

BROADCAST TELEVISION EQUIPMENT

Low Frequency Phase Equalizer



RADIO CORPORATION OF AMERICA
COMMERCIAL ELECTRONIC PRODUCTS, CAMDEN, N. J.

EQUIPMENT LOST OR DAMAGED IN TRANSIT

When delivering the equipment to you, the truck driver or carrier's agent will present a receipt for your signature. Do not sign it until you have (a) inspected the containers for visible signs of damage and (b) counted the containers and compared with the amount shown on the shipping papers. If a shortage or if evidence of damage is noted, insist that notation to that effect be made on the shipping papers before you sign them.

Further, after receiving the equipment, unpack it and inspect thoroughly for concealed damage. If concealed damage is discovered, immediately notify the carrier, confirming the notification in writing, and secure an inspection report. This item should be unpacked and inspected for damage **WITHIN 15 DAYS** after receipt.

Report all shortages and damages to RCA, Broadcast and Television Department, Camden 2, N. J.

Radio Corporation of America will file all claims for loss and damage on this equipment so long as the inspection report is obtained. Disposition of the damaged item will be furnished by RCA.

REPLACEMENT PARTS AND ENGINEERING SERVICE

RCA field engineering service is available at current rates. Requests for field engineering service may be addressed to your RCA Broadcast Field Representative or the RCA Service Company, Inc., Broadcast Service Division, Camden, N. J. Telephone: WOODLAWN 3-8000.

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 and electron tube ordering instructions according to your geographical location.

SERVICE PARTS

LOCATION	ORDER SERVICE PARTS FROM:
Continental United States, Alaska and Hawaii	Service Parts Order Service, Bldg. 60, 19th & Federal Sts., Camden 5, New Jersey or through your nearest RCA Regional Office. Emergency orders may be telephoned, telegraphed, or teletyped to RCA Emergency Service, Bldg 60, Camden, N. J. (Telephone: WO 3-8000).
Dominion of Canada	RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec or through your local Sales Representative or his office.
Outside of Continental United States, Alaska, Hawaii and the Dominion of Canada	RCA International Division, Clark, N. J., U.S.A. or through your local Sales Representative.

ELECTRON TUBES

LOCATION	ORDER ELECTRON TUBES FROM:
Continental United States, Alaska and Hawaii	Local RCA Tube Distributor.
Dominion of Canada	RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec or through your local Sales Representative or his office.
Outside of Continental United States, Alaska, Hawaii and the Dominion of Canada	Local RCA Tube Distributor or from: Tube Department RCA International Division 30 Rockefeller Plaza New York 20, New York, U.S.A.

RETURN OF ELECTRON TUBES

If for any reason, it is desired to return tubes, please return them through your local RCA tube distributor, RCA Victor Co. Ltd., or RCA International Div., depending on your location.

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.

LIST OF RCA REGIONAL OFFICES

<i>Atlanta 3, Georgia</i> 1121 Rhodes-Haverty Bldg. 134 Peachtree St. N.W. JACKSON 4-7703	<i>Boston 16, Mass.</i> 2301, John Hancock Bldg. 200 Berkley St. HUBBARD 2-1700	<i>Chicago 54, Ill.</i> 1186 Merchandise Mart Plaza DELAWARE 7-0700	<i>Cleveland 15, Ohio</i> 1600 Keith Bldg. CHERRY 1-3450
<i>Dallas 35, Texas</i> 7901 Freeway #183 FLEETWOOD 2-3911	<i>Hollywood 28, Calif.</i> RCA Bldg., 1560 N. Vine St. HOLLYWOOD 9-2154	<i>Kansas City 6, Missouri</i> 340 Dierks Bldg. HARRISON 1-6480	<i>New York 20, New York</i> 36 W. 49th St. JUDSON 6-3800
<i>Branch—San Francisco 2, Calif.</i> 420 Taylor St. ORDWAY 3-8027			

BROADCAST TELEVISION EQUIPMENT

INSTRUCTIONS

Low Frequency Phase Equalizer

MI-34025

RADIO CORPORATION OF AMERICA
INDUSTRIAL ELECTRONIC PRODUCTS, CAMDEN, N. J.

Printed in U.S.A.
DU 528

IB-36195-1



Figure 1—MI-34025 Low Frequency Phase Equalizer, Front View

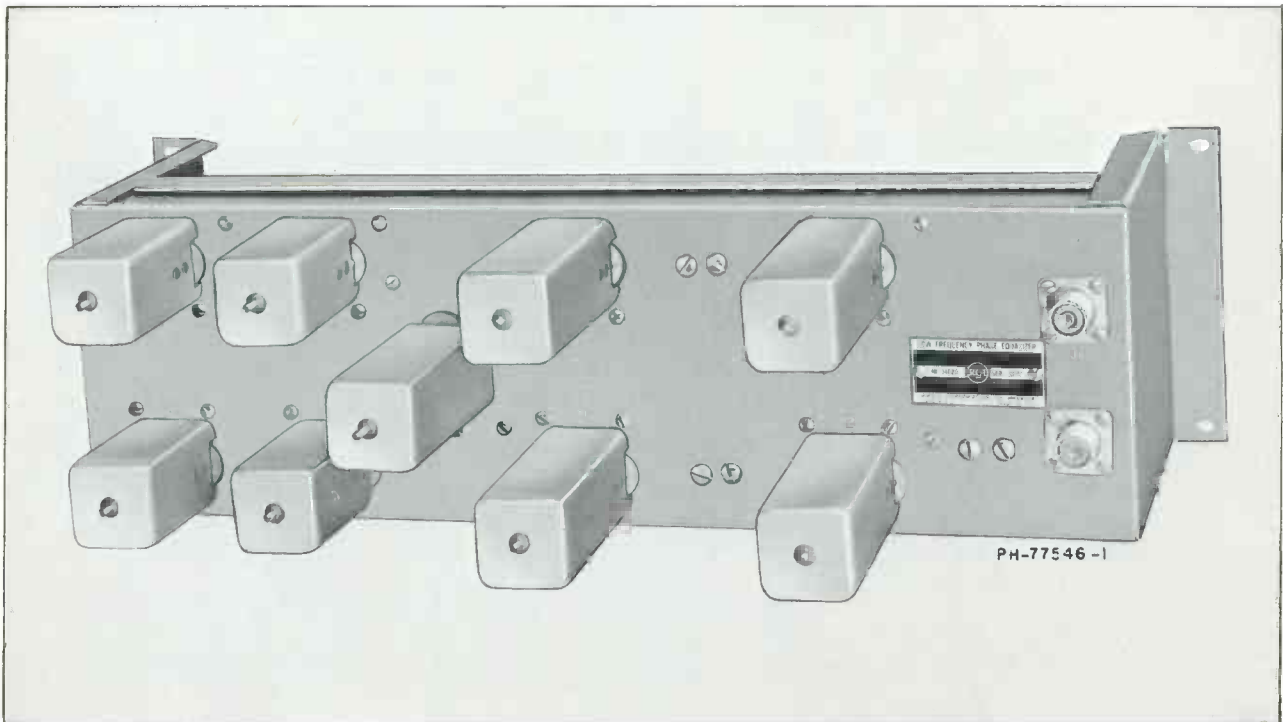


Figure 2—MI-34025 Low Frequency Phase Equalizer, Rear View

TECHNICAL DATA

Type of Circuit

Non-minimum phase reactance network
(No tubes or power supply required)

Impedance

Input and output: 75 ohms

Type of Signal

Composite video; color or monochrome

Circuit Attenuation

0.5 db

Sweep Frequency Response

-1.0 db to 4.2 mc

Phase Response

Constant envelope delay from 2.0 c to 4.2 mc
Four envelope delay ranges as shown in figure 4
Frequency range of envelope delay adjustment 0
to 2.0 mc

Dimensions and Weight

Width (rack space) 19 inches
Height (rack space) 5¼ inches
Depth, 10 inches
Weight, 9 pounds

DESCRIPTION

The MI-34025 Low Frequency Phase Equalizer shown in figures 1, 2, 5, and 8 is designed for insertion into the video input line for a television transmitter to provide compensation for envelope delay distortion at low frequencies, which is caused by the vestigial sideband filter. Correction provided by this equalizer, together with that from the MI-34026 High Frequency Phase Equalizer will, when properly installed and adjusted, greatly improve the transient response of a television transmitter. Color edges will be sharper and there will be good registration of color and luminance information.

Figure 3 shows the required transmitter envelope delay characteristics and tolerances as specified by the Federal Communications Commission.

The MI-34025 Phase Equalizer is intended for use with RCA filterplexers MI-19086 (A, B, C, D) MI-19179, MI-27316, and ES-27254 (UHF) as well as the following series of RCA sideband filters: MI-19104, MI-19114, MI-19085, MI-27315, and ES-27397.

The Low Frequency Phase Equalizer consists of passive, all-pass, constant resistance, bridged-T networks composed entirely of reactive elements (see figure 8).

Two operating controls are provided on the panel of the MI-34025 Low Frequency Phase Equalizer. Switch S1, marked VARIABLE EQUALIZER, connects the equalizer IN or OUT of the video circuit as desired. A four position switch S2, marked DELAY, enables the selection of one of four envelope delay characteristics (see figure 4).

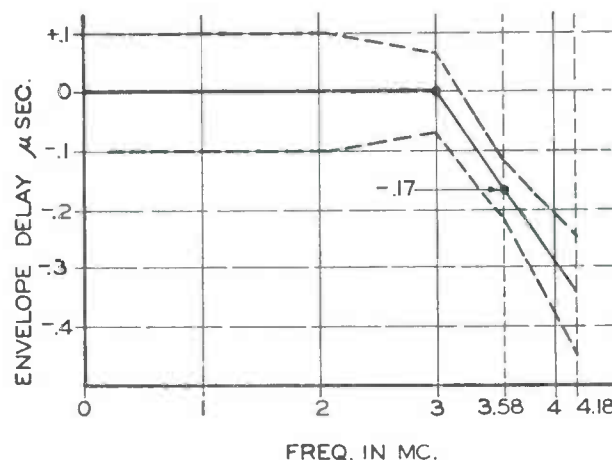


Figure 3—FCC Specified Transmitter Envelope Delay

INSTALLATION

The MI-34025 Low Frequency Phase Equalizer consists of the following items:

- 1 Phase Equalizer
- 1 Coaxial Termination, 75 ohms, $\pm 1\%$
- 2 Connectors for RG-11/U coaxial cable
- 1 Instruction Book, IB-36195-1

CAUTION: USE EXTREME CARE WHEN HANDLING THE EQUALIZER TO AVOID BENDING OR CHANGING THE ADJUSTMENT OF THE COIL STUDS.

The MI-34025 Low Frequency Phase Equalizer should be mounted with associated equipment as shown in figure 6. This arrangement requires two racks as specified in ES-19237-E for VHF or ES-19237-F for UHF, Television Transmitter Input and Monitoring Equipment Racks. Detailed information concerning adjustment and use of this and other transmitter equipment may be found in instruction book IB-30252.

The circuit sequence of control equipment shown in figure 7 has been arranged for best control and monitoring of the signal. The stabilizing amplifier has provision for monitoring the signal with the

benefit of the signal improvement provided by the amplifier without white stretch. As the stabilizing amplifier precedes the delay distortion equalizers, this monitoring output allows inspection of the input signal without the delay distortion introduced by the delay equalizers which are required to compensate for the delay distortion of the transmitter and the high frequency delay of the receiver. After the signal has passed the stabilizing amplifier, an undistorted signal for monitoring is not usually again available except by using a delay compensated demodulator, such as the BW-4B or BWU-4A, when its signal is taken from the antenna feed line of the transmitter.

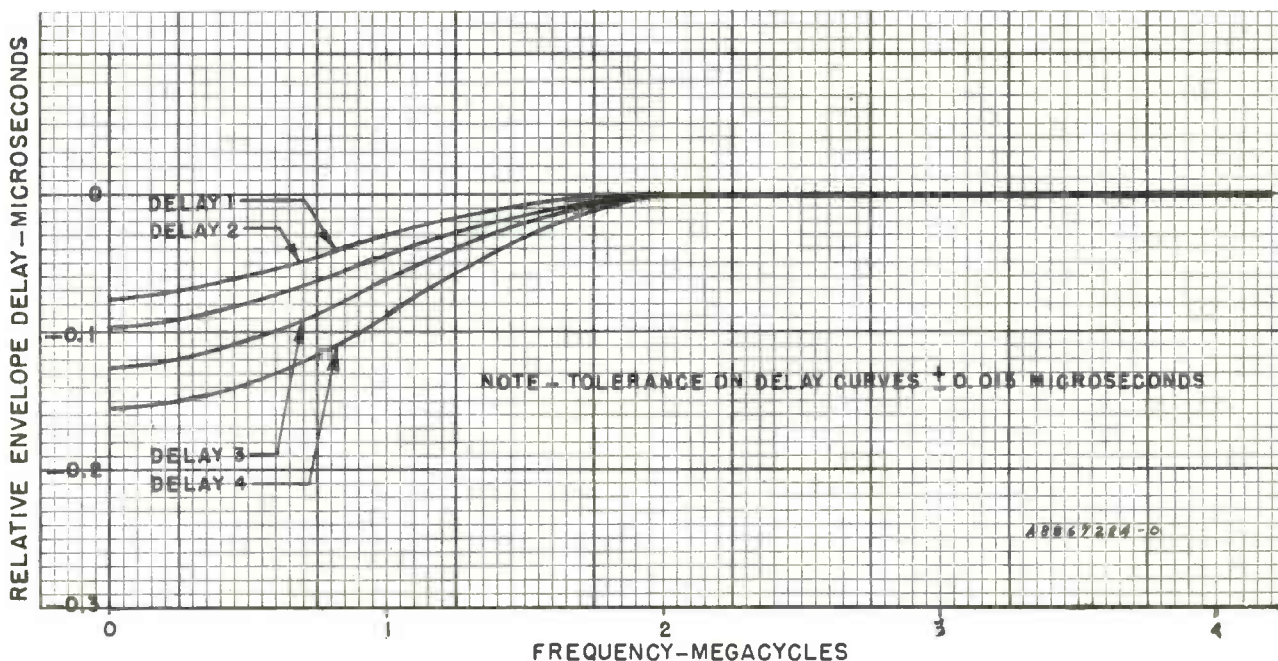


Figure 4—Typical Equalizer Delay Characteristics

OPERATION

The MI-34025 Low Frequency Phase Equalizer has been adjusted at the factory, and all component adjustments have been sealed to prevent accidental change. The setting of the front panel control switches must be determined by test as described in IB-30252.

This type of equipment produces a large signal

delay and therefore behaves much like a very long length of cable. Any impedance irregularity as may result from the use of incorrect connecting cables, inaccurate load termination, or failure to provide a signal source of correct impedance will result in signal degradation in the form of poor transient response and poor frequency response because of reflections.

MAINTENANCE

Since the equalizer has no circuits involving amplifiers or power supplies the only troubles likely to

develop will be those involving mechanical damage, wear, or a faulty component.

TESTING

If a Low Frequency Phase Equalizer is suspected of faulty performance, it can be checked with an envelope delay test set for conformance to specifications. If such a test set is not available, the following check, which will indicate any serious defect in the equalizer, can be made. However, do not attempt to improve the response of the equalizer by making minor adjustments to capacitors or coils. Changing any factory-set adjustment will seriously disturb the delay characteristic curves.

Recommended Test Equipment

75 ohm, $\pm 1\%$, resistor

Oscilloscope, RCA Type TO-524D

Video Sweep Generator, Type BW-5A/B or BWU-

5A/B or other source of low distortion video sweep signal.

1. Terminate the output of the equalizer with 75 ohm, $\pm 1\%$ resistor.
2. Connect the video sweep generator to the equalizer input.
3. Connect the low capacity probe from the oscilloscope to the equalizer input.
4. Observe the response pattern on the oscilloscope while switching through the range of settings on the equalizer. The response patterns should be reasonably smooth for all settings. A defective component will usually cause variations (peaks and valleys) of 50% or more in the response pattern.

PARTS LIST

LOW FREQUENCY PHASE EQUALIZER, MI-34025

Symbol No.	Description	Drawing No.	Stock No.
C1	Capacitor Set: 354 mmf $\pm 1\%$	8801406-1	205347
C2	A-1 Capacitor: variable, 3/35 mmf		
C3	B-1 Capacitor: fixed, 68 mmf $\pm 2\%$, 500 v		
C4	C-1 Capacitor: fixed, 270 mmf $\pm 2\%$, 500 v		
C4	Capacitor Set: 3665 mmf $\pm 1\%$	8801406-2	205348
C5	A-1 Capacitor: variable, 10/160 mmf		
C6	B-1 Capacitor: fixed, 270 mmf $\pm 2\%$, 500 v		
C7	C-1 Capacitor: fixed, 3300 mmf $\pm 2\%$, 500 v		
C7	Capacitor Set: 354 mmf $\pm 1\%$	8801406-3	205347
C8	A-1 Capacitor: variable, 3/35 mmf		
C9	B-1 Capacitor: fixed, 68 mmf $\pm 2\%$, 500 v		
C10	C-1 Capacitor: fixed, 270 mmf $\pm 2\%$, 500 v		
C11	Capacitor Set: 3449 mmf $\pm 1\%$	8801406-4	205349
C12	A-1 Capacitor: variable, 10/160 mmf		
C13	B-1 Capacitor: fixed, 68 mmf $\pm 2\%$, 500 v		
C14	C-1 Capacitor: fixed, 3300 mmf $\pm 2\%$, 500 v		
C15	Capacitor Set: 354 mmf $\pm 1\%$	8801406-5	205347
C16	A-1 Capacitor: variable, 3/35 mmf		
C17	B-1 Capacitor: fixed, 68 mmf $\pm 2\%$, 500 v		
C18	C-1 Capacitor: fixed, 270 mmf $\pm 2\%$, 500 v		
C19	Capacitor Set: 3187 mmf $\pm 1\%$	8801406-6	205350
C20	A-1 Capacitor: variable, 10/160 mmf		
C21	B-1 Capacitor: fixed, 390 mmf $\pm 2\%$, 500 v		
C22	C-1 Capacitor: fixed, 2700 mmf $\pm 2\%$, 500 v		
C23	Capacitor Set: 341 mmf $\pm 1\%$	8801406-7	205351
C24	A-1 Capacitor: variable, 3/35 mmf		
C25	B-1 Capacitor: fixed, 47 mmf $\pm 2\%$, 500 v		
C26	C-1 Capacitor: fixed, 270 mmf $\pm 2\%$, 500 v		
C27	Capacitor Set: 2864 mmf $\pm 1\%$	8801406-8	205352
C28	A-1 Capacitor: variable, 10/160 mmf		
C29	B-1 Capacitor: fixed, 82 mmf $\pm 2\%$, 500 v		
C30	C-1 Capacitor: fixed, 2700 mmf $\pm 2\%$, 500 v		

Symbol No.	Description	Drawing No.	Stock No.
C25	Capacitor Set: 355 mmf $\pm 1\%$	8801406-9	205373
C26	A-1 Capacitor: variable, 3/35 mmf		
C27	B-1 Capacitor: fixed, 68 mmf $\pm 2\%$, 500 v C-1 Capacitor: fixed, 270 mmf $\pm 2\%$, 500 v		
C28	Capacitor Set: 1516 mmf $\pm 1\%$	8801406-10	205353
C29	A-1 Capacitor: variable, 4/70 mmf		
C30	B-1 Capacitor: fixed, 270 mmf $\pm 2\%$, 500 v C-1 Capacitor: fixed, 1200 mmf $\pm 2\%$, 500 v		
C31	Capacitor Set: 710 mmf $\pm 1\%$	8801406-11	205354
C32	A-1 Capacitor: variable, 3/35 mmf		
C33	B-1 Capacitor: fixed, 220 mmf $\pm 2\%$, 500 v C-1 Capacitor: fixed, 470 mmf $\pm 2\%$, 300 v		
C34	Capacitor Set: 710 mmf $\pm 1\%$	8801406-12	205354
C35	A-1 Capacitor: variable, 3/35 mmf		
C36	B-1 Capacitor: fixed, 220 mmf $\pm 2\%$, 500 v C-1 Capacitor: fixed, 470 mmf $\pm 2\%$, 300 v		
C37	Capacitor Set: 1180 mmf $\pm 1\%$	8801406-13	205355
C38	A-1 Capacitor: variable, 4/70 mmf		
C39	B-1 Capacitor: fixed, 150 mmf $\pm 2\%$, 500 v C-1 Capacitor: fixed, 1000 mmf $\pm 2\%$, 500 v		
C40	Capacitor Set: 710 mmf $\pm 1\%$	8801406-14	205354
C41	A-1 Capacitor: variable, 3/35 mmf		
C42	B-1 Capacitor: fixed, 220 mmf $\pm 2\%$, 500 v C-1 Capacitor: fixed, 470 mmf $\pm 2\%$, 300 v		
C43	Capacitor Set: 710 mmf $\pm 1\%$	8801406-15	205354
C44	A-1 Capacitor: variable, 3/35 mmf		
C45	B-1 Capacitor: fixed, 220 mmf $\pm 2\%$, 500 v C-1 Capacitor: fixed, 470 mmf $\pm 2\%$, 300 v		
C46	Capacitor Set: 724 mmf $\pm 1\%$	8801406-16	205356
C47	A-1 Capacitor: variable, 3/35 mmf		
C48	B-1 Capacitor: fixed, 22 mmf $\pm 2\%$, 500 v C-1 Capacitor: fixed, 680 mmf $\pm 2\%$, 500 v		
J1, J2	Connector: coax	255223-1	51800
L1	Coil: 3.63 microhenry	8801380-502	204965
L2	Coil: 2.00 microhenry	8801379-503	204987
L3	Coil: 2.70 microhenry	8801379-509	204964
L4	Coil: 2.00 microhenry. Same as L2	8801379-503	204987
S1	Switch: toggle, DPDT	449663-108	204583
S2	Switch: rotary	472345-1	204675
T1	Transformer: 7.15 microhenry self inductance 3.16 microhenry mutual inductance	8801381-505	204966
T2	Transformer: 6.84 microhenry self inductance 2.86 microhenry mutual inductance	8801381-507	204967
T3	Transformer: 6.47 microhenry self inductance 2.49 microhenry mutual inductance	8801381-508	204968
T4	Transformer: 5.94 microhenry self inductance 2.11 microhenry mutual inductance	8801381-509	204995
T5	Transformer: 4.13 microhenry self inductance 0.13 microhenry mutual inductance	8801381-512	204969
Miscellaneous			
	Connector: cable, male	252868-1	66344
	Connector: coaxial termination, 75 ohm ± 75 ohm $\pm 1\%$, single contact, male	895438-503	204961
	Knob: control	712296-502	17268

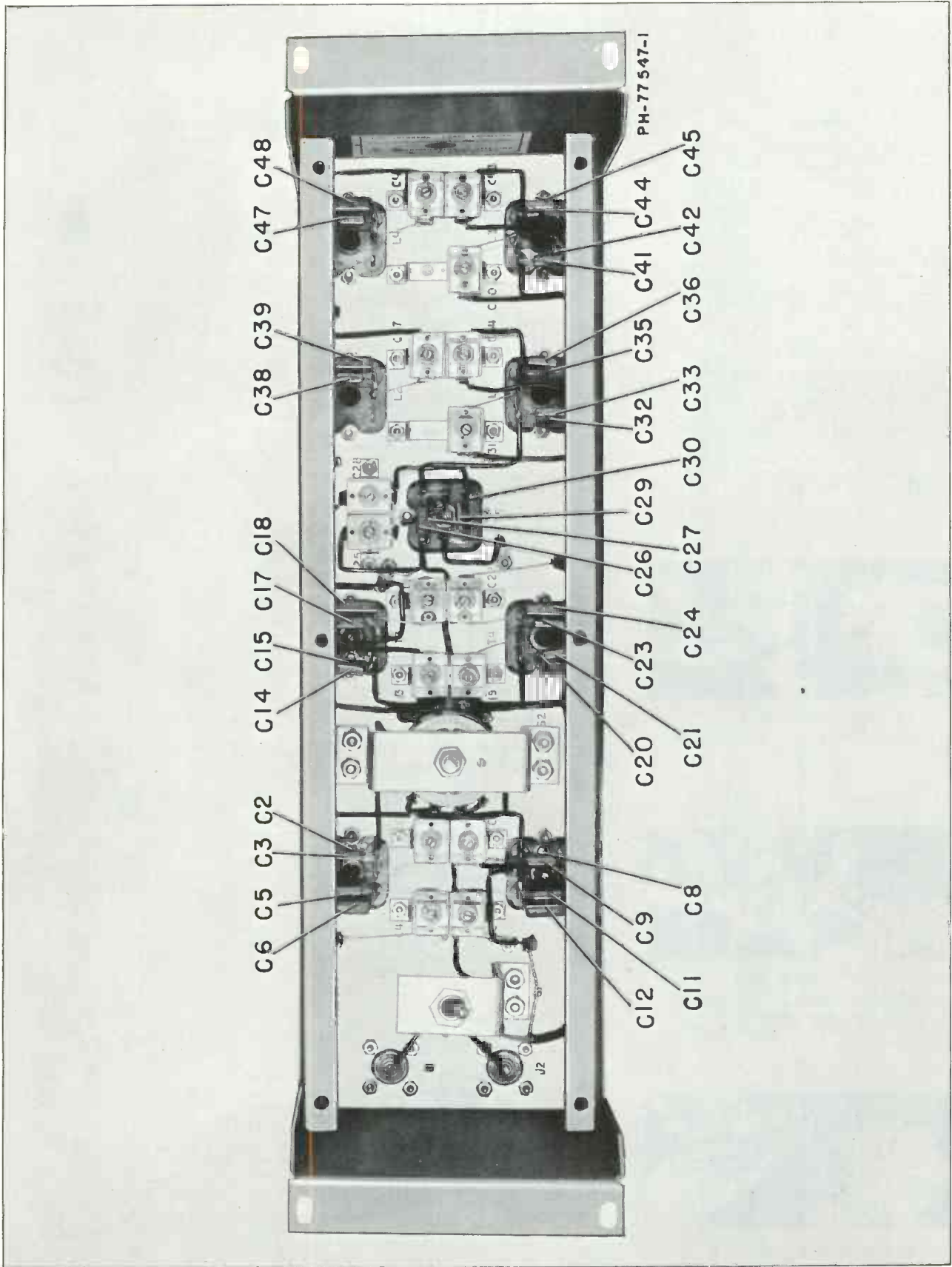


Figure 5—MI-34025 Low Frequency Phase Equalizer, Front View, Cover Removed

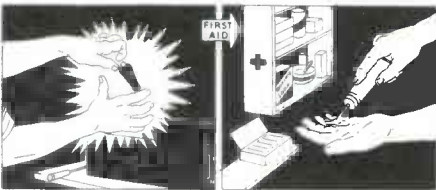
FIRST AID

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.



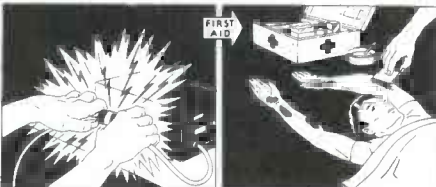
FIRST DEGREE BURN

SKIN REDDENED. Temporary treatment—Apply baking soda or Unguentine.



SECOND DEGREE BURN

SKIN BLISTERED. Temporary treatment—Apply baking soda, wet compress, white petroleum jelly, foille jelly, olive oil, or tea.



THIRD DEGREE BURN

FLESH CHARRED. Temporary treatment—Apply baking soda, wet compress, white petroleum jelly, or foille spray. Treat for severe shock.

BACK PRESSURE—ARM LIFT METHOD OF ARTIFICIAL RESPIRATION (Courtesy of the American Red Cross)

1. Position of the subject (See Fig. 1)
Place the subject in the face down, prone position. Bend his elbows and place the hands one upon the other. Turn his face to one side, placing the cheek upon his hands.



FIGURE 1

2. Position of the operator (See Fig. 2)
Kneel on either the right or left knee at the head of the subject facing him. Place the knee at the side of the subject's head close to the forearm. Place the opposite foot near the elbow. If it is more comfortable, kneel on both knees, one on either side of the subject's head. Place your hands upon the flat of the subject's back in such a way that the heels lie just below a line running between the armpits. With the tips of the thumbs just touching, spread the fingers downward and outward.



FIGURE 2

3. Compression phase (See Fig. 3)
Rock forward until the arms are approximately vertical and allow the weight of the upper part of your body to exert slow, steady, even pressure downward upon the hands. This forces air out of the lungs. Your elbows should be kept straight and the pressure exerted almost directly downward on the back.



FIGURE 3

4. Position for expansion phase (See Fig. 4)
Release the pressure, avoiding a final thrust, and commence to rock slowly backward. Place your hands upon the subject's arms just above his elbows.

5. Expansion phase (See Fig. 5)
Draw his arms upward and toward you. Apply just enough lift to feel resistance and tension at the subject's shoulders. Do not bend your elbows, and as you rock backward the subject's arms will be drawn toward you. Then lower the arms to the ground. This completes the full cycle. The arm lift expands the chest by pulling on the chest muscles, arching the back, and relieving the weight on the chest.



FIGURE 4

THE CYCLE SHOULD BE REPEATED 12 TIMES PER MINUTE AT A STEADY, UNIFORM RATE. THE COMPRESSION AND EXPANSION PHASES SHOULD OCCUPY ABOUT EQUAL TIME; THE RELEASE PERIODS BEING OF MINIMUM DURATION.

Additional related directions:

It is all important that artificial respiration, when needed, be started quickly. There should be a slight inclination of the body in such a way that fluid drains better from the respiratory passage. The head of the subject should be extended, not flexed forward, and the chin should not sag lest obstruction of the respiratory passages occur. A check should be made to ascertain that the tongue or foreign objects are not obstructing the passages. These aspects can be cared for when placing the subject into position or shortly thereafter, between cycles. A smooth rhythm in performing artificial respiration is desirable, but split-second timing is not essential. Shock should receive adequate attention, and the subject should remain recumbent after resuscitation until seen by a physician or until recovery seems assured.



FIGURE 5

INSTRUCTIONS

NOTES:

- 1: LOCATE ALL INDIVIDUAL UNITS AS OBTAINED & SECURE FRAMES USING HARDWARE SUPPLIED.
- 2: BOLT CABINETS TOGETHER USING HARDWARE SUPPLIED.
- 3: BASE IS PART OF RACK (ENTIRE BOTTOM AREA OF BASE IS OPEN TO RECEIVE EXTERNAL WIRING.)
- 4: FOR CHANNELS #2-#3 ARRANGE UNITS IN RACK #1 AS SHOWN IN FIG #1 (GENERAL RADIO MONITOR) OR FIG #2 (NEWLETT PACKARD MONITOR).
FOR CHANNELS #2-#3 ARRANGE UNITS IN RACKS AS SHOWN IN FIG #1.
FOR CHANNELS #14-#13 USE BW-4B INSTEAD OF BW-4B. ARRANGE UNITS IN TOP PART OF RACK #2 AS SHOWN IN FIG #3. OTHER UNITS AS SHOWN IN FIG #1.
- 5: ELECTRICAL SHIELDS MI-30546-G21 & MI-30546-G22 MOUNT BETWEEN RACKS.

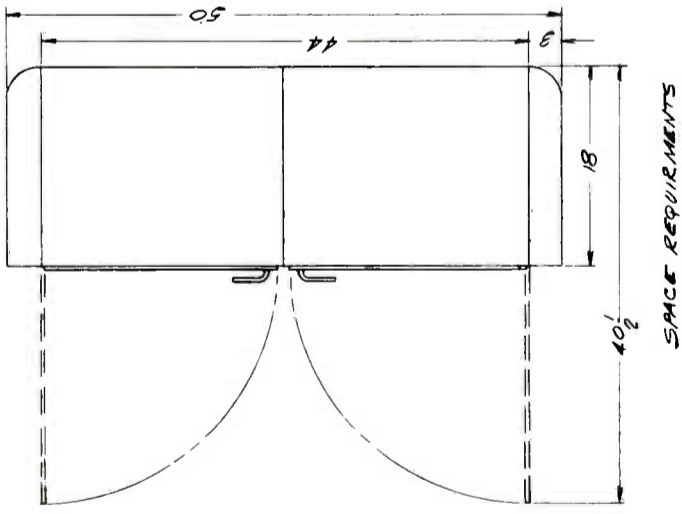
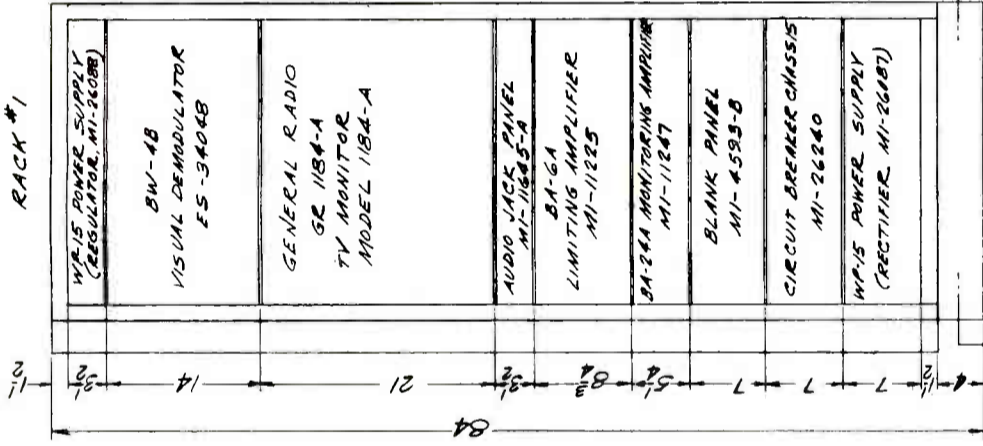
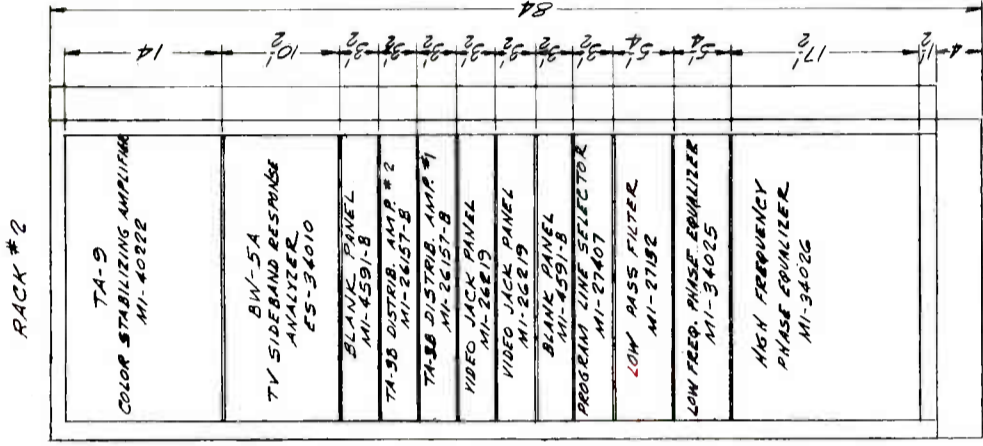


FIG #1 (SEE NOTE #4)

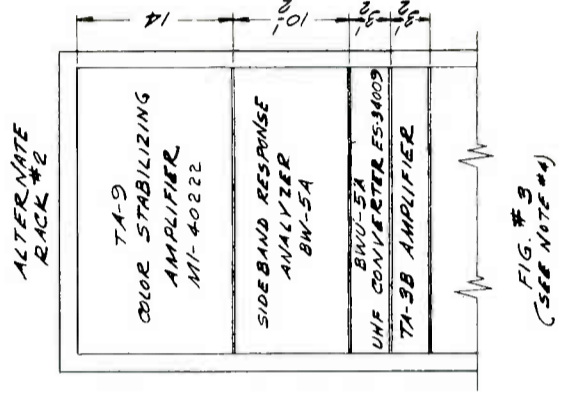


FIG #3 (SEE NOTE #4)

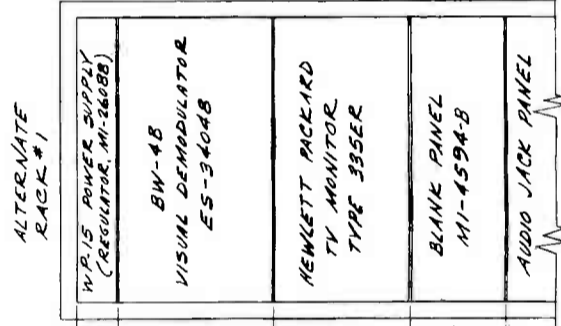
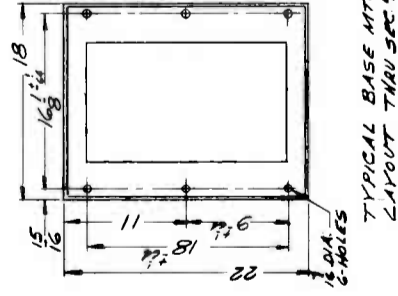
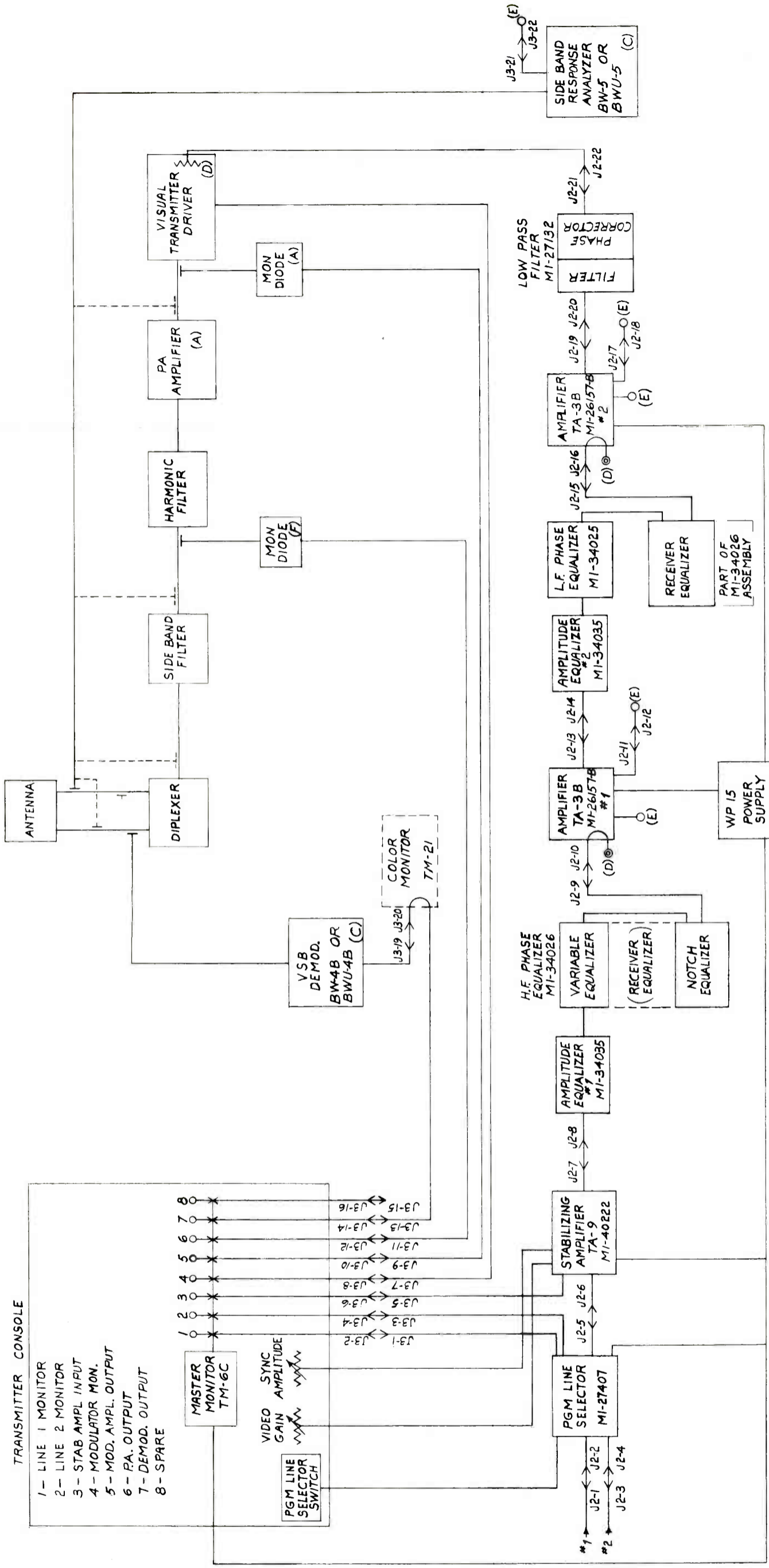


FIG #2 (SEE NOTE #4)





NOTES

- (A) ITEMS REQUIRED ONLY IF AMPLIFIER IS PRESENT
- (B) † BOTH ANTENNA LINES MUST BE EQUIPPED WITH MONITOR PICKUPS, ONE TO SERVE DAILY, THE OTHER AS CHECK POINT.
2- IF DEMODULATOR DOES NOT REJECT AURAL SIGNAL, ITS PICKUP POINT MUST PRECEDE THE DIPLEXER.
- (C) USE DIRECTIONAL COUPLERS TO SUPPLY SIGNAL TO THE BW-4B AND BW-5A.
- (D) PRECISION TERMINATIONS REQUIRED (75±1%).
- (E) TERMINATIONS REQUIRED (75±1%).
- (F) NOT USED WITH SOME TRANSMITTERS

VISUAL SIGNAL CIRCUITS FOR RCA T.V. TRANSMITTERS USING DIPLEXER, TTC-1C OR TTC-5A CONSOLES & ES-19237-E OR F MONITORING EQUIPMENT PARTS.
NOTCH EQUALIZER PORTION OF MI-34026 IS REQUIRED ONLY WHEN A FILTERPLEXER OR NOTCH DIPLEXER REPLACES THE DIPLEXER AS SHOWN.

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Figure 7—Functional Diagram



RADIO CORPORATION OF AMERICA
COMMERCIAL ELECTRONIC PRODUCTS, CAMDEN, N. J.

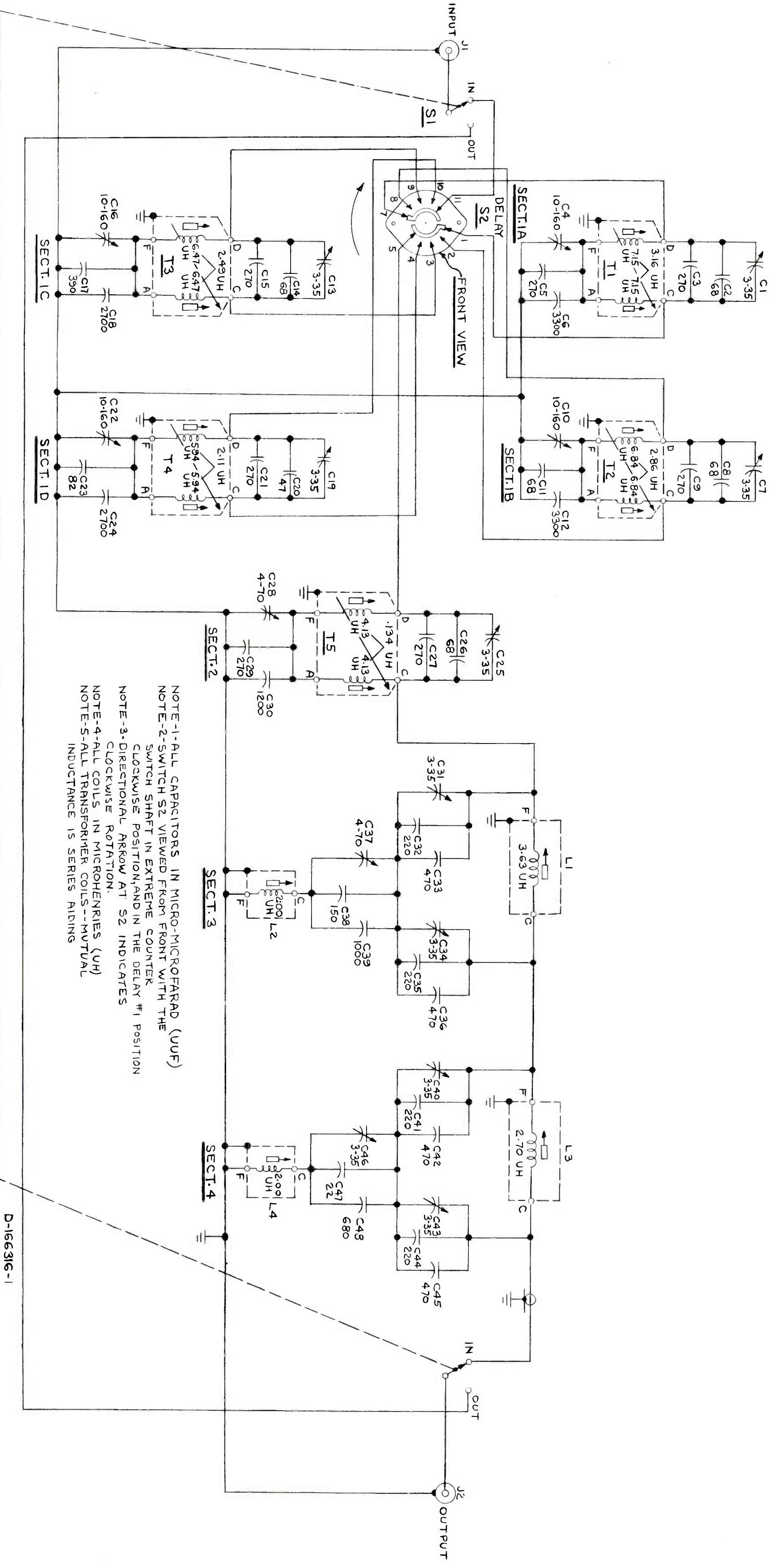


Figure 8—MI-34025 Low Frequency Phase Equalizer, Schematic Diagram

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