# TYPE N1 CARRIER TELEPHONE SYSTEM

# GENERAL INFORMATION — TERMINAL EQUIPMENT

# MAINTENANCE CONSIDERATIONS

CONTENTS PAGE



## 1. GENERAL

**1.01** This section describes the testing considerations involved in maintaining an N1 carrier terminal. It contains a description of the channel unit subassemblies and terminal mountings, including their identification and interchangeability.

**1.02** This section is reissued to update associated forms, test equipment, and interchangeability of channel unit subassemblies. Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

## 2. TESTING CONSIDERATIONS

### (A) Test Requirements

**2.01** In most cases the test requirements in these sections are given in actual scale readings on a specified meter. Any corrections due to using a meter calibrated for one impedance in a different impedance circuit have been included in the requirements. For this reason, meters other than those specified should not be used unless it is certain that equivalent results can be obtained.

**2.02** An exception to the above paragraph involves some tests where a correction must be applied to level measurements because of a deviation in repeater (or group amplifier) input or output impedances. Where such corrections must be applied, attention is called to it in the section.

**2.03** In some tests, requirements are expressed in "dbm." A test tone level expressed in "dbm" means that the power of the test tone at the circuit point concerned is so many db greater or less than a reference power of 1 milliwatt into 600 ohms (0 dbm). For example, a signal level expressed as −20 dbm is a power 20 db less than 1 milliwatt. Similarly a signal level 20 db greater than 1 milliwatt is expressed as +20 dbm.

**2.04** If a requirement is given as a meter reading in "db" and not "dbm," it is an indication that the requirement is simply a reading on the meter and does not specify an actual amount of power.

### (B) Precautions

#### Switching Units from Service

**2.05** Except for cases of complete circuit failure, group and repeater plug-in units are normally removed from service by one of the switching methods. It is important to remember that when an N1 carrier group unit is switched from service, a change of levels will result which may affect any telegraph, telephoto, SAGE, or other data circuits which have been assigned to the system. For this reason, a group unit should not be switched except in cases of emergency, or when certain requirements listed in the sections have been met. A group unit should not be switched from service before the office responsible for the system has been notified.

#### Frogging High-Frequency Lines

**2.06** The method of frogging of high-frequency lines, as a trouble investigation or maintenance device, has been omitted from these sections to avoid interruptions to working systems that may be carrying SAGE, data, or telegraph transmissions.

#### Terminating High-Frequency Lines

**2.07** When an N1 carrier system is given an initial line-up, the transmitted individual channel carrier measurements are made with the transmitting group unit output terminated in 135 ohms. This termination is required to present a good impedance for the meter readings. ***At no time should an N carrier high-frequency line be left unterminated (transmitted carriers removed) for an extended period of time unless the repeaters in the system have been deactivated.*** The regulated N carrier repeaters will operate at top gain if the individual channel carriers are not present on the line. As a result, crosstalk or noise may develop in other carrier systems in the cable. This is of particular importance when N carrier systems are working in K carrier cables.

### (C) Schedule A and B Program Channel Units on N1 Carrier Systems

**2.08** Under normal conditions Schedule A and B program channel units can be placed on any N carrier system which has been initially aligned with all twelve channels. This applies only to Schedule A and B program channel units and not Schedule C and D channel units. From a regulation standpoint, a program circuit consists of channels 5 and 7 missing and a program carrier up 5 db from nominal at channel 6. A reversing tone may also be present at times. This tone is 5 db down from normal at the frequency of channel 5. When channel 5, 6 and 7 are replaced with a program channel unit, the N system will still perform satisfactorily, not disturbing any channel carrier by more than about 1 db. Channel 13 (or channel 1) can be used in the channel 7 slot if it is not used in the system for other purposes.

## 3. IDENTIFICATON AND INTERCHANGEABILITY OF COMPONENT PARTS

### (A) Terminal Mounting Identification

**3.01** Several modifications have been made in the wiring of the N1 carrier terminal mounting into which the channel units are connected. Because these changes affect test requirements, it is necessary to identify the different types of terminal mountings. The following information will be useful for this purpose.

(a) The first model of the terminal mounting J98703A (no list number is shown) has shielded wire between the combining multiple pad and J15, J16, and J17 switching jacks. The mounting has a CHG key which affords a means of identification. The term "L0 Terminal Mounting" is used when reference is made to this terminal mounting.

(b) A modification provided for the use of nonshielded pair wire between the combining multiple pad and J15, J16, and J17 switching jacks in the J98703A, List 1 Terminal Mounting. However, the List 1 does not appear in the terminal marking. The mounting has a 3700-cycle key or an apparatus blank in the upper right-hand position of the lamp and jack

mounting which affords a means of identification. The term "L1 Terminal Mounting" is used when reference is made to this terminal mounting.

(c) The terminal mountings for the J98703FA channel units have nonshielded paired wire between the combining multiple pad and J15, J16, and J17 switching jacks in addition to other circuit changes to improve the terminal impedance for J98703FA units only. These mountings are marked J98703A, List 2 and can thus be identified. For convenience of reference, the term "L2 Terminal Mounting" is used when reference is made to this terminal mounting.

(d) The J98703A, List 3 Terminal Mounting is similar to the J98703A, List 2 except for a change in the power-surge protection. It is referred to as the "L3 Terminal Mounting".

(e) The J98703AT and the J98703AW terminals are shop wired terminal bays which provide terminal equipment for 36 and 24 N carrier channels, respectively. The metal covers, normally provided with the channel units, must be omitted when they are used in these mountings. The group unit covers are still required.

### (B) Interchangeability of N1 and O Carrier Channel Unit Subassemblies

**3.02** Transmission and signaling irregularities will result if type N1 and type O carrier compressor and expandor-signaling subassemblies are interchanged in type N1, O, and ON carrier channel units. The subassemblies, although physically identical, are not electrically interchangeable due to (1) the difference in frequency characteristics of the N1 and O transmitting and receiving low-pass filters, and (2) the difference in signaling tone levels from the 3700-cycle keyer circuits in the N1 and O expandor-signaling subassemblies. When N and O compressor and expandor-signaling subassemblies are interchanged, there can be as much as 6 db excess loss or gain in the 2600-cycle channel net loss. The signaling levels can be off as much as ±11 db from normal.

### (C) N1 Carrier Message Channel Unit Identification

**3.03** The message channel units used on N1 carrier systems fall into two general categories designated J98703F (the original or old channel unit) and J98703FA (the redesigned or new channel unit). Design changes included in the new channel unit are as follows.

(1) The expandor load characteristics were improved to permit the use of a one-milliwatt test tone when testing from a 0-dbm level point. The original J98703F channel units required −16 dbm when testing from a 0-dbm level point.

(2) A 5-db improvement in the ratio of transmitted carrier-to-carrier leak.

(3) The output level of the modulator was made adjustable by the addition of a potentiometer so that the slope over the transmitted 12-channel band can be controlled more closely and better equalization realized.

**3.04** Most of the original expandor-signaling subassemblies have been modified to include the 0-dbm testing advantage described in Item (1) above. The modification makes the compandor tracking of the J98703F unit equal to that of J98703FA unit. However, the channel units which have been rewired to include this change must still be treated as J98703F (old) channel units in all other respects.

**3.05** The changes covered in Items (2) and (3) above are such that the new expandor and signaling subassembly, carrier subassembly, and terminal mounting assembly are not interchangeable electrically with the old. Accordingly, changes have been made in the codes and drawing numbers by which this equipment is identified and ordered as shown in Table 1.

### (D) Interchangeability of N1 Carrier Channel Units

### Channel Units

**3.06** Channel units may be interchanged as indicated below.

(a) J98703F channel units are used only in J98703A, L0 and L1 Terminal Mountings.

## TABLE 1—N1 CARRIER INTERCHANGEABLE UNIT SUBASSEMBLIES

| CHANNEL SUBASSEMBLIES | GROUPS | *Note:* Red labels indicate O carrier units and are not to be used in N Terminals. LABEL IDENTIFICATION NUMBER | J98703F L1-13 2-4 WIRE MESSAGE CHANNEL UNIT | J98703FA L1-13 2-4 WIRE MESSAGE CHANNEL UNIT | J98703FA L14-26 4 WIRE MESSAGE CHANNEL UNIT | J98703FA L28-40 4 WIRE MESSAGE CHANNEL UNIT | J98703FA L41-53 4 WIRE MESSAGE CHANNEL UNIT | J98703AH L1-13 THRU CHANNEL UNIT | J98703AH L14-26 THRU CHANNEL UNIT | J98703AH L28-40 THRU CHANNEL UNIT | J98703AH L41-53 THRU CHANNEL UNIT | J98703AM L1-13 SPECIAL SERVICE CHANNEL UNIT | J98703AM L14-26 SPECIAL SERVICE CHANNEL UNIT | J98703AM L28-40 SPECIAL SERVICE CHANNEL UNIT | J98703AM L41-53 SPECIAL SERVICE CHANNEL UNIT | J98703TA L1-13 C&D PROGRAM CHANNEL UNIT | J98703TA L14-26 C&D PROGRAM CHANNEL UNIT | J98703TA L28-40 C&D PROGRAM CHANNEL UNIT | J98703TA L41-53 C&D PROGRAM CHANNEL UNIT | J98703AP L1-13 CHANNEL UNIT WITHOUT SIGNALING | J98703AP L14-26 CHANNEL UNIT WITHOUT SIGNALING | J98703AP L28-40 CHANNEL UNIT WITHOUT SIGNALING | J98703AP L41-53 CHANNEL UNIT WITHOUT SIGNALING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ED-92319-30 CARRIER | G1-12 | ED-92319-30 | X | | | | | | | | | | | | | | | | | | | | |
| ED-92691-30 CARRIER | G1-13 | ED-92691-30 | | X | | | | X | | | | X | | | | X | | | | X | | | |
| ED-92904-30 | G1-13 | ED-92904-30 | | X | X | | | X | X | | | X | X | | | X | X | | | X | X | | |
| CARRIER | G14-26 | | | | | X | | | | X | | | | X | | | | X | | | | X | |
| ED-92904-31 CARRIER | G1-13 | ED-92904-31 | | | | | X | | | | X | | | | X | | | | X | | | | X |
| ED-92317-30 | G1 | N-2/4W | X | X | X | X | X | | | | | | | | | | | | | X | | | |
| COMPRESSOR | G3 | N-4W | X | X | X | X | X | | | | | | | | | | | | | | X | X | X |
| ED-92595-30 COMPRESSOR | G1 | | | | | | | | | | | | | | | X | X | X | X | | | | |
| ED-92318-30 EXPANDOR AND SIGNALING | ** G1 | J98703F | X | | | | | | | | | | | | | | | | | | | | |
| ED-92318-31 EXPANDOR AND SIGNALING | G3 | J98703FA | | X | X | X | X | | | | | | | | | | | | | | | | |
| ED-92318-32 EXPANDOR AND SIGNALING | *** G4 | J98703F | X | | | | | | | | | | | | | | | | | | | | |
| ED-92596-30 EXPANDOR | G1 | | | | | | | | | | | | | | | X | X | X | X | | | | |
| ED-92906-30 EXPANDOR AND SIGNALING | G2 | J98703FA | | * X | X | X | X | | | | | | | | | | | | | | | | |
| ED-92972-30 EXPANDOR WITHOUT SIGNALING | G1 | J98703AP | | | | | | | | | | | | | | | | | | X | X | X | X |
| ED-92802-30 THRU VOICE FREQUENCY | G1 | J98703AH-1 | | | | | | X | X | X | X | | | | | | | | | | | | |
| ED-92933-30 SPECIAL SERVICE | G1 | J98703AM | | | | | | | | | | X | X | X | X | | | | | | | | |

*Can only be used with ED-92904-30 G1-13 Carrier Subassembly
**May not have the G1 designation
***Modified ED-92318-30, G1 unit marked with a black star

(b) J98703FA channel units are used in J98703A, L0, L1, L2, and L3 Terminal Mountings, and in J98703AT and J98703AW Terminal Mountings.

**3.07** The J98703BP (Amplas) channel unit should not be used in bays having blowers. It may be used alone or together with other channel units in the various combinations indicated in Table 2 where temperatures, 6 feet above the floor in the middle of the aisle, do not exceed those indicated for more than 2 continuous hours.

**TABLE 2 — J98703BP CHANNEL UNIT USAGE**

| Bay or Mtg | Using Chan Unit J98703BP Together with Units Listed | Max Temp |
|---|---|---|
| J98703AT<br>J98703AW | J98703BP — Alone or with<br>J98703AP<br>J98703AH<br>J98703AM | 105 F |
| J98703AT<br>J98703AW | J98703W<br>J98703Y<br>J98703FA (cannot be used with J98703BA bay)<br>J98703TA | 90 F |
| J98703A | J98703BP — Alone or with<br>J98703AP<br>J98703AH<br>J98703AM | 95 F |
| J98703A | J98703W<br>J98703Y<br>J98703FA<br>J98703TA | 80 F |

### (E) Interchangeability and Identification of N1 Channel Unit Subassemblies

#### Compressor Subassemblies

**3.08** Table 1 shows that the compressor subassemblies used in the old and new channel units are alike. Therefore, the same compressor subassembly may be used with either the J98703F channel unit or the J98703FA channel unit.

#### Expandor-Signaling Subassembly

**3.09** The expandor-signaling subassembly in the J98703FA channel units may be one of two types, ED-92318-31, G3 or ED-92906, G2. The subassemblies are interchangeable, but the physical location of the potentiometers and test points in the units are different.

**3.10** The ED-92318-32, G4 expandor-signaling subassembly in the J98703F channel unit is physically similar to the ED-92318-31, G2 unit; however, the two units are ***not*** interchangeable. The units can be identified by the stamping on the rear of the subassembly. As indicated in Table 1 the new units are stamped G3. The old units will generally not show a group number, and therefore, may be assumed to be Group 1.

#### Carrier Subassemblies

**3.11** The carrier subassemblies for the F and FA channel units are not interchangeable. They are designated F or FA on the nameplate on the front of the unit. The subassemblies can also be identified by the "ED" number shown in Table 1, which is stamped on the rear of the unit, and by the identification label on the front (when provided).

**3.12** Carrier subassemblies produced since September, 1961 and carrier subassemblies which have been modified for improved channel regulation are identified by an adhesive backed aluminum label on the subassembly handle. They are interchangeable with the unmodified units. In addition to the regulator circuit change, several of the test points in the improved channel unit have been relocated to afford greater convenience in operation and testing.

#### Voice-Frequency Subassemblies

**3.13** The voice-frequency subassembly of the Thru Channel Unit can ***not*** be used with the J98703F carrier subassembly.

**3.14** The voice-frequency subassembly of the Special Services Channel Unit can ***not*** be used with the J98703F carrier subassembly.

**3.15** The voice-frequency subassembly of the Channel Unit Without Signaling can ***not*** be used with the J98703F carrier subassembly.

**Subassembly Identification**

**3.16** Each of the N1 channel unit subassemblies can be identified by an equipment drawing number stamped on the chassis. However, these numbers are hidden when a channel unit is completely assembled and covered. In view of this, identification labels have been mounted on the front of all subassemblies manufactured since September, 1961. Labels were made available for subassemblies produced prior to this date and are affixed to the front of most of the subassemblies. The identification number which appears on the label of these subassemblies is shown in Table 1.

**(F) Placement of Plug-In Units**

**3.17** The active components of N1 carrier systems are plug-in units. Extreme care must be exercised when inserting the plug-in units into a carrier terminal. The spring fingers of the small jack terminals of the multicontact jacks are easily bent. When one is bent, it not only may prevent good contact in that jack, but because of improper seating of the connector, may prevent proper contacts in the other jack terminals of the jack assembly.

**3.18** When a plug-in unit is inserted into the mounting, feel for the proper positioning of the connector with its jack assembly, then firmly push the unit home. If more force than this seems to be required, remove the unit and examine the connector and jack assembly for bent or broken parts. Damaged individual jack terminals may be replaced without replacing the whole jack assembly. Refer to Section 032-305-801 for procedures to repair or replace one of these jack assemblies.

**3.19** Care should be taken in placing the coverplate on the terminal mountings to see that the stud and the spring wire of the Dzus fastener are not damaged in locking the fastener. Only a quarter of a turn is required to reach the locking point and the stud should not be forced beyond that point. Damaged fasteners should be replaced in accordance with the procedures of Section 069-301-801.

**3.20** There are twelve channel units mounted on the three shelves of the N1 terminal mounting. Channel units 1 through 5 are mounted on the top shelf, channel units 6 through 10 are mounted on the second shelf and channel units 11 and 12 are mounted on the third shelf. If channel 13 is used, it takes the place of the replaced channel.

**(G) Checks for Proper Blower Operation**

**3.21** The net loss stability and life of N1 carrier terminal equipment, if equipped with blowers, are affected by correct blower operation. For correct blower operation, maintenance procedures of Section 161-452-701 should be followed. Abnormal noise or excessive heat above 125° F in the bays are indications of improper blower operation and should be checked. One of the probable causes of this type trouble would be dry or worn bearings. If a failure occurs and replacement parts are required, refer to Section 161-452-801 for correct parts and replacement procedures.

## 4. TEST EQUIPMENT

**(A) Requirements**

**4.01** The tests described in these sections require the use of the following test equipment. The test equipment should be periodically calibrated in accordance with the Bell System Practices covering their use.

1 — Hewlett-Packard 400-type Vacuum Tube Voltmeter

1 — K-14510, Volt-Ohm Milliammeter, Triplett 630, or equivalent (20,000 ohms/volt)

1 — 3A Noise Measuring Set

1 — 2B Signaling Test Set (J64730B with "W" option)

1 — Channel Unit Test Stand (J98705M)

1 — Weston Model 931 Voltmeter with a special red calibration mark of 1/4% accuracy at 38.5 volts

1 — KS-15538, L2, L3, L4, or L5 Carrier Frequency Voltmeter

1 — 2K Tube Test Set (J94002K) (For group unit)

1 — 2J Repeater Test Set (J94002J)

1 — 2N Group Unit Switching Set (J94002N)

1 — Channel Unit Extender (J98703BM-1)

1 — Transmission Measuring Set (21A, 23A, 40B, or equivalent)

1 — KS-19353 Selective Frequency Oscillator (Or 1000-cycle source)

1 — Frequency Counter (See 4.04) or 72A Frequency Meter

1 — 600-ohm Attenuator (For program channel line-up)

1 — P19A Cord (Used with channel test stand)

3 — W1Y Cords or equivalent (To temporarily strap cable pairs)

2 — W13A Cords (Used for connecting alternate receiving group unit to switching set)

1 — W2DW Cord, or equivalent (For use with the vacuum tube voltmeter)

1 — W20D Cord (REG REC GRP)

1 — W4AU Cord (Power cord for 2N switching set)

1 — 1W13B Cord

1 — 2P1D Cord (Used with 2B signaling test set)

1 — 2P4C Cord (Used with 2B signaling test set)

1 — 3P6F Cord (Used to connect 1000-cycle testing tone to the channel unit test stand)

2 — P36A918 Cord Tips

1 — ED-92345-30, G1 Cord Assembly (REG TRANS GRP)

1 — ED-92346-30, G1 Cord Assembly (ALT TRANS GRP)

2 — KS-13895 Plugs (Unwired)

2 — 262B Plugs (600-ohm termination)

1—ED-92717-30, G4 Adapter (135-ohm termination

**4.02** Special consideration should be given to periodically calibrating the KS-15538, Sierra carrier frequency voltmeter (CFVM) using an external source of power as described in the section covering its use. The CFVM should be given the local calibration, using the internal injection oscillator, at frequent intervals during the time the tests described in these practices are being performed. The controls should be adjusted for the calibration error previously determined in the calibration with an external source of power.

**4.03** The KS-15538, L4 CFVM is now standard. The KS-15538, L5 is a transistorized portable version convenient for use at locations that do not have a source of ac power. However, it does not have the frequency range for radio multiplex frequencies. The List 2 and 3 are suitable for use where they are available. The List 1 is less stable and its use may be questionable.

**4.04** The frequency counter must have a frequency range to 550 kc (for radio multiplex) or to 350 kc (for N, O and ON applications). The input circuit must be suitable for measuring as low as 0.1 volt ac. Most commercial models meeting the above requirements are acceptable.

### (B) Channel Unit Test Stand

**4.05** To obtain access to some of the potentiometers and test points it is frequently necessary during line-up to remove a channel unit from the terminal mounting. The J98705M channel unit test stand is provided for testing channel units which are removed from the terminal mounting. To use the test stand, remove the channel unit from the mounting and place it in the stand; turn the switch on the test set to the N1-O1 NORM position. Connect the P19A cord, which is associated with the test stand, to the jack from which the unit was removed and to the test stand.

***Caution: Do not insert or remove the unit from the test stand while the cord is connected to the terminal mounting.***

**4.06** To test channel units in the loop back position, set the test stand switch to N1-F or N1-FA LOOP position and adjust the

carier power to the proper level. The gain potentiometer on the test stand is adjusted for proper carrier level at the receiving side of the channel unit. Line-up procedures of the channel unit should be completed after completion of test in loop back position.

*Note:* Readjust regulator (REG) and expandor (EXP) potentiometers to their required values with the switch in the N1-O1 NORM position to the required value. This must be done because of differences in channel filters.

### (C) N1 Channel Unit Extender

**4.07** The J98703BM-1 N1 Channel Unit Extender is designed to provide an inplace transmitted carrier adjustment which is more precise than the adjustment made in the test stand. The P19A cord on the test stand introduces a loss averaging about 0.4 db to the transmitted carrier. After the channel is adjusted in the test stand and moved to its normal position in the terminal, the carrier level will be above the adjusted value. The channel unit extender removes the cause of this variation.

**4.08** To use the extender, each channel unit, one at a time, is slid out of its terminal mounting about 4 inches and reconnected to the terminal by using the extender. The MOD potentiometer is then adjusted for the correct carrier level at the group transmitting output.

**4.09** On channel units equipped with can covers, access to the MOD potentiometer is made through a drilled hole.

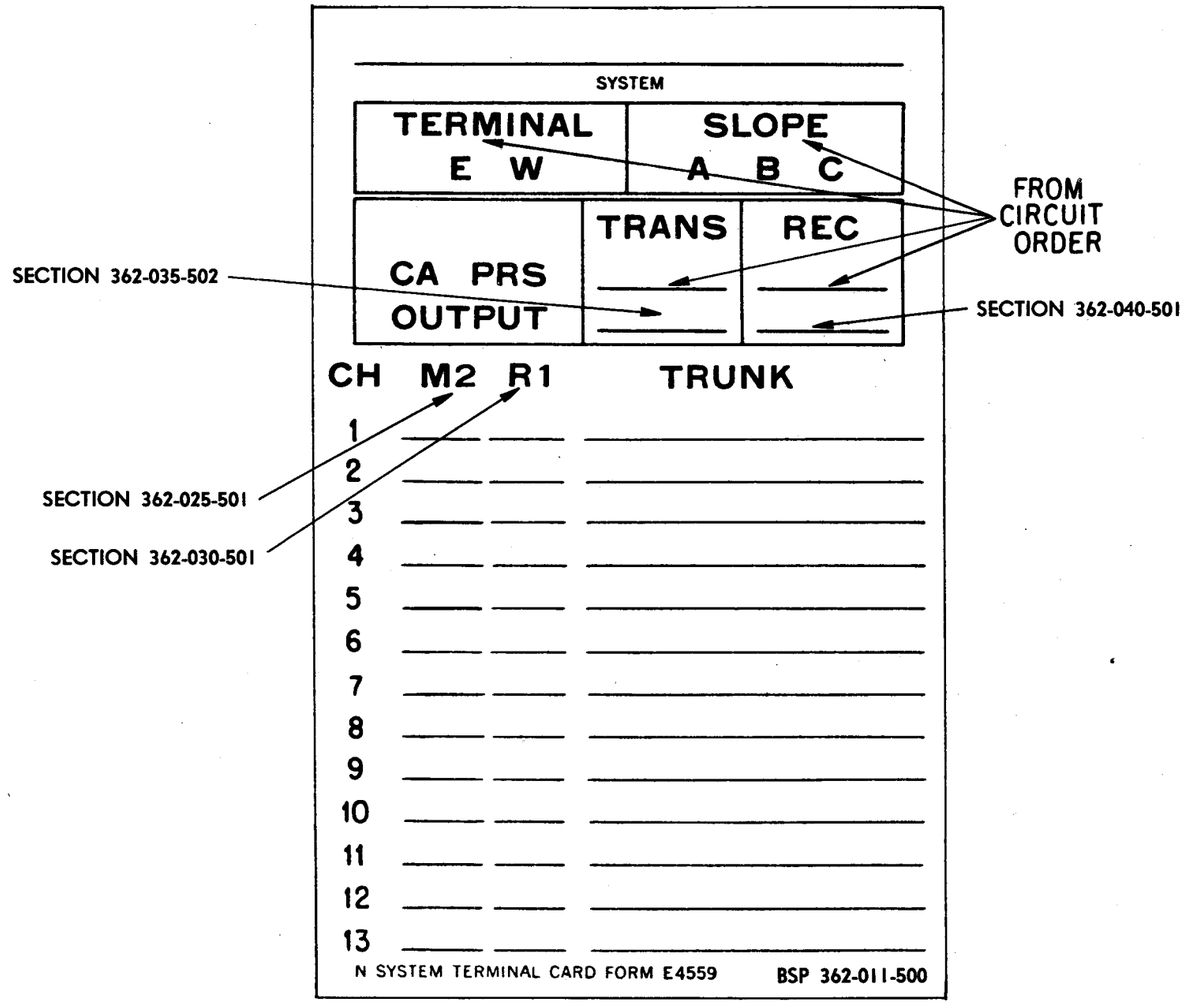
## 5. ASSOCIATED FORMS

**5.01** Copies of the forms necessary for recording information for future reference are included as part of this practice.

(a) Form E-4559 is used for recording the M2 jack readings and R1 jack readings. Space is also provided for recording the total power output of the transmitting and receiving group units.

(b) Form E-4856 is provided for use in the designation holders of the top and bottom terminals on 36 channel shop wired terminal bays. Form E-4857 is used in the same manner for the middle terminal. Space is provided on these forms for recording M2 jack and total power output of the transmitting and receiving group circuits. No space has been provided for recording R1 jack readings since the new and modified regulators used in these systems are adjusted to the same carrier output level at the R1 jack.

(c) Form E-4558-6 is used for recording the group unit channel carrier outputs as specified in the sections, and for computing the slope and plotting the resultant slope line of these carriers.




SYSTEM NO. PRINTED IN U.S.A.

| E W | A B C | TRANS. | REC. |
|---|---|---|---|
| TERMINAL | SLOPE | OUTPUT | |

| CH | M2 | TRUNK | CH | M2 | TRUNK |
|---|---|---|---|---|---|
| 1 | | | 7 | | |
| 2 | | | 8 | | |
| 3 | | | 9 | | |
| 4 | | | 10 | | |
| 5 | | | 11 | | |
| 6 | | | 12 | | |

N SYSTEM TERMINAL CARD FORM E-4856

PRINTED IN U.S.A.

| E W | A B C | SYSTEM | TRANS. | REC. |
|---|---|---|---|---|
| TERMINAL | SLOPE | | OUTPUT | |

| CH | M2 | TRUNK | CH | M2 | TRUNK | CH | M2 | TRUNK |
|---|---|---|---|---|---|---|---|---|
| 1 | | | 5 | | | 9 | | |
| 2 | | | 6 | | | 10 | | |
| 3 | | | 7 | | | 11 | | |
| 4 | | | 8 | | | 12 | | |

N SYSTEM TERMINAL CARD FORM E-4857

**COPIES OF FORMS E-4559, E-4856, AND E-4857**

SLOPE COMPUTATION N or ON CARRIER

362-400-510

E 4558-6 (11-63)

| CHAN. OR CARR. NO. | MULTIPLY BY – (a) | MULTIPLY BY + (b) | OUTPUT dbm + (c) | OUTPUT dbm – (d) | PRODUCTS (a)×(d) OR (b)×(c) + (e) | PRODUCTS (a)×(c) OR (b)×(d) – (f) |
|---|---|---|---|---|---|---|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6† | | | | | | |
| 7 | | | | | | |
| LCO* | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | | |
| TOTALS | | | | | | |
| DIFF. BETWEEN COL. (c) AND (d); (e) AND (f) RETAIN SIGN OF LARGER | | | (g) | | (h) | |

BLOCK 1

DATE _____ SYSTEM _____

TESTER _____ LOCATION _____

SLOPE SETTING _____ TYPE EQUIP. _____

TEMP. _____ DIRECTION _____

CHANNELS or GROUPS USED _____

BUILD OUT EQPT VALUES AL ____ SP _____

† N CARRIER
When A & B Program Channel is used, reduce measured value by 5.0 db

*ON CARRIER

| GROUPS USED (+LCO) | REDUCE MEASURED VALUE BY |
|---|---|
| 1 | 11.5 |
| 12 | 10.0 |
| 123 | 9.0 |
| 1236 | 7.0 |
| 12356 | 4.0 |

BLOCK 2 — 362-400-510
DETERMINATION OF SLOPE (S)
SLOPE = $S = \frac{(h)}{k} = \_\_ =$

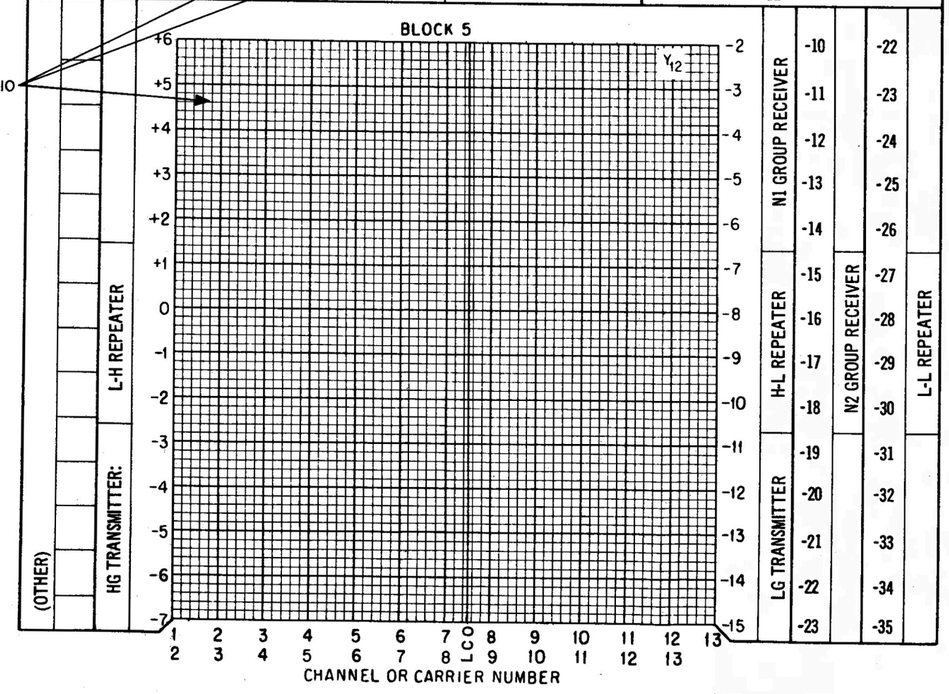
DESIGN SLOPE _____

BLOCK 3 — 362-400-510
DETERMINATION OF $Y_0$
$Y_0 = \frac{(g)}{M} = \_\_ =$

BLOCK 4 — 362-400-510
DETERMINATION OF $Y_{12}$
$Y_{12} = NS + Y_0$
$N \times S =$ X =
$Y_0 =$ _____
$Y_{12} =$ (SUM)

362-400-510

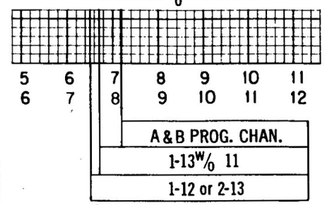
BLOCK 5



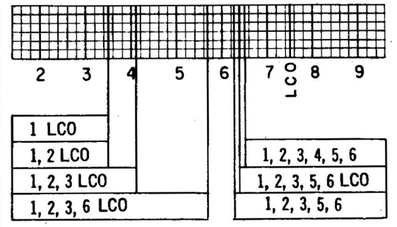

N CARRIER

| CHANNEL | | CHANNELS EQUIPPED: 12 – (a) | 12 + (b) | 1-13W/o 11 – (a) | 1-13W/o 11 + (b) | A&B PROG – (a) | A&B PROG + (b) | CHANNEL | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | -11 | | -11.3 | | -12.4 | | 1 | 2 |
| 2 | 3 | - 9 | | - 9.3 | | -10.4 | | 2 | 3 |
| 3 | 4 | - 7 | | - 7.3 | | - 8.4 | | 3 | 4 |
| 4 | 5 | - 5 | | - 5.3 | | - 6.4 | | 4 | 5 |
| 5 | 6 | - 3 | | - 3.3 | | - | | 5 | 6 |
| 6 | 7 | - 1 | | - 1.3 | | - 2.4 | | 6 | 7 |
| 7 | 8 | | + 1 | | + 0.7 | | - | 7 | 8 |
| | | | | | | | | | |
| 8 | 9 | | + 3 | | + 2.7 | | + 1.6 | 8 | 9 |
| 9 | 10 | | + 5 | | + 4.7 | | + 3.6 | 9 | 10 |
| 10 | 11 | | + 7 | | + 6.7 | | + 5.6 | 10 | 11 |
| 11 | 12 | | + 9 | | - | | + 7.6 | 11 | 12 |
| 12 | 13 | | +11 | | +10.7 | | + 9.6 | 12 | 13 |
| 13 | | | | | +12.7 | | +11.6 | 13 | |
| K | | | 26 | | 30 | | 32 | | K |
| M | | | 12 | | 12 | | 11 | | M |
| N | | | .50 | | .49 | | .44 | | N |

N CARRIER $Y_0$ POSITION




ON 2 CARRIER $Y_0$ POSITION




ON 2 CARRIER

| CARR | GROUPS EQUIPPED: 1, 2, 3, 4, 5, 6 – (a) | 1, 2, 3, 4, 5, 6 + (b) | 1, 2, 3, 5, 6 – (a) | 1, 2, 3, 5, 6 + (b) | 1, 2, 3, 5, 6 LCO – (a) | 1, 2, 3, 5, 6 LCO + (b) | 1, 2, 3, 6 LCO – (a) | 1, 2, 3, 6 LCO + (b) | 1, 2, 3 LCO – (a) | 1, 2, 3 LCO + (b) | 1, 2 LCO – (a) | 1, 2 LCO + (b) | 1 LCO – (a) | 1 LCO + (b) | CARR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -11 | | -10.6 | | -10.8 | | -9.5 | | -6.2 | | -5 | | -5 | | 1 |
| 2 | - 9 | | - 8.6 | | - 8.8 | | -7.5 | | -4.2 | | -3 | | -3 | | 2 |
| 3 | - 7 | | - 6.6 | | - 6.8 | | -5.5 | | -2.2 | | -1 | | | | 3 |
| 4 | - 5 | | - 4.6 | | - 4.8 | | -3.5 | | -0.2 | | | +1 | | | 4 |
| 5 | - 3 | | - 2.6 | | - 2.8 | | -1.5 | | | +1.9 | | - | | | 5 |
| 6 | - 1 | | - 0.6 | | - 0.8 | | | + 0.6 | | +3.9 | | - | | | 6 |
| 7 | | + 1 | | - | | | | - | | - | | - | | | 7 |
| LCO | | - | | - | | + 2.2 | | + 3.6 | | +6.9 | | +8 | | +8 | LCO |
| 8 | | + 3 | | - | | - | | - | | | | | | | 8 |
| 9 | | + 5 | | + 5.4 | | + 5.2 | | - | | | | | | | 9 |
| 10 | | + 7 | | + 7.4 | | + 7.2 | | - | | | | | | | 10 |
| 11 | | + 9 | | + 9.4 | | + 9.2 | | +10.6 | | | | | | | 11 |
| 12 | | +11 | | +11.4 | | +11.2 | | +12.6 | | | | | | | 12 |
| K | 26 | | 25.5 | | 25.7 | | 21.4 | | 5.7 | | 4.5 | | 4.5 | | K |
| M | 12 | | 10 | | 11 | | 9 | | 7 | | 5 | | 3 | | M |
| N | .50 | | .52 | | .51 | | .57 | | .73 | | .77 | | .77 | | N |