw available on the colorplexer chassis at coil L5 (located slightly left of center when viewed from rear).

4. Mount the other stand-off post (MI-40416 Item 2B) by using the mounting screw available directly beneath the Q PHASE trimmer capacitor, C135 (located in center of subcarrier shielded compartment at left bottom of colorplexer chassis).

5. Drill a hole utilizing a No. 43 drill at the upper left-hand corner of the Q VID BAL 2 control bracket.

6. Drill a second hole (No. 43 drill) at the upper right-hand corner of the I VID BAL 2 control bracket.

7. Using the self-tapping screws supplied (MI-40416 Item 2F), mount two terminal boards (MI-40416 Item 2E) to the control brackets by means of the holes drilled in steps 3 and 4.

8. Disconnect the two precision resistors from the center terminal of the Q CARRIER BALANCE control, R176, and connect them to the terminal board attached to the Q VID BAL 2 control bracket.

9. Disconnect the two precision resistors from the center terminal of the I CARRIER BALANCE control, R171, and connect them to the terminal board attached to the I VID BAL 2 control bracket.

10. Connect the center conductor of the shorter coaxial cable lead from the automatic carrier balance chassis to terminal D of transformer T2. Ground the shield to a chassis ground lug.

11. Examine the 4-wire laced cable attached to the IN-OUT switch, S1, on the carrier balance control chassis and note the color-coding on the individual wires. With the color-coding in mind, make the following connections to the colorplexer:

    a. Connect the wire attached to the lower left-hand terminal of switch S1 to the center terminal of the Q CARRIER BALANCE control, R176.

    b. Connect the wire attached to the upper left-hand terminal of S1 to the center terminal of the I CARRIER BALANCE control, R171.

    c. Connect the wire attached to the lower center terminal of S1 to the terminal board mounted on the Q VID BAL 2 control bracket.

    d. Connect the wire attached to the upper center terminal of S1 to the terminal board mounted on the I VID BAL 2 control bracket.

12. Connect the center conductor of the long coaxial cable lead from the automatic carrier balance control chassis to the left-hand terminal of the terminal board mounted directly beneath tube socket, XV22. Ground the shield using a chassis ground lug.

13. Using the hardware (MI-40416 Items 2A, 2D, 2J, 2K, and 2L) and cable clamps (MI-40416 Items 2C and 2I) supplied, secure wires and cables to posts as shown in Figure 6.

INITIAL ADJUSTMENTS

1. Place the IN-OUT switch, S1, to OUT.

2. Remove tube V5 from its socket.

3. Connect the vertical input of a calibrated oscilloscope, such as the RCA Type TO-524D, to one of the colorplexers' OUTPUT test jacks.

4. Connect a vacuum tube voltmeter, such as the RCA Type WV-97A, to the test jack, J4, on the carrier balance control.

5. Apply color bar test signals to the input of the colorplexer.

6. Apply power and adjust B+ voltage to 280 volts.

7. Adjust the CARRIER BALANCE controls on the colorplexer to produce an unbalance in the output signal of approximately 5% with respect to white.

8. Adjust the trimmer capacitor, C23, to its mid-position.

9. Tune the adjustable cores of coils L1 and L2 until maximum deflection of the meter indicator is obtained.

10. Replace tube V5 in its socket and remove tube V2.

11. Tune the adjustable core of coil L4 until maximum deflection of the meter indicator is obtained.

12. While observing the oscilloscope pattern, adjust the CARRIER BALANCE controls on the colorplexer for optimum balancing of the output signal.

13. Place the IN-OUT switch, S1, to IN.

14. Rotate the trimmer capacitor, C23, through its full adjustment range and note if the colorplexer remains in balance.

15. If unbalance occurs during the preceding adjustment, return C23 to its mid-range setting and retune coil L1 until balance is achieved.

16. Repeat step 14 (and 15 if necessary) until balance is maintained in the colorplexer irrespective of changes in the setting of C23.

OPERATION AND MAINTENANCE

It is recommended that, at the beginning of each operating day, the settings of the various controls of the colorplexer be checked. Once operating personnel have become familiar with the equipment, such checking is a relatively simple matter. Use of the automatic carrier balance control permits a wider range of transconductances between the modulator tubes to be tolerated without impairing balance, however, for optimum linearity the tubes should be selected with some regard to equivalence.

During routine maintenance periods, dust the equipment and inspect all components for discoloration caused by overheating. Inspect all cable connectors for cleanliness and tightness. Check the tubes in a mutual conductance tube checker, replacing those which are below normal or are otherwise defective. Help to anticipate tube failure by keeping a log of all tube readings, comparing them with previous readings each time they are checked. In cases of abnormal operation, check for the presence and correct amplitude of all input signals. Be sure all adjustments have been made correctly; misadjustment is the most frequent source of trouble.

To insure proper functioning of the unit at all times a marginal performance check should be made at weekly intervals. This may be accomplished by rotating trimmer capacitor, C23, through its full adjustment range and noting any change in colorplexer carrier balance. If unbalance is evident from this check then the alignment procedure outlined under INITIAL ADJUSTMENTS should be made to provide maximum stability in the feedback loop.

Use of the Schematic Diagram, Figure 7, and the Typical Operating Voltages Chart will assist in the location of defective components.

REPLACEMENT PARTS AND ENGINEERING SERVICE

When ordering replacement parts, please give symbol, description, and stock number of each item ordered.

The part which will be supplied against an order for a replacement item may not be an exact duplicate of the original part. However, it will be a satisfactory replacement differing only in minor mechanical or electrical characteristics. Such differences will in no way impair the operation of the equipment.

The following tabulations list service parts, electron tube, and field engineering service ordering instructions according to the geographical location of the station.

SERVICE PARTS

STATION LOCATION	OBTAIN SERVICE PARTS FROM
Continental United States or Alaska	Local Broadcast Equipment Sales Representative, his office, or directly from the Service Parts Order Service, Bldg.60, 19th and Federal Streets, Camden 5, N. J. Emergency orders may be telephoned, telegraphed, or teletyped to RCA Emergency Service, Bldg.60, Camden, N.J. (Telephone: Woodlawn 3-8000).
Dominion of Canada	Local Broadcast Equipment Sales Representative, his office, or directly from RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec.
Outside of Continental United States, Alaska, and the Dominion of Canada	Local Broadcast Equipment Sales Representative, or Service Parts Order Service, RCA International Division, Gloucester, New Jersey. U.S.A.

ELECTRON TUBES

STATION LOCATION	OBTAIN ELECTRON TUBES FROM
Continental United States or Alaska	Local Distributor or nearest of the following warehouses: 34 Exchange Place Jersey City 2, New Jersey 589 E. Illinois Street Chicago 11, Illinois 420 S. San Pedro Street Los Angeles 13, California
Dominion of Canada	Local Broadcast Equipment Sales Representative, his office, or directly from RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec.
Outside of Continental United States, Alaska, and the Dominion of Canada	Local Distributor or from: Tube Department RCA International Division 30 Rockefeller Plaza New York 20, New York. U.S.A.

If for any reason, it is desired to return tubes, please return them to the place of purchase. If this is not convenient, please notify your RCA serving warehouse so that Return Authorization may be forwarded to you.

PLEASE DO NOT RETURN TUBES DIRECTLY TO RCA WITHOUT AUTHORIZATION AND SHIPPING INSTRUCTIONS.

It is important that complete information regarding each tube (including type, serial number, hours of service and reason for its return) be given.

When tubes are returned, they should be shipped to the address specified on the Return Authorization form. A copy of the Return Authorization and also a Service Report for each tube should be packed with the tubes.

FIELD ENGINEERING SERVICE*

STATION LOCATION	REQUEST FIELD ENGINEERING SERVICE FROM
Continental United States or Alaska	Local Broadcast Equipment Sales Representative or the RCA Service Company, Inc., Broadcast Communications Service Division, Camden, N.J. Telephone: Woodlawn 3-8000.
Dominion of Canada	Local Broadcast Equipment Sales Representative, his office, or directly from RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec.
Outside of Continental United States, Alaska, and the Dominion of Canada	Chief Engineer RCA International Division 30 Rockefeller Plaza New York 20, New York, U.S.A.

**Charges for field engineering service will be made at current rates.*

PARTS LIST

For ordering information see page 13

SYMBOL NO.	DESCRIPTION	DRAWING NO.	STOCK NO.
	AUTOMATIC CARRIER BALANCE, MI-40416		
C1	Capacitor: fixed, paper, 0.01 mf ±10%, 400 v	735715-163	73561
C2	Capacitor: fixed, mica, 100 mmf ±5%, 500 v	727853-223	79996
C3	Capacitor: fixed, paper, 0.1 mf ±10%, 400 v	737818-413	59907
C4	Capacitor: fixed, mica, 1000 mmf ±10%, 500 v	727866-147	39652
C5	Capacitor: fixed, mica, 180 mmf ±5%, 500 v	727853-229	98951
C6	Capacitor: fixed, paper, 0.1 mf ±10%, 400 v	735715-175	73551
C7	Capacitor: fixed, mica, 1000 mmf ±10%, 300 v	727856-147	53300
C8 to C11	Capacitor: fixed, mica, 1500 mmf ±5%, 500 v	8817627-2	208024
C12	Capacitor: fixed, paper, 0.1 mf ±10%, 400 v. Same as C6	735715-175	73551
C13	Capacitor: fixed, mica, 390 mmf ±5%, 500 v	727853-237	79988
C14, C15	Capacitor: fixed, paper, 0.01 mf ±10%, 400 v. Same as C1	735715-163	73561
C16	Capacitor: fixed, mica, 1000 mmf ±10%, 500 v. Same as C4	727866-147	39652
C17	Capacitor: fixed, paper, 0.022 mf ±10%, 400 v	735715-167	73562
C18, C19	Capacitor: fixed, paper, 0.01 mf ±10%, 400 v. Same as C1	735715-163	73561
C20	Capacitor: fixed, paper, 0.047 mf ±10%, 400 v	735715-171	73553
C21	Capacitor: fixed, mica, 390 mmf ±5%, 500 v. Same as C13	727853-237	79988
C22	Capacitor: fixed, mica, 47 mmf ±5%, 500 v	727853-215	95320
C23	Capacitor: ceramic trimmer, 7-45 mmf, 500 v	984003-5	54221
C24	Capacitor: fixed, paper, 0.1 mf ±10%, 400 v. Same as C6	735715-175	73551
C25	Capacitor: fixed, paper, 0.047 mf ±10%, 400 v. Same as C20	735715-171	73553
C26	Capacitor: fixed, mica, 12 mmf ±5%, 500 v	748252-311	59906
CR1	Crystal: rectifier; 1N34A		59395
F1	Fuse: 3/8 amp	990157-105	205957
J1, J2	Connector: coaxial	255223-1	51800
J3	Connector: male	856945-4	204558
J4	Connector: tip jack, red	845648-2	54409
L1	Coil: coupling	8905400-501	208021
L2	Transformer: discriminator	8905432-1	208122
L3	Coil: peaking	8831776-503	206020
L4	Coil: peaking, adjustable	8905297-501	208020
L5	Coil: peaking, subcarrier	8825473-509	202989
P1, P2	Connector: coaxial	252868-1	66344
P3	Connector: female, 6 contacts	856945-3	204559
R1	Resistor: fixed, composition, 560,000 ohm ±10%, 1/2 w	82283-95	502456
R2	Resistor: fixed, composition, 120 ohm, ±10%, 1/2 w	82283-51	502112
R3	Resistor: fixed, composition, 59 ohm ±10%, 1/2 w	82283-59	502156
R4	Resistor: fixed, composition, 15,000 ohm ±10%, 2 w	99126-76	522315
R5	Resistor: fixed, composition, 10,000 ohm ±10%, 1/2 w	82283-74	502310
R6	Resistor: fixed, composition, 180,000 ohm ±10%, 1/2 w	82283-89	502418
R7, R8	Resistor: fixed, composition, 47,000 ohm ±10%, 1/2 w	82283-82	502347
R9	Resistor: fixed, composition, 560,000 ohm ±10%, 1/2 w. Same as R1	82283-95	502456
R10	Resistor: fixed, composition, 5600 ohm ±10%, 1/2 w	82283-71	502256
R11	Resistor: fixed, composition, 47,000 ohm ±10%, 1/2 w. Same as R7	82283-82	502347
R12	Resistor: fixed, composition, 33,000 ohm ±10%, 1/2 w	82283-80	502333
R13	Resistor: fixed, composition, 100 ohm ±10%, 1/2 w	82283-50	502110
R14 to R17	Resistor: fixed, precision, 1 megohm ±1%, 1/2 w	990185-601	208022
R18	Resistor: fixed, composition, 470 ohm ±10%, 1/2 w	82283-58	502147
R19	Resistor: fixed, composition, 470,000 ohm ±10%, 1/2 w	82283-94	502447
R20	Resistor: fixed, composition, 75,000 ohm ±5%, 1 w	90496-204	512375
R21	Resistor: fixed, composition, 390,000 ohm ±10%, 1/2 w	82283-93	502439
R22	Resistor: fixed, composition, 390 ohm ±10%, 1/2 w	82283-57	30498
R23	Resistor: fixed, composition, 22,000 ohm ±10%, 1 w	90496-78	512322
R24	Resistor: fixed, composition, 82,000 ohm ±10%, 1/2 w	82283-85	502382
R25	Resistor: fixed, composition, 750 ohm ±5%, 1/2 w	82283-156	19785
R26	Resistor: fixed, composition, 5600 ohm ±10%, 1/2 w. Same as R10	82283-71	502256
R27	Resistor: fixed, composition, 100,000 ohm ±10%, 1/2 w	82283-86	502410
S1	Switch	95559-5	93263
T1	Transformer: heater, 50/60 cycle	445939-2	57932
XF1	Holder: fuse	99088-2	48894
XV1, XV2	Socket: tube, 9 pin	737870-14	94926
XV3 to XV5	Socket: tube, 7 pin	737867-14	94925

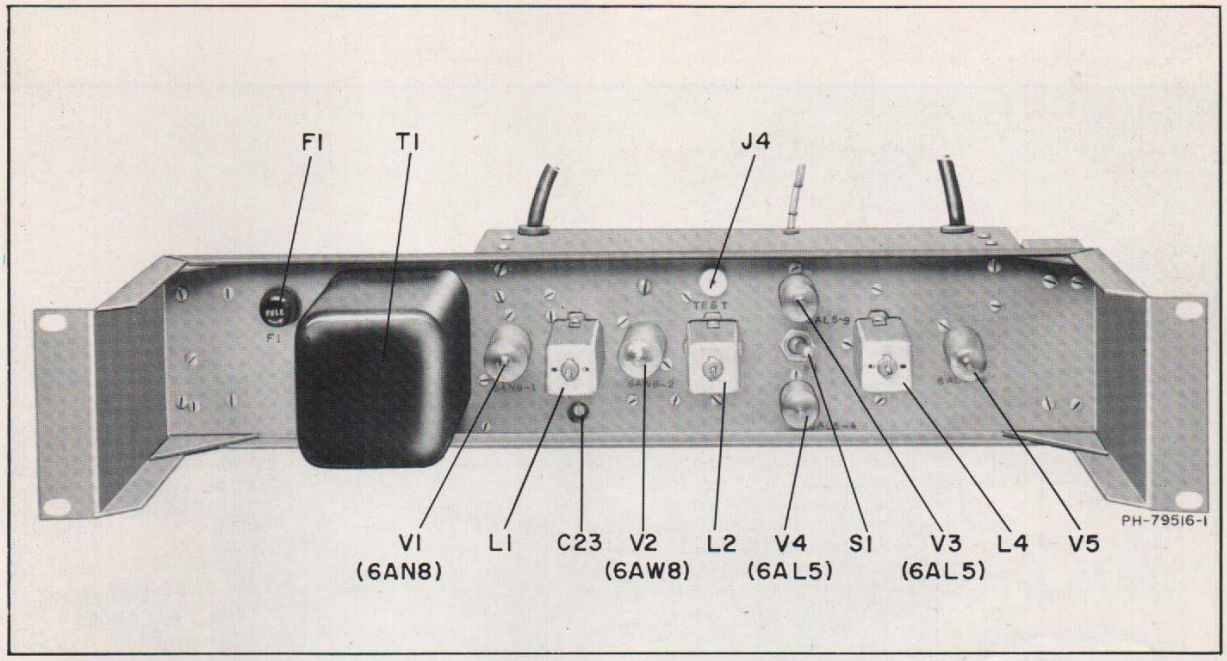

Figure 3 - Front View, Automatic Carrier Balance Control

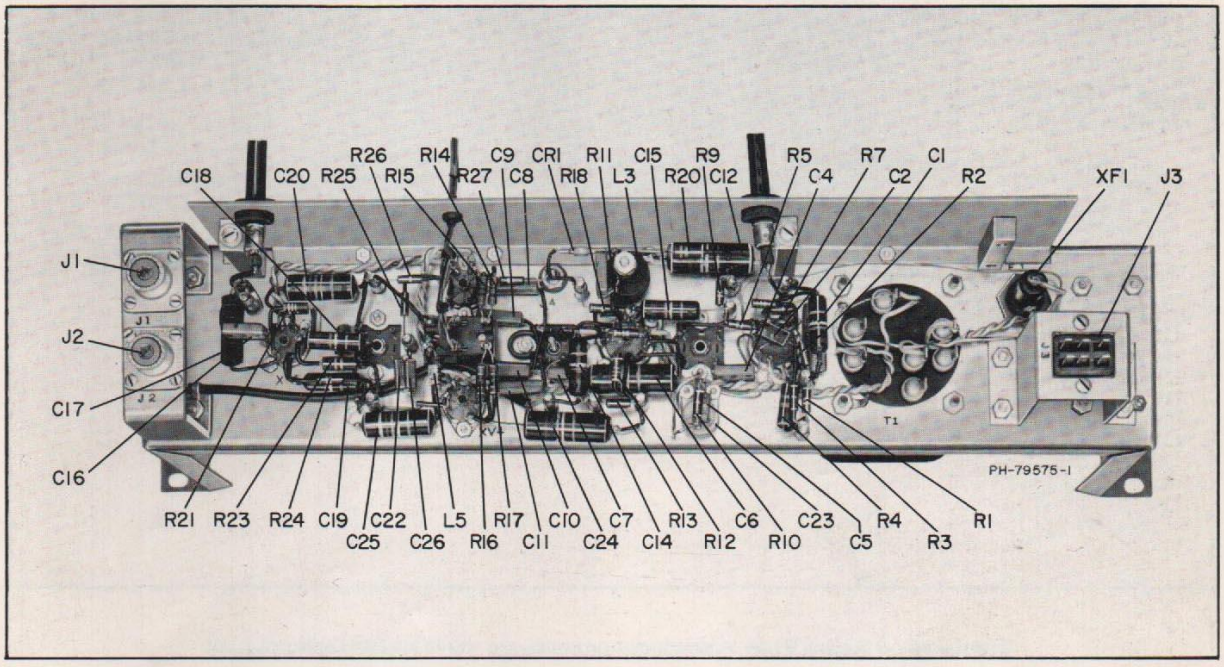

Figure 4 - Rear View, Automatic Carrier Balance Control

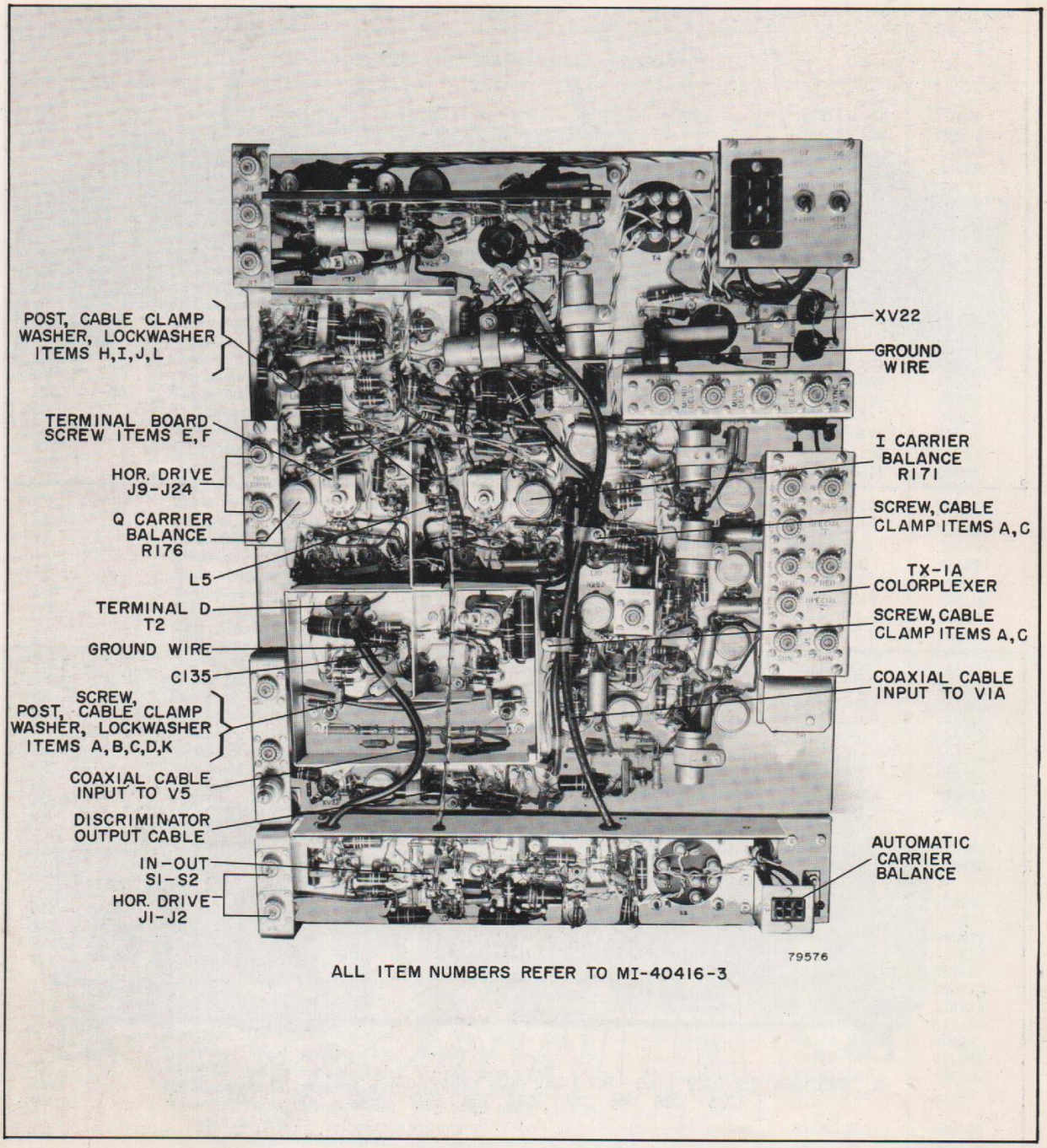

Figure 5 - Rear View showing connections to TX-1A Colorplexer

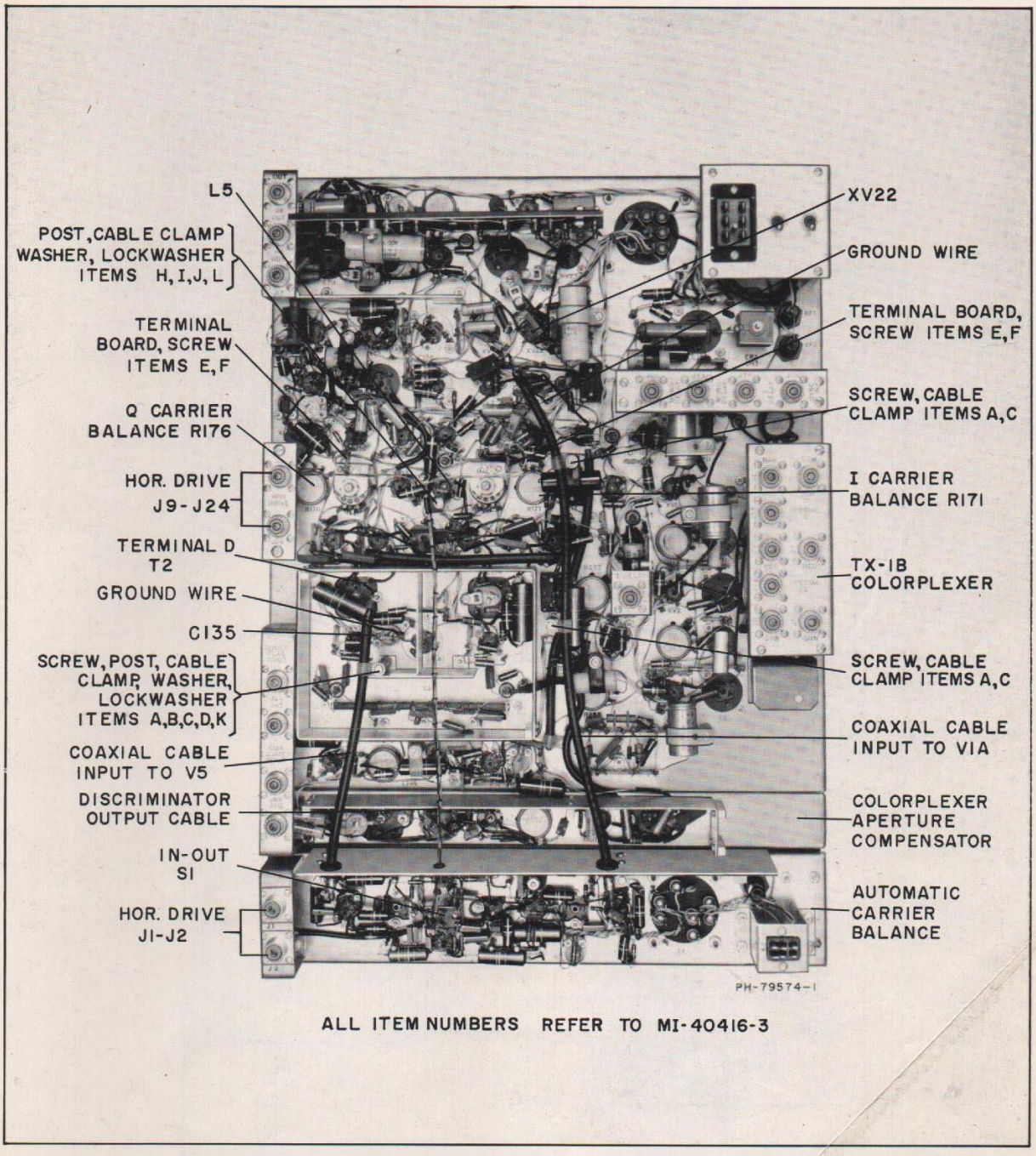

Figure 6 - Rear View showing connections to TX-1B Colorplexer

*TYPICAL OPERATING VOLTAGES

TUBE			GRID		PLATE		CATHODE		SCREEN	
SYMBOL	TYPE	FUNCTION	PIN	DC VOLTS	PIN	DC VOLTS	PIN	DC VOLTS	PIN	DC VOLTS
V1A	1/2 6AN8	Cathode Follower	2	0	1	280	3	13*	-	-
V1B	1/2 6AN8	Burst Amplifier	8	72	6	210	9	68	7	280
V2A	1/2 6AW8	Burst Amplifier	7	70	9	230	8	90	8	280
V2B	1/2 6AW8	Burst Keyer	2	-1.25	3	80	1	0	-	-
V3A	1/2 6AL5	Discriminator	-	-	5	7.5	4	3.5	-	-
V3B	1/2 6AL5	Discriminator	-	-	1	3.5	7	-0.5	-	-
V4A	1/2 6AL5	Discriminator	-	-	5	6	2	3	-	-
V4B	1/2 6AL5	Discriminator	-	-	1	3	7	-0.5	-	-
V5	6AU6	Subcarrier Amplifier	1	-0.1	5	170	7	2.3	6	145

* All voltages measured to ground with RCA VoltOhmyst.
Filament voltage, 6.3 volts a-c; Power Supply, 280 volts d-c.
Composite color bar test pattern input.

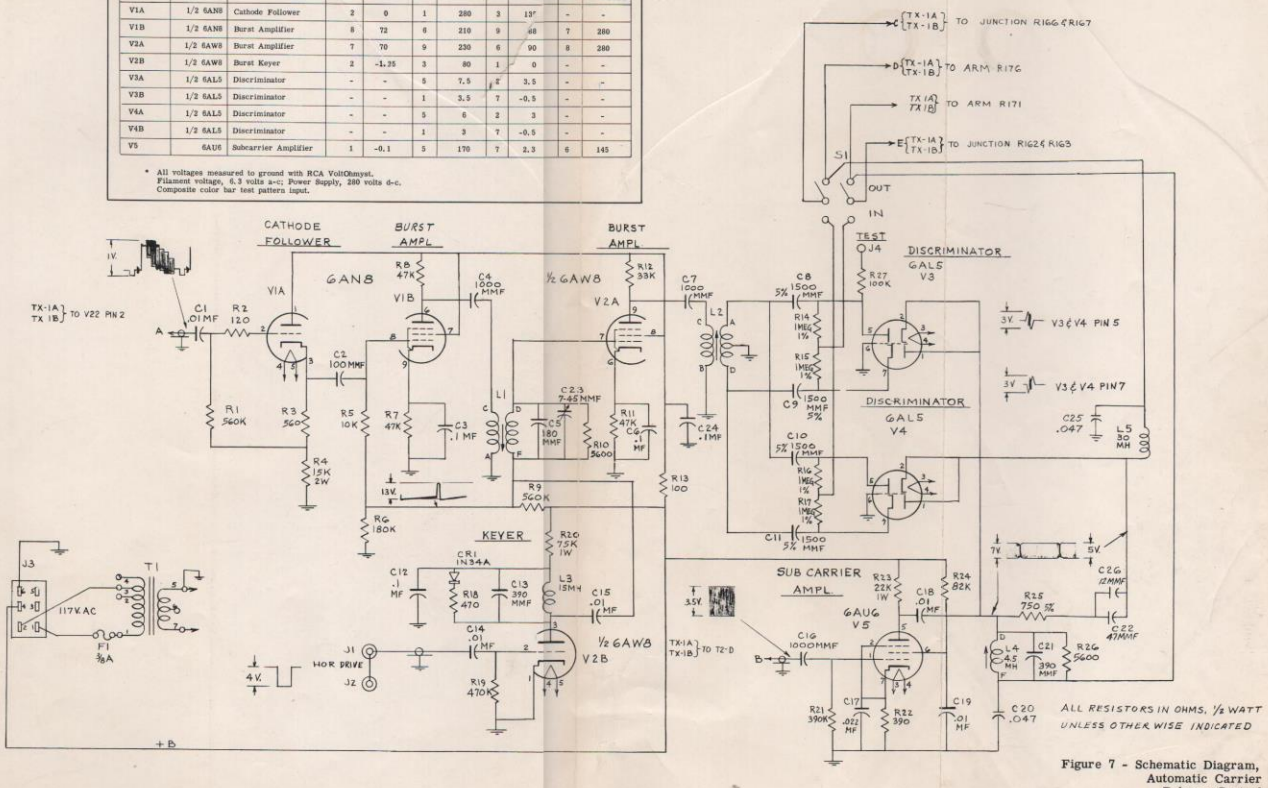

Figure 7 - Schematic Diagram, Automatic Carrier Balance Control

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ENGINEERING PRODUCTS DIVISION CAMDEN, N. J.