

SLC*-1 SUBSCRIBER EQUIPMENT

IDENTIFICATION, INSTALLATION, REMOVAL, MATERIAL, AND MAINTENANCE OUTSIDE PLANT

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NOTICE

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2.02 A subscriber unit (SU) must be installed, at the subscriber premises for each derived line. The units available are as follows.

- (a) The NT1 SU, for mounting indoors only, is not compatible with ESS central offices. It will cause an Automatic Line Insulation Test (ALIT) failure on the physical line, and will limit testing from the Repair Service Bureau.
- (b) The NT2 SU, for mounting indoors only, contains additional circuitry for compatibility with ESS central offices, ALIT, and Repair Service Bureau testing. The NT2 also provides twice the battery charging current of the NT1.
- (c) The NT12B SU provides the same functions as the NT2 but includes a weatherproof housing, suitable for outside mounting. A 123A1A station protector is factory-wired into the NT12 SU.
- (d) ♦The NT12B SU provides the same functions as the NT12 (MD) but will operate in temperatures as low as -40 degrees F.♦

2.03 A KS-20390L6 battery must be installed and plugged into each subscriber unit to provide talk battery and ringing capability to the derived set(s) and to power the subscriber unit. ♦The battery is trickle charged from the CO when the physical and derived lines are in the on-hook condition.♦

2.04 ♦A 293A adapter (Fig. 3), when used with a standard dial lamp transformer (2012C) plugged into 120-volt ac, provides additional charging current to the KS-20390L6 battery. Normally the equipment is charged by line voltage in the on-hook condition. The 293A adapter is intended for high usage customers such as small businesses, canvassers, or users of data terminals.♦



♦*The 293A adapter will not function properly if the 2012C transformer is used for any other purpose. Each adapter requires its own transformer.*♦

2.05 A 1A battery charger will be required, in each service area, for maintaining a supply of charged batteries for installation and repair. A 158A Test Set is required for installation testing.

A. Ordering Guide

2.06 The components used, in outside plant, for providing SLC-1 service may be ordered as follow.

(a) As a complete set for an installation:

- SLC-1A (includes one NT1 SU, KS-20390L6 battery, and 1119A filter)
- SLC-1B (includes one NT2 SU, KS-20390L6 battery, and 1119A filter)
- SLC-1C (includes NT12B SU, KS-20390L6 battery, and 1119A filter).

(b) As individual components:

- Filter, 1119A
- Battery, KS-20390L6 [this is a sealed, nickel-cadmium (Ni-Cd) battery replaceable unit and is required for maintenance spares]
- NT1, pack circuit
- NT2, pack circuit
- NT12B, pack circuit.

(c) Optional items, ordered separately as needed:

- Adapter, 293A
- Bracket, AT-8853B (magnetic for mounting filter on metal surface)
- Bracket, AT-8853C (for mounting filter without additional mounting screws)
- ♦Closure, service, AT-8813C (used with NT12B to house filter and adapter)
- Closure, service, AT-8813D (used with NT2 to house protector, filter, and adapter).♦

Note: These service closures will minimize number of holes drilled for mounting.

2.07 The Ni-Cd battery must be charged prior to installation. After being placed in service, the battery is charged over the line from the

central office when both the physical and derived lines are in an idle condition.

2.08 There are two standard applications for SLC-1 service. One is for providing main line service to separate premises from the physical line (Fig. 1). The other is for providing an additional line (ADL) on the same premises as the physical line (Fig. 2).

2.09 Installation instructions are printed on the shipping packages of SLC-1 equipment used in outside plant. Copies of these instructions and related instructions from the cover of the 158A Test Set are incorporated into this practice.

3. INSTALLATION

A. 1119A Filter (Main Line Service)

Note: The 1119A filter must be placed on the physical line before proceeding to install the subscriber unit.

3.01 When the SLC-1 unit is used to provide service to a different location than the physical subscriber (i.e., fed by different drop wires), the 1119A filter should be mounted at the distribution terminal pole, or pedestal, serving the physical subscriber (Fig. 4). Do not place the filter on the physical subscriber's premises.



When installing a 1119A filter, remember that this is a working line and use proper precautions. Before opening line, monitor to verify that line is idle. Also check for polarity prior to filter installation, and maintain the observed polarity to avoid disrupting TOUCH-TONE® service.

3.02 For aerial cable terminal installation of filter, mount filter on the pole adjacent to cable terminal (Fig. 5), and transfer the drop into filter. Terminate the drop on terminals designated STATION and tape back any slack in drop wire. Do not cut slack out of the drop wire so that original wiring can be restored if the filter is removed later. Run bridle or other approved weather-proof wire from LINE terminals on filter to cable terminal binding posts where drop was removed. Test line according to local procedure just as for any other line transfer.

3.03 If physical subscriber is working out of a buried wire pedestal, place filter in the pedestal. Mounting holes of the 1119A filter are designed to fit the holes of the terminal mounting bracket. Remove drop or B-Service wire from cable binding posts and terminate on STATION terminals of filter. Run bridle wire or approved cross-connect wire from LINE terminals of filter to cable binding posts. If physical line is being served by B-Service wire, do not remove sheath ground. Test line according to local procedure just as for any other line transfer.

Note: An AT-8853B mounting bracket (ordered separately) may be used as an alternate method for mounting the 1119A filter. It consists of a magnetic plate, and associated hardware, that allows the filter to be attached to any convenient steel or iron surface in numerous pedestals (Fig. 6).

B. 1119A Filter (Additional Line Service)

3.04 When the physical and derived subscribers are within the same building, the 1119A filter can be mounted on the premises. Common examples are ADL service (Fig. 2), and multiple (clustered) SLC-1 installations in apartment buildings (Fig. 13). For ADL service, the 1119A filter must be located between the station protector and all physical station equipment.

C. With NT1 (SLC-1A) or NT2 (SLC-1B), Fig. 8

3.05 When using NT1 or NT2 subscriber units, locate the filter near the station protector if possible, (Fig. 7), to eliminate excessive station wire changes. Disconnect physical station wiring from the protector and connect to STATION terminals on filter, either directly or by mounting a connecting block as a bridging point. Connect from LINE terminals on filter to the protector and test physical subscribers line according to normal procedures. LINE and STATION connections are normally made to the filter using the red (R) and green (G) conductors. Other conductors [e.g. yellow (Y) and black (BK)] can be left unconnected. However, where required by local practice for independent use, such as dial lights, these conductors should be connected to by-pass the 1119A filter.

Note: The AT-8853C mounting bracket (ordered separately) may be used to attach

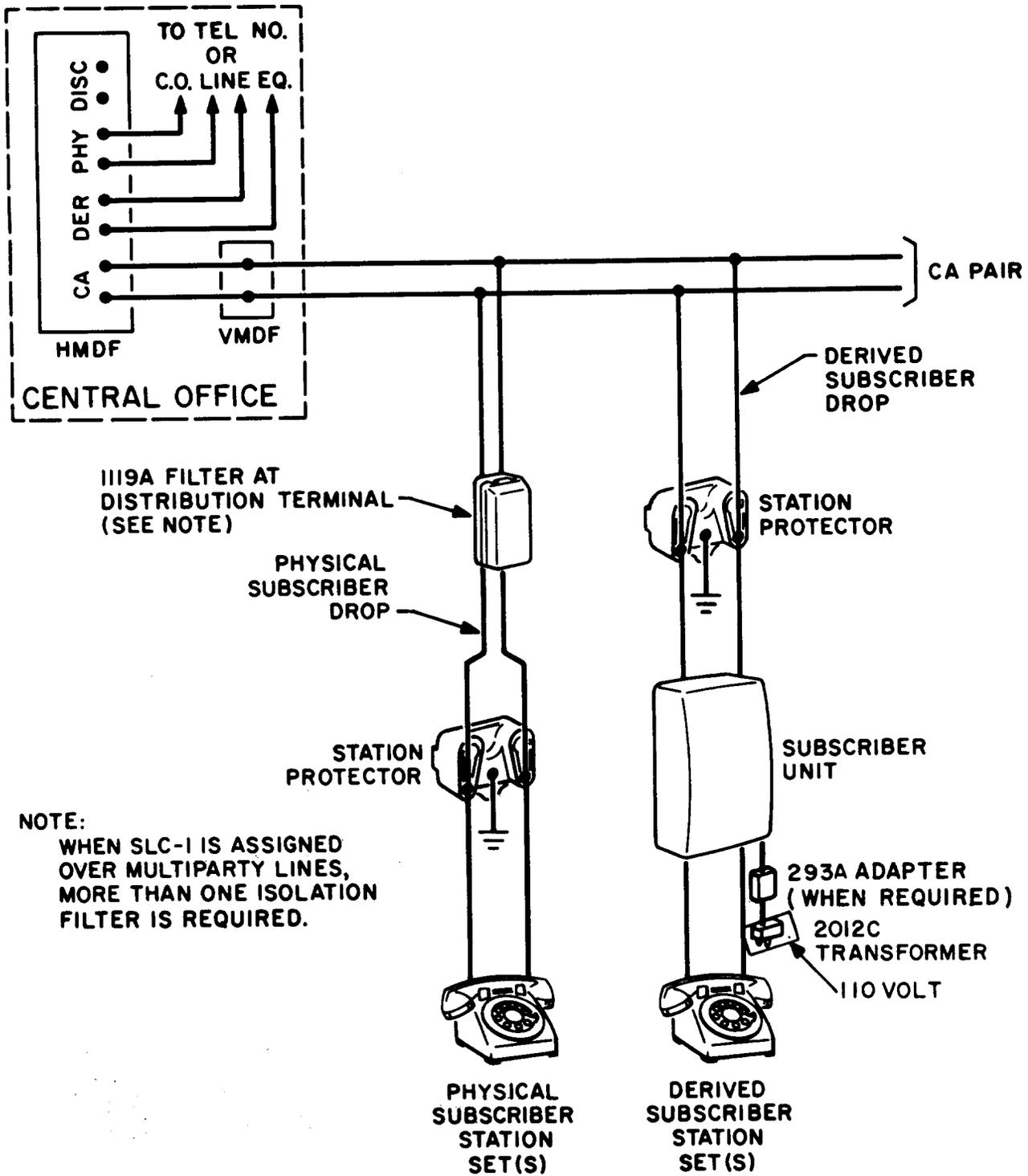
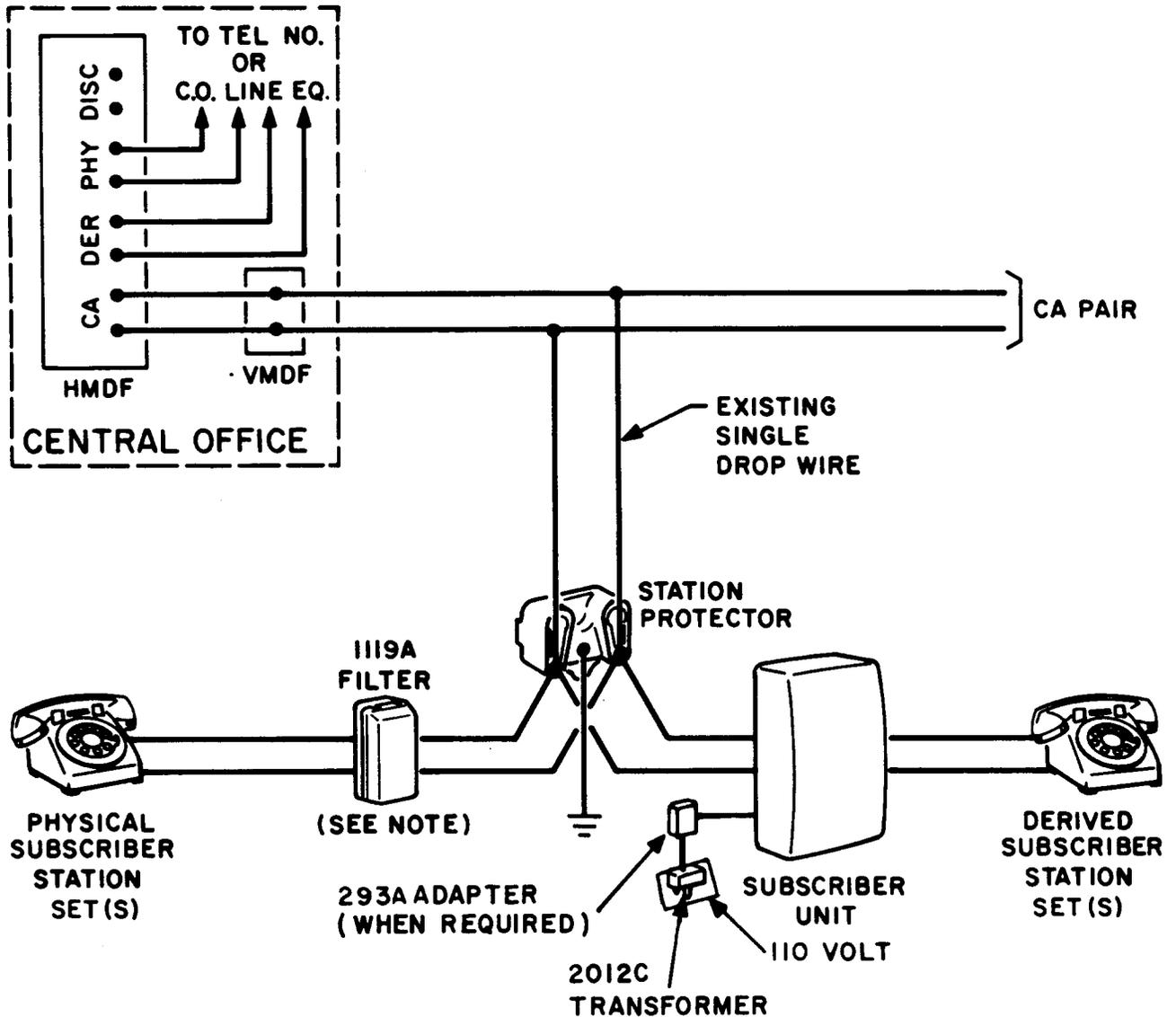


Fig. 1—Typical Application for Providing Service to Separate Premises From Physical Station

**NOTE:**

AN ISOLATION FILTER MUST BE INSERTED BETWEEN THE LINE AND ALL PHYSICAL STATION EQUIPMENT.

Fig. 2—Typical Application of an Additional Line (ADL) on Same Premises as Physical Station

the filter to the station protector (Fig. 7) to avoid drilling mounting holes.

D. With NT12-Type (SLC-1C), Fig. 9

3.06 Filter connections when using the NT12-type subscriber unit are similar to those with the indoor units, except that the protector in the NT12-type unit must be used in place of the

external protector normally used. For ADL service, proceed as follows.

- (1) Make tests of cable pair paragraph 3.15.
- (2) Mount NT12-type subscriber unit paragraph 3.16.
- (3) Wire the drop (either new or existing) to protector in the NT12-type subscriber unit.

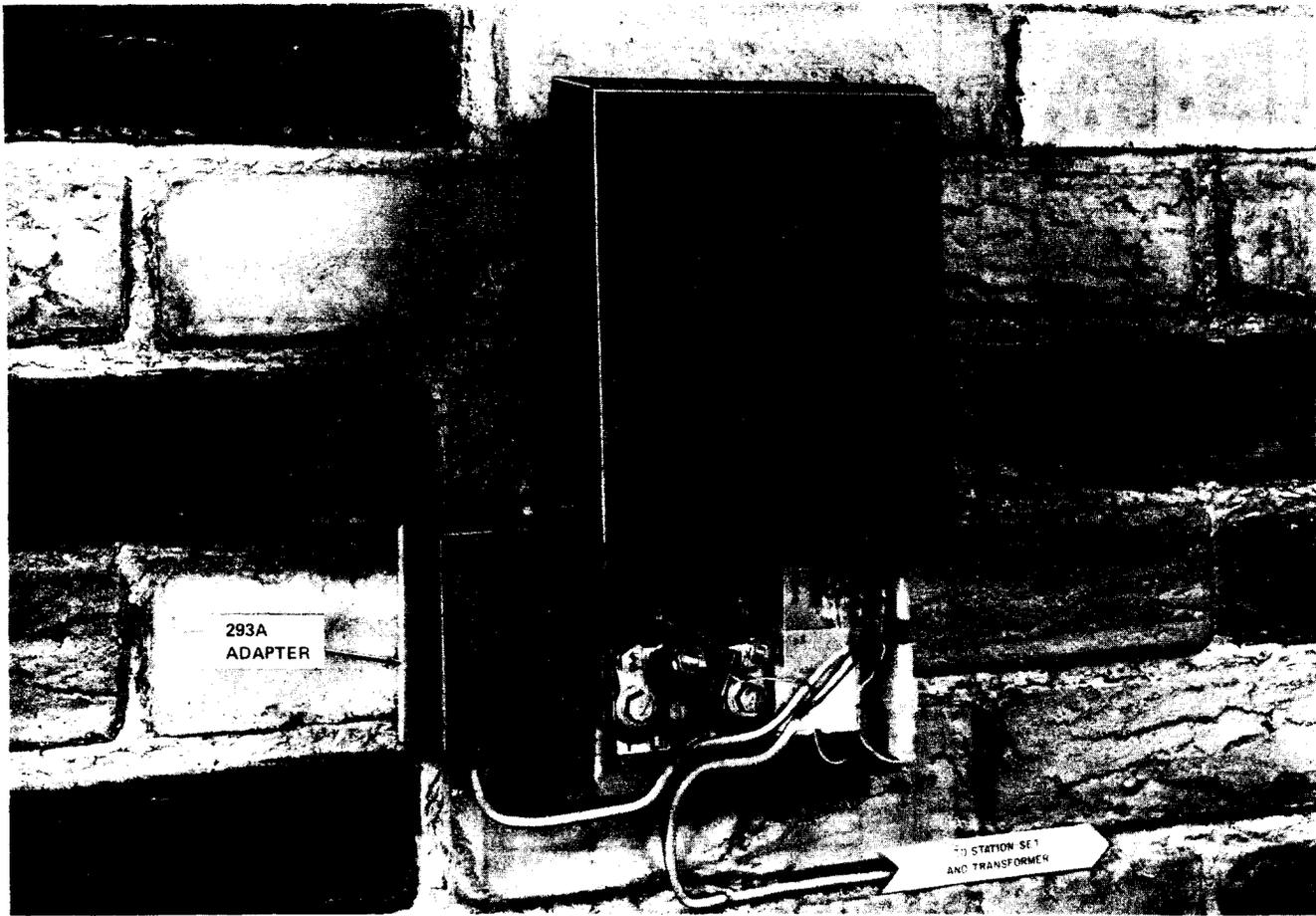


Fig. 3—NT12B SU With 293A Adapter

(4) Mount the filter beside the subscriber unit either with the screws furnished or with the AT-8853C mounting bracket (Fig. 9). Bracket must be ordered separately.

Note: Do not perform NT12-type installation tests (paragraph 3.18) until filter installation has been completed.

(5) Connect the LINE side of the filter to the protector of the NT12-type subscriber unit and the physical station wiring to the STA terminals. Physical station wiring may be spliced as shown by Fig. 9 or connected directly to the STA terminals. Spare conductors in physical wiring may remain unconnected or if used (for dial light, etc.), they should be connected so as to by-pass the 1119A filter.

(6) Test physical line according to normal procedures.

E. NT1 (SLC-1A) or NT2 (SLC-1B) Subscriber Units, Fig. 10

3.07 Place the drop wire, if necessary, connect to the assigned cable pair, and mount the station protector in the normal manner. For additional line applications, use the existing drop wire and protector as indicated in Fig. 2. If an existing protector is used, check the carbon blocks and replace them if there is any evidence of damage.

3.08 The NT1 or NT2 subscriber unit must be mounted inside the derived subscriber's premises. Placement in a basement or garage location is preferable in lieu of the living quarters if the following conditions are met.

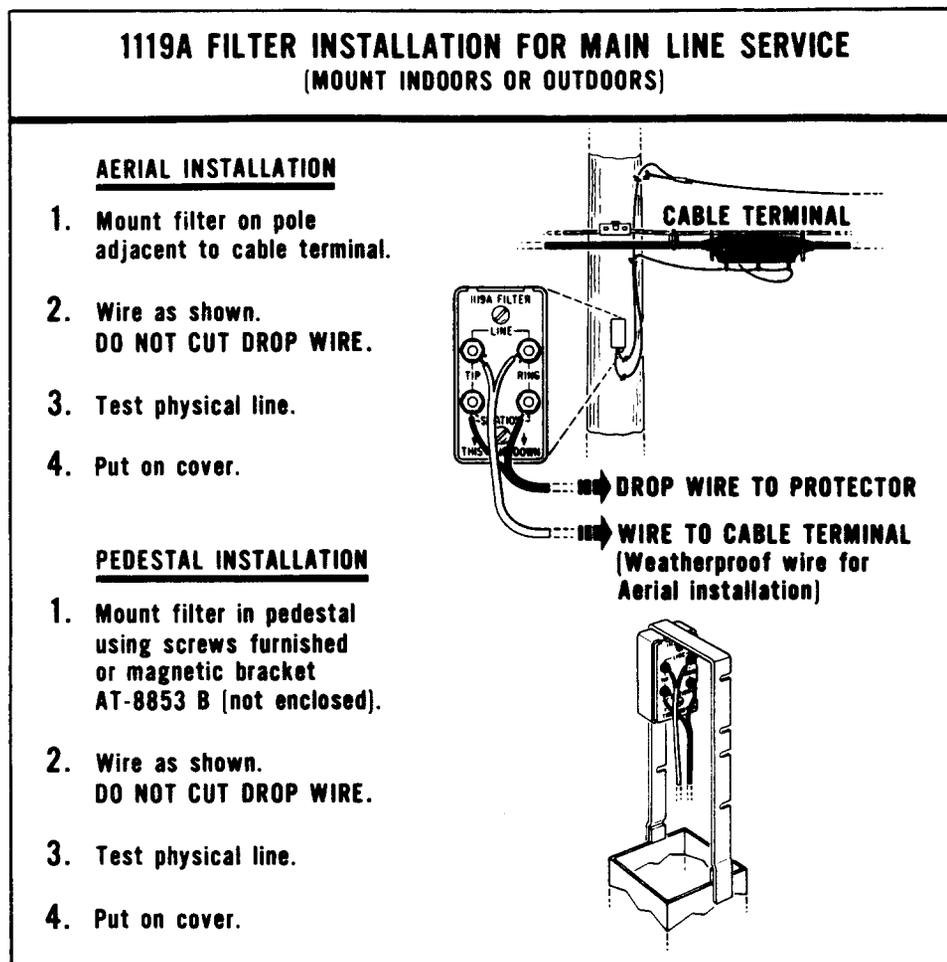


Fig. 4—Label Showing Installation of 1119A Filter for Main Line Service

- (a) Basement or garage is enclosed and temperature inside is never lower than -20°F .
- (b) The subscriber unit mounting location is readily accessible by repair personnel.
- (c) Distance to farthest station is less than 1000 feet for 24 gauge inside wire and 500 feet for 26 gauge inside wire.
- 3.09** Before mounting the subscriber unit, the 158A Test Set should be used to test the line as follows.

(1) Depress the OFF button to verify that test set is operational. Both INT BAT TEST lamps should light, if not, replace batteries in 158A Test Set, (Fig. 11).

- (2) Connect test set leads to the incoming line either at protector or at end of station wire from protector.



Do not have subscriber unit or any other station wire (except to the 1119A filter) connected to the protector at this time.

- (3) Set the temperature switch for the approximate outside temperature.
- (4) Depress CO BAT button and observe for PASS or FAIL. This tests for proper potential of central office battery.
- (5) Depress the SIG LVL button and observe for PASS or FAIL. This tests for proper

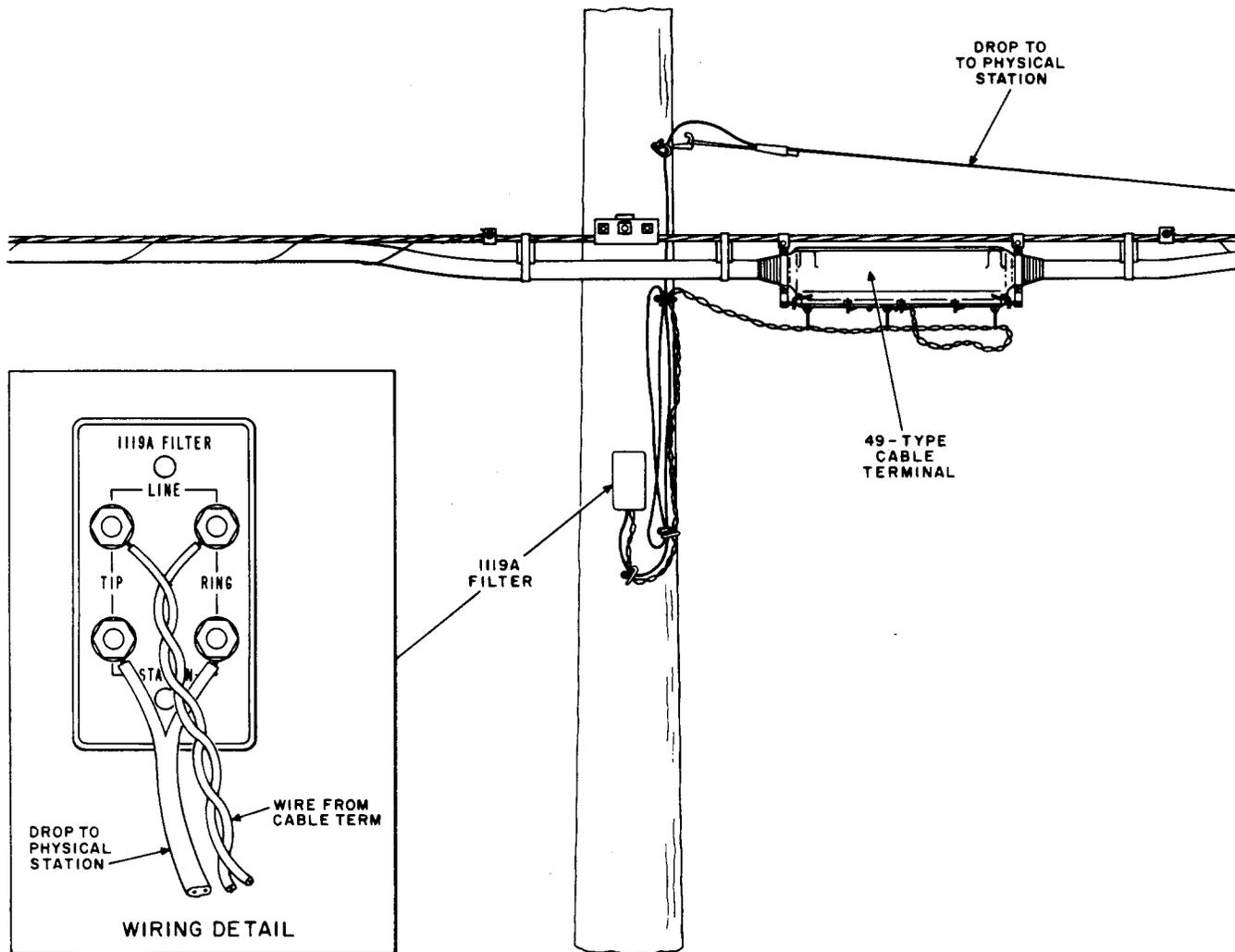


Fig. 5—Mounting of 1119A Filter on Pole—Showing Wiring Detail

level of 76 kHz carrier being sent from the central office unit.

Note: If either the CO BAT or SIG LVL test fails, refer to Fig. 11 for possible causes.

3.10 To install the subscriber unit, remove battery and components from carton and proceed as follows.

- (1) Fasten baseplate to mounting surface using appropriate hardware.
- (2) Carefully snap electronics board on to baseplate making certain that board is securely against stand-off posts.

(3) Terminate station wire from protector to LINE terminals of subscriber unit.

(4) Run inside wiring from station connecting blocks and connect to STA terminals of subscriber unit. If there is more than one set, a connecting block should be used to bridge all sets from the subscriber unit. **Do not place battery into holder until testing is complete.**

Note: To avoid erroneous connection (in the future) of a station set on the central office side of the subscriber unit, the following precautions should be observed.

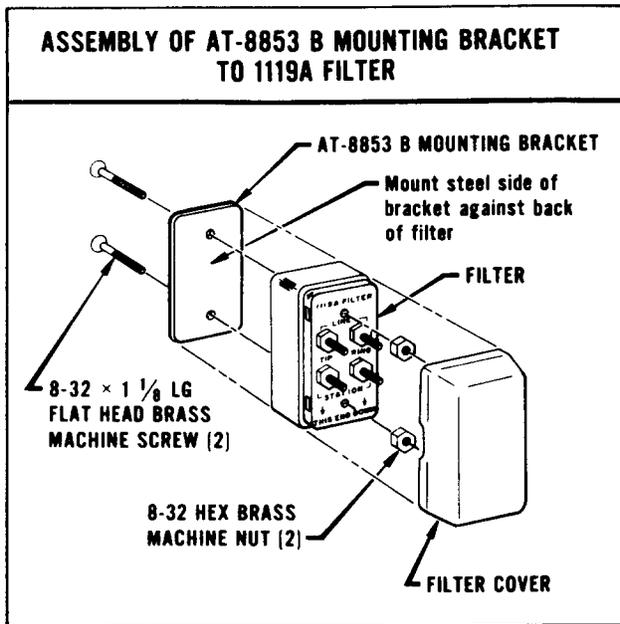


Fig. 6—AT-8853B Mounting Bracket (Magnetic)—Assembly Instructions

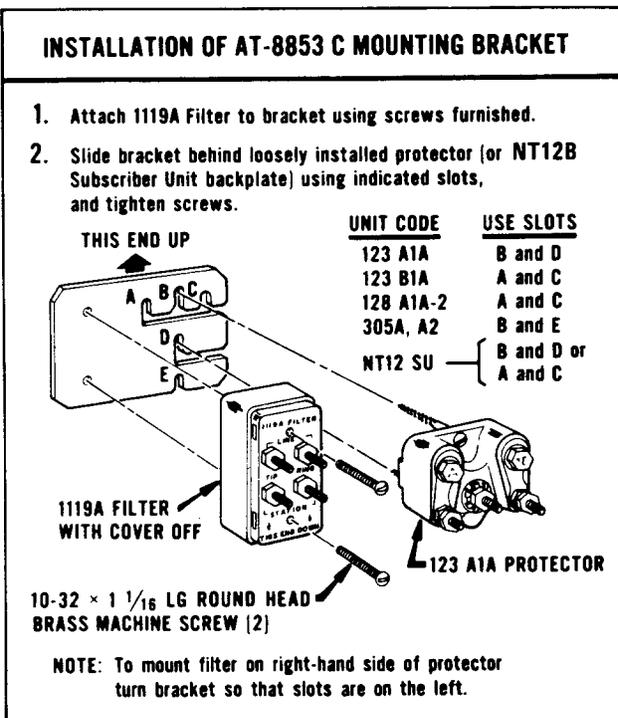


Fig. 7—Label Showing Installation of AT-8853C Mounting Bracket

(a) Station wire between the protector and the subscriber unit should be continuous, with no intermediate terminals, connecting blocks, or bridged extensions.

(b) If the station protector and the subscriber unit are not within view of each other, a special service marker or a locally prepared tag should be placed at the protector to identify a carrier line termination.

F. Testing (NT1 or NT2)

3.11 Perform the following tests with the 158A test set.

(1) Plug the subscriber unit battery into the SU BAT jack on the 158A test set and connect the battery cable of the test set to the battery jack on the subscriber unit (Fig. 10).

Note: Before proceeding, be sure that clip leads from the test set are disconnected from the CO line.

(2) Depress the SU BAT button and observe for PASS or FAIL. This test indicates the condition of the subscriber unit battery. If it fails the test, replace the battery and repeat the test.

(3) Depress the CHARGE button and wait for 15 seconds while observing for PASS or FAIL. (If PASS lamp lights within 15 seconds, unit is good.) This test will determine if the charge circuit in the subscriber unit is supplying sufficient current for charging the battery. If test fails, first check for loose connection at the protector or the LINE terminals. If test still fails, replace the subscriber unit and repeat the test.

Note: Charge current can be detected only when both physical and derived lines are idle.

3.12 When all tests have been completed satisfactorily, disconnect 158A test set and depress OFF button to avoid discharging test set batteries. Slip battery into holder of subscriber unit, connect battery plug into jack, and place cover on unit.

3.13 Make normal dial tone and ring-back tests from telephone set(s). If trouble is found,

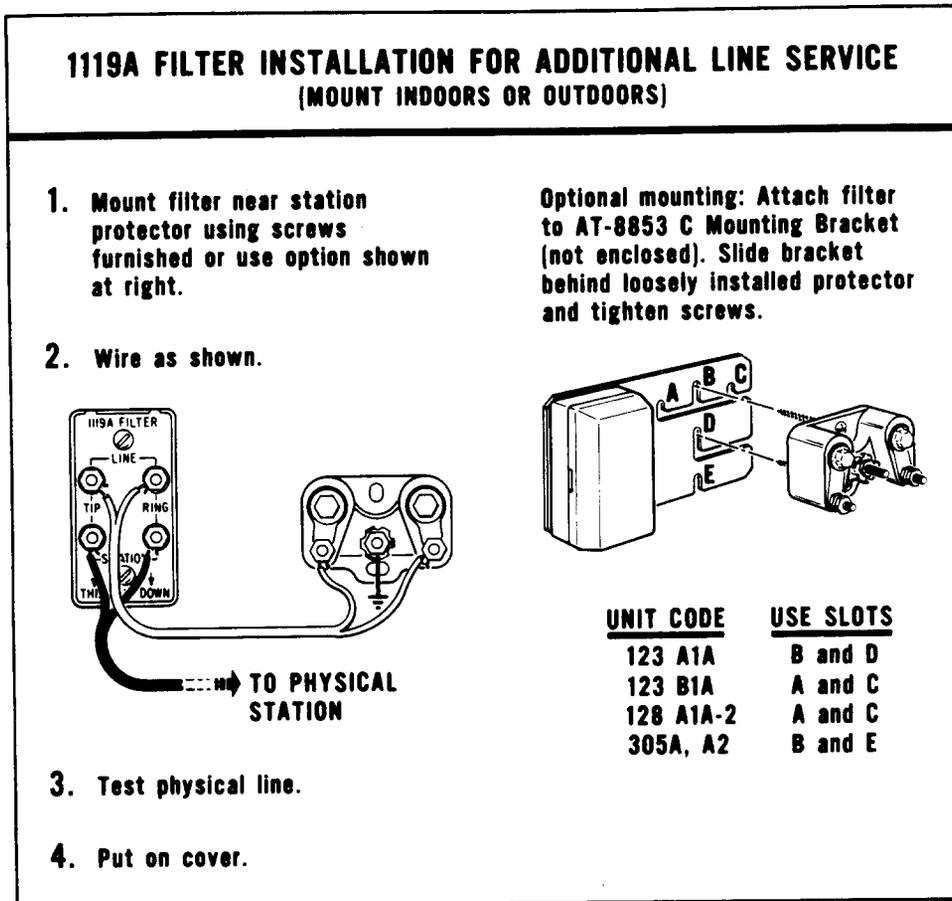


Fig. 8—Label Showing Installation of Filter for ADL Service With NT1 or NT2 Subscriber Units

refer to Table A for possible cause and remedial action. A final test may be made by placing a call.

Note: No more than three ringers in high notch or four ringers in low notch may be connected per subscriber unit.

G. NT12-Type (SLC-1C) Subscriber Unit, Fig. 12

3.14 Place drop-wire, if necessary, and connect to the assigned cable pair. For additional line applications, the existing drop may be used by rewiring to the subscriber unit which will replace the existing protector. The subscriber unit can be mounted on any outside vertical surface on customers premises. The distance to the farthest station must be less than 1000 feet for 24 gauge inside wire and 500 feet for 26 gauge inside wire.

3.15 Before mounting the NT12-type unit, the 158A test set should be used to test the line as follows.

- (1) Depress OFF button to verify that test set is operational. Both INT BAT TEST lamps should light; if not, replace batteries in 158A test set, (Fig. 11).
- (2) Connect test set leads to the incoming line at the protector or at end of drop wire.



Do not have any station wiring (except possibly to a 1119A filter) connected at this time.

- (3) Set the temperature switch for the approximate outside temperature.

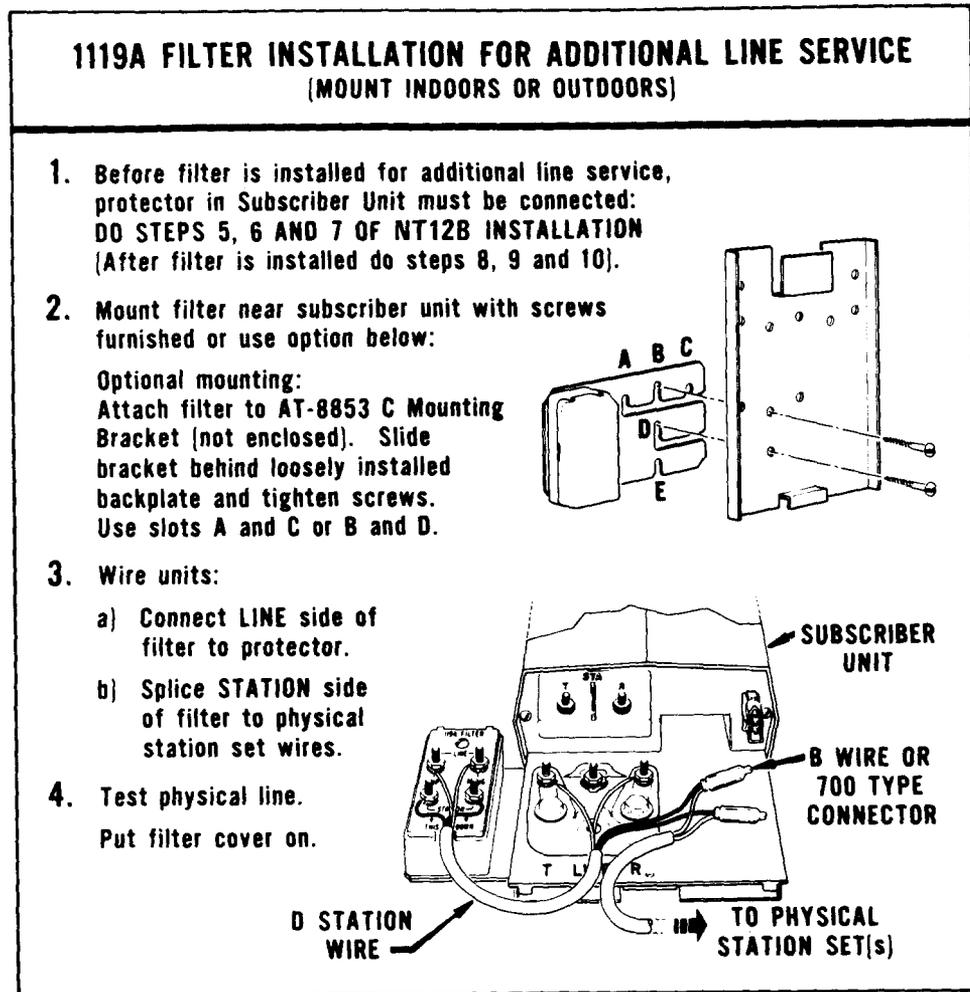


Fig. 9—Label Showing Installation of Filter for ADL Service With NT12B Subscriber Unit

(4) Depress CO BAT button and observe for PASS or FAIL. This tests for proper potential of central office battery.

(5) Depress the SIG LVL button and observe for PASS or FAIL. This tests for proper level of 76 kHz carrier being sent from the central office unit.

Note: If either the CO BAT or SIG LVL test fails, refer to Fig. 10 for possible causes.

3.16 To install the NT12-type subscriber unit, remove battery and components from carton and proceed as follows.

(1) Remove protector, if present from previous installation, and fasten baseplate vertically

to mounting surface using screws furnished. (Baseplate may be mounted horizontally in basement or other location not exposed to the weather.) Select two mounting holes (on lower half of backplate) that match either the holes left by the removed protector or holes that can be used in mounting a protector later on. If necessary for firm mounting, use a third screw through one of the holes in the top half of the backplate.

(2) Slide subscriber unit housing onto baseplate.

3.17 Make connections to protector and subscriber unit as follows.

(1) Connect drop wire to enclosed protector and insure that protector is properly grounded.

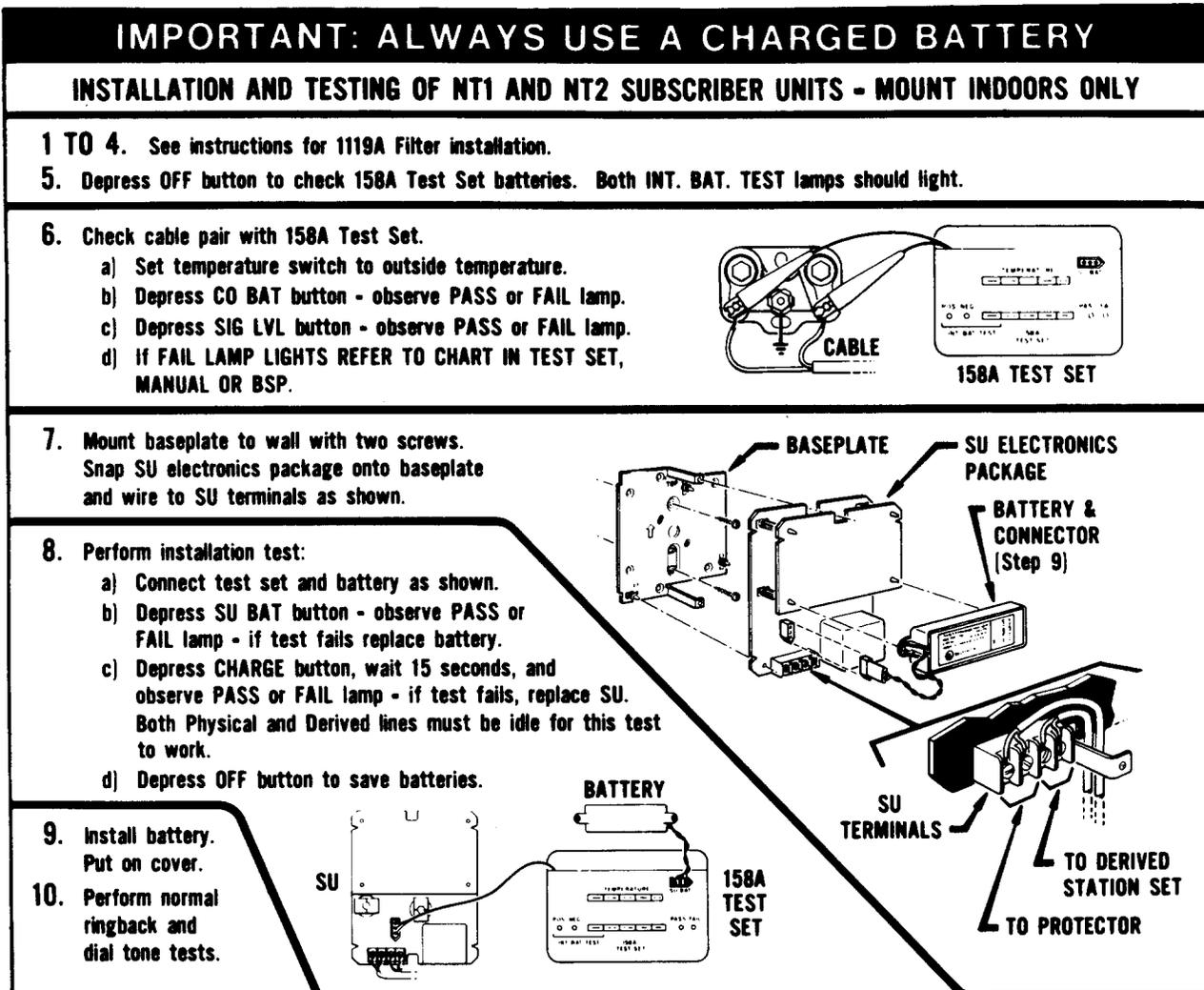


Fig. 10—Label Showing Installation Instructions for NT1 or NT2 Subscriber Unit

(If shielded service drop is used, connect shield to protector ground with an F-type connector.)

(2) Terminate station wiring to STA terminals on subscriber unit, and dress all wiring toward base of unit so that cover may be attached freely. **Do not place battery into holder until testing is complete.**

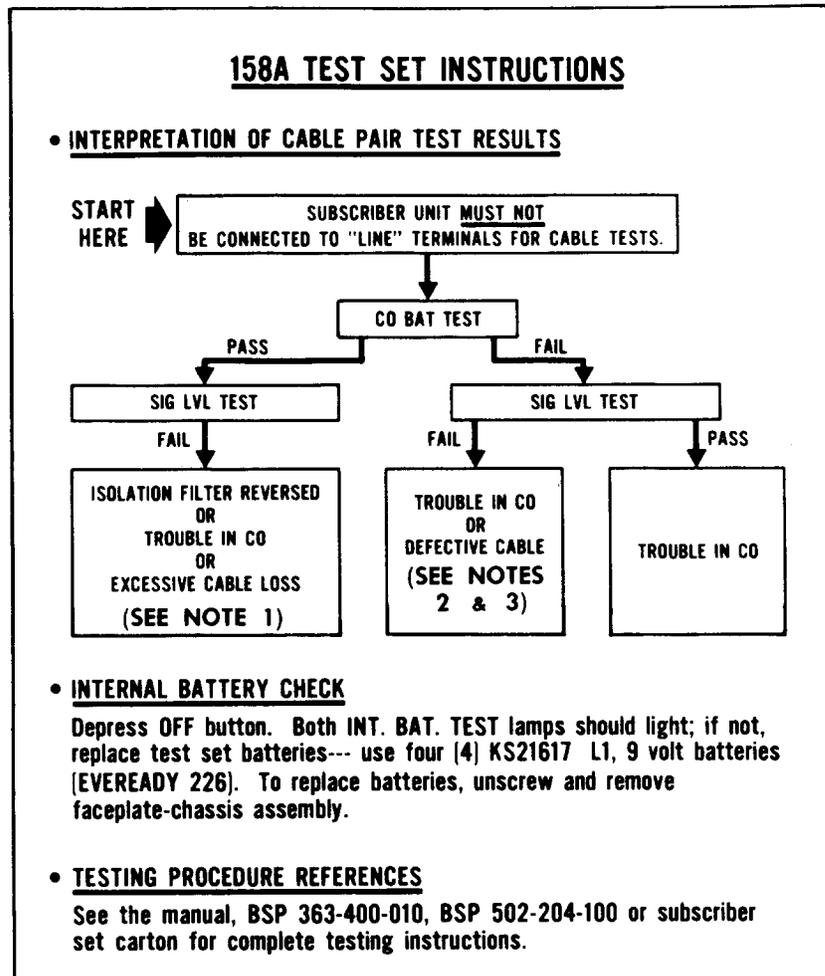
Note: The protector enclosed in the NT12-type and the subscriber unit electronics are wired together at the factory. This connection is not shown on Fig. 12.

H. Testing (NT12-Type)

3.18 Perform the following installation tests with the 158A test set.

(1) Plug the subscriber unit battery into the SU BAT jack on the 158A test set and connect the battery cable of the test set to the battery jack on the subscriber unit, Fig. 12.

Note: Before proceeding, be sure that clip leads from the test set are disconnected from the CO line.

**Notes:**

1. If SIG LVL test alone fails and the trouble can not be traced to an unwanted connection (SU or station wiring without a filter), the CO, or the 1119A filter, the cable pair should not be used for SLC-1 because the pair is probably too long, has excessive bridge tap, or is loaded.
2. If both CO BAT and SIG LVL tests fail, refer to CO for testing. If no trouble is found in CO, the cable pair may be defective. If trouble cleared in CO allows CO BAT test to pass but SIG LVL test continues to fail, refer to Note 1.
3. "Defective cable" refers to trouble anywhere between the test point and the CO.

Fig. 11—Label Showing Instructions for Line Test—Using 158A Test Set

IMPORTANT: ALWAYS USE A CHARGED BATTERY

INSTALLATION AND TESTING OF NT12B SUBSCRIBER UNIT

1 TO 4. See instructions for 1119A Filter installation.

5. Depress OFF button to check 158A Test Set batteries. Both INT. BAT. TEST lamps should light.

6. Check cable pair with 158A Test Set at point where SU is to be connected at service drop.

- a) Set temperature switch to outside temperature.
- b) Depress CO BAT button - observe PASS or FAIL lamp.
- c) Depress SIG LVL button - observe PASS or FAIL lamp.
- d) IF FAIL LAMP LIGHTS REFER TO CHART IN TEST SET, MANUAL OR BSP.

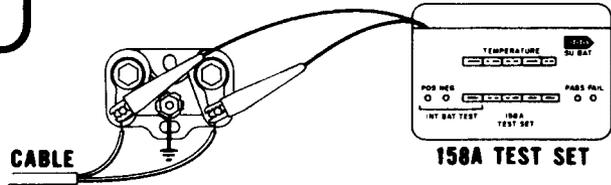
7. Remove protector (if present from previous installation) and mount baseplate to wall with two screws. If necessary, use a third screw through one of the holes near the top of the baseplate. Slide SU onto baseplate and wire to SU terminals as shown. If service drop is shielded, ground to protector with an F Type Connector (not shown).

8. Perform installation tests:

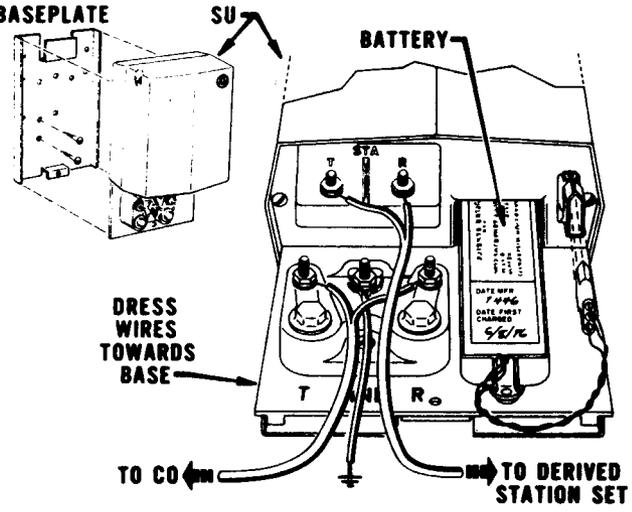
- a) Connect test set and battery as shown.
- b) Depress SU BAT button - observe PASS or FAIL lamp - if test fails replace battery.
- c) Depress CHARGE button, wait 15 seconds, and observe PASS or FAIL lamp - if test fails, replace SU. Both Physical and Derived lines must be idle for this test to work.
- d) Depress OFF button to save batteries.

9. Install battery. Put on cover.

10. Perform normal ringback and dial tone tests.



158A TEST SET



BATTERY

TO CO **TO DERIVED STATION SET**

Fig. 12—Label Showing Installation Instructions for NT12B Subscriber Unit

(2) Depress the SU BAT button and observe for PASS or FAIL. This test indicates the condition of the subscriber unit battery. If it fails the test, replace the battery and repeat the test.

(3) Depress the CHARGE button and wait for 15 seconds while observing for PASS or FAIL. If PASS lamp lights within 15 seconds, unit is good. This test will determine if the charge circuit in the subscriber unit is supplying sufficient current for charging the battery. If test fails, first check for loose connection at the protector. If test still fails, replace the subscriber unit and repeat the test.

Note: Charge current can be detected only when both physical and derived lines are idle.

3.19 When all tests have been completed satisfactorily, disconnect 158A test set and depress OFF button to avoid discharging test set batteries. Slip battery into holders of subscriber unit, connect battery plug into jack, and place cover on unit.

3.20 Make normal dial tone and ring-back tests from telephone set(s). If trouble is found, refer to Table A for possible cause and remedial action. A final test may be made by placing a call.

Note: No more than three ringers in high notch or four ringers in low notch may be connected per subscriber unit.

I. New Extensions

3.21 On installations involving new extensions on the derived line, a call-back test should be made to be sure that all extensions are connected to the STA (derived) side of the subscriber unit. For example, request a call-back from the service order completion desk.

J. Clustered Applications

3.22 Where multiple subscriber units serve a group of subscribers in the same building, as in an apartment complex, a clustered arrangement in the basement, or utility area is recommended.

3.23 A cluster installation should be initiated by an engineering work order. The work order

should call for mounting and wiring of all subscriber units and filters.

3.24 The installation procedure is similar to that described for additional line service. It is recommended that the number of subscriber units and filters intended for use at a location, be mounted and wired to a spare block, (as shown by Fig. 12), so that units may be assigned and all inward and outward movement will be completed by cross-connections to the assigned cable pairs.

3.25 An installation of this type will depend on the conditions that exist for each situation. The installation of the cluster arrangement should include cable pair tests with the 158A test set and complete subscriber unit installation (including batteries) tests. In order to make these tests and to prevent the batteries in the subscriber units from discharging, it would be necessary that either—

(a) The physical pairs to be used are available and working, or

(b) The physical pairs to be used are available and are connected in the central office by means of a "physical disconnect" strap arrangement which will provide battery and ground only on the pairs.

3.26 The service order should contain the notation "cluster location," indicating that subscriber units and 1119A filters have been installed. Completion of the service order will include connection of telephone set(s) and final ring-back and dial tone tests.

4. SERVICE ORDER REMOVAL

4.01 Service orders for disconnection of service will show whether associated equipment is to be removed (REM) or left in place as a connect-through (CT). Non-CT service requires that all SLC-1 equipment be removed as well as the telephone sets. In such cases, remove the 1119A filter and connect physical line through in the normal manner. If the physical line associated with an SLC-1 is removed (or the CT is removed on a previously disconnected line), the 1119A filter should also be removed.

4.02 When a CT is removed, the subscriber units should be removed when possible. Left-in

TABLE A
INSTALLATION TROUBLE ANALYSIS

FAILURE	POSSIBLE CAUSE	REMEDIAL ACTION
No dial tone	Defective connection or open inside wiring	Check wiring and connections
	Defective tel set	Check tel set and internal connections Replace if defective
	Defective SLC-1 subscriber unit and/or battery †	Replace unit and/or battery
	Missing or miswired jumper in central office from SLC-1 terminal block to derived line equipment*	Refer to CO to check jumpers or test wiring and CO unit using SLC-1 test arrangement
	Defective SLC-1 CO unit*	Refer to CO for replacement of unit
Bells do not ring	To many ringers connected on line	Limit number of ringers on line to 3 in high notch or 4 in low notch
	Ringer wired wrong in tel set	Set must be wired for bridged ringing
	Defective ringer	Replace ringer on tel set
	Defective SLC-1 subscriber unit	Replace unit
	Defective SLC-1 CO unit*	Refer to CO for replacement of unit

* If tests are properly made by CO forces, using the SLC-1 testing arrangement, these conditions will be corrected prior to installation.

† If batteries are properly charged, this will not be a problem.

units discovered on subsequent visits should be removed and returned to the storeroom.

4.03 When a subscriber unit is removed from service, disconnect the battery and remove battery from unit. If the time from initial battery charge is more than two years, discard the battery. All other batteries should be returned to the storeroom for recharging and future reuse.

5. MATERIAL AND EQUIPMENT PROCEDURES

A. SLC-1 Battery

5.01 When a subscriber unit is received from Western Electric Co., the battery may not be fully charged and has an indefinite shelf life. Before being placed in service, the battery must

be charged for at least 20 hours on a 1A battery charger. Batteries may be left on charge indefinitely without damage. Several batteries should be kept on charge at all times to ensure the availability of fully charged batteries for service orders and repair forces.

5.02 When a battery is removed from the charger in preparation for service order installation, it should not be connected to the battery plug in subscriber unit until unit is installed on subscriber's premises and installation tests have been completed, (paragraph 3.11 or 3.18).

5.03 Normally the SLC-1 battery is trickle charged from the CO in the on-hook condition but sometimes when the subscriber has high usage the battery does not get enough time to recharge.

- WIRING INSTRUCTIONS**
 PLACE THE FOLLOWING CROSS-CONNECTIONS:
- ① FROM PAIRS 1-13 (66MI-50) TO THE LINE TERMINALS OF 1119A FILTERS
 - ② FROM THE LINE TERMINALS OF THE FILTERS TO THE LINE TERMINALS OF THE CORRESPONDING SUBSCRIBER UNIT
 - ③ FROM THE STATION TERMINALS OF THE 1119A FILTERS 1-13, TO PAIRS 26-38 (66MI-50)
 - ④ FROM THE STA TERMINALS OF THE SUBSCRIBER UNITS 1-13 TO PAIRS 14-25 AND PAIR 39 (66MI-50)
 - ⑤ FROM PAIRS 1-13 (66MI-50) TO ASSIGNED C.O. CABLE PAIRS
 - ⑥ FROM PAIRS 26-38 (66MI-50) TO ASSIGNED HSE CABLE PAIRS OF PHYSICAL SUBSCRIBERS.
 - ⑦ FROM PAIRS 14-25 AND PAIR 39 (66MI-50) TO ASSIGNED HSE. CABLE PAIRS OF DERIVED SUBSCRIBERS.
- NOTE: IF HSE. CA. PAIRS ARE NOT DEDICATED TO APARTMENTS, JUMPERS 6 AND 7 ARE PLACED AT THE TIME THE SERVICE ORDER IS WORKED.

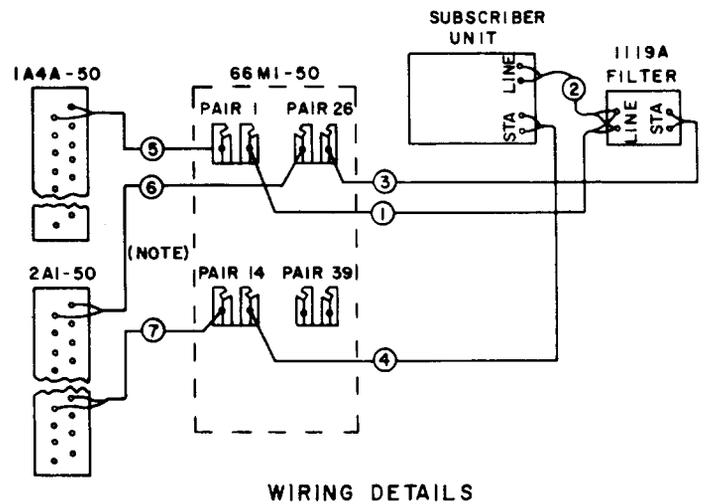
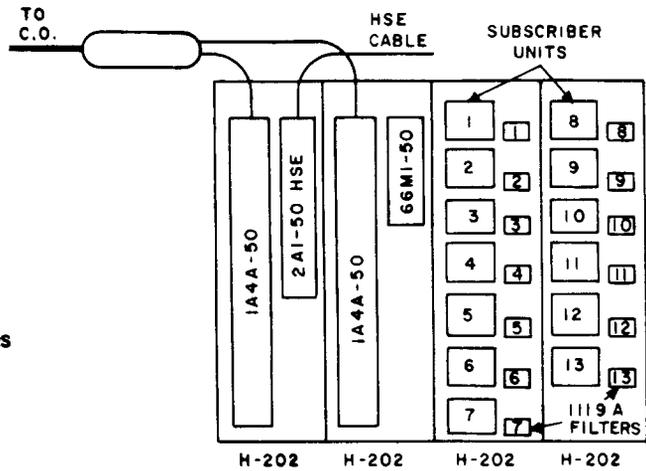


Fig. 13—Suggested Example of Clustered Arrangement—Showing Wiring Detail

When this condition occurs the 293A adapter (Fig. 3) must be used to supplement the line voltage in charging the battery. The adapter is placed next to the SLC-1 equipment, the pair from the adapter having connectors is then plugged into the equipment. The battery is then plugged into the adapter. The other pair from the adapter is spliced (B connector) to a D inside wire that is run to a 2012C transformer plugged into a 120-volt ac outlet in the subscribers premises.

Note: This adapter is to be used with high usage subscribers.



Subscriber unit batteries should be dated when placed on initial charge. Always remove the battery from returned units and if 2 years or more

have elapsed since initial charge, the battery should be discarded. Other batteries may be placed on the 1A battery charger or stored for future use. Used batteries should be charged for at least 20 hours on the 1A battery charger before being reused.

B. Installation Supplies

5.04 The installer must be supplied with the following materials and equipment for an SLC-1 installation.

- (a) SLC-1 Subscriber Unit: The installer should be provided a packaged set, (SLC-1A, -1B,

or -1C subscriber set) which includes a battery and filter.

- (b) Fully charged battery for subscriber unit.
- (c) Additional 1119A filters. (If SLC-1 is assigned over multiparty line, more than one may be required.)
- (d) 158A Test Set (Test set should be returned to the storeroom at the end of the day.)

Note: The installer should also carry a spare subscriber unit but the unused units should be returned to the storeroom at the end of the day.

C. Defective and/or Reusable Units

5.05 If a used subscriber unit is believed defective, it should be tagged (write any helpful information on the tag) before being returned to Western Electric Co. according to local procedures. Reusable units should be properly identified and returned to the storeroom for future availability.

Caution: Care should be used when handling this delicate equipment.

6. MAINTENANCE (OUTSIDE REPAIR)

A. General Maintenance

6.01 It is important that everyone who has contact with either the physical or derived lines of a SLC-1 system for order activity or maintenance, be aware that a second telephone number and associated CO line equipment is sharing the cable facilities of a physical line. Therefore, trouble on either the physical or the derived line may affect both subscribers.

6.02 Unless it is certain from the subscribers report or test result that the trouble does not involve the subscriber unit, the dispatched repairperson should have a spare subscriber unit and battery. The spare unit and battery may be kept on the repair truck. Units should be kept boxed in order to protect them from physical damage. The battery can be contained in the unit but **its plug must always be disconnected** until installation. The battery will discharge in a few days if it is plugged into unit before installation.

6.03 A fully charged battery can be stored on a truck for a maximum of 1 month. After that the battery must be recharged. Chargers should be located at the garages or work centers with fully charged batteries available at all times. A routine procedure should be set up locally for exchanging the batteries carried on repair trucks on a monthly basis.

6.04 Repair procedures on physical SLC-1 lines are basically the same as other lines. The main difference is that trouble on the derived subscriber's terminal, drop, protector, or inside wire can cause trouble on the physical line. However, under these conditions, both lines will be experiencing trouble.

6.05 The repairperson should first attempt to clear troubles indicated by the test desk. If trouble exists on both the physical and derived lines, the problem is not likely to be caused by the subscriber unit.

B. Trouble on Derived Line

6.06 If trouble is suspected on the derived line only, initial tests should be made at the subscriber unit using a hand test set. In most cases, this will allow repairperson to prove trouble either toward the carrier line or toward inside wire or station set(s). These tests will be covered in the following paragraphs and Table B.

Note: A short version of this repair procedure is provided inside the cover of the subscriber unit.

6.07 For reports of no dial tone (NDT), ringing trouble (BDR), transmission trouble (CH or CBH), or noise trouble, proceed as follows.

- (1) Test for central office battery and ground across the LINE terminals of the subscriber unit. (Battery potential across STA terminals is provided by the battery in the subscriber unit.)
- (2) If either battery or ground is not present at the subscriber unit, make additional tests for battery and ground at the protector and cable terminal. If the test desk report verifies continuity to the subscriber unit (tested the 80V short caused by the charge circuit in the subscriber unit), these additional tests will not be necessary.

If the trouble can not be traced to an open, or a loose connection, refer to the CO to correct the absence of battery or ground.

Note: Absence of either battery or ground from the line may have allowed the battery in the subscriber unit to discharge. The SU battery should be replaced. Otherwise, the subscriber's line must be tested after battery and ground have been restored and the SU battery has had sufficient time to recharge (at least 2 hours).

(3) If both battery and ground are present, remove the station wire from the STA terminals of the subscriber unit and connect hand test set across the STA terminals. Depending on the trouble reported, listen for dial tone (in talk position), listen to ringing signal (in monitor position), or place a test call.

(4) If no trouble is observed in Step (3), station wiring or station trouble is indicated. Reconnect the station wire and proceed to check wiring and telephone set(s).

Note: Verify that no more than three ringers in the high notch or four ringers in the low notch are connected to the subscriber unit.

(5) If trouble is observed in Step (3), proceed as follows until it is cleared.

(a) Replace battery in subscriber unit



If this clears the trouble, the cause may be battery discharge (rather than a defective battery), and it is important to take further steps to insure that it does not occur again. Check for an intermittent open at all connection points from the subscriber unit to the cable terminal. If none is found, the charging circuit in the subscriber unit may be defective.

(b) Replace subscriber unit.

(c) Refer to central office for testing and possible replacement of the CO unit.

(d) If a 158A test set is available, test for the 76 kHz signal level (SIG LVL) to see

if the cable pair is beyond the transmission limit. (See paragraph 3.09 or 3.15.) If the cable pair does not pass the SIG LVL test, either transfer the derived service to a suitable cable pair or place the subscriber on physical service.

6.08 For noise reports the same procedure may be used. Give special attention to station protector carbons and all connections. Check for noise on physical line. Noise on both physical and derived lines indicates probable cable trouble.

6.09 Local television, radio stations, or certain television receivers can cause interferences. Usual corrective measures are **not** applicable for SLC-1 lines, such as, using a 1542A inductor or placing KS-13814L7 capacitors. If RF interference is a problem, the subscriber should be placed on physical service.

6.10 Recurring trouble caused by discharged battery in the subscriber unit may result from high usage of either the derived or the physical subscriber. In such cases, a 293A adapter and 2012C transformer should be used.

Note: The battery is being charged only when both the derived and physical lines are idle.

6.11 If intermittent troubles persist on a SLC-1 derived line, a 158A test set should be used to check the 76 kHz carrier level. Failure of this test could indicate one or more of the following.

(1) Cable pair too long.

(2) Cable pair may be loaded.

(3) Too much bridged tap on cable pair.

(4) The 1119A filter missing or reversed on physical line.

6.12 Extreme care should be taken to protect SLC-1 lines during cable activity. Half-tapping of cable pairs can cause service outage to derived lines. If it is necessary to transfer a cable pair carrying a SLC-1 line, it will be identified on the transfer sheet and must be handled individually.

TROUBLE ANALYSIS TABLE

TABLE B
TROUBLE ANALYSIS FOR SLC-1 DERIVED LINE

FAILURE	POSSIBLE CAUSE	TEST	REMEDIAL ACTION
No dial tone or Bells do not ring or Transmission trouble or Noise on line	Defective cable pair, cable connection, or frame connection	Test for CO battery and ground across LINE terminals of subscriber unit using hand test set. To isolate trouble, make additional tests at protector and cable terminal	Tighten loose connections. If trouble persists, refer to CO or cable repair forces
	Defective inside wire or telephone set	Test on STA terminals of subscriber unit using hand test set with telephone sets disconnected	Check wiring connections and telephone set(s). Replace defective item
	Defective or discharged battery in subscriber unit	Replace battery in subscriber unit and test with hand test set	Replace battery. Check for (and repair) intermittent open at LINE terminals, protector, and cable terminal. If no bad connections are found, replace subscriber unit.
	Defective subscriber unit	Replace subscriber unit and retest	
	Defective CO unit		Refer to CO for testing and replacement
	Excessive cable pair loss	Make SIGLVL test on line using 158A Test Set	Transfer derived service to an acceptable cable pair or place customer on physical cable pair
Bells do not ring	Same as above plus: Too many ringers	Limit ringers to three in high notch or four in weak notch	Change ringer notch or reduce number of ringers
Noise on line	Same as above plus: Protector carbons	Examine carbons	Replace if defective
	Noise cable pair	Check for noise on physical line	Locate and clear noise or refer to cable repair forces