

TYPE N3 CARRIER TELEPHONE SYSTEM
TERMINAL EQUIPMENT
POWER SUPPLY UNIT
IN-SERVICE REPLACEMENT USING N3 SWITCHING SET

The replacement of a 21-volt power supply unit exhibiting voltage instability, failure of the alarm circuit, or excessive ripple may be done, without interruption to service on the system, by use of a switching set. To replace a power supply unit, the N3 switching set is connected to a jack on the combining and switching unit. An alternate 21-volt power supply unit is plugged into the switching set. Tests are made on the power supply units to verify proper operating characteristics. A toggle switch on the switching set provides means for switching the terminal power load from the regular to the alternate unit and from the alternate unit to the new unit placed in the terminal. If properly executed, the switch can be accomplished without a transmission hit. However, caution should be exercised in following the operational procedures to avoid errors and, thus, prevent excessive hits on the system. Two spare power supply units are required: one for replacing the unit in the terminal and one for use in the switching set.

This section is reissued to make various changes in the procedural steps. Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

APPARATUS:

- 2 — J87245A 21-Volt Power Supply Units
- 1 — J99300AU N3 Switching Set
- 1 — KS-14510 Volt-Ohm-Milliammeter (VOM)
- 1 — 400-Type Hewlett-Packard Vacuum Tube Voltmeter (VTVM)

STEP	PROCEDURE
	A. Power Supply Unit Tests
	<i>Note:</i> These tests should be performed before the power supply units are used for replacement in the terminal or as an alternate in the switching set during the switching operation.
1	Set the N3 switching set LOAD switch to REGULAR, ALT switch to TEST, and VM & RIPPLE switch to ALTERNATE.
2	Plug a power supply unit into the switching set, and set ADJ VOLTS potentiometer fully counterclockwise.

STEP	PROCEDURE
3	Remove either of the two switching connectors from the TEST POWER jacks on the combining and switching unit (lower jack selected in Fig. 1).
4	Connect the switching set power cord to the vacant TEST POWER jack on the combining and switching unit.
5	<p>Set the ADJ VOLTS potentiometer of the power supply unit in the switching set for an output voltage of 21.0 volts as read on the voltmeter of the switching set.</p> <p>Caution: An output voltage in excess of 23 volts may cause operation of the high-voltage protection circuit and protection fuse in the power supply unit. If this occurs, the ADJ VOLTS potentiometer should be set fully counterclockwise and the power supply unit should be removed and then reinserted to restore the protection circuit. If the PROTECTION fuse is blown, replace it with a new fuse.</p> <p>Note: If it is not possible to set the output voltage to 21.0 volts, check the dc input voltage across the -48V and G ripple test jacks with the VOM. If the input voltage is 43 to 52 volts, the unit is defective and not suitable for use in the system.</p>
6	<p>Measure the output ripple voltage across the 21V and G ripple test jacks with the VTVM.</p> <p>Requirement: 0.012 volt rms maximum.</p>
7	<p>If this requirement cannot be met, measure the input ripple across -48V and G ripple test jacks with the VTVM.</p> <p>Requirement: 0.30 volt rms maximum.</p> <p>Note: If the input ripple voltage is within requirements and the output ripple voltage exceeds requirements, then the unit is defective and should not be used.</p>
8	<p>Operate the test switch to the FULL LOAD position to check the voltage regulation of the unit.</p> <p>Requirement: The voltmeter should read 21 ± 0.2 volts, and the ammeter should read approximately 4 amperes.</p>
9	<p>Operate the test switch to the NO LOAD position.</p> <p>Requirement: The voltmeter should indicate less than 5 volts indicating that the high-voltage protective circuit in the power supply unit is functioning. To restore the protective circuit, operate the test switch to the 1/4 LOAD position and remove and reinsert the power supply unit. If the PROTECTION fuse is blown, replace it with a new fuse.</p> <p>Note: If the unit does not meet the no-load and full-load voltage regulation requirements, then it is defective and should not be used in the system.</p>

STEP	PROCEDURE
10	<p>To test the 21-volt alarm circuit in the power supply unit, operate the test switch to the FULL LOAD position and slowly turn the ADJ VOLTS potentiometer on the power supply unit in a clockwise direction until the ALM TST lamp comes on; then read the voltmeter.</p> <p>Requirement: 21.8 \pm0.1 volts.</p> <p>Note: If this requirement is not met, set the ADJ VOLTS potentiometer for 21.8 volts and then adjust the HV ALM potentiometer on the side of the power supply unit until the ALM TST lamp comes on. If the adjustment cannot be made within the 21.8 \pm0.1 volt requirement, the unit is defective and should not be used in the system.</p>
11	<p>With the test switch again operated to the FULL LOAD position, slowly turn the ADJ VOLTS potentiometer counterclockwise until the ALM TST lamp comes on; then read the voltmeter.</p> <p>Requirement: 20.2 \pm0.1 volts.</p> <p>Note: If this requirement is not met, set the ADJ VOLTS potentiometer for 20.2 volts and then adjust the LV ALM potentiometer on the side of the power supply unit until the ALM TST lamp comes on. If the adjustment cannot be made within the 20.2 \pm0.1 volt requirement, the unit is defective and should not be used in the system.</p>
12	<p>With the test switch in the 1/4 LOAD position, set the ADJ VOLTS potentiometer for 21.0 volts. The power supply unit is now ready for use.</p>
<p>B. In-Service Switching of Power Supply Units</p>	
<p>Note: Two power supply units tested in accordance with Steps 1 through 12 are required for the following procedure.</p>	
13	<p>Set the N3 switching set LOAD switch to REGULAR, ALT switch to TEST, and VM & RIPPLE switch to ALTERNATE.</p>
14	<p>Plug a power supply unit, that has been checked and adjusted, into the switching set.</p>
15	<p>Remove either of the two switching connectors from the TEST POWER jacks on the combining and switching unit (lower jack selected in Fig. 1).</p>
16	<p>Connect the switching set power cord to the vacant TEST POWER jack on the combining and switching unit.</p>
17	<p>Remove the second switching connector from the TEST POWER jack on the combining and switching unit as shown in Fig. 1.</p>
18	<p>Set the VM & RIPPLE switch to the REGULAR position and adjust the ADJ VOLTS potentiometer on the regular power supply unit in the terminal for 21 \pm0.1 volts.</p> <p>Caution: If the voltage of the regular supply unit is not within 20 and 22 volts and cannot be adjusted, the regular power supply unit is so seriously defective that in-service replacement should be attempted only at the risk of incurring damage to the alternate unit due to overload caused by the defective regular unit.</p>

STEP	PROCEDURE
19	Operate the VM & RIPPLE switch to the ALTERNATE position and set the ADJ VOLTS potentiometer on the alternate power supply unit in the switching set for a reading of 20.5 volts. Operate the ALT switch to the BRIDGE position, thereby paralleling the outputs of the alternate and regular power units.
20	<p>Very slowly advance the ADJ VOLTS potentiometer on the alternate power supply unit in the switching set in a clockwise direction for a reading of 21.5 volts on the voltmeter. Observe the reading on the ammeter of the switching set.</p> <p>Requirement: When the ammeter reading has stabilized at some value greater than 3 amperes (fully loaded bay), it should indicate that the alternate unit has assumed the entire terminal load. Proceed to operate the LOAD switch to the ALT position, thereby removing the bridging of the regular power supply unit from the circuit.</p>
21	Remove the regular power supply unit from the terminal bay.
22	Plug another power supply unit that has been checked and adjusted on the N3 switching set into the terminal bay.
23	Operate the VM & RIPPLE switch to the REGULAR position and set the ADJ VOLTS potentiometer on the new regular power supply unit in the terminal for a reading of 21.5 volts on the voltmeter.
24	<p>Operate the VM & RIPPLE switch to the ALTERNATE position and set the LOAD switch to the REGULAR position. Very slowly turn the ADJ VOLTS potentiometer on the alternate power supply unit in the switching set counterclockwise for a reading of 20.5 volts on the voltmeter. Observe the reading on the ammeter of the switching set.</p> <p>Requirement: When the ammeter reading has dropped and stabilized at some value of approximately 500 milliamperes, it should indicate that the regular power supply unit has assumed the entire terminal load.</p>
25	Operate the ALT switch to the TEST position and insert a switching connector into the vacant TEST POWER jack on the combining and switching unit.
26	Operate the VM & RIPPLE switch to the REGULAR position, and adjust the ADJ VOLTS potentiometer on the regular power supply unit for a reading of 21.0 volts on the voltmeter.
27	Remove the switching set power cord from the TEST POWER jack on the combining and switching unit, and insert the second switching connector.

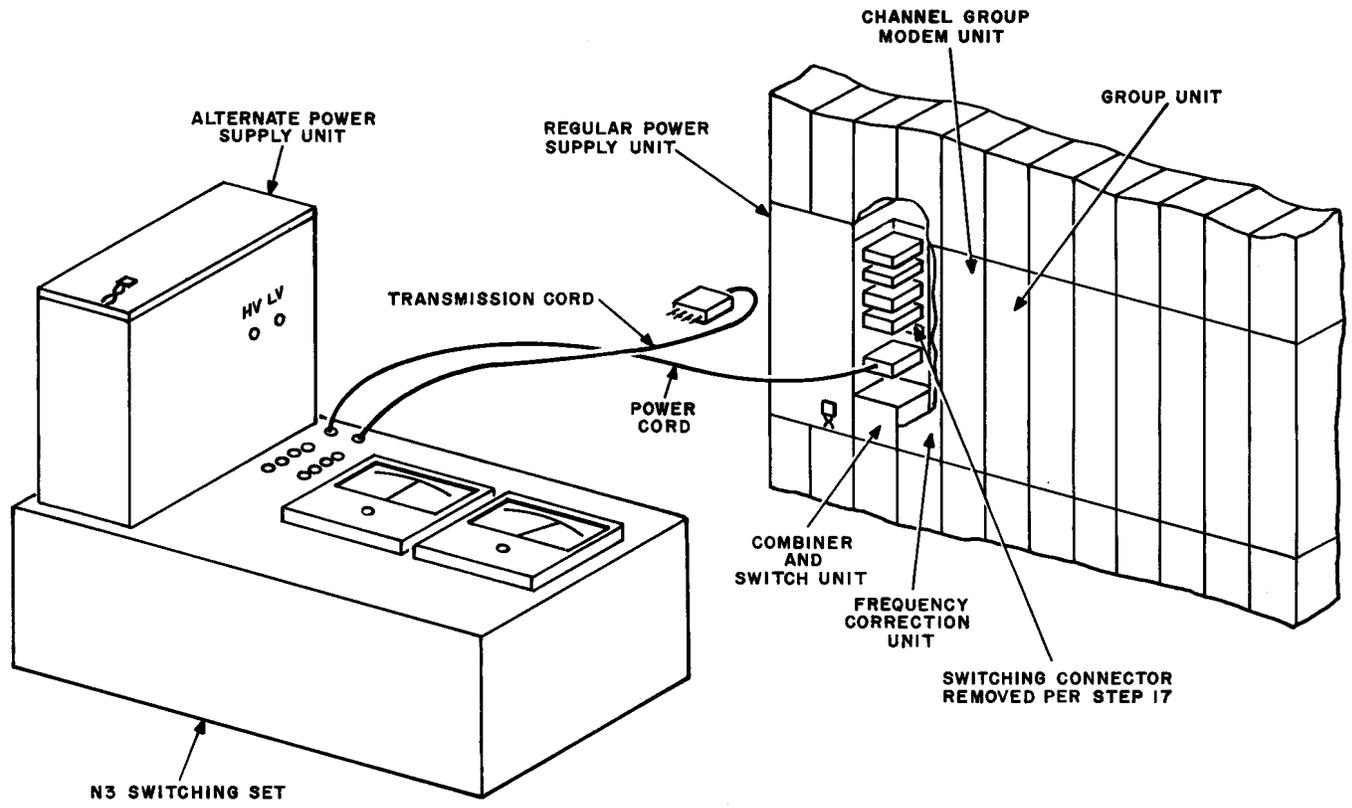


Fig. 1 — Switching N3 Power Supply Units