A6 CHANNEL BANK
J68929( ) BAYS AND J98626( ) FRAMES
GENERAL MAINTENANCE CONSIDERATIONS
COMMON EQUIPMENT
ANALOG MULTIPLEX TERMINAL EQUIPMENT

CONTENTS PAGE

1. GENERAL

1.01 This section covers methods and equipment for testing and adjusting the A6 channel bank and the associated A6 carrier supply. The J68929A A6 channel bank bay is illustrated in Fig. 1.

1.02 This section is reissued to:

(a) Change the title

(b) Reduce some test levels by 10 dB

(c) Include reference to some J68954( ) plug-in units

(d) Include reference to the J98626AE carrier distribution panel

(e) Include reference to LMX-3 test jacks

(f) Include reference to a new crosstalk test

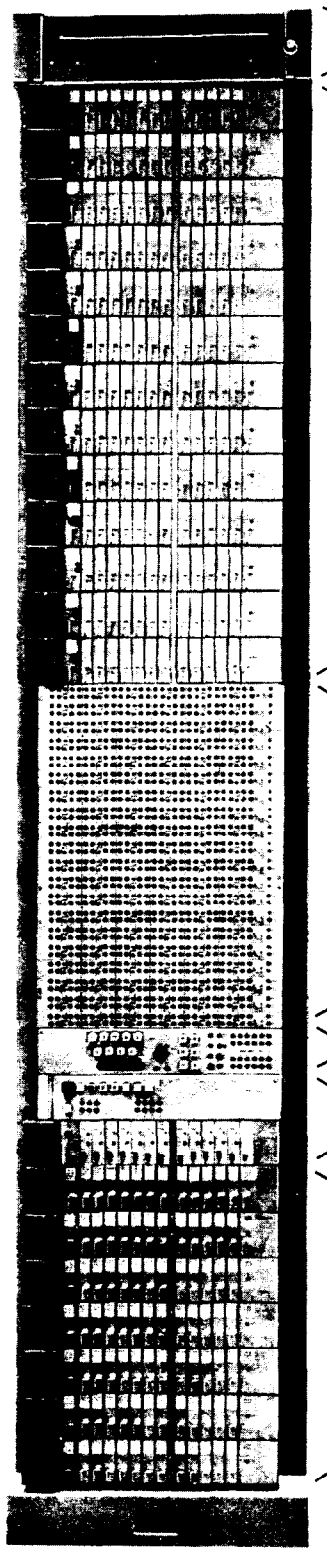
(g) Include an illustration on channel filter characteristics

(h) Include a caution to be observed when testing the A6 auxiliary carrier supply.

Arrows are used to indicate significant changes.

1.03 The maintenance and operation sections covered by this section are as follows:

356-016-300	J68929( ) Bays—Equipping and Fusing the Bay
356-016-301	J68929( ) Bays—Voice-Frequency Operations
356-016-302	J98626( ) Frames—Operation
356-016-303	J98626( ) Frames—Equipping and Fusing the Frames
356-016-501	Carrier Supply—Initial Tests
356-016-502	J68929( ) Bays—Channel Bank Tests and Adjustments
356-016-503	Carrier Supply—In-Service Tests
356-016-504	Carrier Supply—Trouble Correction Procedures.
356-016-505	J98626( ) Frames—Channel Bank Tests and Adjustments
356-016-506	Carrier Failure Alarm—Carrier Supply—Tests and Trouble Correction



FIRST AND SECOND BAYS:
J68929( ) FILTER AND FUSE PANEL

FIRST AND SECOND BAYS:
J68929AA A6 CHANNEL BANK
SHELF ASSEMBLY (13 UNITS)

FIRST AND SECOND BAYS:
ED-51441-30 VF JACK MOUNTING ASSEMBLY

FIRST OR SECOND BAY:
J68929AD VF TEST, MONITOR, AND TALK PANEL

FIRST BAY: J68929AE, L1 AND L2
CHANNEL CARRIER DISTRIBUTION PANEL
AND
J68929AB CHANNEL CARRIER SUPPLY SHELF

SECOND BAY: J68929AE, L1 AND L3
CHANNEL CARRIER DISTRIBUTION PANEL

FIRST AND SECOND BAYS:
J68929AA A6 CHANNEL BANK
SHELF ASSEMBLY (7 UNITS)

NOTE:
IF EQUIPPED FOR CFA, CHANNEL BANK NO. 7 IN THE FIRST BAY IS REPLACED BY THE J68929BA CFA CARRIER SUPPLY SHELF. THE J68929BB CFA CARRIER DISTRIBUTION SHELF WILL BE MOUNTED IN THE SECOND BAY.

Fig. 1—J68929A A6 Channel Bank Bay

1.04 The A6 channel bank (Fig. 2) consists of the following plug-in units mounted on a J68929AA shelf-type framework:

12—J68929AF ▶(MD) or AR (MD) or J68954BG (std)◀ channel modem units

1—J68929AG ▶(MD) or AU (MD) or J68954BH (std)◀ channel bank modem unit

1—J68929AH ▶(A&M) or AW (std)◀ -12 volt regulator unit

1—J68929BC ▶(MD) or J68954BJ (std) carrier failure alarm◀ (CFA) unit (optional)

or

1—J68929AS GDF interface unit (optional)

1.05 The A6 channel bank translates 12 outgoing 200- to 3400-Hz VF channels into one 60- to 108-kHz basic group in its transmitting section and translates the corresponding incoming basic group into 12 VF channels in its receiving section. Thus, the A6 channel bank functions as an interface between 12 VF circuits and one group circuit.

1.06 The A6 regular carrier supply and associated distribution equipment (Fig. 3) consists of the following items:

12—J68929AJ channel carrier amplifier units

1—J68929AK channel bank carrier amplifier unit

1—J68929AL carrier supply generator unit

1—J68929AM carrier supply -12 volt regulator unit

1—J68929AN A6 transfer, logic, and channel bank carrier alarm unit

1—J68929AE (L1 and L2) carrier distribution panel ▶(for J68929 bays and J98626 frames)◀

1—J68929AE (L1 and L3) carrier distribution panel ▶(for J68929 bays and J98626A and B frames)◀

1—▶J98626AE (L1 and L2, L1 and L3, L1 and L4, L1 and L5) carrier distribution panel (for J98626 frames, except A and B)◀

Note: The first four items above are plug-in mounted on a J68929AB shelf-type framework; the J68929AN transfer, logic, and channel bank carrier alarm unit is located in the J68929AE (L1 and L2) distribution panel.

1.07 The A6 carrier supply generates and the distribution panels distribute at the proper level, the 12 individual channel carrier frequencies (8.140, 8.144, 8.148, . . . and 8.184 MHz) and the one channel bank carrier frequency (8.248 MHz) required for operation of the A6 channel bank.

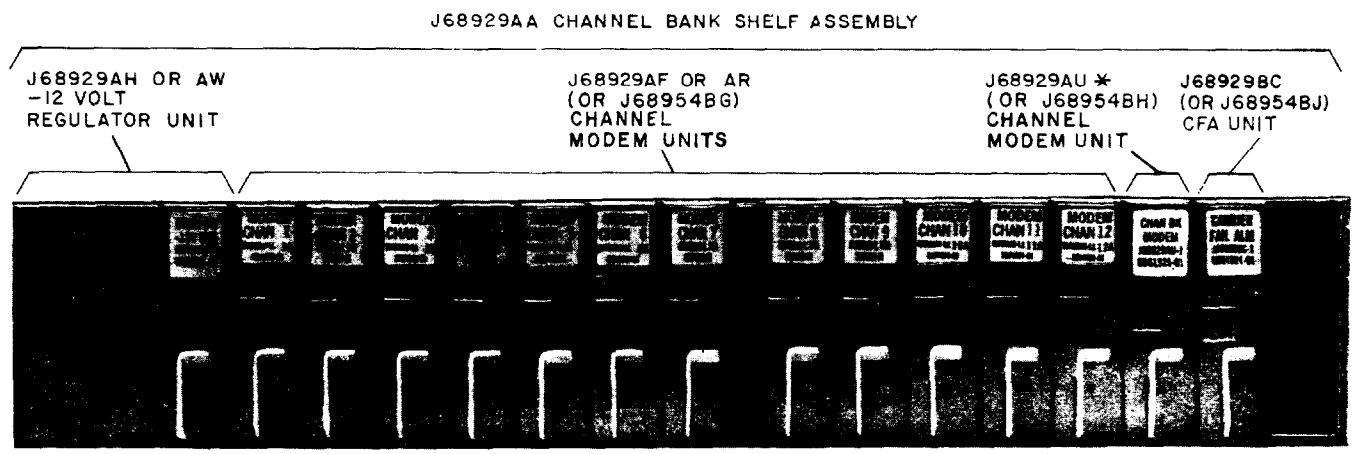


Fig. 2—▶A6 Channel Bank◀

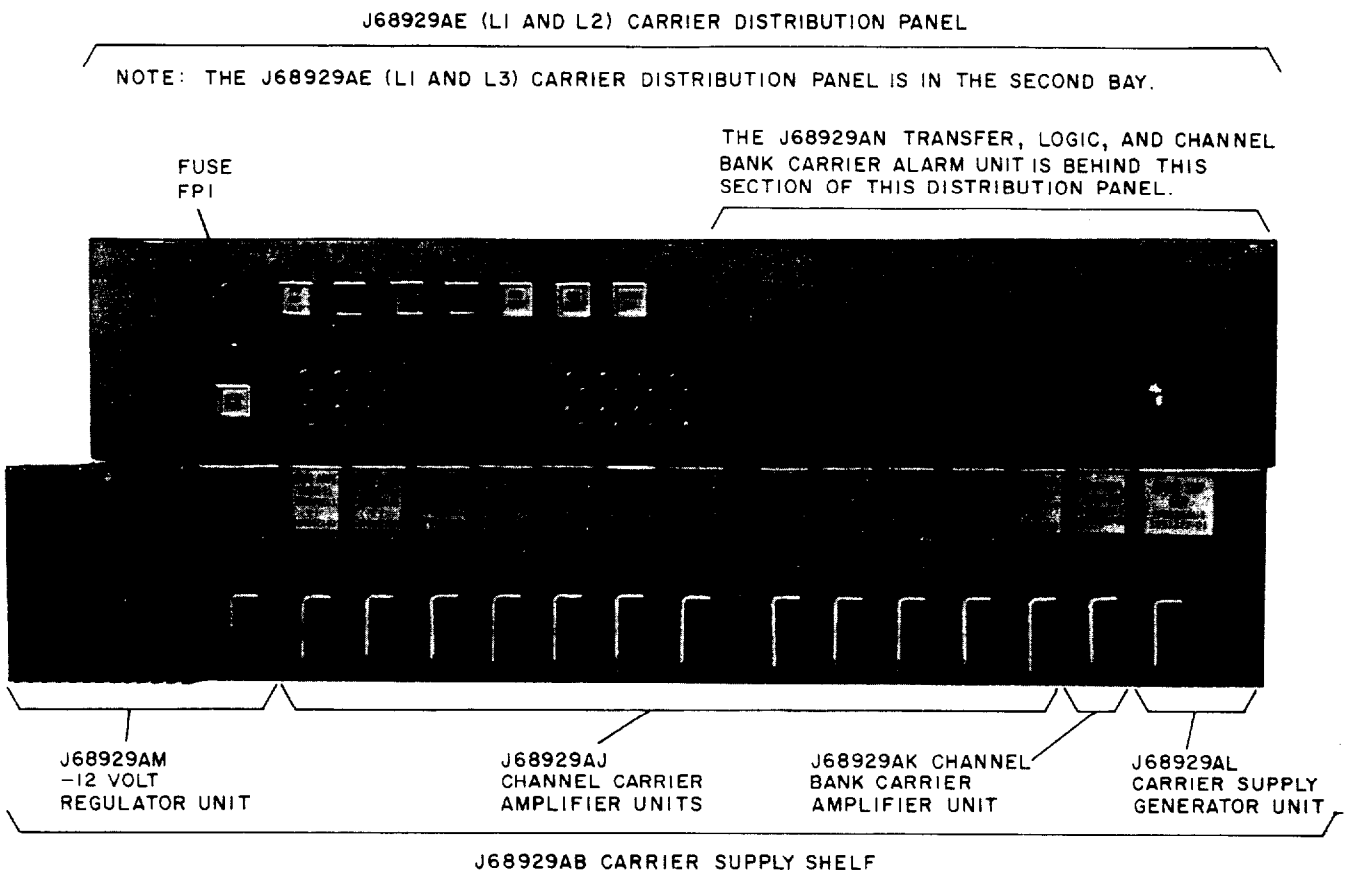


Fig. 3—A6 Carrier Supply and Distribution Panel

1.08 The A6 auxiliary carrier supply (Fig. 4) consists of the following items which are plug-in mounted in the J68929AP shelf.

1—J68929AK channel bank carrier amplifier unit

1—J68929AL carrier supply generator unit

1—J68929AM carrier supply -12 volt regulator unit

Note: In addition, a jack, lamp, and fuse panel is mounted on this shelf.

1.09 The A6 auxiliary carrier supply generates the 12 individual channel carrier frequencies and the one channel bank carrier frequency required by the A6 channel bank. It provides protection for an A6 regular carrier supply in the event a second regular supply is not available.

1.10 The CFA carrier supply (Fig. 5) is provided in the A6 channel bank bay and the A6 UTE frames on an optional basis. When used in the J68929( ) channel bank bay, the equipment consists of the following items mounted on two shelves (J68929BA and J68929BB).

1-Way CFA

1—J68929BD 392-kHz generator unit

1—J68929BE primary distribution unit

2—J68929BG carrier secondary distribution units

1—J68929BK, L1 carrier generator unit

1—J68929BM carrier switch unit

1—J68929BN CFA connector unit

2-Way CFA

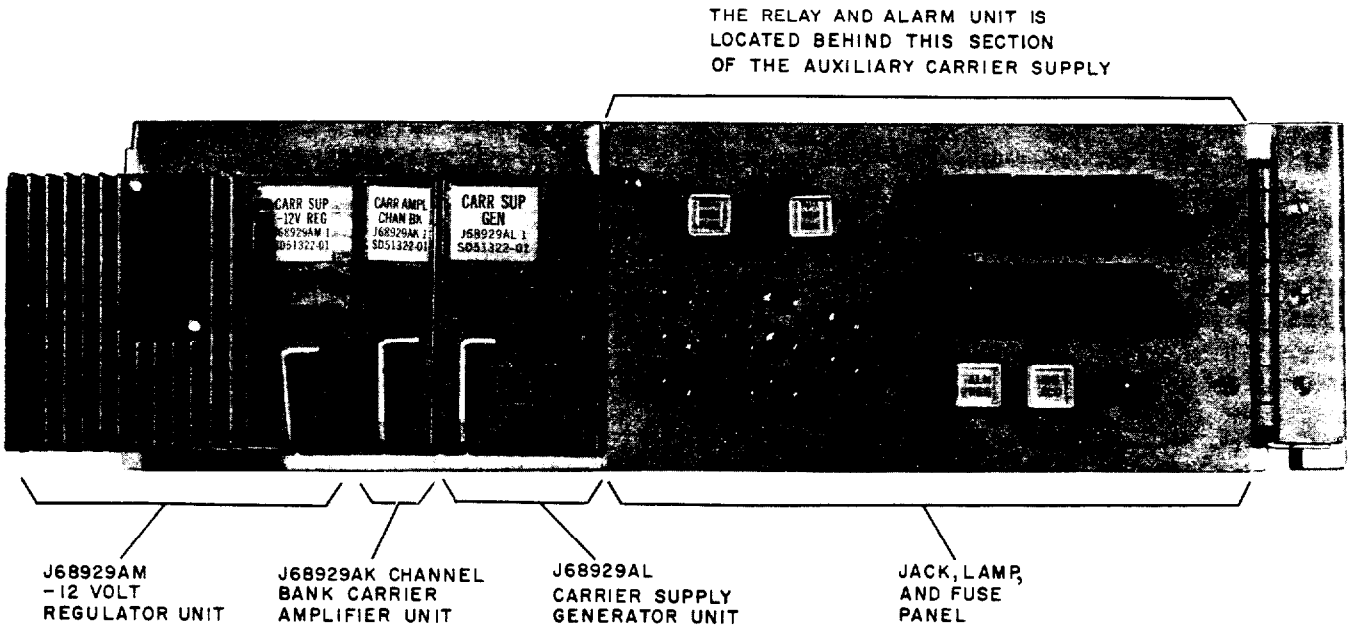


Fig. 4—A6 Auxiliary Carrier Supply

1—J68929BD 392-kHz generator unit

2—J68929BE primary distribution units

2—J68929BG carrier secondary distribution units

4—J68929BH pilot secondary distribution units

1—J68929BJ pilot generator unit

1—J68929BK, L2 carrier generator unit

1—J68929BL pilot/carrier switch unit

1—J68929BN CFA connector unit

1-Way/2-Way CFA

1—J68929BD 392-kHz generator unit

3—J68929BE primary distribution units

4—J68929BG carrier secondary distribution units

4—J68929BH pilot secondary distribution units

1—J68929BJ pilot generator unit

1—J68929BK, L1 carrier generator unit

1—J68929BK, L2 carrier generator unit

1—J68929BL pilot/carrier switch unit

1—J68929BM carrier switch unit

Note 1: When the CFA system is provided for in the A6 channel bank, but the CFA carrier supply shelf is not equipped, ***two*** J68929BN CFA connectors are used in the J68929BA shelf.

Note 2: ▮The CFA carrier supply generator, switch, and alarm units for A6 UTE frames are as listed above for J68929 bays. The CFA carrier distribution arrangements for A6 UTE frames are as follows:

(a) The J68929BE primary distribution units (in the J68929BA shelf) and the J98626AG (CFA pilot) and J98626AH (CFA carrier) secondary distribution units (in ED-2C142 and ED-2C143 shelves) are used in the J98626A and B frames.

(b) The J68929BF primary distribution units (in the J68929BA shelf) and the ED-2C390 (CFA carrier) and ED-2C391 (CFA pilot) secondary distribution units (in the J98626AJ, L1 shelf) are used in the J98626C, D, E, and F frames.

Note 3: The J68929BA shelf is used in the J68929A and J98626( ) arrangements; whereas, the J68929BB shelf is used in the J68929A arrangement only.◀

1.11 The CFA carrier supply provides required frequencies to the CFA units in the associated A6 channel banks. In turn, each CFA unit provides an indication at both ends of a group facility when a carrier system fails, due to either loss of transmission or excessive noise. The resultant carrier-failure indication initiates alarms and removes associated trunks from service. When the carrier trouble is corrected, the CFA unit automatically restores the associated trunks to service.

1.12 The CFA auxiliary carrier supply (Fig. 6) consists of the following items which are plug-in mounted in the J68929BP shelf.

1-Way CFA

1—J68929AJ, L1 channel carrier amplifier unit

1—J68929BD 392-kHz generator unit

1—J68929BG carrier secondary distribution unit

1—J68929BK, L1 carrier generator unit

2—J68929BN CFA connector units

1—J68929BR CFA alarm unit

2-Way CFA

1—J68929AJ, L2 channel carrier amplifier unit

1—J68929BD 392-kHz generator unit

1—J68929BG carrier secondary distribution unit

1—J68929BJ pilot generator unit

1—J68929BK, L2 carrier generator unit

1—J68929BN CFA connector unit

1—J68929BR CFA alarm unit

1-Way/2-Way CFA

1—J68929AJ, L1 channel carrier amplifier unit

1—J68929AJ, L2 channel carrier amplifier unit

1—J68929BD 392-kHz generator unit

1—J68929BG carrier secondary distribution unit

1—J68929BJ pilot generator unit

1—J68929BK, L1 carrier generator unit

1—J68929BK, L2 carrier generator unit

1—J68929BR CFA alarm unit

Note: When the CFA system is provided for in the A6 channel bank, but the CFA auxiliary carrier supply is not equipped, ***two*** J68929BN CFA connectors are used in the J68929BP shelf.

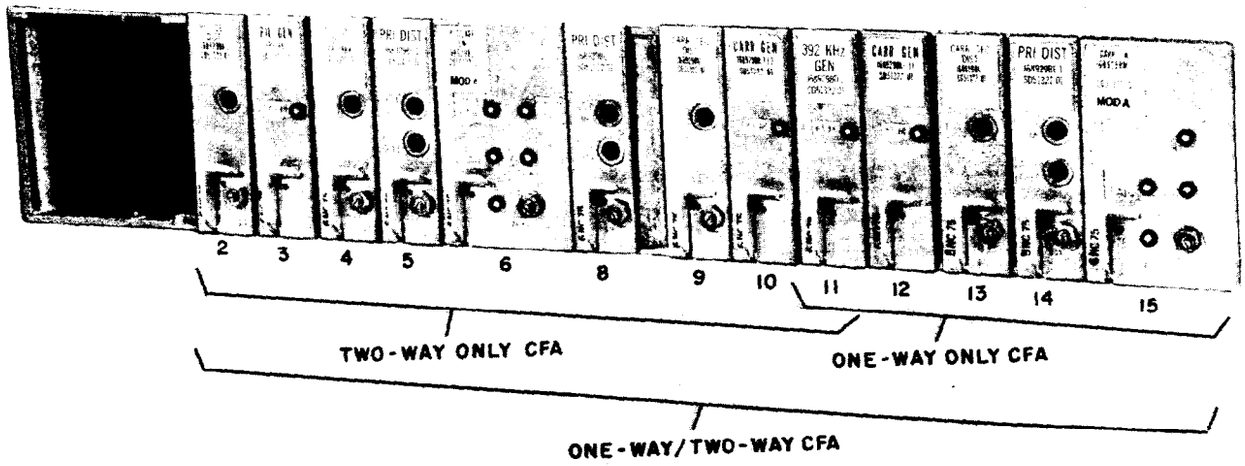
1.13 The CFA auxiliary carrier supply generates the frequencies required by the CFA units. It provides protection for a CFA regular carrier supply in the event a second regular supply is not available.

1.14 The J68929( ) A6 channel bank bay layout consists of four bays arranged in mutually-protected pairs arbitrarily designated regular and alternate; neither pair has priority. Each pair of bays is served by a carrier supply and a primary distribution panel (List 1 and 2) located in bay No. 1 of each pair. A secondary distribution panel (List 1 and 3) is located in bay No. 2 of each pair. In the event one carrier supply fails, a mutual carrier-protective-switching system will connect carrier power to all four bays from the remaining carrier supply.

1.15 ▶The J98626( ) A6 UTE frames are protected against carrier supply failure in the same manner as the J68929( ) bays, except that each carrier supply provides for a frame or a set of frames. In both cases, an auxiliary carrier supply may be used to protect the regular supply when this mutual protective arrangement is not provided.

1.16 In an arrangement similar to the A6 carrier supply, each pair of J68929( ) bays or sets of J98626( ) frames is served (on an optional basis) by a CFA carrier supply and associated primary and secondary distribution circuits; thus, the CFA carrier supply may be protected on a regular-and-alternate or regular-and-auxiliary basis.◀

FOR J68929( ) BAYS



FOR J98626( ) FRAMES

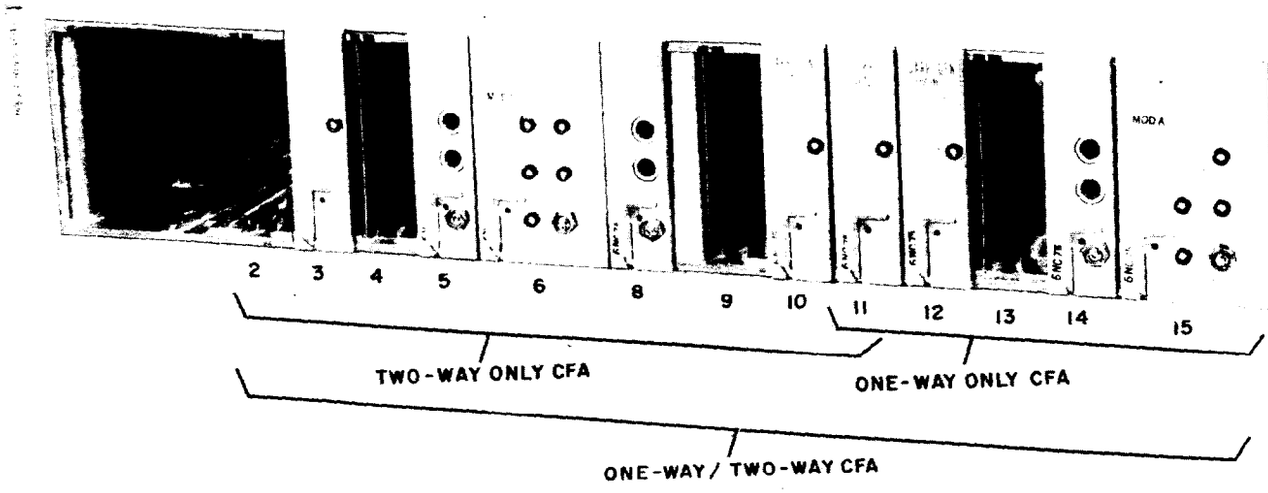


Fig. 5—A6 CFA Carrier Supply Arrangement—J68929( ) Bays and J98626( ) Frames

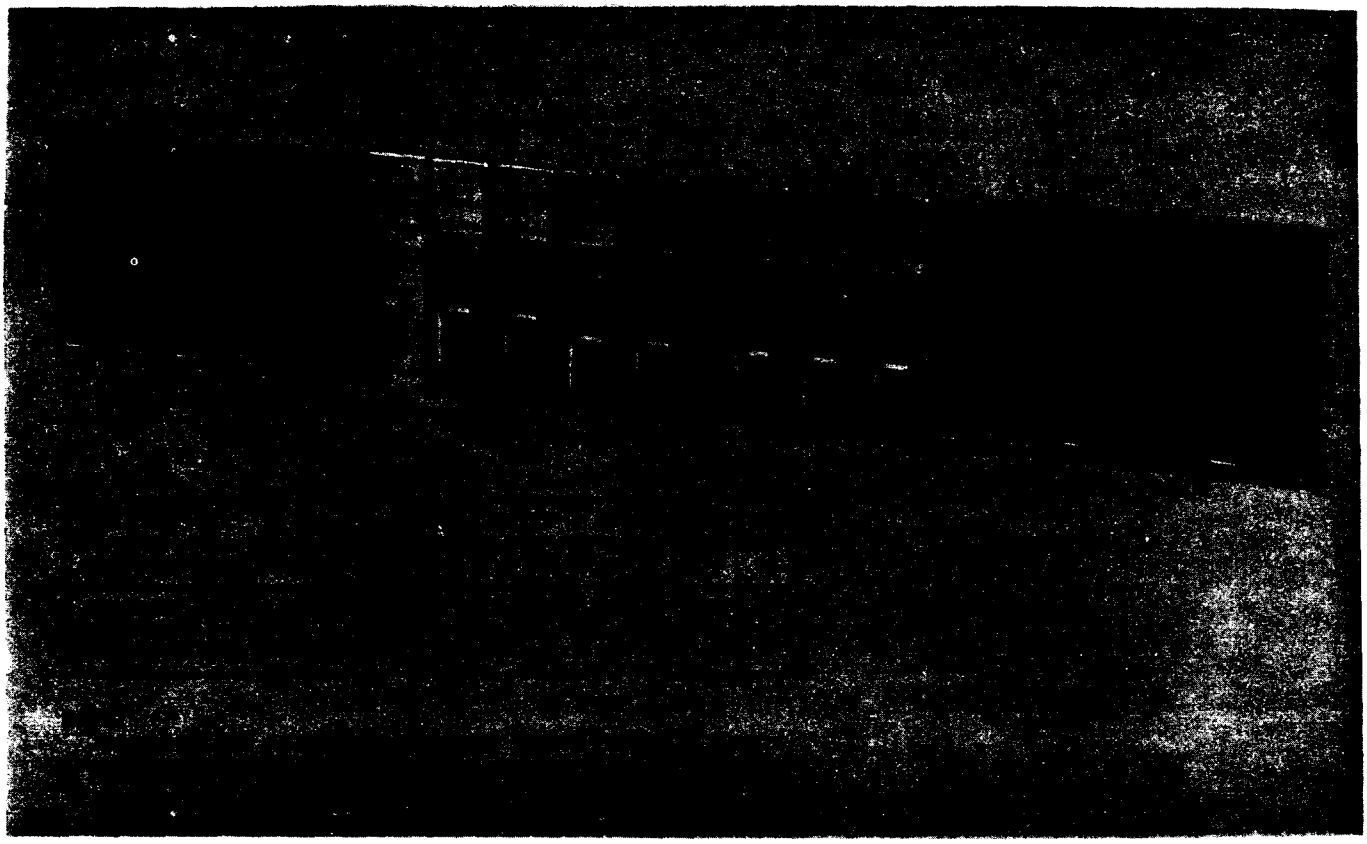


Fig. 6—J68929BP CFA Auxiliary Carrier Supply

2. SYSTEM CONSIDERATIONS

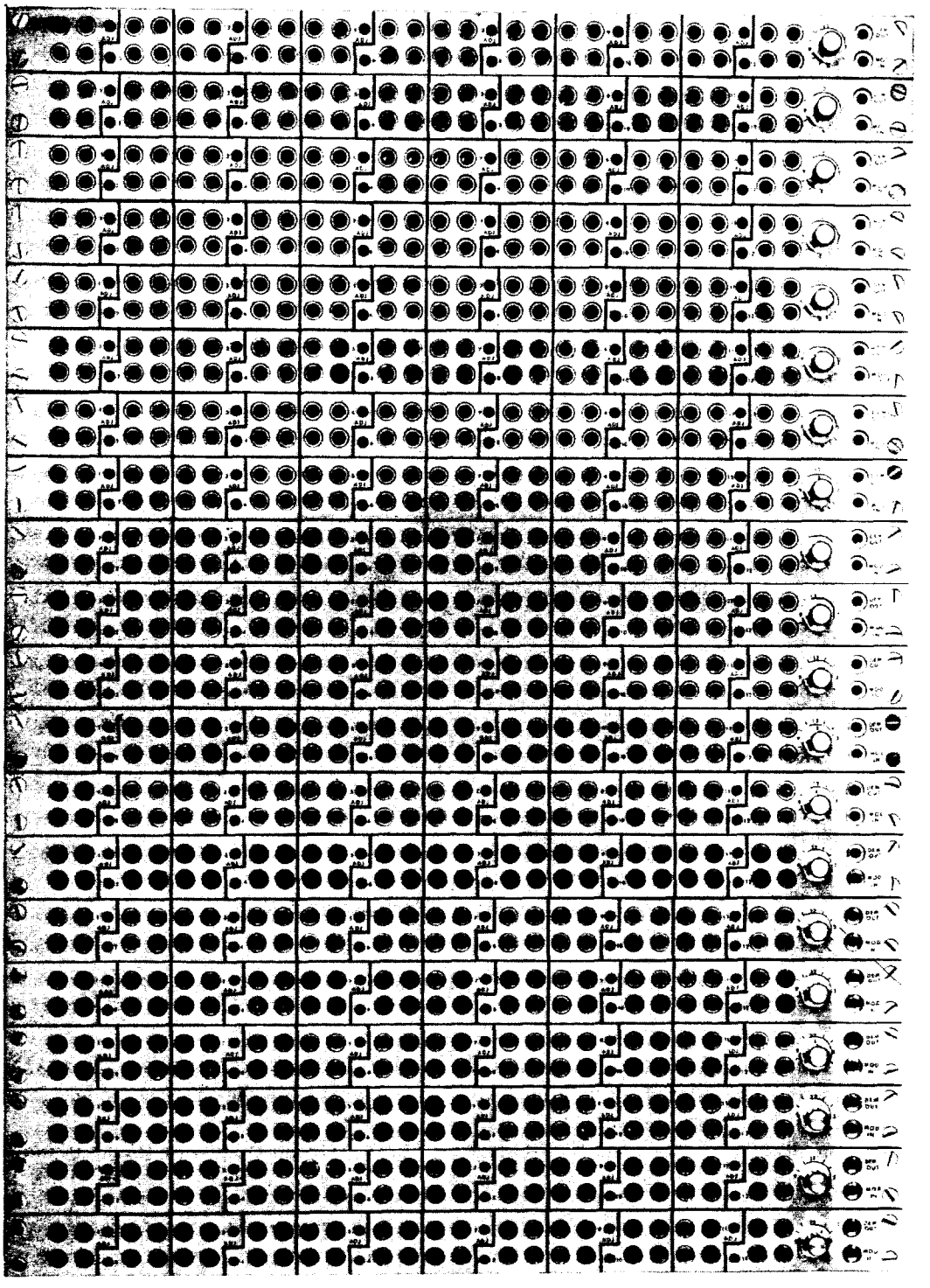
2.01 Both the A6 channel bank and the carrier supply are provided with jack access for making the required tests. The channel bank is provided with controls for making transmitting and receiving level adjustments.

2.02 In the J68929( ) bays, VF transmission jacks associated with the A6 channel bank are located on the ED-51441-30 VF jack mounting assembly (Fig. 7). These jacks (designated EQ OUT/MOD IN and DEM OUT/EQ IN) provide access for measuring the 200- to 3400-Hz VF into and out of the A6 bank. In addition, monitoring jacks are located on the VF jack mounting assembly. These jacks (designated MOD IN MON and DEM OUT MON) provide access for monitoring the A6 VF channels.

2.03 In the J98626( ) A6 UTE frames, VF transmission jacks associated with the A6 channel bank are located on the manual access panel, which provides access to the VF channels via type 950A multipin access connectors on the maintenance connectors. These VF transmission jacks are designated DROP OUT/LINE IN and LINE OUT/DROP IN. In addition, SIG DROP and SIG LINE jacks on the manual access panel provide access, via the maintenance connector, to the signaling leads. VF monitoring is provided via the TEL T and R jacks on the J98626AA communications panel.

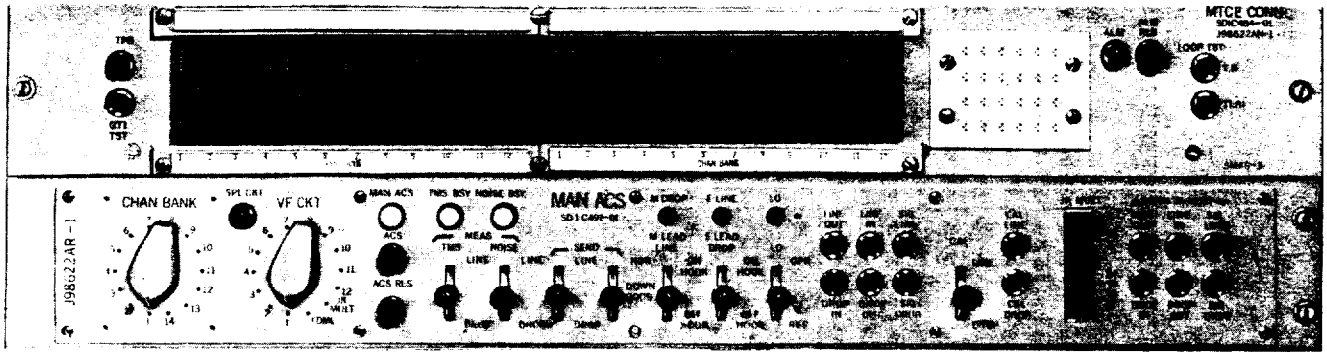
2.04 Two basic manual access panel and maintenance connector arrangements are provided for the A6 UTE frames—(1) The J68922AR and AT manual access panels and the J68922AN and BL maintenance connectors for SMAS systems, and (2) the J68922AU manual access panel and the J68922BK maintenance connector for non-SMAS systems. These units are illustrated in Fig. 8 and are described in Section 356-016-102.

2.05 The transmitting section of the channel bank modem contains an adjustable amplifier to

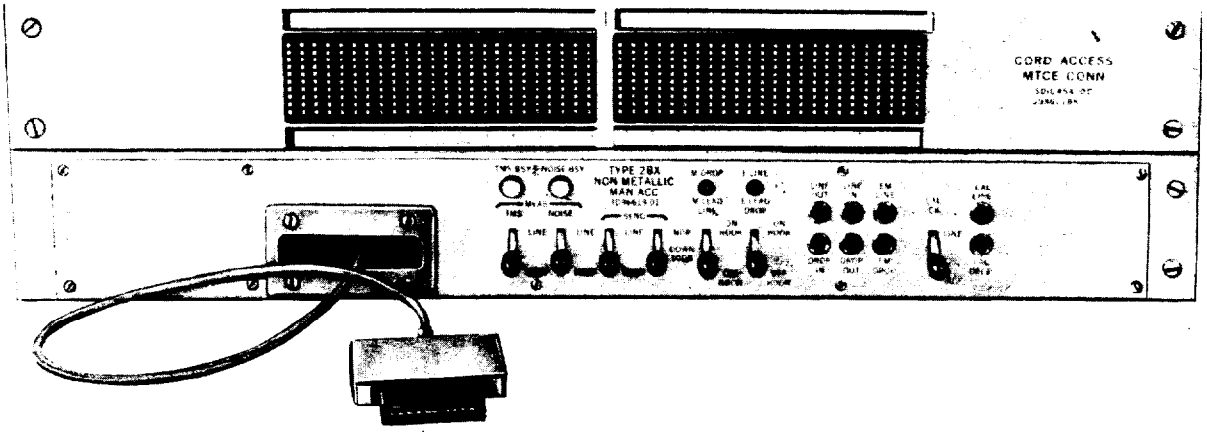


NOTE:
THE ADJ CONTROL IS USED WHEN THE J68929AF MODEM IS USED.
IT IS NOT USED WHEN THE J68929AR (OR J68954BG) MODEM IS USED.

Fig. 7—ED-51441-30 VF Jack Mounting Assembly



SMAS ARRANGEMENT



NON-SMAS ARRANGEMENT

Fig. 8—A6 UTE Maintenance Connectors and Manual Access Panels

raise the 60- to 108-kHz output to the level required by the succeeding group modulator. The amplifier adjustment (TRMT ADJ) control is located in the channel bank modem (J68929AG or AU ♦or J68954BH)♦ and is accessible through a hole in the front panel of this modem.

2.06 The receiving section of each of the 12 channel modems contains an adjustable amplifier to raise the VF output to the level required at the DEM OUT jacks. When the J68929AF channel modems are used, the amplifier adjustment (ADJ) controls are located on the jack panels in the ED-51441-30 VF jack mounting assembly (Fig. 7). When the J68929AR ♦(or J68954BG)♦ channel modems are used, the GAIN ADJ controls are located on the channel modem faceplates (Fig. 2).

2.07 Group-frequency transmission jacks associated with the A6 channel bank are located on the LMX equipment. These jacks (designated CH BK OUT ALT, CH BK OUT/GR MOD IN, and GR DEM OUT/CH BK IN ♦in LMX-2 equipment or GDF OUT ALT/MOD IN and DEM OUT/GDF IN in LMX-3 equipment)♦ provide access for measuring the 60- to 108-kHz basic group out of and into the A6 bank.

2.08 A -12V jack on each J68929AH or AW -12 volt regulator is provided for testing the dc

voltage that is supplied to each corresponding channel bank.

2.09 Jacks are provided on the A6 regular carrier supply for measuring the following:

(a) The 64-kHz sync frequency, via the 64KHZ TST jack (135Ω)

(b) The regular channel and channel bank carrier frequencies, via the SIG TST jack (95Ω)

(c) The alternate channel carriers, via the ALT CH CXR (or CARR) jack (95Ω)

(d) The alternate channel bank carrier, via the ALT CH BK CXR (or CARR) jack (95Ω)

Note: Two 95Ω/75Ω jacks on the J68929AE (L1 and L2) carrier distribution panel provide access to two 95- to 75-ohm transformers for using 75-ohm test equipment to make measurements at the above 95-ohm test points [the SIG TST, ALT CH CXR (or CARR), and ALT CH BK CXR (or CARR) jacks]. The 64KHZ TST jack is accessed directly when using 135-ohm test equipment.

2.10 A test (TST) jack, one on each of the J68929AJ channel carrier amplifiers, is provided for testing the operation of the channel carrier detector. A -12V jack on the J68929AM -12 volt regulator is provided for testing the dc voltage supplied to the A6 carrier supply.

2.11 Other jacks on the A6 regular carrier supply provide patching access to the following carrier circuits:

(a) The output from the carrier supply generator, via the GEN OUT jack (95Ω)

(b) The input to the carrier distribution circuit, via the DIST IN jack (95Ω)

(c) The output from the channel carrier switching circuit, via the CH SW OUT jack (95Ω)

(d) The input to the channel hybrid circuit, via the CH HYB IN jack (95Ω)

(e) The output from the channel bank carrier switching circuit, via the CH BK SW OUT jack (95Ω)

(f) The input to the channel bank hybrid circuit, via the CH BK HYB IN jack (95Ω)

Note: When measurements are made at these jacks, the 75-ohm test equipment should be connected to the applicable 95-ohm jack via the 95Ω/75Ω jacks on the J68929AE (L1 and L2) carrier distribution panel.

2.12 Jacks are provided on the A6 auxiliary carrier supply as follows:

(a) A 64 KHZ TST jack (135Ω) for measuring the 64-kHz sync frequency

(b) A CH CXR (or CARR) jack (95Ω) (except when associated with the CFA auxiliary carrier supply) for measuring the A6 channel carrier frequencies

(c) A CH BK CXR (or CARR) jack (95Ω) for measuring the A6 channel bank carrier frequency

(d) A GEN OUT jack (95Ω) for providing access to the output of the carrier supply generator

(e) A DIST IN jack (95Ω) for providing access to the input of the carrier distribution circuit.

Note: When measurements are made at the above 95-ohm jacks, the 75-ohm test equipment should be connected to the applicable jack via the 95Ω/75Ω jacks on the auxiliary carrier supply.

2.13 Jacks and controls are provided on the CFA regular carrier supply for testing, adjusting, and patching as follows:

(a) On the J68929BE and BF primary distribution units:

(1) The ALT OUT jack (95Ω) provides access for measuring the carrier power arriving from the alternate (or auxiliary) CFA supply for 1-way carrier (8.143843 MHz), 2-way carrier (8.147843 MHz), and 2-way pilot (8.147920 MHz). This jack can also be used for restoration patching in the event a nearby carrier supply fails.

(2) The DIST IN jack (95Ω) provides access to the primary distribution circuit input

for carrier restoration in the event of failure of the pilot/carrier switch (2-way CFA) or the carrier switch (1-way CFA). This jack can also be used for sending tone when testing the associated carrier distribution circuit.

(3) The ALT ADJ control provides a means of adjusting the alternate carrier or pilot arriving from the alternate (or auxiliary) CFA carrier supply.

(b) On the J68929BG (carrier) and J68929BH (pilot) secondary distribution units:

(1) The TST jack (95Ω) provides access for measuring the output power from the secondary distribution circuit.

(2) The LEV ADJ control provides a means of adjusting the output power from the secondary distribution circuit.

Note: When measurements are made at the above 95-ohm jacks, the 75-ohm test equipment should be connected to the applicable jack via the 95Ω/75Ω jacks on the J68929AE (L1 and L2) carrier distribution panel.

2.14 Jacks and controls are provided on the CFA auxiliary carrier supply as follows:

(a) On the J68929BG carrier secondary distribution unit:

(1) The TST jack (95Ω) provides access for measuring the output power from the secondary distribution circuit.

(2) The LEV ADJ control provides a means of adjusting the output power from the secondary distribution circuit.

(b) On the J68929AJ channel carrier amplifier units, a TST jack is provided for testing operation of the channel carrier detector.

Note: When measurements are made at the above 95-ohm jack, the 75-ohm test equipment should be connected to the jack via the 95Ω/75Ω jacks on the J68929AP A6 auxiliary carrier supply.

3. TEST CONSIDERATIONS

3.01 The various tests and adjustments for the A6 channel bank include carrier leak, frequency response, noise, and crosstalk tests and transmitting and receiving level adjustments, as described in detail in Sections 356-016-502 and -505. In addition, the A6 carrier supply output power and alarm tests are described in Sections 356-016-501 and -503, and the A6 CFA tests are provided in Section 356-016-506.

3.02 The tests in the associated sections are based on the prerequisite that the regular and alternate (or auxiliary) carrier supplies and all applicable channel banks are fully equipped. If the alternate carrier supply is not equipped, or some channel banks are not fully equipped, all steps that involve such unequipped channels or the alternate carrier supply must be bypassed until these channels and/or the carrier supply are equipped.

3.03 When equipping, fusing, or testing any carrier supply or channel bank, minimum load requirements for the associated -12 volt regulators ***must*** be observed to avoid blowing the corresponding -24 volt input fuse. The minimum load for the J68929AH and AM regulators is approximately 100 milliamperes; therefore, before applying power to these -12 volt regulators, the carrier supply shelf should be equipped with at least the carrier supply generator or three channel carrier amplifiers; any channel bank shelf should contain at least the channel bank modem or three channel modems. There is no minimum load requirement for the J68929AW -12 volt regulator.

Caution: The J68929AH and AW -12 volt regulators and the J68929AL carrier supply generator may be damaged if inserted or removed while connected to the -24 volt supply. Always remove the applicable fuse before inserting or removing the regulator or generator units.

3.04 When making the transmitting level adjustment (Section 356-016-502 or -505), the adjustment should be made as near the center of the group band (60- to 108-kHz) as possible; thus, it should be made by applying a ♦-26♦ dBm test tone to the VF input (MOD IN or LINE IN jacks) in Channel 6 (if Channel 6 is equipped) and adjusting

the TRMTG ADJ control on the channel bank modem for an output of ▶-52◀ dBm at the CH BK OUT ▶ALT (LMX-2) or GDF OUT ALT (LMX-3)◀ jack. If Channel 6 is ***not*** equipped, the adjustment should be made for the channel nearest to Channel 6. Then the overall response is checked by comparing all other equipped channels with the adjusted channel.

> ***Note:*** If the system is equipped with a group distributing frame (GDF), the transmitting level (▶-47.3◀ dBm) may be tested at the GDF.

3.05 Routine carrier leak tests (normally in Channel 2) are not required for the A6 channel bank because the modulators will not permit deterioration of this characteristic as did earlier channel banks. However, in the event trouble-location tests are required, they can be made at the CH BK OUT ALT ▶(or GDF OUT ALT)◀ jack. When measuring Channel-2 carrier leak, the 58AT pilot filter set should be inserted between the CH BK OUT ALT ▶(or GDF OUT ALT)◀ jack and the receiving test equipment (RTE) (unless ▶the RTE has a built-in 104.08-kHz filter or a high selectivity).◀ The measured signal power at the CH BK OUT ALT ▶(or GDF OUT ALT)◀ jack should be -85 dBm or less, which is 10 dB below the actual carrier leak due to a 10-dB loss in the 104.08-kHz pilot filter in both the 58AT set and the 49A TMS; however, the 49A TMS shows only deviation from the normal TLP.

> ***Note:*** When the A6 channel bank is equipped for CFA, the J68929BC ▶(or J68954BJ)◀ CFA unit should be removed from the channel bank shelf to measure Channel-3 carrier leak.

3.06 The channel demodulators are adjusted (Section 356-016-502 or -505) by applying a test tone of ▶-15 dBm (LMX-2) or -14 dBm (LMX-3),◀ at the appropriate group frequencies, to the input [CH BK IN ▶(LMX-2) or GDF IN (LMX-3)◀ jack] of the receiving section of the channel bank. The ADJ controls on the VF patch bay or the GAIN ADJ control on the front panel of the channel modems, as applicable, are adjusted for a ▶-3◀ dBm signal at the DEM OUT or LINE OUT jacks for each of the 12 VF channels.

> ***Note:*** If the system is equipped with a GDF, the test tone may be applied at the GDF at a level of ▶-15 dBm for either LMX-2 or LMX-3.◀

3.07 The channel bank tests (Section 356-016-502 or -505) include both equal-level and unequal-level looping arrangements. Either method constitutes sufficient testing; however, the procedures for the equal-level looping arrangement are to be used if spare group equipment is available for the tests. The procedures for the unequal-level looping arrangement should be used ***only if spare group equipment is not available,*** since equal-looping is preferred. Testing by both methods is not required.

3.08 Measurement of the channel bank frequency response, noise, and crosstalk with the transmitting and receiving circuits looped together at the terminal will disclose transmission irregularities which are independent of any irregularities contributed by the high-frequency line. If the channel modem circuits are to be looped and tested under nominal level conditions, 37-db gain will be needed between the CH BK OUT ALT ▶(LMX-2) or GDF OUT ALT (LMX-3)◀ and the CH BK IN ▶(LMX-2) or GDF IN (LMX-3)◀ jacks.

3.09 The type L terminal can be looped at approximately equal-level points by patching the channel bank to a spare group modulator and demodulator circuit, and looping between the transmitting group bank output and the receiving group bank input; via ▶a spare group transmitting trunk,◀ a hybrid, or a 3-dB pad ▶(LMX-2) or an ED-52536-20 maintenance group bank pad (LMX-3).◀ By using the spare group equipment, service need be removed only from the channel bank under test.

3.10 For the frequency response tests in Sections 356-016-502 and -505, only two test frequencies are required. A 1000-Hz test tone is used to provide a reference near the center of the channel filter passband, and a 200-Hz test tone is used to provide a test at the low frequency end of the channel filter since this is the most critical part of its passband.

> ***Note:*** The overall VF response of the facility is tested in Sections 660-450-301 and -505.

3.11 The noise test using C-message weighting is used to measure noise that affects message service over the channels. The test using 3-kHz flat weighting is for identifying low-frequency noise,

which is detrimental to program operation or special services. The test using 3-kHz flat weighting may not reveal ac power induction noise or white noise, but will indicate the level of the demodulated 104.08-kHz pilot. If the 3-kHz flat-weighting requirements cannot be met, a through-pilot insertion unit can be used in the corresponding LMX terminal position when measuring the channel noise. Under this condition, the requirement for Channels 3 to 12 will also apply to Channels 1 and 2. Be sure to replace the original pilot insertion unit when the test is completed.

3.12 The crosstalk tests in Sections 356-016-502 and -505 will indicate defective modulator and demodulator band-filters in the channel banks. With the ▶channel bank under test (looped bank) cross-looped (frogged) via another channel bank (looping bank),◀ and with a test tone of 3000 or 5000 Hz applied to one channel, a measurement is made on the adjacent channels. Failure to meet the requirements indicates trouble in either the sending or receiving filters or in both filters.

3.13 In the crosstalk procedures, Channel B is used as the sending channel and Channels A and C are used as the receiving channels, where A, B, and C are any three consecutively-numbered channels as indicated in Sections 356-016-502 and -505. This arrangement tests the transmitting filter of Channel B and receiving filter of Channel C. ▶These filters are designed to pass only the ***upper*** sidebands of the respective channel carriers. The ***upper*** sidebands are in the range of 8.140 to 8.188 MHz and are translated (by the channel bank modulator) to ***lower*** sidebands in the range of 60 to 108 kHz. When 3000-Hz power is applied to Channel 2, for example, 8.141- and 8.147-MHz sidebands are produced by the Channel 2 modulator. The 8.147-MHz sideband is passed and the 8.141-MHz sideband is rejected by the Channel 2 filter; thus, a 101-kHz sideband is produced at the channel bank output (Fig. 9A). If the transmitting band-filter of Channel 2 is faulty, enough of the 8.141-MHz power may pass through and reappear at 107 kHz as the 1000-Hz-point ***lower*** sideband of Channel 1. If the receiving band-filter of Channel 3 is faulty, enough of the 8.147-MHz power may enter the demodulator of Channel 3 and reappear as the 1000-Hz-point ***upper*** sideband. When 5000-Hz power is applied to Channel 2 (Fig. 9B), neither of its products (8.139 and 8.149 MHz) should pass the Channel 2 transmitting band-filter; however, if the filter is faulty, enough of the 8.149-MHz power may pass to reappear at 99 kHz as the 1000-Hz-point ***lower*** sideband of Channel 3.◀

3.14 If a lamp on the A6 carrier distribution panel (List 1 and 2) does not light to meet a test requirement, the lamp should be tested before attempting to locate trouble in the equipment.

3.15 The tests in Sections 356-016-501, -502, -503, -505, and -506 are intended to be used as conventional step-by-step procedures; however, where practical, illustrations containing all significant information have been included to enable the tests to be made by simply referring to these diagrams, provided that the basic principles for making such tests are clearly understood.

3.16 Before testing any in-service VF channel, that channel should be monitored. If not in use, it should then be placed out of service.

> ▶***Caution: Before removing any plug-in unit from the J68929AP A6 auxiliary carrier supply, ensure that the associated regular carrier supply is operating by observing that both the REG GEN FAIL lamp on the auxiliary carrier supply and the SW ON ALT and REG GEN FAIL lamps on the associated regular carrier supply are extinguished.***◀

4. TEST EQUIPMENT

4.01 When the J68929AD VF test, monitor, and talk panel is mounted in the A6 channel bank bay, it should be used for all voice-frequency tests within its range of operation (Sections 356-016-100 and -301). If it is not available, or if it does not meet the equipment specifications (e.g., if a 200-Hz test tone is required), select a suitable test set from available equipment.

> ***Note:*** Two arrangements of the J68929AD panel are provided. One is used with the 40B analog T&NMS and the other with the KS-20805 digital T&NMS. These panels are shown in Fig. 10.

4.02 Test equipment suitable for measurements in the group band (60 to 108 kHz) should be selected from available equipment listed in Section 356-010-500.

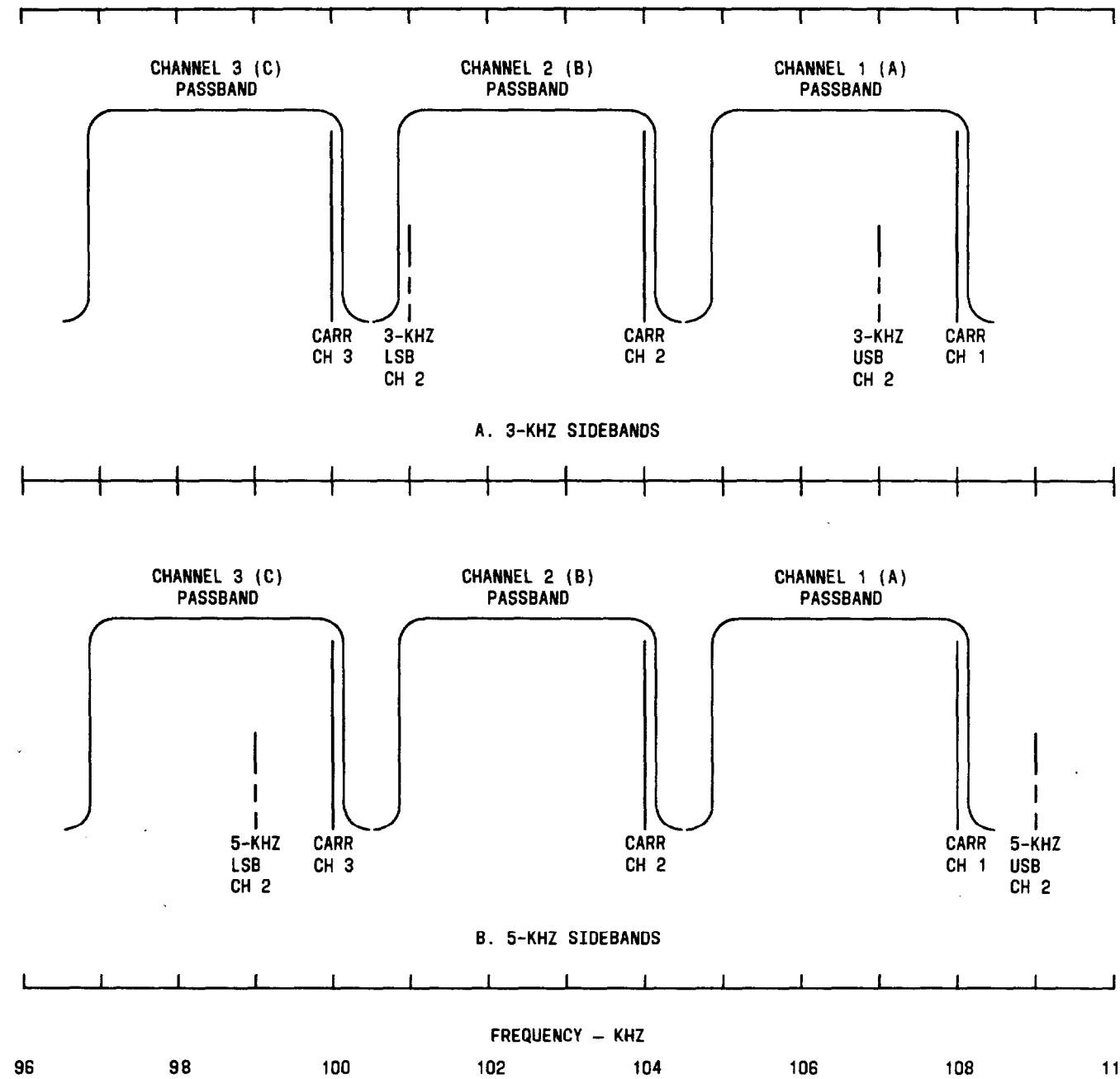
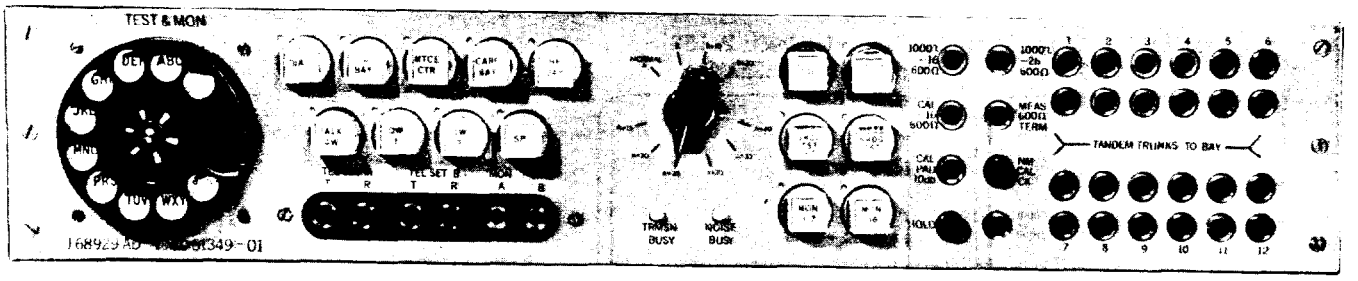


Fig. 9—Channel Filter Characteristics Versus 3-kHz and 5-kHz Sidebands—At Channel Bank Output

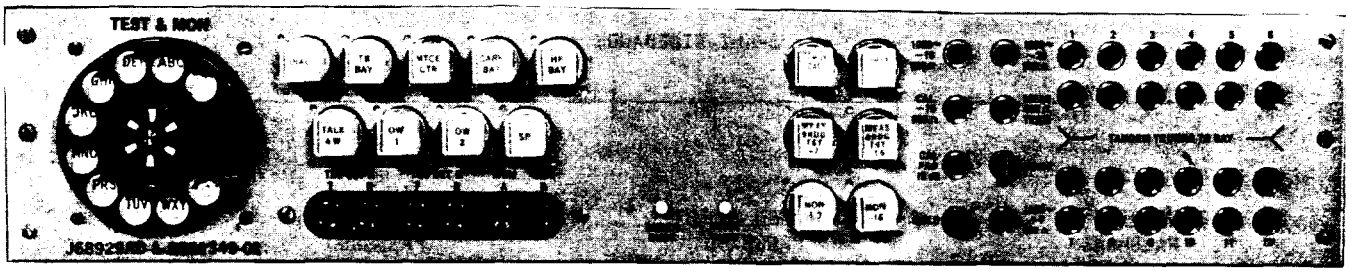
4.03 Where test equipment specifications (frequency, power, impedance, etc) are given in the apparatus list for any chart, this indicates only the ***minimum*** requirements for the tests in that chart. Selected equipment will normally have better characteristics and, of course, can be used.

> ***Note:*** ***Equivalent*** test equipment referred to in this and associated sections is defined as equipment having characteristics at least as good as those specified and having an accuracy sufficient to measure within any tolerances listed in the applicable test requirements.

4.04 Normally, values are given for preadjusting the test equipment to the approximate values required for any particular test. Then, when performing the applicable test, the test equipment



FOR 40B T&NMS



FOR KS-20805 T&NMS

Fig. 10—A6 VF Test, Monitor, and Talk Panels

may require a slight adjustment for optimum results according to the type of test being performed.

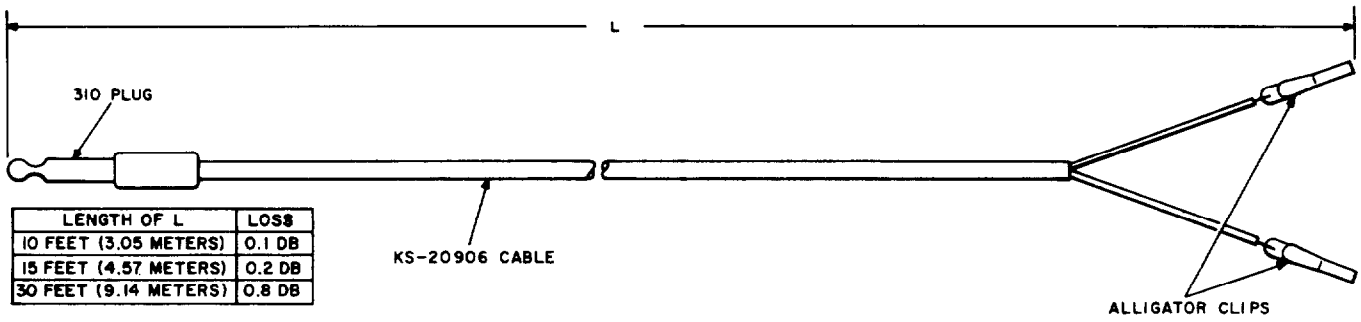
4.05 All tests in the associated sections (356-016-501 through -506) are based on the prerequisite that all test equipment has been calibrated in accordance with applicable sections.

> ***Note:*** Test equipment used in tests requiring either equal-level or unequal-level looping should be calibrated as a test group for maximum accuracy, since both sending and receiving test equipment will be operating at the same VF frequency.

4.06 A special cord (Fig. 11) is required for making the carrier distribution test in Section 356-016-501. It can be constructed locally from KS-20906, L1 shielded, 26-gauge, solid, 95-ohm, twisted-pair cable; one 310-type plug; and two alligator clips. The length of the cord will be determined by the type of facility to be tested. For example, a 10-foot ▶(3.05-meter)◀ cord may be sufficient for J68929( ) bays, but a longer cord may be required for some J98626( ) frame arrangements. The shortest practical length should be used and the corresponding loss added to the measurement. This cord should be carefully assembled as shown in Fig. 11 to ensure minimum losses.

4.07 Selective carrier frequency measurements are made at the SIG TST and ALT CH CXR (or CARR) jacks on the J68929AE (L1 and L2) carrier distribution panel and, when provided, at the CH CXR (or CARR) jack on the J68929AP auxiliary carrier supply panel. Due to the multitonic nature of the signal spectrum at this jack, a low-distortion test set mode should be used if available. This mode will prevent erroneous readings due to overloading of the test set.

4.08 When using the J68922AR and AT (SMAS) manual access panels, remove any patches from the LINE IN and LINE OUT jacks before changing channels. After switching to another channel, reconnect the patch(es) and then press the ACS (or ACC) key.



LENGTH OF L	LOSS
10 FEET (3.05 METERS)	0.1 DB
15 FEET (4.57 METERS)	0.2 DB
30 FEET (9.14 METERS)	0.8 DB

Fig. 11—Method of Constructing Special Cord

4.09 When using the J68922AU (non-SMAS) manual access panel, caution must be exercised when inserting the cord-access plug into a multipin access connector associated with an in-service VF channel. Partial insertion of the plug permits monitoring; whereas, full insertion opens the VF circuit to permit testing toward the drop or line. While making such connections, all keys on the panel should be in the neutral position and no plugs should be in the test jacks.

4.10 When using the KS-20805 digital T&NMS, off-scale readings are indicated by a + or - sign, as applicable, instead of numerical values.

4.11 Connections between the monitor jacks on the ED-51441-30 VF jack assembly and the MON LINE A and B jacks on the J68929AD test, monitor, and talk panel can be made with an 8-foot P6T cord.

4.12 Connections between the A5 and A6 monitor facilities can be made with a P4BN cord. One of the 428A plugs on the P4BN cord is designated ***A5*** and the other is designated ***A6***. The plug marked ***A5*** uses tip and sleeve connections; whereas, the ***A6*** uses tip and ring connections. The ***A6*** plug connects to the monitor jacks on the standard ED-51441-30 VF jack panel, and the ***A5*** plug connects to:

(a) The standard A5 jack, key, and lamp panel (J68832L) TEL L 4W jacks.

(b) The consolidated A5 VF test, monitor, and talk panel (J98617AD) MON LINE A and B jacks.

5. MAINTENANCE AND TROUBLE LOCATION

5.01 Periodic maintenance tests are not required for the A6 channel banks or the CFA carrier supply; however, the A6 carrier supply must be tested periodically and the ***J68929AM, List 1***, -12 volt regulator for the A6 carrier supply must be tested any time that the regulator is to be removed from the shelf. The test procedures are given in Section 356-016-503. Periodic tests and trouble-location tests are listed in Section 356-001-011.

Note: The J68929AM, List 2, -12 volt regulator does not require such tests.

5.02 If a defect is found in any unit that is panel mounted, it should be repaired in place. If a defect is found in a plug-in unit, it should be replaced with a spare unit and sent to the applicable Western Electric repair facility.