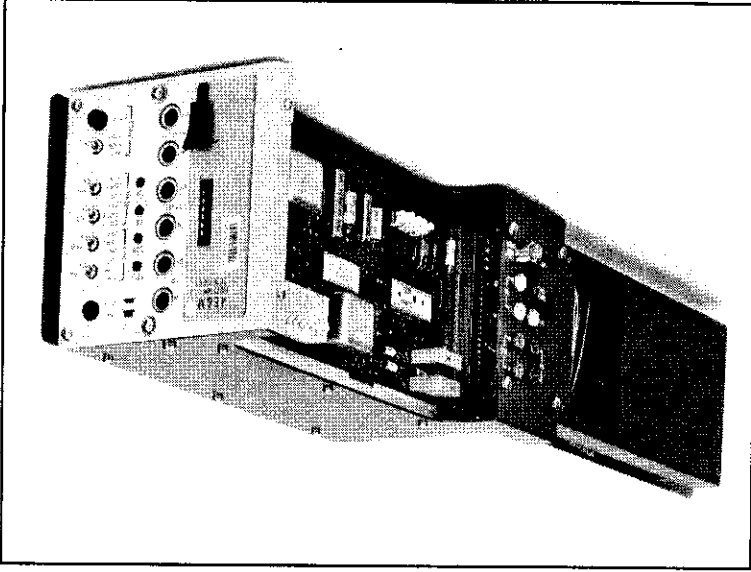


A025431B0G



Operation Manual

Channel Unit Extender Test Set

431B

SOM-431B
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Sierra®

SIERRA 431B-1 & 431B-2
SIERRA 431B-21 & 431B-22
Channel Unit Extender Test Set
Operational Manual
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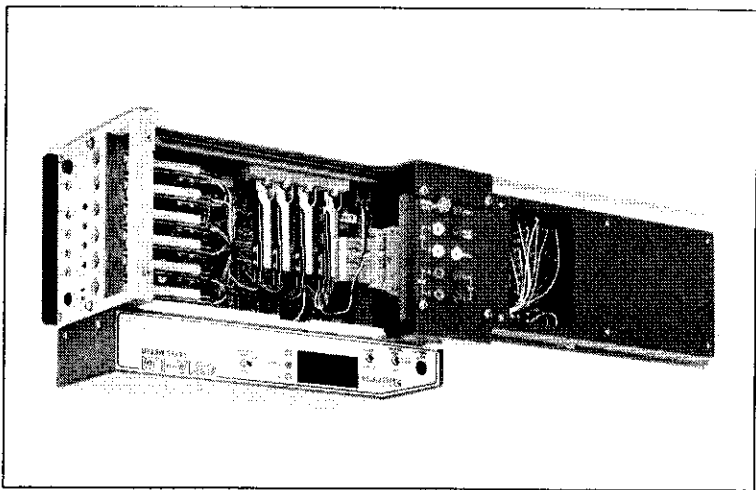
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Fig. 1-1
431B showing Level Meter



GENERAL INFORMATION

1.1 INTRODUCTION

The Sierra 431B Test Set incorporates several test functions in one specialized instrument. It can be used in place of four pieces of standard test equipment: (1) Signaling Path Test Set (SPTS), (2) Channel Unit Extender, and (3) D3/D4 Portable Test Set with (4) Channel Access Unit (CAU).

This manual can be used for all versions of models 431A and 431B:

- 431B-1 Measures actual levels in the channel unit (CU).
- 431B-2 Normalized so that the Test Level Points (TLPs) appear at 0 dbm, like the D3/D4 Test Set with the CAU.
- 431B-21 431B-1 with a built-in 431A-LM.
- 431B-22 431B-2 with a built-in 431A-LM.

The 431A-LM is an optional Level Meter.

SPTS Functions - Monitors and displays the received A & B signaling bits from the distant end. Provides switches for the user to establish the transmit signaling status toward the distant end. A second set of indicators displays the transmit A & B signaling bits from the CU under test. Provides a second set of switches to control the receive signaling status of the CU under test. In addition, the 431B has a THRU position on these switches where the A & B signaling

bits to and from the distant end pass directly to and from the CU, making the Test Set electrically transparent.

Channel Unit Extender - Replaces the channel unit in the shelf slot. Provides a jack field for access to the line and drop side of the receive and transmit signals and the E & M signals. Provides mounting for the channel unit with easy access to its circuitry.

D3/D4 Portable Test Set Functions with Channel

Access Unit (CAU) - Provides connection points for the transmit and receive signals when the test set is equipped with a 431A-LM Level Meter, or when it is used with an external analog Test Set. Provides an oscillator for insertion of a tone into the signal path.

1.2 APPLICATION OF TEST SET

The Sierra 431B Test Set provides a compact means of testing the receive and transmit analog path of any given channel unit in either SLC-96* systems or D4 channel banks. The 431B provides access to the drop side VF circuits and to the internal VF test points of the channel units. It also provides access and control of the E & M circuit and also of the A and B signaling bits.

*Trademark of the AT&T Technologies.

1.3 FUNCTIONAL DESCRIPTION

General System Information - The D4 Channel Banks and the SLC-96* System are both designed to convert multiple channels of voice frequency signals into T-carrier digital pulse streams.

With respect to each channel unit, the direction toward the voice frequency (VF) metallic cable-pair is known as the DROP side, and the direction toward the T-carrier line is known as the LINE side.

Function of Sierra 431B - The 431B is primarily designed to test the receive and transmit operation of any given channel unit. Either VF or data port channel units can be tested. Access is provided to the drop-side cable pairs in both the LINE and DROP directions. Access is also provided to the internal VF test points within the channel unit, so that gain or attenuation between the test points and the cable pairs can be measured. These measurements can be made on both transmit and receive parts of the CU. When the VF path is broken, a tone is available to insert at a known reference level. This permits completion of the analog circuit for monitoring operation on the line side.

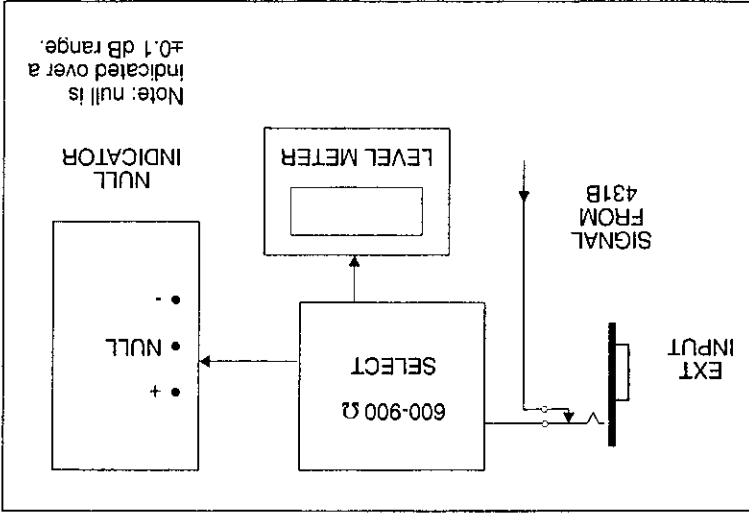


Fig. 1-2
431A-LM Functional Diagram

Fig. 1-3
431B-1 Functional Diagram

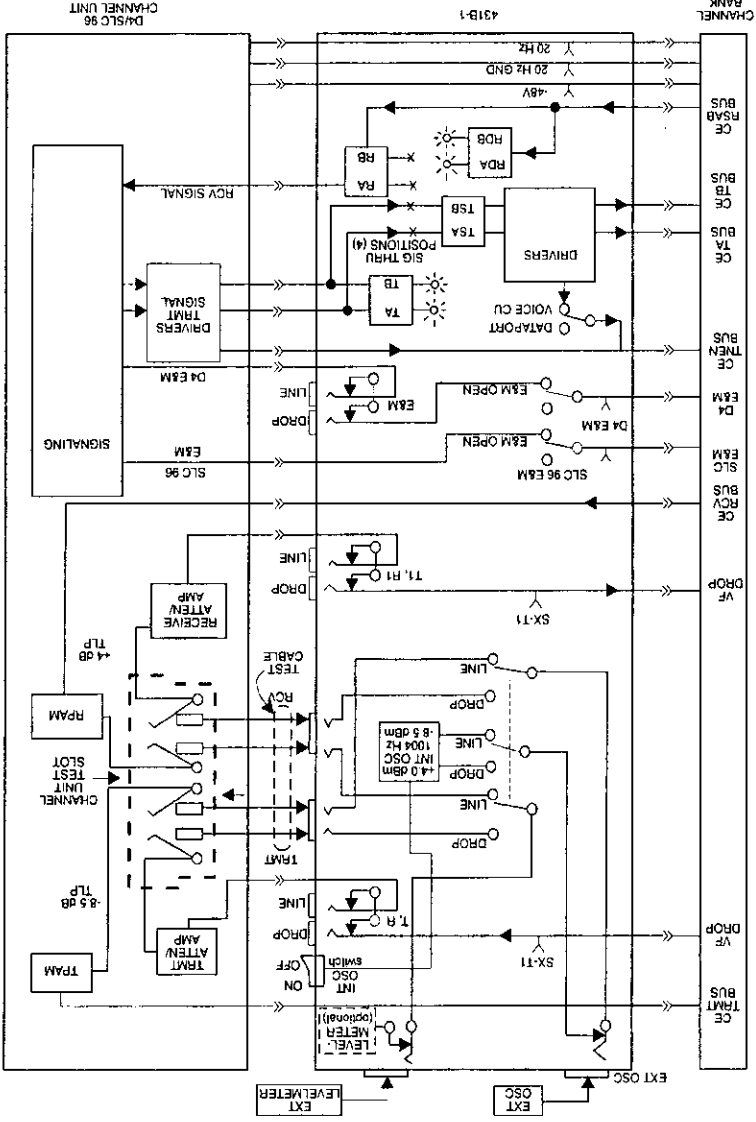
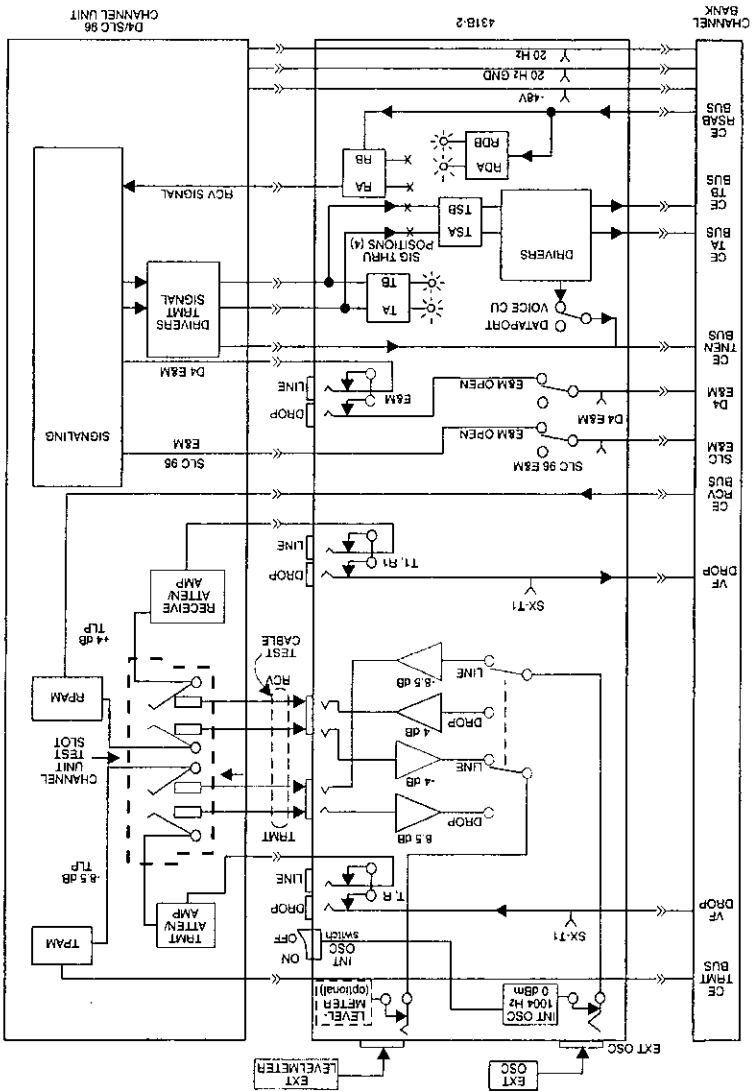


Fig. 1-4
431B-2 Functional Diagram



CHANNEL BANK
431B-2
D4/SLC 96 CHANNEL UNIT

431B Tests Two Types of Channel Unit - VF and data port channel units do not have the same pin-out. However, the 431B is able to test both types. It is equipped with a DATA PORT Switch located on the back (the panel opposite the Front Panel). This switch provides two positions:

- (1) DATA PORT for data channel units, and
- (2) VOICE CU for VF channel units.

Functional Diagrams. - As an aid to understanding the operation of the 431B, refer to the functional diagrams:

431A-LM	Fig. 1-2 (p. 1-3)
431B-1	Fig. 1-3 (p. 1-4)
431B-2	Fig. 1-4 (p. 1-5)

VF Circuit Testing - For VF circuit testing the 431B can be equipped with the optional 431A-LM Level Meter. Without this option, an external meter must be connect the to EXT DET jack.

The 431B-1 and the 431B-21 provide internal test tones of 404, 1004, and 2804 Hz with an output level at -8.5 dbm for testing at the transmit TLP of the channel unit, and at +4.0 dbm for testing at the receive TLP.

The 431B-2 and the 431B-22 provide internal test tones of 404, 1004, and 2804 Hz at 0.0 dbm. A built-in attenuator gives a level of -8.5 dbm for testing at the transmit TLP of the channel unit, and an amplifier gives +4.0 dbm for the receive TLP.

NOTE: Setting of the LINE/DROP push-button switch controls the direction of the signal in the 431B.

If the user desires a signal source with a different level or frequency, an external source can be connected to the EXT OSC jack. When a plug is inserted in this jack, the internal source is disconnected and disabled.

The 431B-1 and the 431B-21 require the input at the EXT OSC jack of the actual levels applied at the TLPs in the Channel Unit (CU).

An example of using the 431B Test Sets that read the *actual* signal levels:

1. For a level of -21.5 dbm at the transmit TLP of the channel unit, -21.5 dbm should be inserted into the EXT OSC jack and the LINE/DROP push-button set to LINE.

2. For a level of -21.5 dbm at the receive TLP of the channel unit, -21.5 dbm should be inserted into the EXT OSC jack and the LINE/DROP push-button switch set to DROP.

The 431B-2 and the 431B-22 are normalized so that the TLPs appear at 0 dbm. The signal travels through an amplifier for positive gain or an attenuator for negative gain in level to match to the TLPs in the Channel Unit (CU).

An example of using the 431B Test Sets that read the normalized levels:

1. For a level of -21.5 dbm at the transmit TLP of the channel unit equipment, -13.0 dbm should be inserted into the EXT OSC jack and the LINE/DROP push-button switch set to LINE.

2. For a level of -21.5 dbm at the receive TLP of the channel unit, -25.5 dbm should be inserted in the EXT OSC jack and the LINE/DROP push-button switch set to DROP.

Use of the Test Probe - In VF testing the 431B uses a test probe which is inserted into the channel unit (CU) under test. The probe, together with the internal circuitry of the 431B, allows two selections of test configuration by operating the LINE/DROP push-button switch on the front panel.

Push-button Switch in LINE Position - The 431B is configured to test the Pulse Amplitude Modulation (PAM) sections of the channel unit. The Level Meter will read the VF output of the RPAM, and the signal source is connected to supply the selected tone into the VF input of the TPAM.

Push-button Switch in DROP Position - The 431B is configured to test the performance of the transmit and receive VF paths through the channel unit. An external signal source of known level and be inserted into the VF input to measure the level through the VF transmit path. Also, the internal signal source can be used to measure the level through the VF receive path.

Testing the Signaling Information - The A and B signaling bit information, which is ordinarily connected directly into the channel unit when it is in the shelf, is brought to the front panel of the 431B. The information from both the channel unit and from the channel bank is displayed by indicator lights. Toggle switches on the front panel of the 431B permit the selection of the status of both A and B bits to be indicated into the channel unit and into the channel

bank. In addition, these toggle switches also have a THRU position which permits passing the signaling information directly into the channel unit, as occurs when it is in the shelf.

The E/M circuit passes through the 431B and is brought to the front panel at two 310 jacks, permitting access in either the LINE or DROP (D4) direction. Additional pin jacks allow access to both SLC-96 and D4 E & M lines. A normally closed push-button switch, E&M OPEN, opens the E & M lines to connect the jacks only to the line side.

Other Test Points - There are nine circuit-access test points on the side of the 431B. These are:

E-SCL, M-SLC, E-D4, M-D4, SX-T, SX-T1, 20 HZ, 20 HZ GRD, and -48V.

These test points are described in Table 3-1 and Fig. 3-4 (page 3-9).

SOM-431B

OPERATION

2.1 INTRODUCTION

The 431B is available in four versions: the 431B-1 and the 431B-21 measure actual levels; the 431B-2 and the 431B-22 are normalized so that the TLPs appear at 0 dbm. This section provides operational information for all units. With the exception of the additional internal oscillator tones available with model 431B, the 431A models work identically.

2.2 RECEIVING INFORMATION

When the Test Set is received, unpack and inspect it carefully. Check the equipment received against the order.

The 431B Channel Unit Extender Test Set is furnished with a test probe which has an attached cable and plug (Sierra Part Number C03512300).

2.3 CUSTOMER SERVICE

If the Test Set is found to be damaged or does not operate properly, or if the contents of the shipment are not complete, contact the Sierra Customer Service Department (see Section 5).

2.4 POWER REQUIREMENTS

The 431B draws its power from the channel unit slot. DC power is used at -12V, +12V and +5V. The power consumption is given in Section 4, Technical Data.

2.5 INSTALLATION

Channel Unit and Extender - Identify the channel unit (CU) to be tested and remove it from the shelf slot. Insert the extender portion of Sierra 431B into the shelf slot, being sure it is fully seated. Insert the CU into the 431B.

DATA PORT Switch Setting - Both data and voice channel units (CU) can be tested. The 431B has a switch on the back (the panel opposite the Front Panel) which can be set to accommodate either type CU.

In the VOICE CU position, a VF channel unit can be tested in the well, and signaling tests can be made with or without a CU in the well.

In the DATA PORT position, both VF and Data CUs can be tested in the well, but signaling tests cannot be made unless there is a CU in the well.

Test Probe - For VF testing, connect the test probe to TRMT and RCV jacks on the bottom of 431B and to the TST connector on the front of the channel unit (CU) under test.

In using the probe, be sure to seat the dual 310 plug such that the serrated edge (TRMT side) is toward the front. Also be sure the contact finger board is inserted in the TST connector on the front of the channel unit with the key slot on the bottom.

NOTE: If making noise test using the 431B, the INT OSC (Internal Oscillator) switch on the bottom panel must be turned OFF.

2.6 SIGNALING TESTS

Signaling tests are conducted without the use of the test probe. Direct access to the D4 E/M circuits is available on the front panel of the 431B; use the LN (LINE) jack or the DP (DROP) jack, as needed.

Read status of received signaling bits A and B from the distant end on indicators RDA and RDB. A and B bit indications which do not correlate with the far end signaling status indicate faulty operation in the common equipment or the channel bank.

Set status of transmitted signaling bits A and B toward the far end with switches TSA and TSB. If the E relay at the far end does not respond to the signaling commands, this may indicate faulty operation in the common equipment or the channel bank.

Read status of transmitted signaling bits A and B from channel unit (CU) under test on indicators TA and TB. Readings which do not correspond with the drop side condition may indicate faulty operation in the channel unit under test.

Set status of received signaling bits A and B toward channel unit (CU) under test using switches RA and RB. If the E relay in the channel unit under test does not respond to the signaling commands, this indicates faulty operation in the channel unit.

To pass signaling information directly from common equipment (CE) to channel unit (CU), set all toggle switches to the THRU position.

2.7 V.F. TESTS (Analog Tests on Transmitt Side)

The test probe is used during VF testing and when it

is in place, the circuit of the *transmit* side is broken at the -8.5 dbm Test Level Point (TLP) within the channel unit (CU) under test. Both parts of the circuit are accessed with the test probe. Level readings can be taken on the VF path, and a known signal can be inserted into the Transmit Pulse Amplitude Modulation (TPAM) circuit.

VF Circuit Performance

Step 1. Patch the TR LN jack on the 431B front panel to an external VF oscillator (Sierra 808D or similar).

Step 2. If the 431B is *not* equipped with the Level Meter option, connect a patch cord from the EXT DET jack on the 431B bottom panel to a Level Meter which provides a 600 Ω termination (Sierra 808D or similar).

Step 3. Set the VF oscillator for desired output.

Step 4. Set the LINE/DROP push-button switch on the 431B front panel to the DROP position.

Step 5. Read Level Meter. Using the input from the VF oscillator as a reference, Level Meter readings show the transmit VF gain or attenuation within the channel unit.

Transmit Signal Insertion

Step 1. The 431B transmit TLP (test level point) is at -8.5 dbm, which is supplied by an internally generated signal at 1004 Hz. If desired, a different frequency and/or level (+10.0 dbm max.) can be inserted at the EXT OSC jack on the bottom panel. With a plug in this jack, the internal 1004 Hz signal is disconnected.

For the 431B-1 and the 431B-21:
To provide -8.5 dbm at TLP, apply a -8.5 dbm input level at the EXT OSC jack.

For the 431B-2 and the 431B-22:
To provide -8.5 dbm at TLP, apply a 0 dbm input level at the EXT OSC jack.

Step 2. Set the LINE/DROP push-button switch on the 431B front panel to the LINE position.

Step 3. The known signal is now supplied to the input of the TPAM circuits for use in testing the digital circuits.

2.8 V.F. TESTS (Analog Tests on Receive Side)

The test probe is used during VF testing and when it is in place, the circuit of the receive side is broken at the +4.0 dbm Test Level Point (TLP) within the channel unit (CU) under test. Both the transmit and the receive paths of the circuit are accessed with the test probe. Level readings can be taken on the VF path. The level of the output of the Receive Pulse Amplifier Modulation (RPAM) circuit can also be measured.

VF Circuit Performance

Step 1. The 431B receive TLP (test level point) is at +4.0 dbm, which is supplied by an internally generated test tones. If desired, a different frequency and/or level (+10.0 dbm max.) can be inserted at the EXT OSC jack on the bottom panel. With a plug in this jack, the internal 1004 Hz signal is disconnected and disabled.

Step 2. Connect a patch cord from one of the LN jacks on the 431B front panel to a Level Meter which

provides a 600Ω termination (431B Level Meter option, Sierra 808D or similar). On a 2-wire channel unit, use the TR LN jack; on a 4-wire unit, use T1, R1 LN.

Step 3. Set the LINE/DROP push-button switch on the 431B front panel to the DROP position.

Step 4. Read Level Meter. Using the input from the VF oscillator as a reference, Level Meter readings show the receive VF gain or attenuation within the channel unit.

RPAM Output Level

Step 1. Establish a signal into the RPAM circuit from the common equipment of known frequency and level. (Connect a VF oscillator at the distant end.)

Step 2. If the 431B is not equipped with the Level Meter option, connect a patch cord from the EXT DET jack on the 431B bottom panel to a Level Meter which provides a 600Ω termination (Sierra 808D or similar).

Step 3. Set the LINE/DROP push-button switch in the 431B front panel to the LINE position.

Step 4. Read Level Meter. Using the known signal input to the RPAM as a reference, Level Meter readings show the VF performance of the RPAM.

For the 431B-1:

A Level Meter connected to the EXT DET jack should read +4.0 dbm.

For the 431B-2:

A Level Meter connected to the EXT DET jack should

read 0.0 dbm.

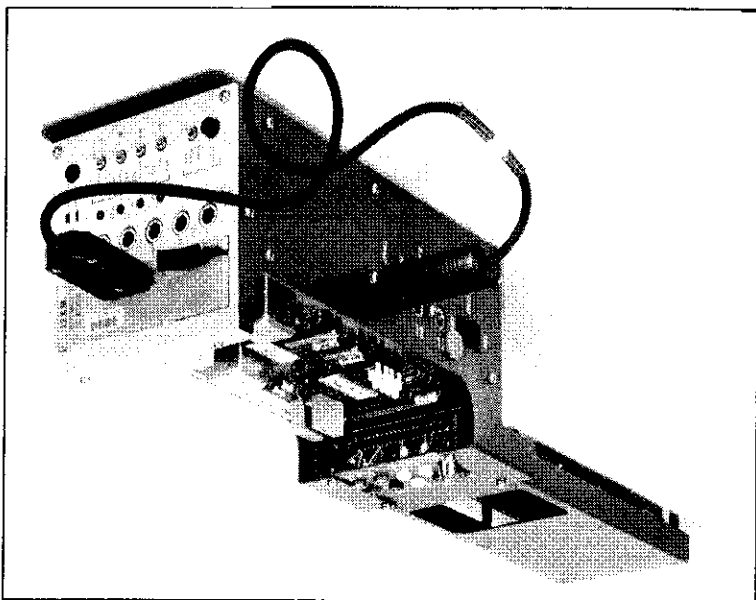
For the 431B-21:

To verify a +4.0 dbm RPAM TLP, the Level Meter should read +4.0 dbm.

For the 431B-22:

To verify a +4.0 dbm RPAM TLP, the Level Meter should read 0.0 dbm.

431B Channel Unit Extender Test Set
Fig. 3-1



PHYSICAL DESCRIPTION

3.1 GENERAL APPEARANCE

A view of the Sierra 431B without the optional Level Meter is shown in Fig. 3-1. See Fig. 1-1 (opposite page) for the 431B with a Meter.

The Test Set box is nearly 5" square without the Level Meter, and 5" x 6-5/8" with the Meter. When positioned in the bay for testing, the Test Set projects approximately 11-1/2" from the face of the relay rack. The back of the 431B has a 10" extender which is inserted into the slot for the channel unit under test. The channel unit itself is inserted into the front of the 431B, which is arranged for easy access to the circuitry of the channel unit. [Fig. 3-1 shows a typical channel unit in place.]

3.2 TEST PROBE

The Sierra 431B is furnished with a test probe (Sierra part number C03512300) which is used in VF testing on channel units. The probe consists of a multi-wire cable, about 24" long, with a dual 310 plug on one end and a set of contact fingers on the other.

3.3 CONTROLS, CONNECTORS AND INDICATORS

The various operating panels of the 431B are found in these tables and figures:

Front Panel	Fig. 3-2, Table 3-1
Bottom Panel	Fig. 3-3, Table 3-1
Side Panel	Fig. 3-4, Table 3-1
Level Meter	Fig. 3-5, Table 3-2

Fig. 3-2
Front Panel

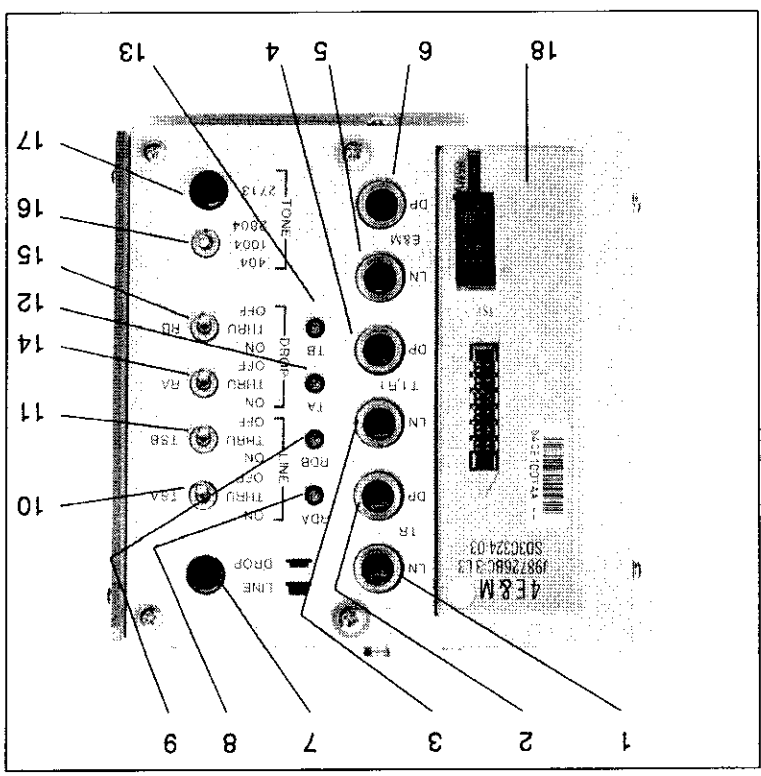


TABLE 3-1
CONTROLS, CONNECTORS AND INDICATORS

Item Name	Function
1. TR LN (T/R LINE)	Allows access to the transmit and receive VF circuit toward the line side on 2-wire channel units, and to transmit only on 4-wire channel units. Opens the circuit from the drop side.
2. TR DP (T/R DROP) jack	Allows access to the transmit and receive VF circuit from the drop side on 2-wire channel units, and to receive only on 4-wire channel units. Opens the circuit toward the line side.
3. T1, R1, LN (T1/R1 LINE) jack	Allows access to the receive VF circuit from the line side on 4-jack wire channel units. Opens the circuit toward the drop side.
4. T1, R1 DP (T1/R1 DROP) jack	Allows access to the transmit VF circuit toward the drop side on jack 4-wire channel units. Opens the receive circuit from the line side.

FRONT PANEL (Fig. 3-2)

table continued

TABLE 3-1 (Continued)
 CONTROLS, CONNECTORS AND INDICATORS

Item	Name	Function
5.	E&M IN (E/M LINE) jack	Allows access to the signals at the line side on D-4 4 wire E&M jack circuits only. Opens the E&M drop side. (Not usable with D4CE800.)
6.	E&M DP (E/M DROP) jack	Allows access to the signals at the drop side on D-4 4-wire jack E&M circuits only. Opens the E&M line side. (Not usable with D4CE800.)
7.	LINE/DROP	Button Out - Connects VF oscillator and detector to line side of test-probe circuit. Button In - Connects VF oscillator and detector to drop side of test-probe circuit.
8.	LINE RDA lamp	Indicates status of the receive signaling bit A. ON = Logic 1; OFF = Logic 0.
9.	LINE RDB lamp	Indicates status of the receive signaling bit B. ON = Logic 1; OFF = Logic 0.

table continued

TABLE 3-1 (Continued)
 CONTROLS, CONNECTORS AND INDICATORS

Item Name	Function
10. LINE TSA switch	Sets transmit signaling bit A ON = Logic 1; OFF = Logic 0. THRU passes bit A from CE to CU.
11. LINE TSB switch	Sets transmit signaling bit B ON = Logic 1; OFF = Logic 0. THRU passes bit B from CE to CU.
12. DROP TA lamp	Indicates status of the transmit signaling bit A. ON = Logic 1; OFF = Logic 0.
13. DROP TB lamp	Indicates status of the trans- mit signaling bit B. ON = Logic 1; OFF = Logic 0.
14. DROP RA switch	Sets receive signaling bit A. ON = Logic 1; OFF = Logic 0. THRU passes bit A from CU to CE.
15. DROP RB switch	Sets receive signaling bit B. ON = Logic 1; OFF = Logic 0. THRU passes bit B from CU to CE.

FRONT PANEL (Fig. 3-2) (Continued)

TABLE 3-1 (Continued)
 CONTROLS, CONNECTORS AND INDICATORS

Item	Name	Function
16.	TONE switch	Three-position switch selects from 404, 1004, and 2804 HZ internal oscillator test tones.
17.	2713 TONE switch	When pressed, momentary-type switch provides 2713 looping tone instead of selected test tones.
18.	Channel Unit Well	Test set well for insertion of channel unit under test (CU). [Fig. 3-1 shows a typical channel unit in place.]

FRONT PANEL (Fig. 3-2) (Continued)

Fig. 3-3
Bottom Panel

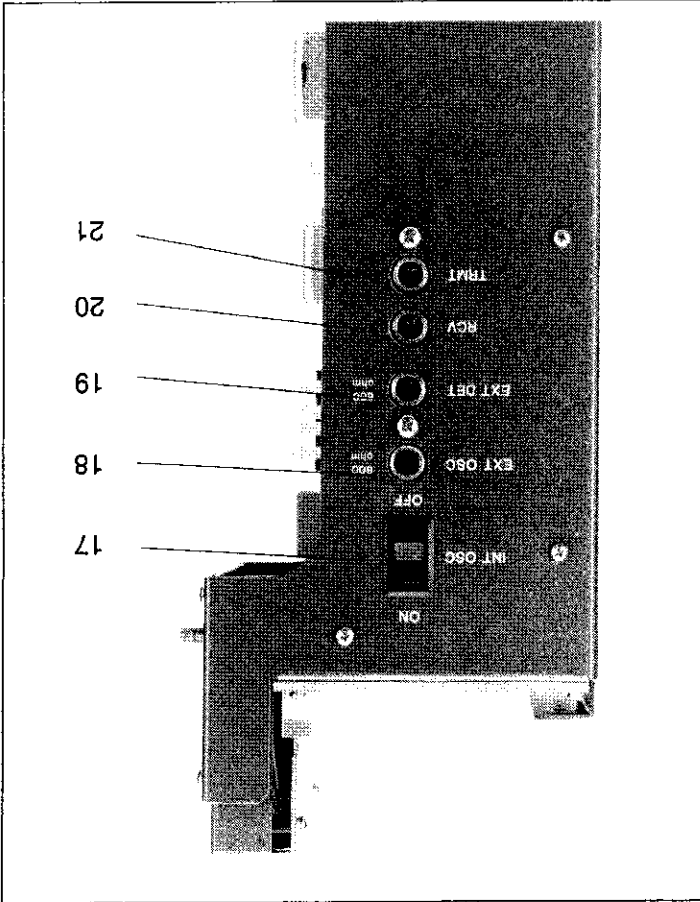


table continued

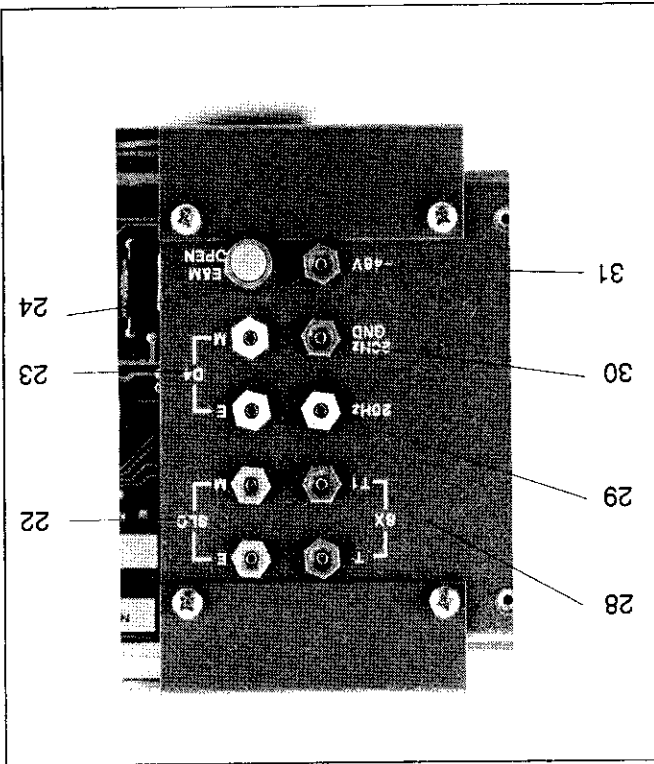
Item Name	Function
19. INT OSC	OFF disables internal oscillator. ON enables internal oscillator unless a jack is inserted in EXT OSC.
20. EXT OSC jack	Connection point for external oscillator. (+10.0 dbm max.) Internal oscillator is disconnected and disabled when jack is inserted.
21. EXT DET jack	Connection point for external Level Meter. The optional Level Meter is disconnected when a jack is inserted here.
22. RCV jack*	Test probe connection point for receive circuits of channel unit.
23. TRMT jack*	Test probe connection point for transmit circuits of channel unit.

*NOTE: RCV and TRMT jacks are normally accessed by the dual 310 plug of the 431B test probe.

BOTTOM PANEL (Fig. 3-3)

TABLE 3-1 (Continued)
CONTROLS, CONNECTORS AND INDICATORS

Fig. 3-4
431B Side Panel



... ..

TABLE 3-1 (Continued)
 CONTROLS, CONNECTORS AND INDICATORS

Item	Name	Function
24.	E&M SLC jacks	Allow access to the SLC-96 E&M signals of the remote terminal.
25.	E&M D4 jacks	Allow access to E&M signals at D4 banks and SLC-96 Central Office terminals.
26.	E&M OPEN push-button	Normally closed, this push- button switch allows the E&M leads to be momentarily opened if required. (The SLC E&M jacks and the D4 E&M jacks are on the channel bank side of this switch.)
27.	-48V jack	Allows access to the office battery voltage.
28.	20 Hz GND	Allows access to the ground line for BUSY and 20 Hz tests.
29.	20 Hz jack	Allows access to the ringing circuit through a 1470 Ω resistor.
30.	T & T1 SX jacks	Allow access to a DC simplex voltage.

431B SIDE PANEL (Fig. 3-4)

table continued

TABLE 3-1 (Continued)
 CONTROLS, CONNECTORS AND INDICATORS

Item Name	Function
431B BACK PANEL (Not Shown)	DATA PORT position provides access for either VF or (Not DATA PORT shown) switch
	data channel units. Signaling tests cannot be made unless there is a CU in the well.
	VOICE CU position provides access for VF channel units, but not for data CUs. Signaling tests can be made with or without a CU in the well.

TABLE 3-2
431A-1M LEVEL METER
CONTROLS, CONNECTORS AND INDICATORS

Item Name	Function
1. EXT INPUT jack	Input to Level Meter measuring circuit. A plug in this jack disables the internal connection to the 431A meter circuit.
2. OHMS switch	Selects the input impedance. Must be set to 600Ω for the internal circuit.
3. BRDG TERM switch	Selects BRIDGING or TERMINATED for the input. Must be set to TERM when the internal circuit is used.
4. Digital Display	3-1/2-position LED read-out shows level in dbm.
5. Null Indicator	3 single LEDs show null on green light. Both + and - indicated by amber light. The green NULL indicator covers a range of ± 0.1 dB with respect to the actual null point.
6. SOUND switch	Controls internal audible null indicator. (OFF and ON only.)

Figure 3-5. Optional Level Meter. (SOM-431B)

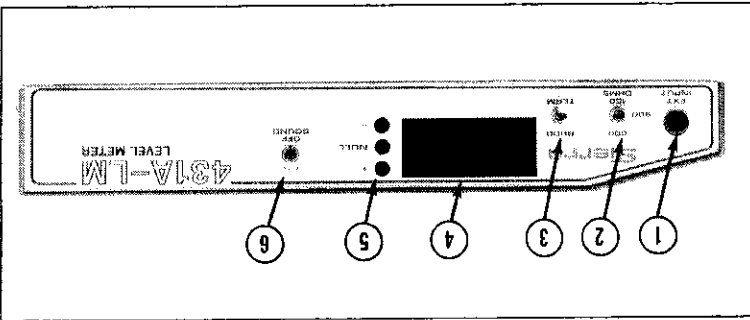


Fig. 3-5
Optional Level Meter

SOM-431B

TECHNICAL DATA

431B-1 TRANSMIT TEST CIRCUIT

Level of Internal	Oscillator at TRMT jack	-8.5 ±0.1 dbm
Gain from External	Oscillator to TRMT jack	0.0 ±0.1 db
Gain from TRMT jack	to EXT DFT jack	0.0 ±0.1 db

431B-1 RECEIVE TEST CIRCUIT

Level of Internal	Oscillator at RCV jack	+4.0 ±0.1 dbm
Gain from External	Oscillator to RCV jack	0.0 ±0.1 db
Gain from RCV jack	to EXT DFT jack	0.0 ±0.1 db

431B-2 TRANSMIT TEST CIRCUIT

Level of Internal	Oscillator at TRMT jack	-8.5 ±0.1 dbm
Gain from External	Oscillator to TRMT jack	-8.5 ±0.1 db
Gain from TRMT jack	to EXT DFT jack	+8.5 ±0.1 db

431B-2 RECEIVE TEST CIRCUIT

Level of Internal	Oscillator at RCV jack	+4.0 ±0.1 dbm
Gain from External	Oscillator to RCV jack	+4.0 ±0.1 db
Gain from RCV jack	to EXT DFT jack	-4.0 ±0.1 db

VF OSCILLATOR

Internal Oscillator: Frequency
 404, 1004, 2804 Hz \pm 1 Hz
 431B-1 Levels +4.0 and -8.5 dbm
 431B-2 Level 0 dbm

External Oscillator: Level
 Input Impedance at EXT OSC jack
 +10.0 dbm maximum
 600 Ω

DETECTOR

Amplifier Gain 0.0 dB
 Output Impedance at EXT DET jack
 600 Ω

JACKFIELD (type 310 jacks)

Impedance Level 600 Ω
 DATA PORT Switch Selection for VF or Data Channel Unit testing

POWER REQUIREMENTS

(DC power is drawn from Channel Unit Bay)
 Source Load (maximum) without Level Meter with Level Meter
 -12V 30 mA 60 mA
 +12V 80 mA 110 mA
 +5V 60 mA 510 mA

LEVEL METER (431A-LM Option)

Frequency Range
200 to 400 Hz

Measurement Range
-40.0 to +9.9 dBm
>+9.9 reads "HI"
<-40.0 reads "LO"

Impedance at Level Meter input jack:
Terminated
150, 600 900 Ω
≥15,000 Ω

Bridging (at 1000 Hz)
≥15,000 Ω

Level Accuracy:

Frequency Range (Hz)	Level Range (dbm)
1004	0.1 dB
300-3500	0.2 dB
200-4000	0.3 dB

Null Indicator:

The Level Meter has three LEDs and an audible tone. This table shows levels and their responses:

Display Level (dbm)

431A- LM-1	1431A- LM-1	1431A- LM-2	Indicator	Condition	Audio Tone
431A-	LM-1	LM-2	BOTH		

≥+4.3	≥-8.2	≥+0.3	+	Flashes	OFF
+4.2	-8.3	+0.2	+	ON	ON
+4.1	-8.4	+0.1	NULL	ON	ON
+4.0	-8.5	0.0	NULL	ON	ON
+3.9	-8.6	-0.1	NULL	ON	ON
+3.8	-8.7	-0.2	-	ON	ON
≤+3.7	≤-8.8	≤-0.3	-	Flashes	OFF

Weight:	including probe with probe, Level Meter	4.1 lb (1.9 kg) 5.6 lb (2.6 kg)
Extension from Face of Relay Rack when in use		11-1/2" (29 cm) (approx.)
Overall Dimensions (maximum):	Length Width Height Height with Level Meter	21-1/2" (54-1/2 cm) 5" (13 cm) 5" (13 cm) 7" (17 cm)

MECHANICAL CHARACTERISTICS

Temperature:	Operating	0°C to +50°C
	Storage	+32°F to +122°F -40°C to +65°C
	Humidity (non-condensing)	-40°F to +149°F 95% maximum

ENVIRONMENTAL RANGE

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MAINTENANCE

5.1 GENERAL

The Sierra 431B has no fuses or replaceable light bulbs. However, if damaged in the field, the A1 PWB can be replaced by the user. Otherwise maintenance is limited to keeping the Test Set clean.

5.2 REPAIR INFORMATION

If the 431B malfunctions and the difficulty cannot be readily identified, the Test Set should be returned for repair. Contact Sierra Customer Service:

ADDRESS: P.O. Box 817, Santa Barbara Research Park
6868 Cortona Drive
Goleta, California 93116
Telephone: (805) 968-3551
Customer Service: (800) 227-8452
FAX: (805) 968-0922

When an instrument is to be returned for repair or servicing (whether under warranty or not), obtain packing and shipping instructions and a Return Authorization Number (RA no.) from the Customer Service Department before shipping the Test Set. IMPORTANT: Please include a written description of the trouble with the instrument when shipping it for service or repair.

5.3 CLEANING

The instrument can be cleaned with a mild soap solution and a soft cloth. Before cleaning the Test Set, squeeze the cloth after dipping it in the solution. Be careful not to moisten any wiring or electrical parts. Do not submerge the Test Set in the solution. Use

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another cloth to wipe dry after cleaning.

5.5 PARTS AND ACCESSORIES

When first shipped from the factory, the 431B includes a test probe. If needed, a replacement is available.

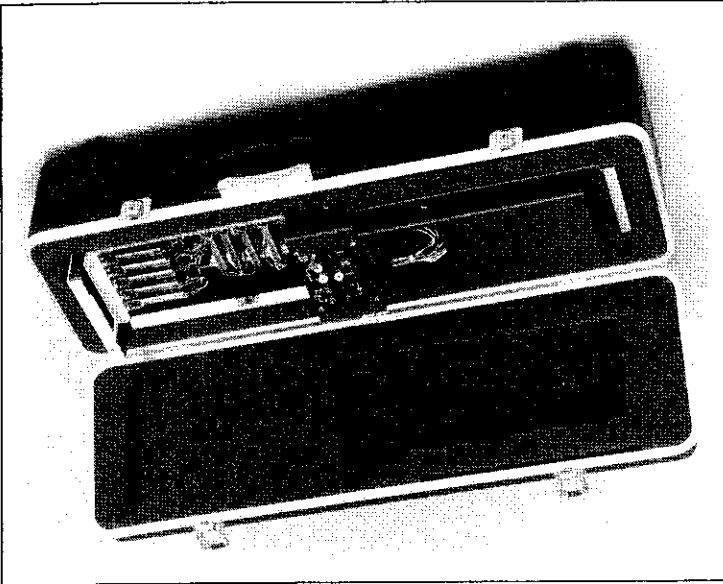
The 431B is available with or without a Level Meter. The Level Meter itself cannot be installed in the field.

There are two optional carrying cases which may be ordered separately. The carrying case for the 431B without a Level Meter is Sierra Part Number 921000098. The carrying case for the 431B with a Level Meter is Sierra Part Number 921000112.

Figure 5-1 on the next page shows the 431B in the Sierra 921000098 Carrying Case.

Item	Sierra Part Number
Replacement Test Probe	C03512300
Carrying Case (431B only)	921000098
Carrying Case (431B with 431A-LM)	921000112
3" Extender	262A-2

431B with Optional Carrying Case
Fig. S-1



SOM-431B

1. The 431B is a... 2. The 431B is a... 3. The 431B is a...

NOTES

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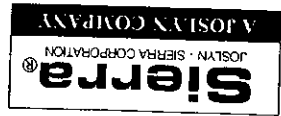
WARRANTY

JOSLYN-SIERRA warrants products manufactured by it to be free from defects in material and workmanship and to meet the applicable specifications under normal use and service for a period of 36 months from the date of original shipment by us. Our obligation under this limited warranty is confined to the repair or replacement of such products which, after having been returned to the factory or a point designed by us, shall be examined and in our sole opinion, found defective and that such defect was not induced by causes external to the product. Alternatively, JOSLYN-SIERRA may elect to issue credit for any such defective product. All products to be repaired or replaced shall be returned prepaid to the designated place of repair in accordance with authorization and packing and shipping instructions issued by JOSLYN-SIERRA. Return shall not be made until such authorization and instructions are issued. Each returned product shall be accompanied by a statement or report fully stating the claimed defects and any other pertinent information concerning the failure.

JOSLYN-SIERRA's responsibility under this limited warranty does not apply to any products which have been repaired, worked upon or altered by persons not authorized by us so as to in our sole judgment, injure the stability or reliability of such product, or which have been subject to misuse, negligence or accident, or where applicable, the serial number has been altered, effaced or removed. JOSLYN-SIERRA shall not be liable for damages resulting from the use of the purchased product, nor shall JOSLYN-SIERRA be responsible for any failure in the performance of other items to which the purchased product is connected or the functioning of an entire system or parts of any system of which the purchased product may be a part.

JOSLYN-SIERRA reserves the right to make changes in the design or construction of any of its products at any time without incurring any obligation to make changes whatsoever on units previously purchased. Routine calibration and accessories, including but not limited to all vacuum tubes, fuses, pilot lamps and batteries used with our products are not covered by this limited warranty. A test setup charge will apply to any returned instrument which, after test, is found to meet the applicable specifications.

This limited warranty is in lieu of all other warranties, expressed, implied or statutory. No representative or person is authorized to represent or assume for JOSLYN-SIERRA any liability in connection with the sale of products other than set forth herein. IN NO EVENT SHALL JOSLYN-SIERRA BE LIABLE FOR SPECIAL INCIDENTAL OR CONSEQUENTIAL DAMAGES.



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Golata, California 93116
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methods may warrant.

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