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PRELIMINARY
TECHNICAL MANUAL
for
SIDEBAND CONVERTER
MODEL LFCA-1



THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N. Y.

OTTAWA, CANADA

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3. That the equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise.
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1. Model Number of Equipment.
2. Serial Number of Equipment.
3. TMC Part Number.
4. Nature of defect or cause of failure.
5. The contract or purchase order under which equipment was delivered.

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When ordering replacement parts, the following information must be included in the order as applicable:

1. Quantity Required.
2. TMC Part Number.
3. Equipment in which used by TMC or Military Model Number.
4. Brief Description of the Item.
5. The *Crystal Frequency* if the order includes crystals.

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All correspondence pertaining to Warranty Claims, return, repair, or replacement and all material or equipment returned for repair or replacement, within Warranty or otherwise, should be addressed as follows:

THE TECHNICAL MATERIEL CORPORATION
Engineering Services Department
700 Fenimore Road
Mamaroneck, New York

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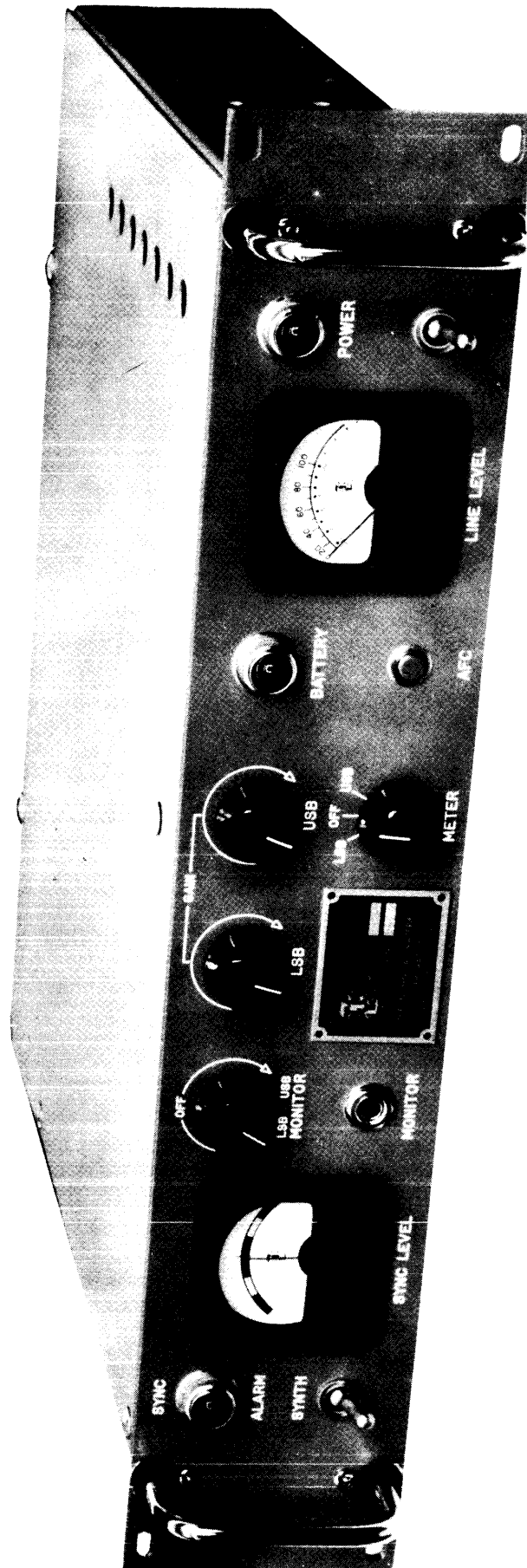


Figure 1-1. Sideband Converter, Model LFCA-1

SECTION 1

GENERAL DESCRIPTION

1-1. FUNCTIONAL DESCRIPTION.

Sideband Converter, Model LFCA-1 (figure 1-1), is an i-f converter that operates as part of a receiver system and provides simultaneous lower sideband and upper sideband reception, with an audio amplifier for selective monitoring of either channel. As shown in figure 1-2, the LFCA comprises five major circuits: upper sideband detectors and amplifiers, lower sideband detectors and amplifiers, phase-lock circuitry, audio frequency amplifier, and power supply. The phase-lock circuits employed in the LFCA permit locking the carrier injection oscillator to a received suppressed carrier, or to a 100-kc reference signal from an associated unit. Switchover circuits, contained within the LFCA, automatically switch to a battery power source in the event of a-c line power failure.

1-2. PHYSICAL DESCRIPTION.

The LFCA is designed for mounting in a standard 19-inch wide equipment cabinet; the unit is equipped with tilt-lock slide mechanisms that permit the unit to be pulled forward and tilted to expose the top, bottom, or rear of the chassis for greater ease of maintenance. Each major circuit that comprises the LFCA is designed as an individual, plug-in, printed circuit card (refer to figure 1-2), providing greater flexibility during

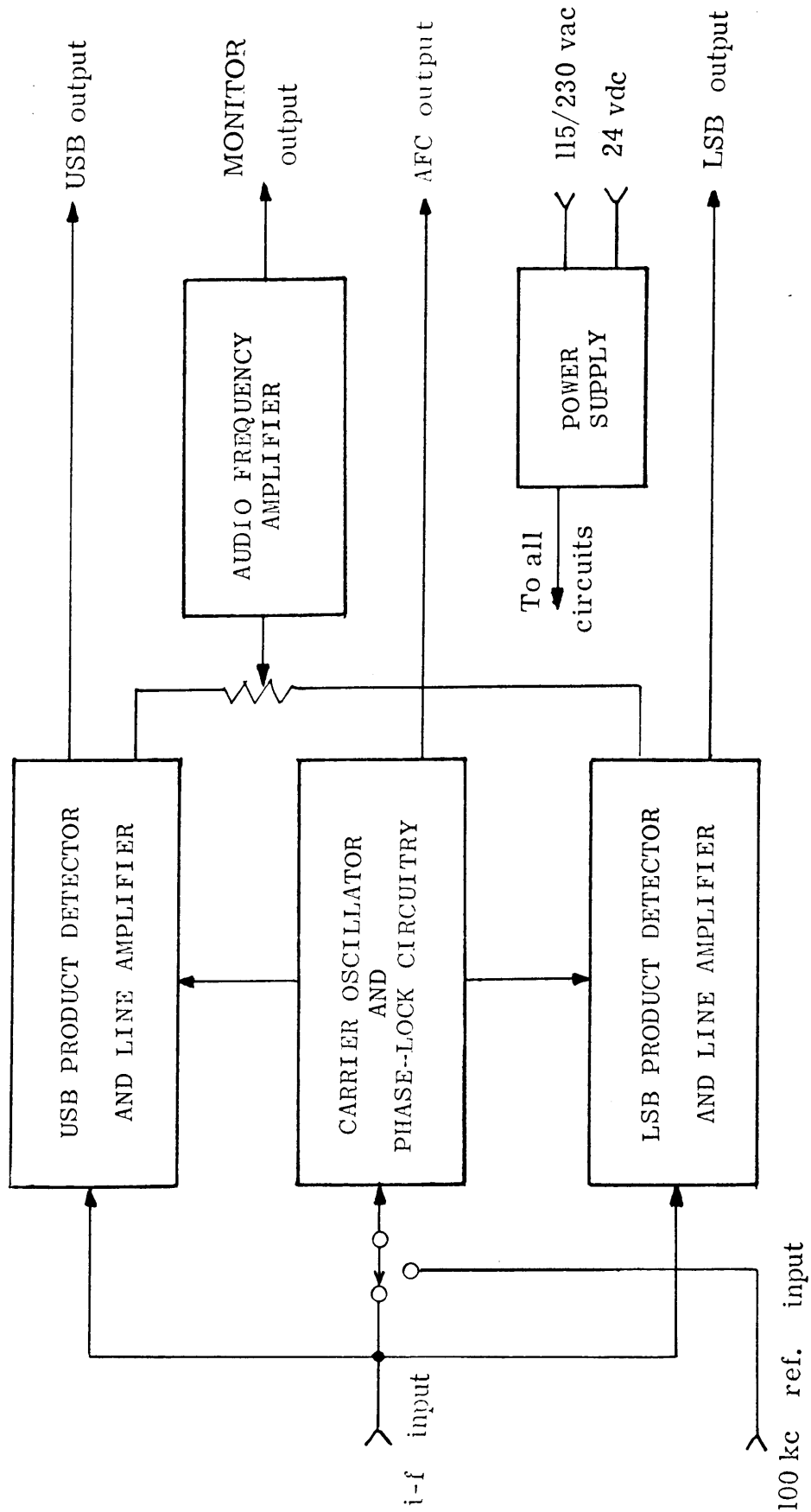


Figure 1-2. Simplified Block Diagram, LFCA.

maintenance and troubleshooting. With the exception of the battery switch (located on the rear apron) all operating switches, controls, and indicators are located on the front panel of the LFCA.

1-3. TECHNICAL SPECIFICATIONS.

INPUT POWER:	115/230 VAC, 47-400 cycle or ± 12 VDC, with automatic switchover to battery power supply (in event of a-c line power failure).
TYPE OF RECEPTION:	Single sideband or independent sideband (with or without carrier suppression), with or without automatic frequency control.
SIDEBAND SELECTION:	Upper sideband, lower sideband, or independent sideband (by a front panel switch).
INPUT FREQUENCY:	100 kc ± 4 kc.
INPUT IMPEDANCE:	50 ohms.
INPUT LEVEL:	1 millivolt.
PHASE LOCK SYSTEM:	A. Maintains synchronism with 25 db carrier suppression over frequency range of $\pm 0.1\%$ of received frequency (when used with such a receiver as the VLRB-1). B. If switched to synthesized input signal, will phase-lock to 100 kc.
SYNTHESIZER INPUT:	100 kc, 1 mv/50 ohms or -47 dbm.
AUDIO OUTPUT:	A. USB channel: 0 dbm. B. LSB channel: 0 dbm. C. Headphone monitoring of either USB or LSB at 1/2 watt into 4 ohms.
UNWANTED SIDEBAND REJECTION:	At least 60 db.

1-3. TECHNICAL SPECIFICATIONS (CONT)

ENVIRONMENT: Operation over temperature range from 0°C to +50°C, and humidity up to 90%.

WEIGHT: 18 pounds.

DIMENSIONS: Width - 19 inches
Height - 3.5 inches
Depth - 15 inches

1-4. EQUIPMENT SUPPLIED.

The LFCA is tested at the factory and is carefully packaged for shipment. Loose items included with the unit are listed in table 1-1.

NOTE

When the LFCA is shipped as part of a system the items listed in table 1-1 are omitted from the unit package but are included as part of the system cabling.

TABLE 1-1. LOOSE ITEMS LIST

PART NO.	DESCRIPTION	QUANTITY
IN	Instruction Manual	2
MS3057-6	Cable Clip	2
MS3106A14S1S	Connector Plug (Female)	1
MS3106A14S2S	Connector Plug (Female)	1
PJ055B	Telephone Plug	1
TP129	Alignment Tool	1
UG88*/U	BNC Connector Plug	3

SECTION 2
INSTALLATION

2-1. GENERAL.

The LFCA is carefully packaged at the factory to prevent damage during shipment. When the unit is delivered at the operating site, inspect the packing case and its contents for damage that might have occurred during transit. Unpack the equipment carefully, and inspect all packaging material for parts that may have been shipped as loose items. (Refer to paragraph 1-4). With respect to damage to the equipment for which the carrier is liable, the Technical Materiel Corporation will assist in describing methods of repair and furnishing of replacement parts.

2-2. MECHANICAL INSTALLATION.

Since the LFCA is used in combination with other equipment, the unit is designed for installation in a standard 19-inch wide equipment cabinet. The LFCA is equipped with tilt-lock slide mechanisms that permit the unit to be pulled forward in the cabinet and tilted to expose the top, bottom, or rear of the chassis for greater ease of maintenance. To install the LFCA in an equipment cabinet, proceed as follows:

- a. Pull out center sections of the tracks (located in equipment rack) until they lock in an extended position.

b. Position the slide mechanisms of LFCA in the tracks, and ease the unit into rack until release buttons engage holes in the tracks.

c. Depress release buttons and slide LFCA completely into rack; secure front panel of unit to the rack, using screws and washers.

NOTE

To prevent LFCA cables from snagging, attach the reel-mounted springs (NEGATOR B motors) located inside the rack to the cables.

d. Make necessary cable connections, as described in paragraph 2-3.

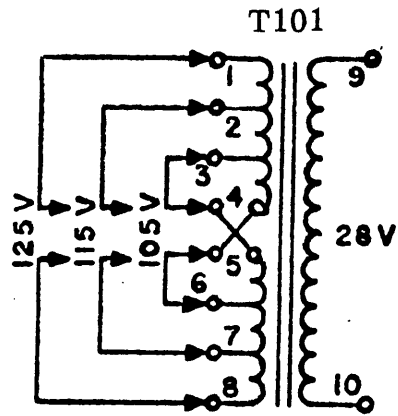
2-3. ELECTRICAL INSTALLATION.

NOTE

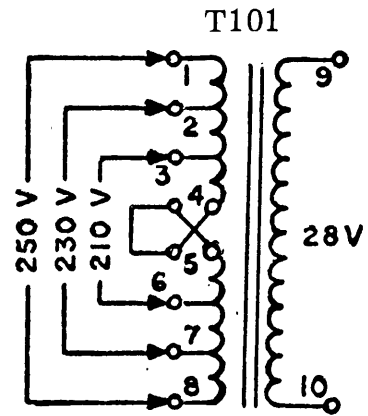
The LFCA is designed to operate on 115 or 230 volts a-c, 47-400 cycle primary power. The LFCA is wired at the factory for 115 volts a-c operation; if operation on other voltage is required, use information given in figure 2-1 to change wiring, as indicated.

Make the following electrical connections (refer to figure 2-2, and to schematic diagram, figure 7-1):

- a. Connect a-c power to J113.
- b. Connect 24 volt battery power supply to J114.
- c. For USB output, connect 600-ohm audio line to terminals 5 and 7 of E101; ground terminal 6 for balanced output.



105/115/125 V
60/50 CPS



210/230/250 V
60/50 CPS

Figure 2-1. Transformer Wiring

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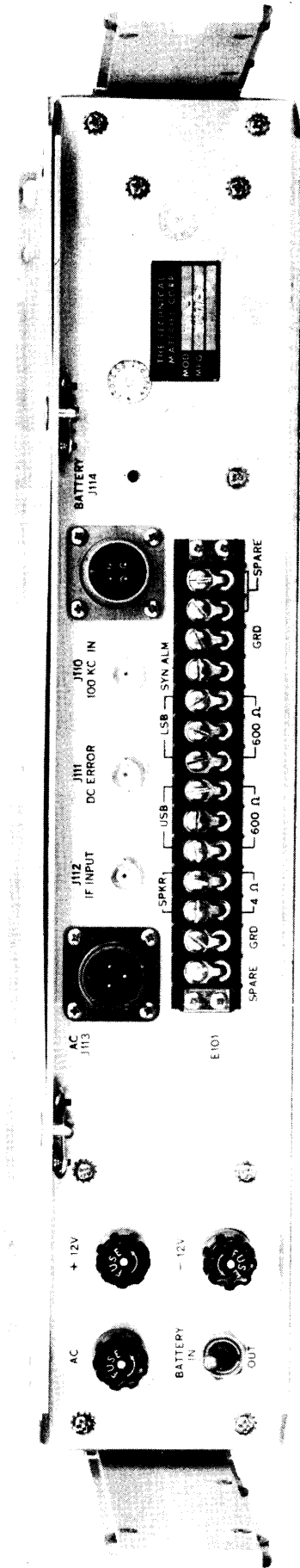


Figure 2-2. LFCA Rear Apron, Terminals and Controls

d. For LSB output, connect 600-ohm audio line to terminals 8 and 10 of E101; ground terminal 9 for balanced output.

e. For MONITOR output, connect 4-ohm speaker to terminals 3 and 4 of E101.

f. For remote SYNC alarm indication, connect 12 volt d-c alarm device (buzzer, lamp, relay, etc.) to terminals 11 and 12 of E101. (Terminal 11 is positive; terminal 12 is ground).

SECTION 3

OPERATOR'S SECTION

3-1. GENERAL.

The LFCA operates in conjunction with related units of a receiver system (refer to paragraph 1-1).. The functions of the LFCA front panel switches, controls, and indicators are briefly explained in table 3-1 (refer to figure 3-1).

NOTE

Make sure that all units related to the system are properly connected and powered.

TABLE 3-1. OPERATING CONTROLS AND INDICATORS

ITEM NO. (FIG. 3-1)	PANEL DESIGNATION	FUNCTION
1	SYNC ALARM lamp (DS103)	Lights when carrier injection oscillator is not synchronized with received pilot carrier or reference 100 kc signal, as selected by SYNTH switch (item 13).
2	MONITOR control (R106)	Adjusts level of monitor audio output, and selects output of either USB or LSB channel for monitoring.
3	LSB GAIN control (R105)	Adjust output level to 600 ohm LSB audio line.
4	USB GAIN control (R104)	Adjusts output level to 600 ohm USB audio line.
5	BATTERY lamp (DS102)	Lights when unit is powered by emergency battery power supply.

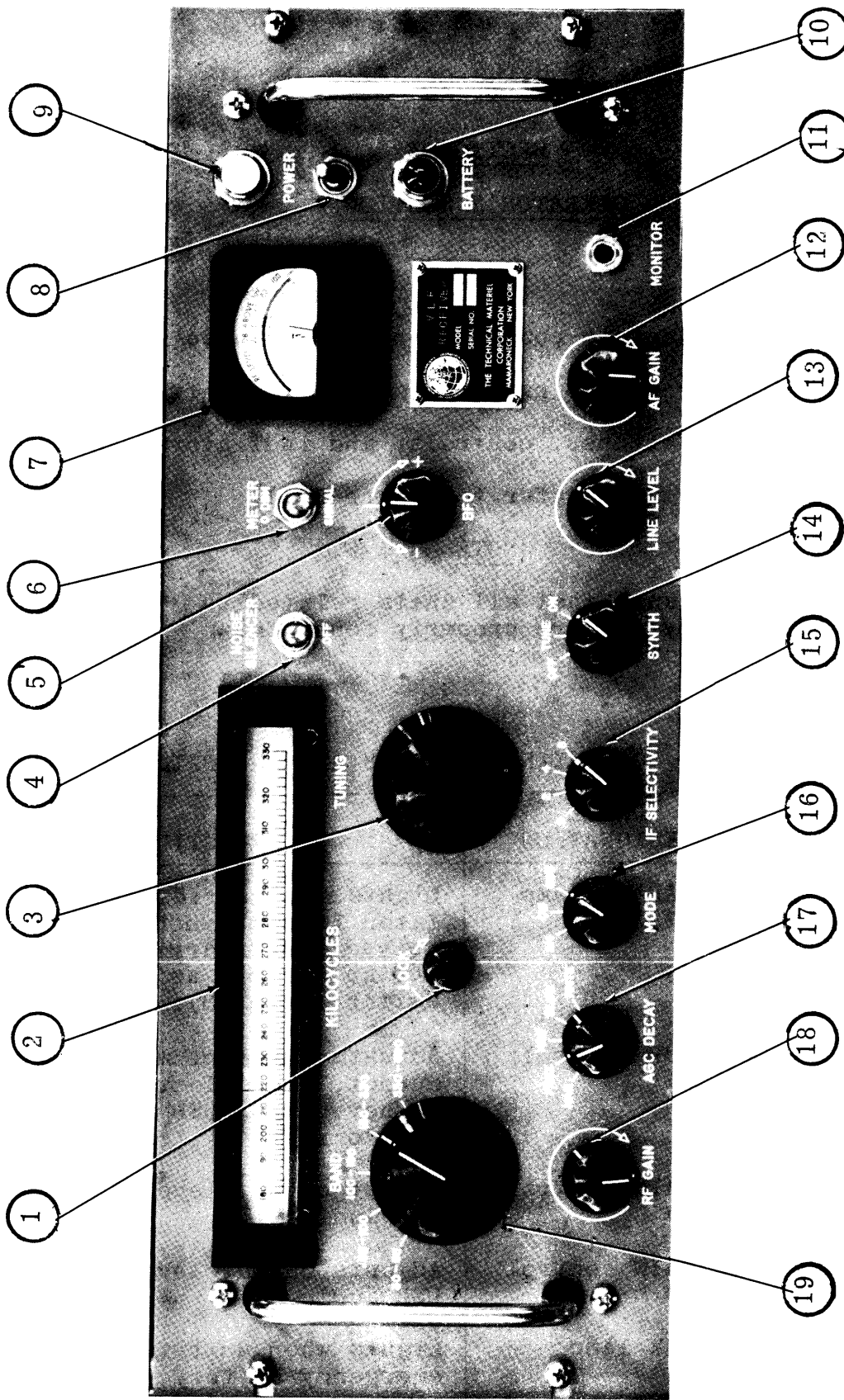


Figure 3-1. VLRB, Front Panel Operating Controls

TABLE 3-1. OPERATING CONTROLS AND INDICATORS (CONT.)

ITEM NO. (FIG. 3-1)	PANEL DESIGNATION	FUNCTION
6	POWER lamp (DS101)	Lights when unit is powered by a-c line supply.
7	POWER switch (S101)	Connects power supply to a-c line.
8	LINE LEVEL meter (M102)	Indicates output level to LSB or USB audio line, as selected by METER switch (item 10).
9	AFC switch (S102)	When depressed, disconnects AFC (automatic frequency control) voltage from associated receiver; grounds AFC loop to carrier injection oscillator.
10	METER switch (S103)	When set at LSB, connects LINE LEVEL meter (item 8) to indicate output level to LSB audio line; when set at USB, connects LINE LEVEL meter (item 8) to indicate output level to USB audio line; when set at OFF, disables LINE LEVEL meter (item 8) .
11	MONITOR jack (J101)	Permits headphone monitoring of LSB or USB channel, as controlled by MONITOR control (item 2).
12	SYNC LEVEL meter (M101)	Indicates degree of synchronism of carrier injection oscillator.
13	SYNTH switch (S104)	When set at upper position, connects 100 kc reference signal to phase-lock circuits; when set at lower position, connects received pilot carrier to phase-lock circuits.

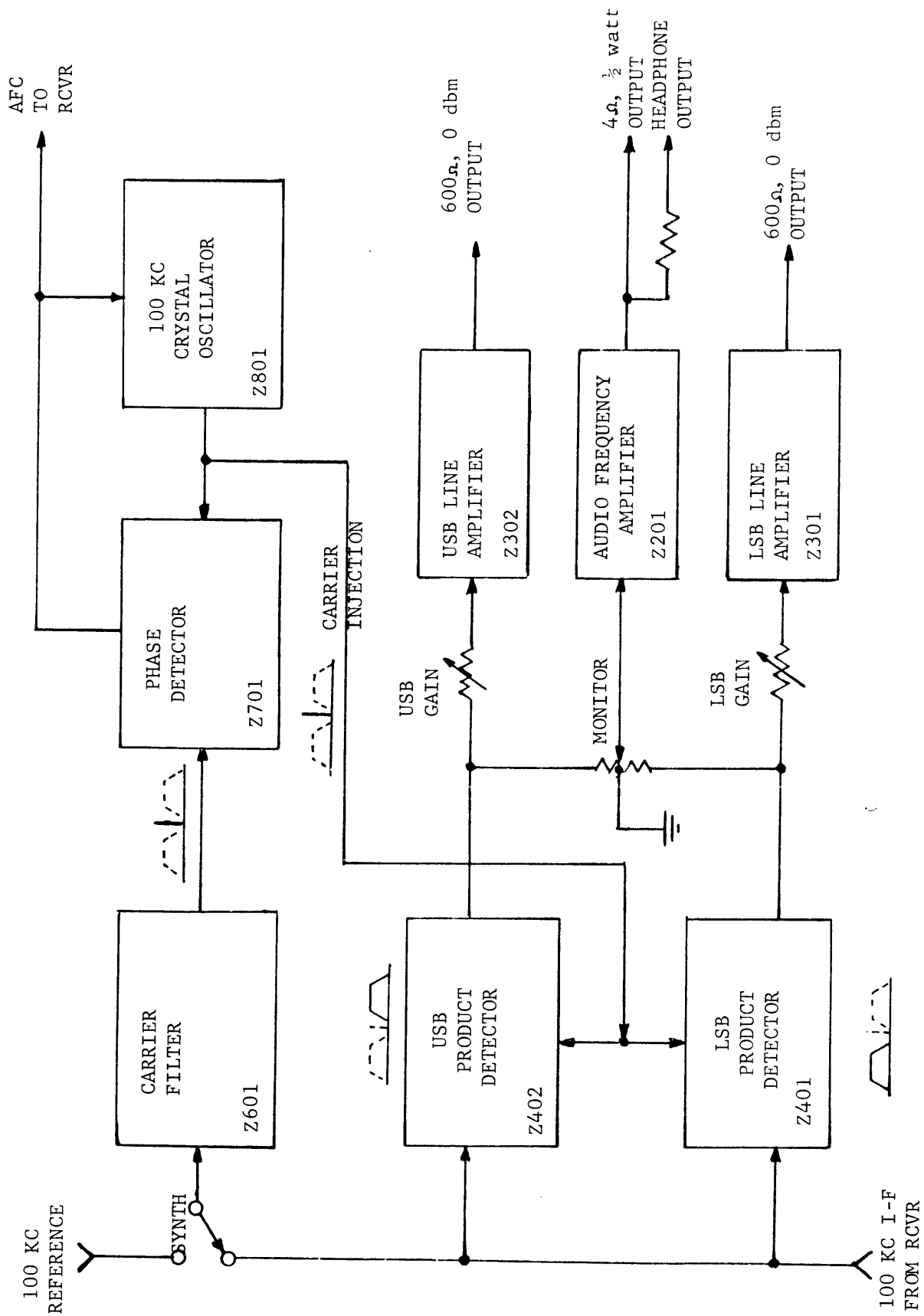


Figure 4-0. Block Diagram, LFCA

SECTION 4
PRINCIPLES OF OPERATION

4-1. OVERALL FUNCTIONAL ANALYSIS (REFER TO FIGURE 4-0).

The LFCA has eight major printed circuit cards: lower sideband product detector, lower sideband line amplifier, upper sideband product detector, upper sideband line amplifier, carrier filter, phase detector, crystal oscillator, and audio frequency amplifier and power supply. The LFCA operates as a sideband converter in conjunction with an associated LF/MF receiver. For a functional description of each printed circuit card, refer to paragraphs 4-2 through 4-7.

NOTE

Since the components of LSB product detector and line amplifier (Z401 and Z301) are identical to those of USB (Z402 and Z302, Z302), only LSB channel operation will be explained.

4-2. LOWER SIDEBAND PRODUCT DETECTOR (FIGURE 4-1).

The product detector amplifies and converts the 100 kc i-f receiver input signal to audio frequency. This is accomplished by feeding the i-f signal to the input amplifier Q401, and then filtering out the desired sideband signal by filter FL401-1, which passes signals between 96.00 and 99.75.

NOTE

The USB product detector (Z402) contains filter FL401-2, which passes signals between 100.25 and 104.00

The filtered signal is amplified by Q402, and is routed to the balanced demodulator, diodes CR401, CR402, CR403, and CR404. The 100 kc signal from the carrier injection oscillator (Z801) is amplified by Q403 and is also routed to the balanced demodulator. The output of the demodulator, the difference frequency in the range of 250 to 4000 cps, is routed to the LSB line amplifier (Z301).

The LSB line amplifier (Z301) is described in paragraph 4-6.

4-3. CARRIER FILTER (FIGURE 4-2).

The 100 kc i-f signal from the receiver is routed to amplifier Q601, and the amplified signal is then applied to Y601.

NOTE

Q601 is operative when SYNTH switch S104 is at its down position.

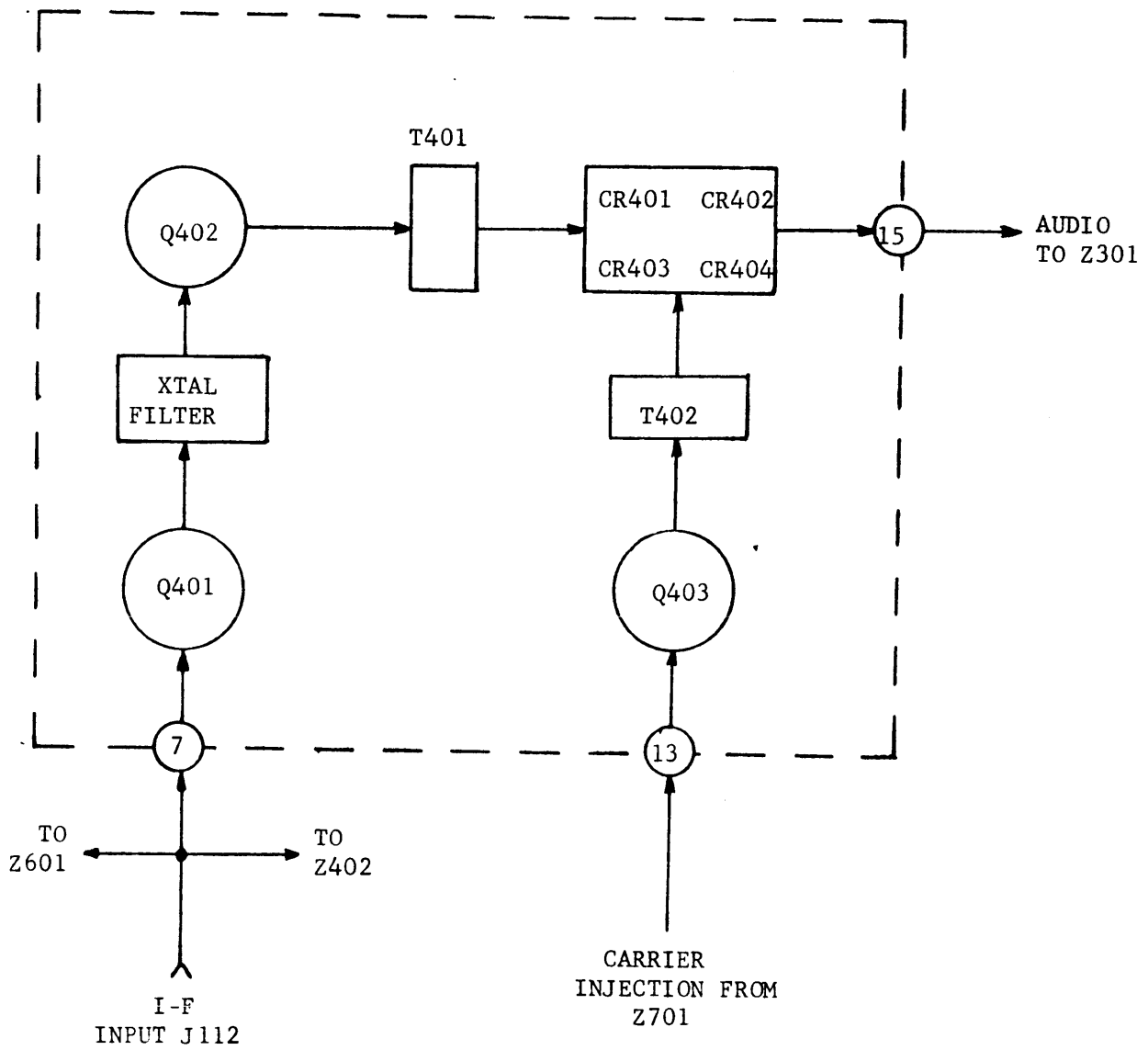


Figure 4-1. LSB Product Detector, Z401 Simplified Block Diagram.

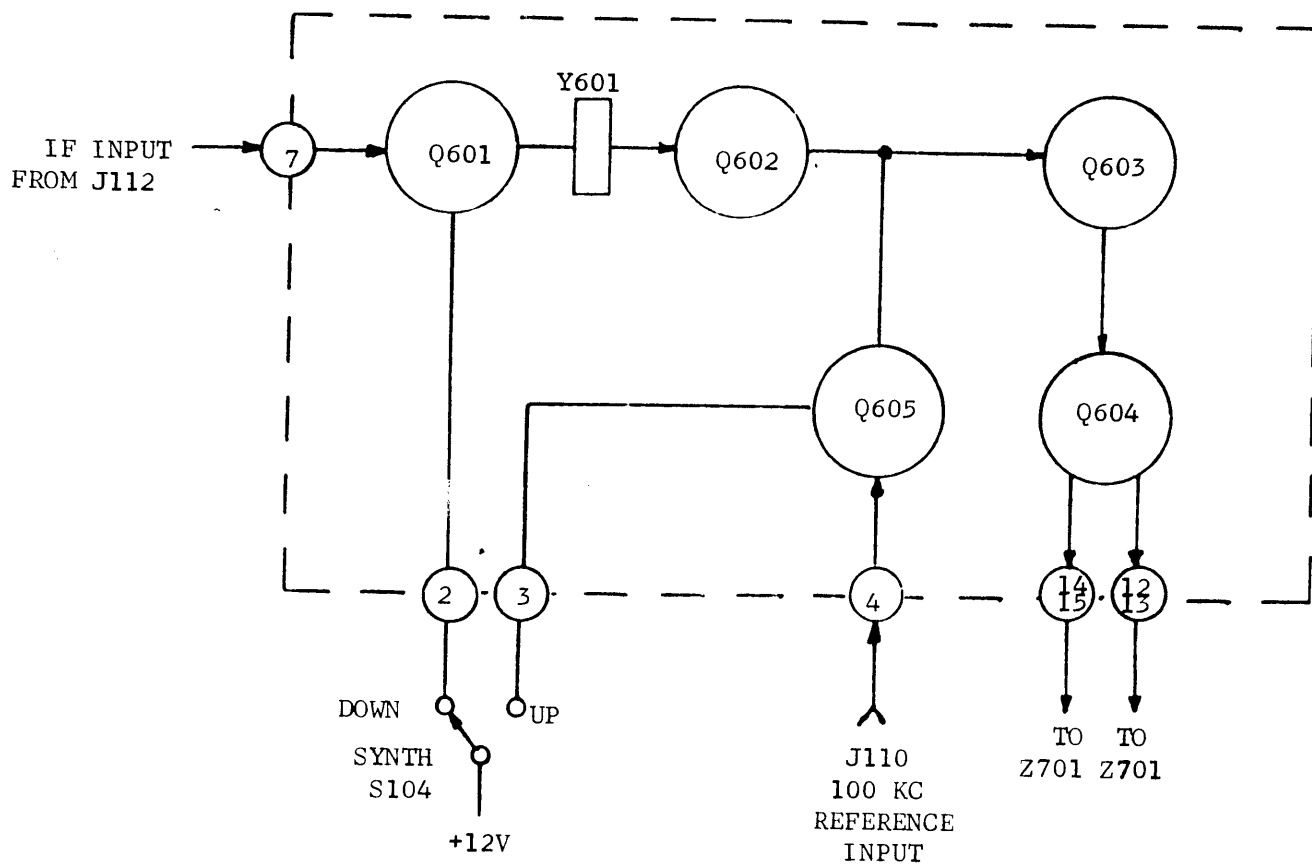


Figure 4-2. Carrier Filter, 7601, Simplified Block Diagram

Y601, a narrow bandwidth filter (12 cps), separates the suppressed carrier from the sideband signals. The carrier signal, centered at 100 kc, is amplified by Q602 and the output is applied to the transformer-coupled amplifier chain Q603 and Q604.

A 100 kc reference signal input at J110 is applied to amplifier Q605. When SYNTH switch S104 is at its up position Q605 is operative (Q601 is not operative) and the amplified 100 kc reference signal is applied to the amplifier chain Q603 and Q604.

The output of Q604 is routed to the phase detector module Z701.

4-4. PHASE DETECTOR (FIGURE 4-3 and 4-4).

a. Phase Detector Theory. - To understand the operation of the phase detectors contained in this equipment, the three extreme circuit conditions should be observed. Refer to figure 4-3. First, it must be assumed that the two signals applied to the circuit (E_1 and E_2) are of the same frequency. When E_1 and E_2 are in phase (shown E_1 and E_{2a}), CR1 will conduct on each negative excursion portion of the signal, and E_3 will be positive due to IR drop across resistor R. When E_1 and E_2 are 180° out of phase (shown E_1 and E_{2a}) CR 2 will conduct on the positive excursion portion of E_1 . E_3 will be negative due to the IR drop across resistor R. When E_2 is shifted 90° with respect to E_1 (shown E_1 and E_{2c}), E_3 will be zero because conduction through CR1 and CR2 is equal, but in opposite directions with respect to resistor R. Therefore the output voltage E_3 is dependent upon the phase relationship of the two input signals, E_1 and E_2 .

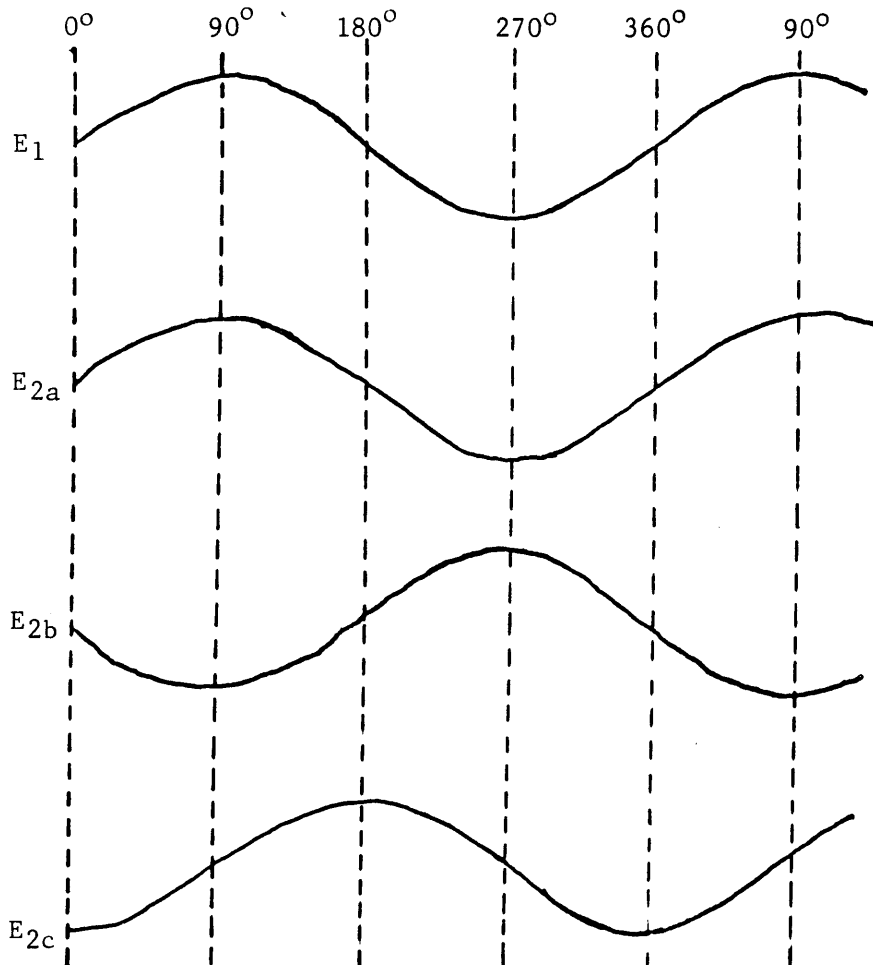
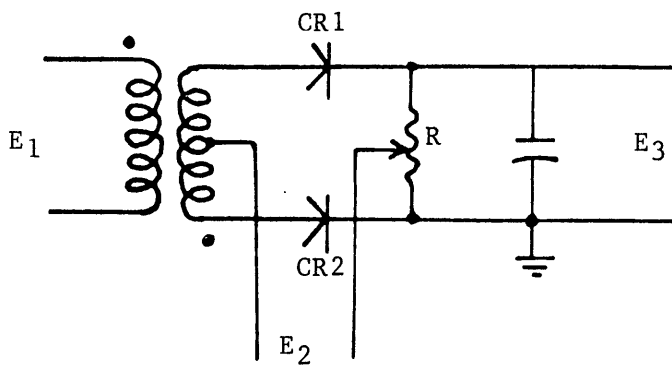


Figure 4-3. Phase Detector Theory

b. Phase Detector Operation. - A signal (nominally 100 kc) from the carrier injection oscillator (Z801) is applied to phase-shift network C709 and R706. The output of the phase-shift network is amplified by Q702 and applied to correction loop phase detector CR703 and CR704. The second input to the correction loop phase detector is a signal from carrier filter (Z601) (either the received pilot carrier, or the 100 kc reference signal). The output of the correction loop phase detector, a d-c voltage dependent on the phase relationship of the two input signals, is routed to the carrier injection oscillator and sync alarm module Z801.

The signal from the carrier injection oscillator is also applied to phase-shift network R705 and C710. The output of this phase-shift network is amplified by Q701 and applied to the alarm phase detector CR701 and CR702. The second input to this phase detector is identical to the second input to the correction loop phase detector.

As a result of the action of the two phase-shift networks, the carrier injection signal applied to the alarm phase detector leads the carrier injection signal applied to the correction loop phase detector approximately 90° . Therefore, when the output of the correction loop phase detector is 0 vdc, the output of the alarm phase detector is a positive d-c signal. The output of the alarm phase detector is routed to the carrier injection oscillator and sync alarm module Z801.

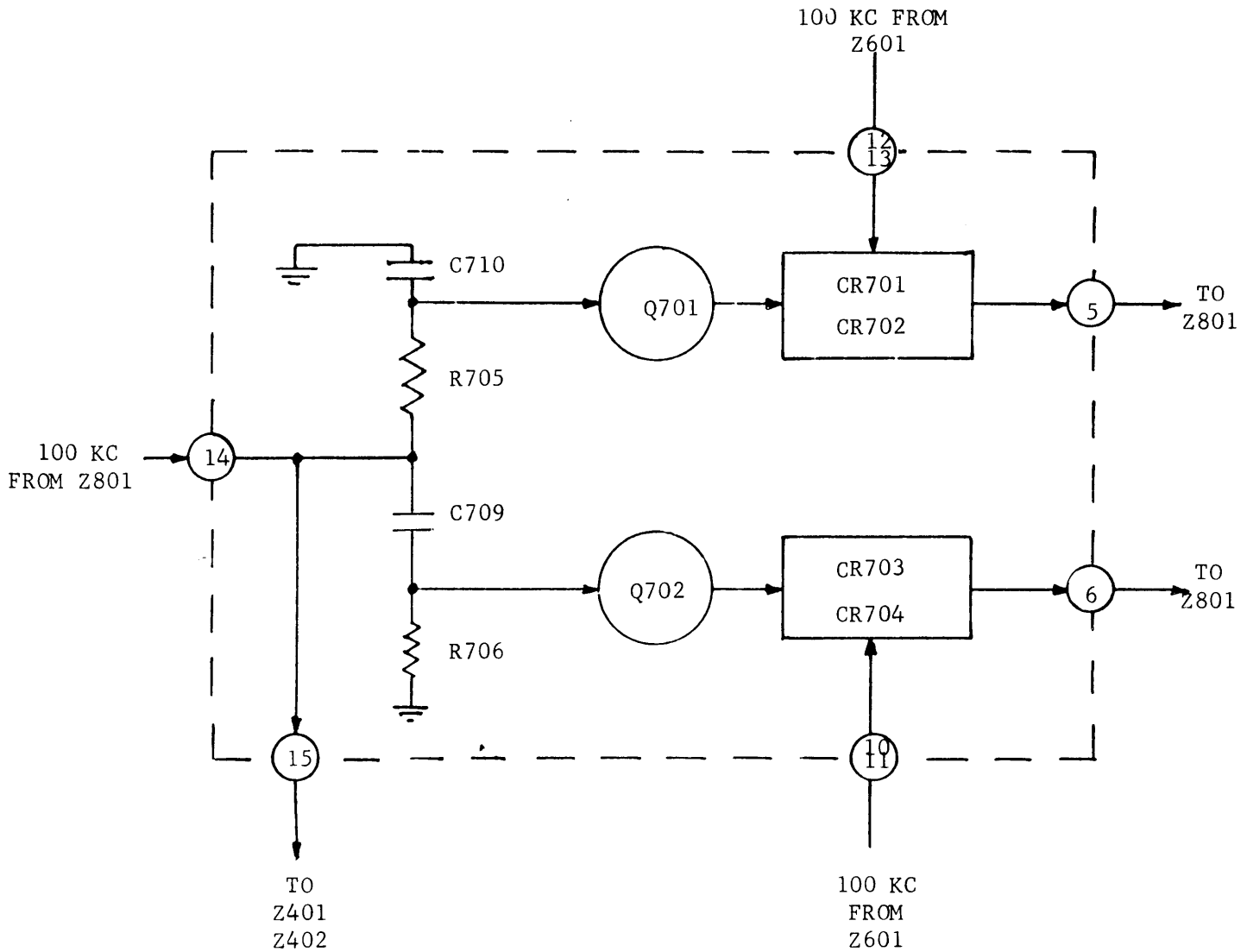


Figure 4-4. Phase Detector, Z701, Simplified Block Diagram

4-5. CARRIER OSCILLATOR AND SYNC ALARM (FIGURE 4-5)

Control loop d-c voltage from the phase detector (Z701) is applied through relay K802 to diode CR803. CR803 is a voltage variable capacitance diode which tunes oscillator Q801 to frequencies slightly higher or lower (+5 cps) than 100 kc. The output of Q801 is amplified by buffer Q802, and then routed to the phase detector (Z701) and the product detectors (Z401 and Z402).

A d-c signal from the alarm phase detector on Z701 is applied to the d-c amplifier chain Q803, Q804, and Q805. Relay K802 is energized when approximately +1 vdc or higher is applied to Q803. When K802 is energized, the control loop from the phase detector to CR803 and AFC switch S102 is completed, SYNC ALARM lamp DS103 is turned off, and +12 vdc is applied to terminal 11 of E101. When K802 is de-energized (less than +1 vdc applied to Q803), the control loop to CR803 and S102 is opened, DS103 is turned on, and terminal 11 of E101 is disconnected from the +12 v supply. Resistor R820 and capacitors C103 and C105 provide a long time constant for the portion of the control loop routed to the associated receiver.

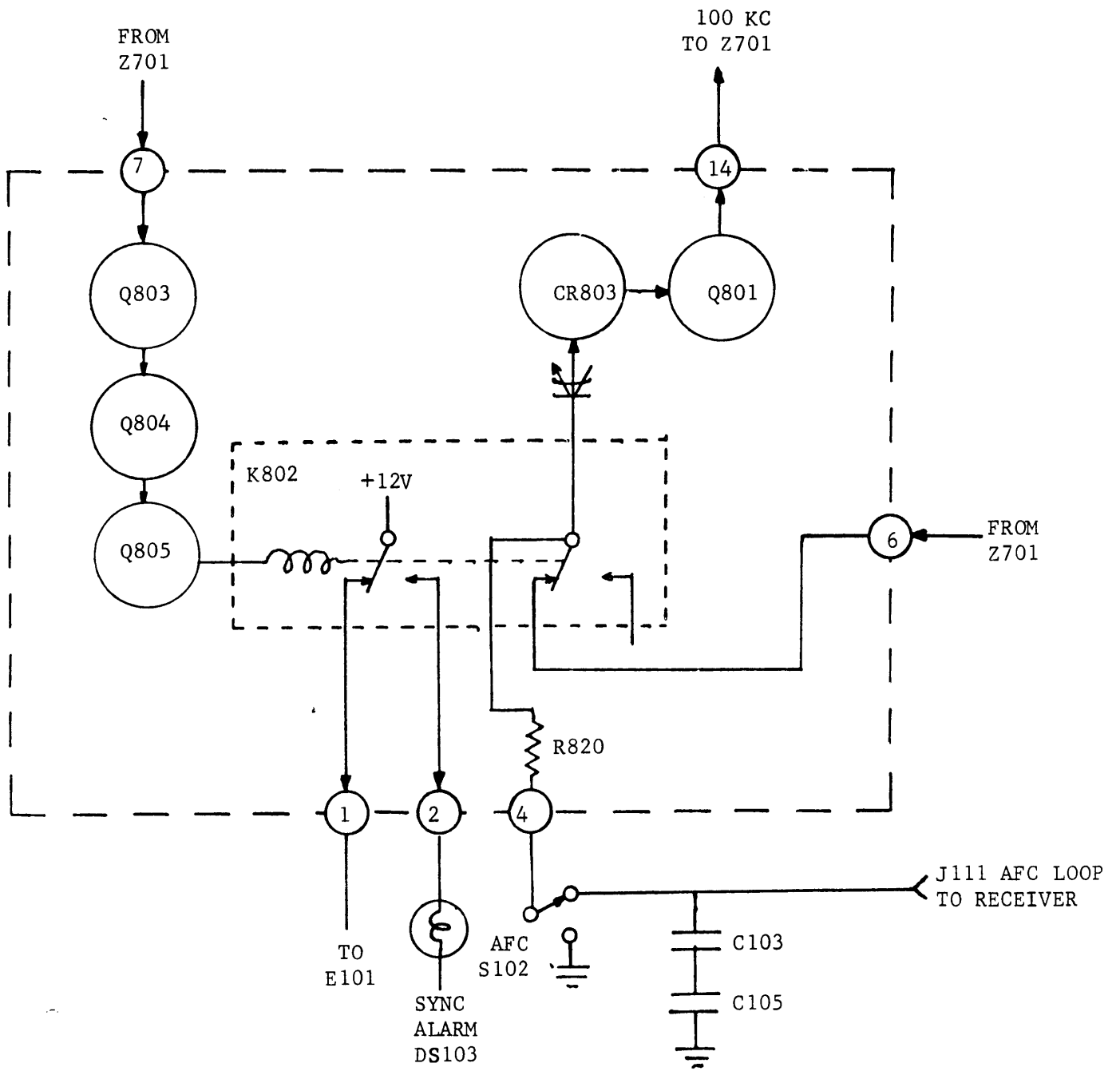


Figure 4-5. Crystal Oscillator, Z801, Simplified Block Diagram

4-6. LSB LINE AMPLIFIER (FIGURE 4-6).

The de-modulated lower sideband signal from product detector module Z401 is applied to distribution network R312 and R313. Part of the audio signal is routed from R312 to MONITOR potentiometer R106. Also, part of the signal is routed from R313 to LSB GAIN potentiometer R105. R312 and R313 may be adjusted to prevent signals of excessively high level from reaching the monitor amplifier and line amplifier. The signal from LSB GAIN potentiometer R105 is routed to amplifier Q301. The output of Q301 is transformer-coupled to push-pull amplifier Q302 and Q304. The output of the push-pull amplifier, nominally one milliwatt at 600 ohms, is made available at terminals 8 and 10 of E101. The center-tap of the output transformer is connected to terminal 9 of E101 (this point may be grounded to provide a balanced output configuration). The full wave rectifier, consisting of CR301 and CR302, is connected to the amplifier through isolating resistors R309 and R310. The output of the rectifier is routed to the LINE LEVEL meter through calibration resistor R311 and switch S103.

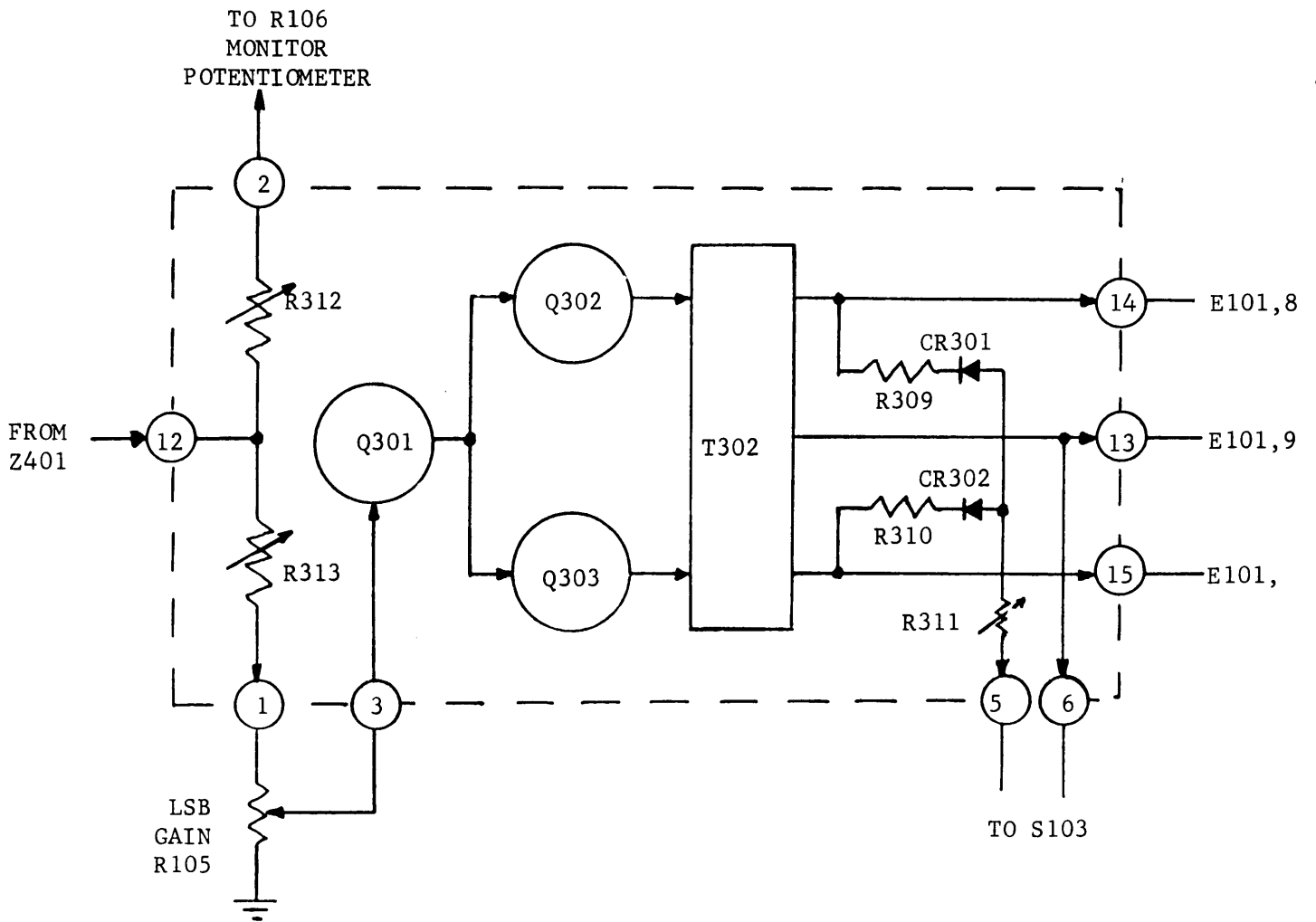


Figure 4-6. LSB Line Amplifier, Z301, Simplified Block Diagram

4-7. AUDIO FREQUENCY AMPLIFIER/POWER SUPPLY (FIGURE 4-7).

a. AF AMPLIFIER. - The audio signal from MONITOR potentiometer R106 is applied to amplifier Q201. The output of Q201 is amplified by phase inverter/push-pull amplifier Q202 and Q203, and is then routed to monitor power amplifier stage Q102 and Q103. The output of the monitor power amplifier (1/2 watt at 4 ohms) is routed to terminals 3 and 4 of E101; a portion of the output is also available at MONITOR jack J101.

b. POWER SUPPLY. - The power supply develops the +12 and -12 vdc necessary for the operation of the LFCA. 28 vac is routed from transformer T101 to the bridge rectifier, CR201, CR202, CR203, and CR204. The positive output (+12 vdc) of the rectifier is supplied to the remainder of the unit through diode CR205; the negative output (-12 vdc) is supplied to the unit through series regulator Q101. External battery power (24 vdc) may be supplied to the unit through connector J114; the negative output of this supply is also routed through series regulator Q101. CR205 isolates the bridge rectifier from the battery power supply and prevents relay K101 from being energized when the unit is powered by the battery power supply.

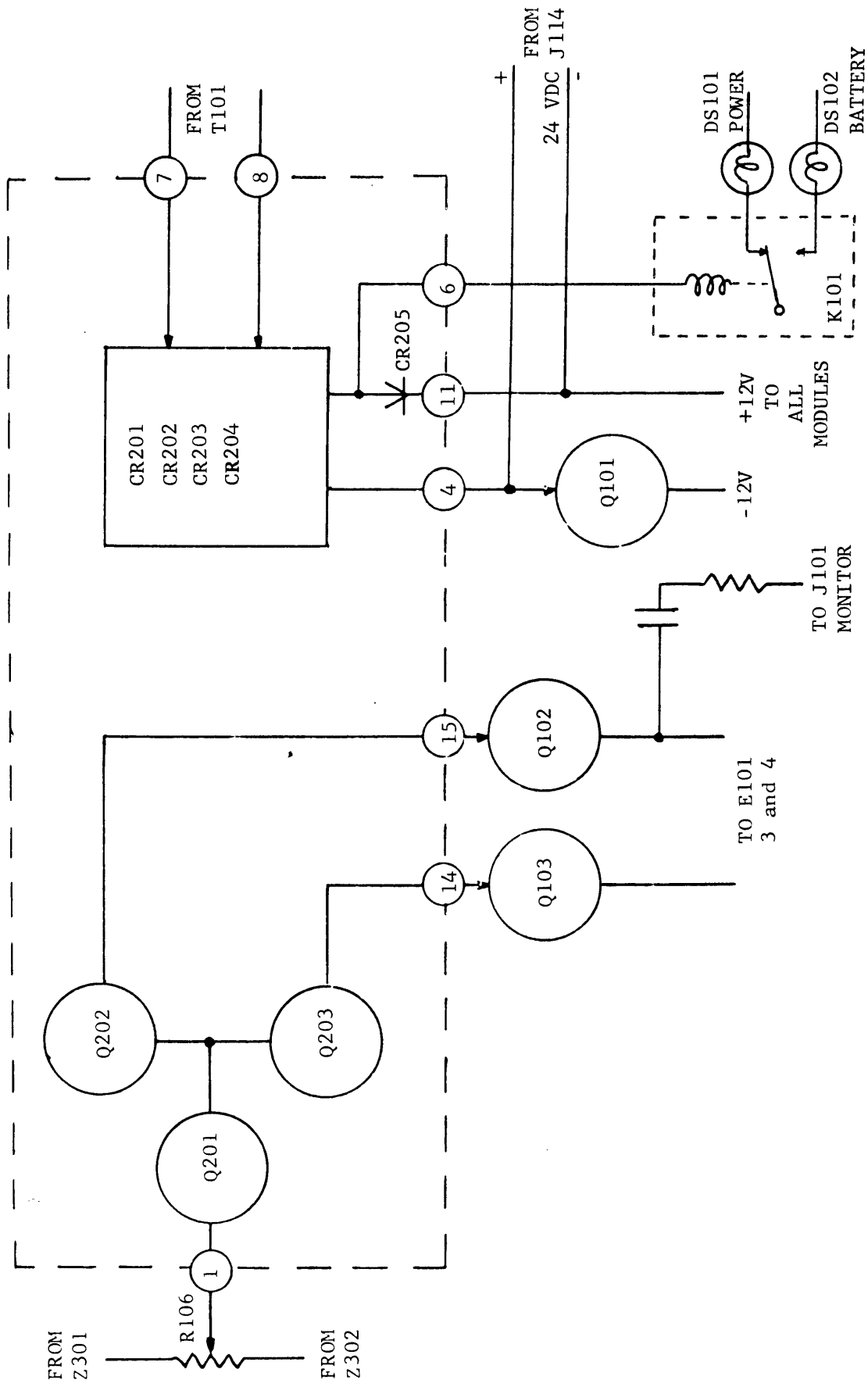


Figure 4-7. AF Amplifier/Power Supply. Z201. Simplified Block Diagram

SECTION 5
TROUBLESHOOTING

5-1. GENERAL.

This section provides troubleshooting procedures relating to the LFCA. It should be determined that associated units of the receiver system (receiver, 100 kc reference signal source, etc.) are operating properly and that interconnections are properly made before a lengthy troubleshooting procedure is performed. The technician should first familiarize himself with the principles of operation as outlined in Section 4 of this manual. Refer the schematic diagram (figure 7-1) for further aid.

NOTE

Remainder of this section
to be supplied.

SECTION 6

PARTS LIST

6-1. INTRODUCTION. - Reference designations have been assigned to identify all component parts of the equipment. They are used for marking the equipment (adjacent to the part they identify) and are included on drawings, diagrams and the parts list. The letters of a reference designation indicate the kind of part (generic group), such as resistor, capacitor, transistor, etc. The number differentiates between parts of the same generic group. Sockets associated with a particular plug-in device, such as a transistor or fuse, are identified by a reference designation which includes the reference designation of the plug-in device. For example, the socket for fuse F401 is designated XF401. The parts of each major group are grouped together.

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LFCA-1 Modular Breakdown	
Main Chassis Assembly	
AF Amplifier Module	
Line Amplifier Module	
Product Detector Module, Upper and Lower Sideband.	
Carrier Filter Module	
Phase Detector Module	
Crystal Oscillator Module	

LFCA-1 MODULAR BREAKDOWN

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
Z101	PRINTED CIRCUIT BOARD ASSEMBLY, MODULAR INTERCONNECT (REFER TO MAIN CHASSIS PARTS LIST)	
Z201	AF AMPLIFIER MODULE (SEE SEPARATE LIST FOR BREAKDOWN)	A3722
Z301	LINE AMPLIFIER MODULE (SEE SEPARATE LIST FOR BREAKDOWN)	A3720
Z302	SAME AS Z301 (SEE SEPARATE LIST FOR BREAKDOWN)	
Z401	PRODUCT DETECTOR MODULE (SEE SEPARATE LIST FOR BREAKDOWN)	A3718-1
Z402	PRODUCT DETECTOR MODULE (SEE SEPARATE LIST FOR BREAKDOWN)	A3718-2
Z601	CARRIER FILTER MODULE (SEE SEPARATE LIST FOR BREAKDOWN)	A3719
Z701	PHASE DETECTOR MODULE (SEE SEPARATE LIST FOR BREAKDOWN)	A3721
Z801	CRYSTAL OSCILLATOR MODULE (SEE SEPARATE LIST FOR BREAKDOWN)	A3723

PARTS LIST

LFCA-1 MAIN CHASSIS

C101	CAPACITOR, FIXED, ELECTROLYTIC: 200 uf, -10% +150% at 120 cps at 25°C; 15 WVDC; polarized, insulated tubular case.	CE105-200-15
C102	CAPACITOR, FIXED, CERAMIC, DIELECTRIC: 100,000 uuf, =8%, -20%; 100 WVDC.	CC100-28
C103	CAPACITOR, FIXED, ELECTROLYTIC: 50 uf, -10% +150% at 120 cps at 25°C; 15 WVDC; polarized, insulated tubular case.	CE105-50-15
C104	CAPACITOR, FIXED, ELECTROLYTIC: 1,700 uf, -10% +75%; 75 WVDC.	CE112-2N
C105	Same as C103.	
C106	NOT USED	
C107	Same as C101.	
CR101	SEMICONDUCTOR DEVICE, DIODE: silicon; nom. Zener voltage 24V; standard anode-to-stud polarity, negative-grounded application; tolerance $\pm 5\%$; junction and storage temperature rating -65°C to +175°C; power dissipation 10 watts DC; solder terminals; hermetically sealed metal and glass case.	VR101-24S51
CR102	SEMICONDUCTOR DEVICE, DIODE: silicon; 12 volts nom., $\pm 5\%$; 10 watts max. dissipation at 25°C; max. current rating 210 ma; max. impedance 3.0 ohms; storage temperature 175°C.	1N2976B
DS101	LAMP, INCANDESCENT: 28 volts; 0.04 amp; miniature bayonet base T-3-1/4 bulb.	BI101-1819
DS102	Same as DS101.	
DS103	Same as DS101.	
E101	TERMINAL BOARD, BARRIER: 14 terminals; 6-32 thd. x 1/4" lg. binder head screws; phenolic black bakelite.	TM100-14
F101	FUSE, CARTRIDGE: 1/2 amp; time lag; 1-1/4" long x 1/4" dia.; slow blow.	FU102-.5
F102	FUSE, CARTRIDGE: 1 amp; time lag; 1-1/4" long x 1/4" dia.; slow blow.	FU102-1
F103	Same as F101.	
J101	JACK, TELEPHONE: tip and sleeve; bushing mounted.	JJ034
J102	CONNECTOR, RECEPTACLE, ELECTRICAL: female; (part of symbol no. Z101)	JJ319-15STD
J103 thru J109	Same as J102. Part of symbol no. Z101.	
J110	CONNECTOR, RECEPTACLE, ELECTRICAL: RF type; 1 round male contact; straight type; series BNC to BNC.	UG625B/U
J111	Same as J110.	
J112	Same as J110.	

J113	CONNECTOR, RECEPTACLE, ELECTRICAL : 3 number 16 male contacts; straight type.	MS3102A14S1P
J114	CONNECTOR, RECEPTACLE, ELECTRICAL: 4 number 16 male contacts; straight type.	MS3102A14S2P
J115	Same as J102. Part of Test Card Assembly, A3996 and does not appear on schematic diagram CK799.	
K101	RELAY, ARMATURE: DPDT; 700 ohms, $\pm 10\%$ DC resistant; operating voltage 24 VDC; current rating 35 ma, 700 mw at 25°C; contacts rated for 5 amps at 29 VDC; clear high impact styrene dust cover case.	RL156-1
M101	METER, INDICATING: 25-0-25 ua movement; approximate resistance 2,000 ohms; black rectangular case.	MR180
M102	METER, AUDIO LEVEL:	MR186
Q101	TRANSISTOR: germanium; pnp; collector-base and emitter voltage 45 VDC at 300 ma, 30 VDC at 500 ma; emitter base voltage 25V; collector current 3 amps; power dissipation 62.5 watts at 25°C; junction temperature range -65 to +100°C.	2N2143
Q102	TRANSISTOR: germanium; PNP; JEDEC type 2N2143 transistor with a controlled hfe limit of 50-100; JEDEC type TO3 case.	
Q103	Same as Q102.	
R101	RESISTOR, FIXED, WIREWOUND: 50 ohms; perm. 5 pct; 5 watt. watts.	RW107-16
R102	RESISTOR, FIXED, COMPOSITION: 2,200 ohms, $\pm 10\%$; 1/2 watt.	RC20GF222K
R103	RESISTOR, FIXED, COMPOSITION: 1,000 ohms, $\pm 10\%$; 2 watts.	RC42GF102K
R104	RESISTOR, VARIABLE, COMPOSITION: 100 ohms, $\pm 10\%$; 2 watts; taper A.	RV4NAYS101A
R105	Same as R104.	
R106	RESISTOR, VARIABLE, COMPOSITION: 1,000 ohms, $\pm 10\%$; 2 watts .	RV110-1
S101	SWITCH, TOGGLE: DPST; rated at 6 amps; solder screw terminals.	ST22K
S102	SWITCH, PUSH BUTTON: rated at 250 ma, non-inductive, AC, 30 watts max. SPST break before make; red bottom.	SW296-1
S103	SWITCH, ROTARY: 1 section, 3 position, 30° angle of throw; contacts rated at 1 amp, 28 VDC or 5 amps, 110 VAC.	SW112
S104	SWITCH, TOGGLE: SPST; rated at 6 amps; solder screw terminals	ST12D
S105	Sam as S101	
T101	TRANSFORMER, POWER, ISOLATION, STEP-DOWN: primary input 105, 115, 125 or 210, 230, 250 V; frequency 50/60 cps, phase 1; secondary 28V, rated at 500 ma; 2-13/16" lg. x 2-11/16" wid x 2-3/8" high; hermetically sealed steel cas .	TF269

T102	TRANSFORMER, AUDIO OUT: primary- 500 ohms, center tapped; secondary- 4 ohms; max. audio operating level 1 watt; frequency range 50 - 10,000 cps; solder stud terminals; fully enclosed steel case.	TF272
XDS101	LIGHT, INDICATOR: with green frosted lens; for miniature bayonet base T-3-1/4 bulb.	TS106-3
XDS102	LIGHT, INDICATOR: with red frosted lens; for miniature bayonet base T-3-1/4 bulb.	TS106-1
XDS103	Same as XDS102.	
XF101	FUSEHOLDER: extractor post type; accomodates cartridge fuse 1/4" dia. x 1-1/4" long; rated at 15 amps 250 V max.; o/a length 1-3/4"; bushing mounted.	FH103
XF102	Same as XF101.	
XF103	Same as XF101.	
XK101	SOCKET, RELAY: with retainer; 6 contacts, solder type terminals; black pheriolic socket.	TS171-1
XQ101	SOCKET, SEMICONDUCTOR DEVICE: 2 pin contact accommodation; 0.040" or 0.050" dia.; polarized; 1 terminal lug grounding strap; o/a dimensions 1-37/64" x 1" max.	TS166-1
XQ102	Same as XQ101.	
XQ103	Same as XQ101.	
Z101	PRINTED CIRCUIT BOARD ASSEMBLY: module interconnect. Consists of eight connectors, symbol nos. J102, J103, J104, J105, J106, J107, J108, J109.	A3735

PARTS LIST

AF AMPLIFIER MODULE

LFCA-1

C201	CAPACITOR, FIXED, ELECTROLYTIC: 10 uf, -10% +150% at 120 cps at 25°C; CE105-10-25 WVDC; polarized; insulated tubular case.	
C202	Same as C201.	
C203	CAPACITOR, FIXED, ELECTROLYTIC: 50 uf, -10% +150% at 120 cps at 25°C; CE105-50-25 25 WVDC; polarized; insulated tubular case.	
C204	Same as C201.	
C205	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 2,200 uuf, GMV: 500 WVDC.	CC100-11
CR201	SEMICONDUCTOR DEVICE, DIODE: silicon; 600 volts, max. continuous DC current .50 amp at 100 C; surge current peak 75 amps; max. operating temp. 150 C; max. forward voltage drop 1.0 V; max. reverse current 1000 ua.	1N2484
CR202 thru CR205	Same as CR201.	
Q201	TRANSISTOR, SPECIAL SELECTED BETA: beta range 85 to 105.	TX101-1
Q202	TRANSISTOR: germanium; PNP; JEDEC type 2N1370-7 transistor with a hfe limit of 120-150. JEDEC type T05 case.	
Q203	Same as Q202.	
R201	RESISTOR, FIXED, COMPOSITION: 1,000 ohms, $\pm 10\%$; 2 watts.	RC42GF102K
R202	RESISTOR, FIXED, COMPOSITION: 470 ohms, $\pm 10\%$; 1 watt.	RC32GF471K
R203	RESISTOR, FIXED, COMPOSITION: 3,300 ohms, $\pm 10\%$; 1/2 watt.	RC20GF332K
R204	Same as R203.	
R205	Same as R203.	
R206	RESISTOR, FIXED, COMPOSITION: 3,900 ohms, $\pm 10\%$; 1/2 watt.	RC20GF392K
R207	RESISTOR, FIXED, COMPOSITION: 8,200 ohms, $\pm 10\%$; 1/2 watt.	RC20GF822K
R208	RESISTOR, FIXED, COMPOSITION: 100 ohms, $\pm 10\%$; 1/2 watt.	RC20GF101K
R209	RESISTOR, FIXED, COMPOSITION: 15 ohms, $\pm 10\%$; 1/2 watt.	RC20GF150K
R210	Same as R209.	
R211	RESISTOR, FIXED, COMPOSITION: 10 ohms, $\pm 10\%$; 1/2 watt.	RC20GF100K
R212	RESISTOR, FIXED, COMPOSITION: 1,200 ohms, $\pm 10\%$; 1/2 watt.	RC20GF122K
R213	Same as R208.	
R214	Same as R208	
R215	Same as R212	
R216	RESISTOR, FIXED, COMPOSITION: 820 ohms, $\pm 10\%$; 1/2 watt.	RC20GF821K

T201	TRANSFORMER, AUDIO FREQUENCY: line output; primary impedance 5K ohms, center tap; secondary 600 ohms, center tap; power rated at 10 MW; frequency range 50-10,000 cps; wire lead type terminals; encapsulated case.	TF271
TP201	TERMINAL STUD: 1/16" board mounting; brass.	TE127-2
TP202 thru TP206	Same as TP201.	

PARTS LIST

LINE AMPLIFIER MODULE

LFCA-1

C301	CAPACITOR, FIXED, ELECTROLYTIC: 50 uf, -10% +150% at 120 cps at 25°C; CE105-50-25 25 WVDC; polarized; insulated tubular case.	
C302	Same as C301.	
C303	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 10,000 uuf, GMV; 500 WVDC.	CC100-16
C304	CAPACITOR, FIXED, ELECTROLYTIC: 200 uf, -10% +150% at 120 cps at 25°C; 15 WVDC; polarized; insulated tubular case.	CE105-200-15
CR301	SEMICONDUCTOR DEVICE, DIODE: germanium; max. peak inverse voltage 60 V; continuous average forward current 50 ma; max. peak forward current 150 ma; max. surge current 500 ma; max. inverse current 500 ua at 50 volts or 30 ua at 10 volts.	1N34A
CR302	Same as CR301.	
Q301	TRANSISTOR, SPECIAL, SELECTED BETA: beta range 85 to 105.	TX101-1
Q302	Same as Q301.	
Q303	Same as Q301.	
R301	RESISTOR, FIXED, COMPOSITION: 1,000 ohms, ±10%; 1/2 watt.	RC209F102K
R302	RESISTOR, FIXED, COMPOSITION: 5,600 ohms, ±10%; 1/2 watt.	RC209F562K
R303	RESISTOR, FIXED, COMPOSITION: 68 ohms, ±10%; 1/2 watt.	RC209F680K
R304	RESISTOR, FIXED, COMPOSITION: 2,700 ohms, ±10%; 1/2 watt.	RC209F272K
R305	RESISTOR, FIXED, COMPOSITION: 1,500 ohms, ±10%; 1/2 watt.	RC209F152K
R306	Same as R305.	
R307	RESISTOR, FIXED, COMPOSITION: 3,300 ohms, ±10%; 1/2 watt.	RC209F332K
R308	Same as R307.	
R309	RESISTOR, FIXED, COMPOSITION: 2,200 ohms, ±10%; 1/2 watt.	RC209F222K
R310	Same as R309.	
R311	RESISTOR, VARIABLE, COMPOSITION: 10,000 ohms, ±10%; nom. power rating 0.25 watt at 70°C; linear taper.	RV111U103A
R312	RESISTOR, VARIABLE, COMPOSITION: 5,000 ohms, ±10%; nom. power rating 0.25 watt at 70°C; linear taper.	RV111U502A
R313	Same as R312.	
T301	TRANSFORMER, AF: interstage; primary impedance 10K ohms, center tap; secondary 1.5K ohms, center tap; power rated at 100 MW; frequency range 50 - 10,000 cps; wire lead type terminals; encapsulated case.	TF270
T302	Same as T301.	
TP301	TERMINAL STUD: 1/16" board mounting; brass	TE127-2
TP302 thru TP307	Same as TP301.	

PART'S LIST

PRODUCT DETECTOR MODULE, LOWER SIDEBAND A3718-1 (Z401)

" " " , UPPER " A3718-2 (Z402)

LFCA-1

C401	CAPACITOR, FIXED, ELECTROLYTIC: 2 uf, -10% +150% at 120 cps at 25°C; 50 WVDC; polarized; insulated tubular case	CE105-2-50
C402	Same as C401	
C403	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 100,000 uuf, + 80% -20%; 100 WVDC.	CC100-28
C404	Same as C403.	
C405	Same as C403.	
C406	Same as C403.	
C407	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 1,000 uuf, ±10%; 500 WVDC.	CC100-9
C408	Same as C403.	
C409	Same as C403.	
C410	Same as C403.	
C411	CAPACITOR, FIXED, MICA DIELECTRIC: 10,000 uuf, ±5%; 100 WVDC; straight wire leads.	CM112F103J1S
C412	Same as C411.	
CR401	SEMICONDUCTOR DEVICE, DIODE: germanium; max. peak inverse voltage 60 V; continuous average forward current 50 ma; max. peak forward current 150 ma; max. surge current 500 ma; max. inverse current 500 ua at 50 volts or 30 ua at 10 volts.	1N34A
CR402	Same as CR401.	
CR403	Same as CR401.	
CR404	Same as CR401.	
FL401-1	FILTER, BYPASS: 4 KC BW (Used on A3718-1 for LSB module, symbol no. Z401)	FX200
FL401-2	FILTER, BYPASS: 4 KC BW (Used on A3718-2 for USB module, symbol no. Z402)	FX199
Q401	TRANSISTOR: NPN diffused silicon; collector to base voltage 25 volts; collector to emitter voltage 20 volts; emitter to base voltage 3 volts; collector current 200 ma; power dissipation 1 watt at 25°C; junction temperature -65°C to +175°C; metal case.	2N706
Q402	Same as Q401.	
Q403	Same as Q401.	
R401	RESISTOR, FIXED, COMPOSITION: 330 ohms, ±10%; 1/2 watt.	RC20GF331K
R402	Same as R401.	
R403	Same as R401.	
R404	RESISTOR, FIXED, COMPOSITION: 10 ohms, ±10%; 1/2 watt	RC20GF100K
R405	Same as R404.	
R406	RESISTOR, FIXED, COMPOSITION: 680 ohms, ±10%; 1/2 watt	RC20GF681K

R407	Same as R406	
R408	Same as R406	
R409	RESISTOR, FIXED, COMPOSITION: 6,800 ohms, $\pm 10\%$; 1/2 watt.	RC20GF682K
R410	Same as R409.	
R411	RESISTOR, VARIABLE, COMPOSITION: 10,000 ohms, $\pm 10\%$; nom. power rating 0.25 watt at 70°C; linear taper.	RV111U103A
R412	RESISTOR, FIXED, COMPOSITION: 10,000 ohms, $\pm 10\%$; 1/2 watt.	RC20GF103K
R413	RESISTOR, FIXED, COMPOSITION: 150 ohms, $\pm 10\%$; 1/2 watt.	RC20GF151K
R414	RESISTOR, FIXED, COMPOSITION: 15,000 ohms, $\pm 10\%$; 1/2 watt.	RC20GF153K
R415	Same as R414.	
R416	RESISTOR, FIXED, COMPOSITION: 1,500 ohms, $\pm 10\%$; 1/2 watt.	RC20GF152K
T401	TRANSFORMER, RADIO FREQUENCY: 100 KC	TT227
T402	TRANSFORMER, RADIO FREQUENCY: 100 KC	TT221
TP401	TERMINAL STUD: 1/16" board mounting; brass.	TE127-2
TP402 thru TP408	Same as TP401.	

PARTS LIST

CARRIER FILTER MODULE

LFCA-1

C601	CAPACITOR, FIXED, ELECTROLYTIC: 2 uf, -10% +150% at 120 cps at 25°C; 50 WVDC; polarized; insulated tubular case.	CE105-2-50
C602 thru C609	Same as C601.	
C610	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 100,000 uuf, +80% -20%; 100 WVDC.	CC100-28
C611	Same as C610.	
C612	Same as C610.	
C613	CAPACITOR, FIXED, MICA DIELECTRIC: 10,000 uuf, ±5%; 100 WVDC; straight wire leads.	CML12F1034LE
C614	Same as C613.	
C615	Same as C613.	
C616	Same as C613.	
C617	Same as C601.	
Q601	TRANSISTOR: PNP germanium drift field; collector to base and collector to emitter voltage 40 volts; emitter to base voltage 0.5 volt; collector and emitter current 10 ma; power dissipation 240 mw at 25°C; storage temperature -65°C to +100°C; hermetically sealed metal case.	2N3914
Q602 thru Q605	Same as Q601.	
R601	RESISTOR, FIXED, COMPOSITION: 100 ohms, ±10%; 1/2 watt.	RC20GF101K
R602	Same as R601.	
R603	RESISTOR, FIXED, COMPOSITION: 3,300 ohms, ±10%; 1/2 watt.	RC20GF332K
R604	Same as R601.	
R605	Same as R601.	
R606	RESISTOR, FIXED, COMPOSITION: 6,800 ohms, ±10%; 1/2 watt.	RC20GF682K
R607	Same as R606.	
R608	Same as R603.	
R609	Same as R606.	
R610	RESISTOR, FIXED, COMPOSITION: 150 ohms, ±10%; 1/2 watt.	RC20GF151K
R611	RESISTOR, FIXED, COMPOSITION: 680 ohms, ±10%; 1/2 watt.	RC20GF681K
R612	Same as R611.	
R613	Same as R611.	
R614	Same as R611.	
R615	RESISTOR, FIXED, COMPOSITION: 47 ohms, ±10%; 1/2 watt.	RC20GF470K
R616	Same as R615.	

R617	Same as R615	
R618	Same as R615.	
R619	Same as R615.	
R620	Same as R615.	
R621	RESISTOR, FIXED, COMPOSITION: 390 ohms, $\pm 10\%$; 1/2 watt.	RC20GF391K
R622	Same as R615.	
R623	Same as R606.	
T601	TRANSFORMER, RADIO FREQUENCY: 100 KC	TT222
T602	TRANSFORMER, RADIO FREQUENCY: 100 KC	TT224
T603	Same as T601.	
T604	TRANSFORMER, RADIO FREQUENCY: 100 KC	TT225
TP601	TERMINAL STUD: 1/16" board mounting; brass.	TE127-2
TP602 thru TP609	Same as TP601.	
XY601	SOCKET, CRYSTAL: clip type; 2 cadmium plated contacts; 3/64" x 5/32" tail slots.	TS167-1
Y601	CRYSTAL UNIT, QUARTZ:	CR115

PARTS LIST

PHASE DETECTOR MODULE:

LFCA-1

C701	CAPACITOR, FIXED, ELECTROLYTIC: 2 uf, -10% +150% at 120 cps at 25°C; 50 WVDC; polarized; insulated tubular case.	CE105-2-50
C702	Same as C701.	
C703	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 100,000 uuf, +80% -20%; 100 WVDC.	CC100-28
C704	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 2,200,000 uuf, +100% -0%; 3 WVDC.	CC100-39
C705	Same as C704.	
C706	Same as C703.	
C707	Same as C703.	
C708	Same as C703.	
C709	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 20,000 uuf, +60% -40%; 150 WVDC.	CC100-35
C710	Same as C709.	
C711	CAPACITOR, FIXED, MICA DIELECTRIC: 10,000 uuf, ±5%; 100 WVDC; straight wire leads.	CML12F103 - J18
C712	Same as C711.	
CR701	SEMICONDUCTOR DEVICE, DIODE: germanium; max. peak inverse voltage 60 V; continuous average forward current 50 ma; max. peak forward current 150 ma; max. surge current 500 ma; max. inverse current 500 ua at 50 volts or 30 ua at 10 volts.	1N34A
CR702	Same as CR701.	
Q701	TRANSISTOR: PNP germanium unit cells; collector to base and collector to emitter voltage 40 volts; emitter to base voltage 0.5 volt; collector and emitter current 10 ma; power dissipation 240 mw at 25°C; storage temperature -55°C to +125°C; hermetically sealed metal case	2N384
Q702	Same as Q701.	
R701	RESISTOR, FIXED, COMPOSITION: 100 ohms, ±10%; 1/2 watt.	RC20GF101K
R702	Same as R701.	
R703	Same as R701.	
R704	Same as R701.	
R705	RESISTOR, FIXED, COMPOSITION: 150 ohms, ±10%; 1/2 watt.	RC20GF151K
R706	Same as R705.	
R707	RESISTOR, FIXED, COMPOSITION: 47 ohms, ±10%; 1/2 watt.	RC20GF470K
R708	RESISTOR, FIXED, COMPOSITION: 680 ohms, ±10%; 1/2 watt.	RC20GF681K
R709	Same as R708	
R710	RESISTOR, FIXED, COMPOSITION: 6,800 ohms, ±10%; 1/2 watt.	RC20GF682K
R711	Same as R710.	

R712	RESISTOR, FIXED, COMPOSITION: 100,000 ohms, $\pm 10\%$; 1/2 watt	RC20GF104K
R713	RESISTOR, VARIABLE, COMPOSITION: 10,000 ohms, $\pm 10\%$; nom. power rating 0.25 watt at 70°C; linear taper.	RV111UJ03A
R714	Same as R713.	
T701	TRANSFORMER, RADIO FREQUENCY: 100 KC	TT226
T702	Same as T701.	
TP701	TERMINAL STRIP: 1/16" board mounting; brass.	TE127-2
TP702 thru TF708	Same as TP701.	

PARTS LIST

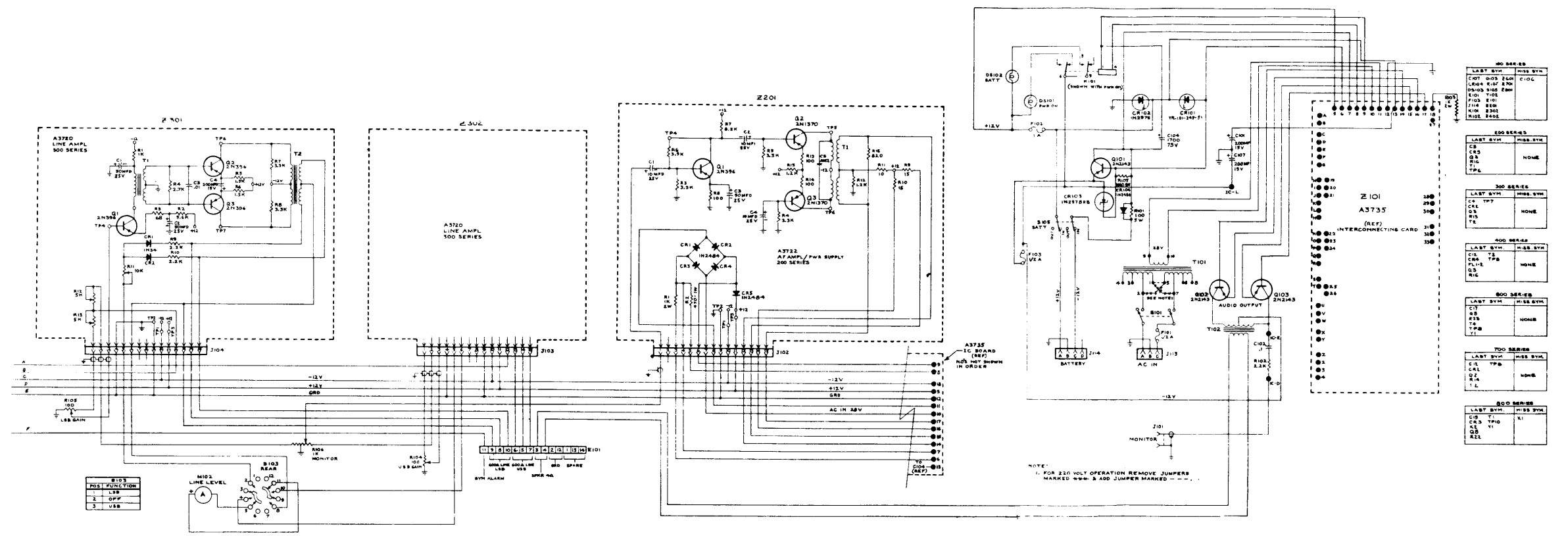
CRYSTAL OSCILLATOR MODULE

LFCA-1

C801	CAPACITOR, FIXED, ELECTROLYTIC: 2 uf, -10% +150% at 120 cps at 25°C; 50 WVDC; polarised; insulated tubular case.	CE105-2-50
C802 thru C806	Same as C801.	
C807	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 100,000 uuf, +80% -20%; 100 WVDC.	CC100-28
C808	Same as C807.	
C809	Same as C807.	
C810	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 1,000,000 uuf, +80% -20%; 3 WVDC.	CC100-34
C811	CAPACITOR, FIXED, MICA DIELECTRIC: 5,100 uuf, ±5%; 300 WVDC; straight wire leads.	CML12F512J3S
C812	CAPACITOR, FIXED, MICA DIELECTRIC: 1,500 uuf, ±5%; 300 WVDC; straight wire leads.	CML12F152J3S
C813	CAPACITOR, FIXED, MICA DIELECTRIC: 330 uuf, ±5%; 500 WVDC; straight wire leads.	CML11F331J5S
C814	CAPACITOR, FIXED, MICA DIELECTRIC: 10,000 uuf, ±5%; 100 WVDC; straight wire leads.	CML12F103J1S
C815	CAPACITOR, VARIABLE, CERAMIC DIELECTRIC: 1.5-7 uuf; operating temperature range -55°C to +85°C; 350 WVDC.	CV109-1
CR801	SEMICONDUCTOR DEVICE, DIODE: silicon junction; average forward current 20 ma; max. power dissipation 200 mw at 25°C; reverse working voltage 100 volts; hermetically sealed glass case.	1N627
CR802	SEMICONDUCTOR DEVICE, DIODE: germanium; max. peak inverse voltage 60 V; continuous average forward current 50 ma; max. peak forward current 150 ma; max. surge current 500 ma; max. inverse current 500 ua at 50 volts or 30 ua at 10 volts.	1N34A
CR803	CAPACITOR, VOLTAGE VARIABLE: silicon; 14-70 uuf range; hermetically sealed glass to metal; 65 WVDC.	CX106-11
K801	NOT USED	
K802	RELAY, ARMATURE: miniature;	RL143-5
Q801	TRANSISTOR: PNP germanium drift field; collector to base and collector to emitter voltage 40 volts; emitter to base voltage 0.5 volt; collector and emitter current 10 ma; power dissipation 240 mw at 25°C; storage temperature -55°C to +100°C; hermetically sealed metal case.	2N384
Q802	Same as Q801.	
Q803	TRANSISTOR, SPECIAL SELECTED BETA: beta range 85 to 105.	TX101-1
Q804	Same as Q801	
Q805	TRANSISTOR: NPN; silicon mesa; collector to base voltage 60 V; collector to emitter voltage 40 V; emitter to base voltage 5 V; collector current 175 ma; power dissipation 2 watts at 25°C; junction temperature 175°C; hermetically sealed metal case.	2N697

R801	RESISTOR, FIXED, COMPOSITION: 100 ohms, $\pm 10\%$; 1/2 watt	RC20GF101K
R802	Same as R801	
R803	Same as R801.	
R804	RESISTOR, FIXED, COMPOSITION: 6,800 ohms, $\pm 10\%$; 1/2 watt.	RC20GF682K
R805	Same as R804.	
R806	Same as R804.	
R807	Same as R804.	
R808	RESISTOR, FIXED, COMPOSITION: 24 megohms, $\pm 10\%$; 1/2 watt.	RC20GF246K
R809	RESISTOR, FIXED, COMPOSITION: 33,000 ohms, $\pm 10\%$; 1/2 watt.	RC20GF333K
R810	RESISTOR, FIXED, COMPOSITION: 4,700 ohms, $\pm 10\%$; 1/2 watt.	RC20GF472K
R811	RESISTOR, FIXED, COMPOSITION: 680 ohms, $\pm 10\%$; 1/2 watt.	RC20GF681K
R812	RESISTOR, FIXED, COMPOSITION: 10,000 ohms, $\pm 10\%$; 1/2 watt.	RC20GF103K
R813	RESISTOR, VARIABLE, COMPOSITION: 10,000 ohms, $\pm 10\%$; nom. power rating 0.25 watt at 70°C; linear taper.	RV111U103A
R814	RESISTOR, FIXED, COMPOSITION: 2,200 ohms, $\pm 10\%$; 1/2 watt.	RC20GF222K
R815	Same as R814.	
R816	RESISTOR, FIXED, COMPOSITION: 15,000 ohms, $\pm 10\%$; 1/2 watt.	RC20GF153K
R817	Same as R816.	
R818	RESISTOR, VARIABLE, COMPOSITION: 5,000 ohms, $\pm 10\%$; nom. power rating 0.25 watt at 70°C; linear taper.	RV111U502A
R819	RESISTOR, FIXED, COMPOSITION: 3,300 ohms, $\pm 10\%$; 1/2 watt.	RC20GF332K
R820	RESISTOR, FIXED, COMPOSITION: 820,000 ohms, $\pm 10\%$; 1/2 watt.	RC20GF824K
R821	Same as R812.	
R822	RESISTOR, FIXED, COMPOSITION: 1,500 ohms, $\pm 10\%$; 1/2 watt.	RC20GF152K
T801	TRANSFORMER, RADIO FREQUENCY: 100 KC	TT223
TP801	TERMINAL STUD: 1/16" board mounting; brass.	TEL27-2
TP802 thru TP810	Same as TP801.	
XY801	SOCKET, CRYSTAL: clip type; 2 cadmium plated contacts; 3/64" x 5/32" tail slots.	TS167-1
Z801	CRYSTAL UNIT, QUARTZ:	CR114

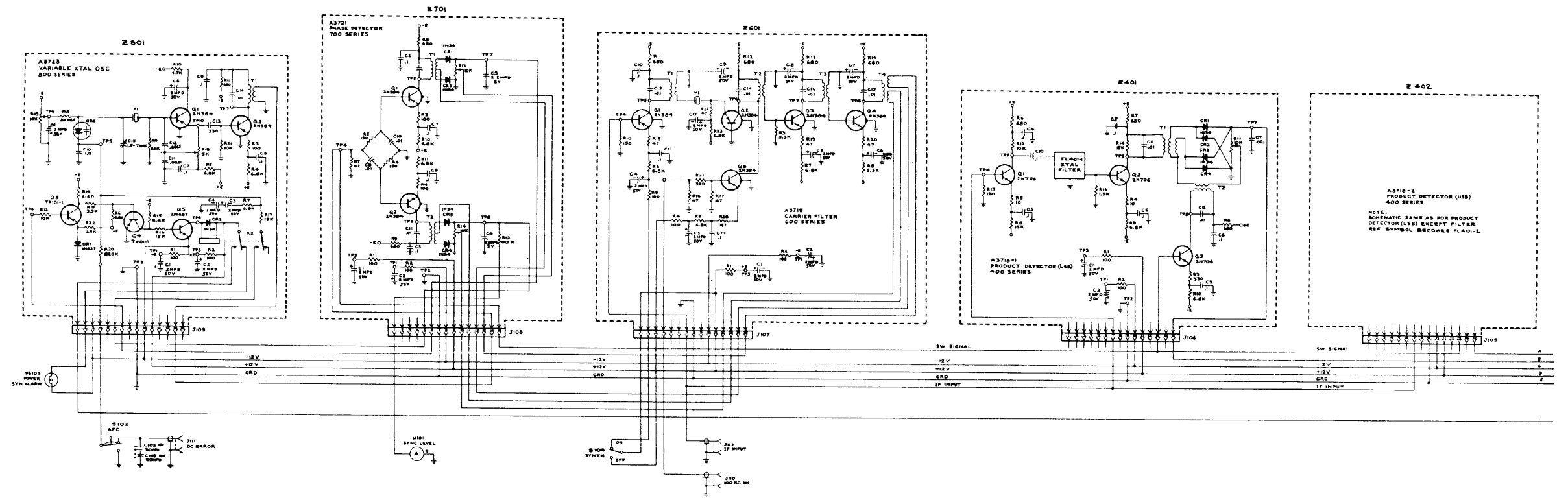
SECTION 7
SCHEMATIC DIAGRAMS



CK-799C

Figure 7-1. LFCA, Schematic Diagram (Sheet 1 of 2)

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CK-799C

Figure 7-1. LFCA, Schematic Diagram
(sheet 2 of 2)
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