

BELL SYSTEM PRACTICES
Teletypewriter and Manual
Telegraph Station and P.B.X.
Installation and Maintenance

SECTION P31.231
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AT&T Co. Standard

120C1 TELETYPEWRITER

SUBSCRIBER SET

1. GENERAL

1.01 This section consists of Bulletin No. 723 prepared by the Bell Telephone Laboratories and describes the 120C1 teletypewriter subscriber set which has been developed for use at teletypewriter stations in connection with giving unattended service.

1.02 The principal applications are indicated below:

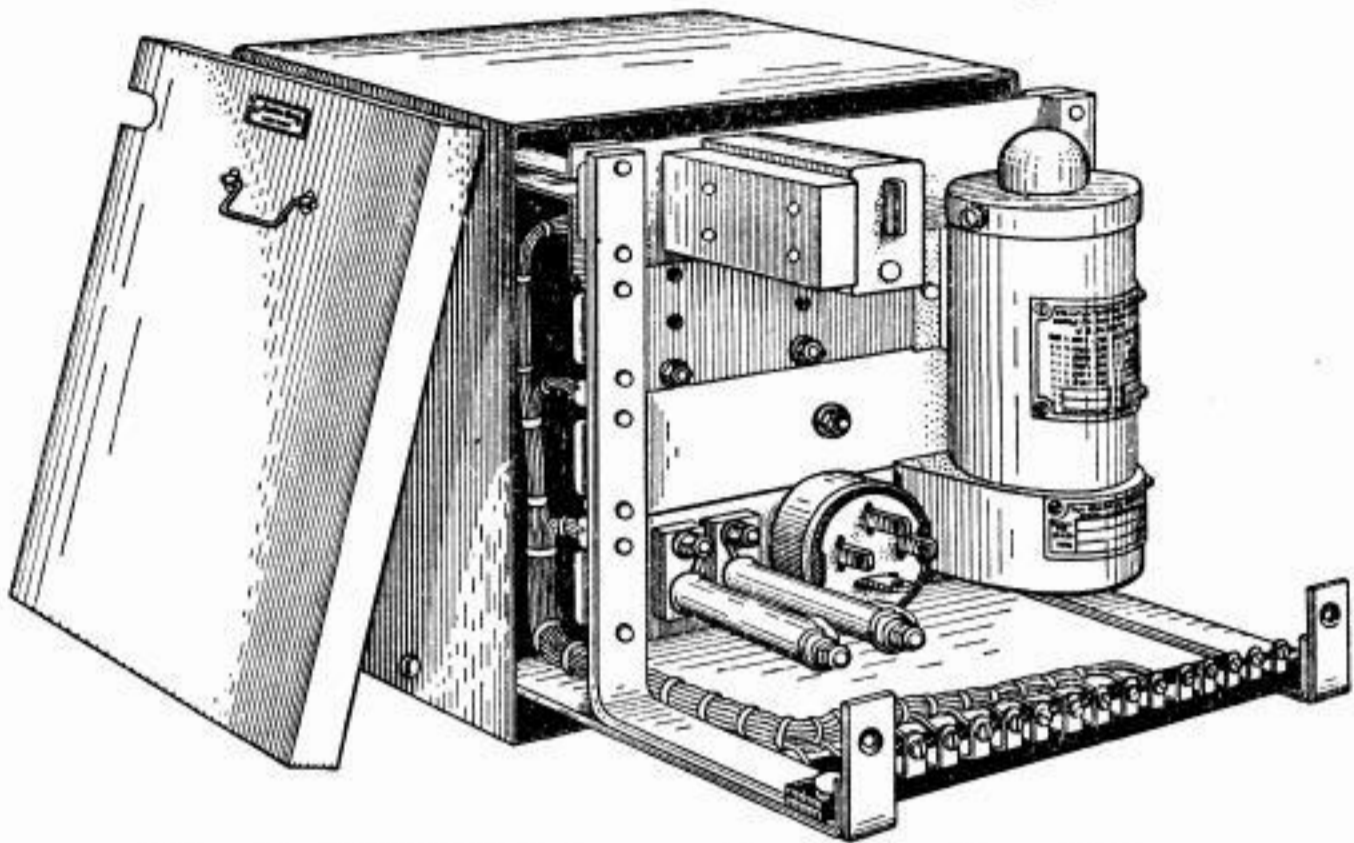
1. At all local stations arranged for unattended service operating on an "open-line" basis, with the exception of local stations operating with the No. 1 TWX switchboard. The latter will continue to be served with the 120A1 and 120B1 teletypewriter subscriber sets.

2. At all "open-line" TLX stations arranged for unattended service. TLX unattended service will be given by employing the 120C1 set as an applique to the 128C1 teletypewriter subscriber set. For the present no information is being prepared covering application to either the 126B1 or the 128A1 teletypewriter subscriber sets.

1.03 In general, when the station is being operated on an attended basis the operating methods both from a subscriber's point of view and from the TWX operator's point of view are the same as for other attended stations operated from the particular switchboard. However, when an unattended start is required, ringing current is applied steadily to the station line until the supervisory lamp is extinguished. This will require the application of ringing current for about 6 to 8 seconds.

2. DESCRIPTION OF EQUIPMENT

2.01 A photograph of the set is shown in Figure 1.



**Fig. 1—120C1 Teletypewriter Subscriber Set—
Unit partially removed from box.**

2.02 Other equipment not shown in the photograph will be required at the station depending upon the service conditions. For instance, for local service with the 15N table there will be needed a power switch which will be placed in the control panel and a sub. set including a ringer and a wave-shaping resistance which will be mounted within the table. It should be noted that the teletypewriter should be equipped with the parts required to operate the motor stop contact on receipt in sequence of the "Fig.", "Blank" and "H" combinations. Detailed lists of the equipment required and the installation drawings to be used for a particular station and service condition are given in Bell System Practices on "Teletypewriter Station Equipment."

2.03 The 120C1 apparatus is mounted on mounting plates attached to a removable framework unit which stands within a metal box about 9 inches high by 9 inches wide by 8 inches deep. The box is finished with brown lacquer. The framework rests on two runners to allow enough room beneath its base for the placing of connecting wiring. The signal wiring terminals are located on the base near the front. The connecting signal wiring is folded loosely with enough length to permit the framework unit to be removed from the box and placed on the floor for maintenance work.

2.04 Power is brought into the set through a tyrex cord. One end of this cord connects to the power fittings in the table and the other to a connector body which plugs into a base in the set. The cord is brought into the box through a notch in the upper left-hand portion of the door.

2.05 The equipment arrangements are shown on drawing ED-70177-01.

2.06 The set will ordinarily be mounted inside the 15N and 19A tables. Detailed methods of mounting are shown on Plan drawings.

3. DESCRIPTION OF CIRCUITS

3.01 A description of the circuits of the set will be given for two typical applications as follows:

- (1) When the set is used in local service with a No. 15 Teletypewriter, a-c. power supply and with a TWX switchboard with the flashing recall feature.
- (2) Same as above except that the No. 19 teletypewriter set is employed.

3.02 The complete circuits for the above are shown on SD-70085-011-012.

(A) No. 15 Teletypewriter Case

3.03 Reference should be made to Fig. 2.

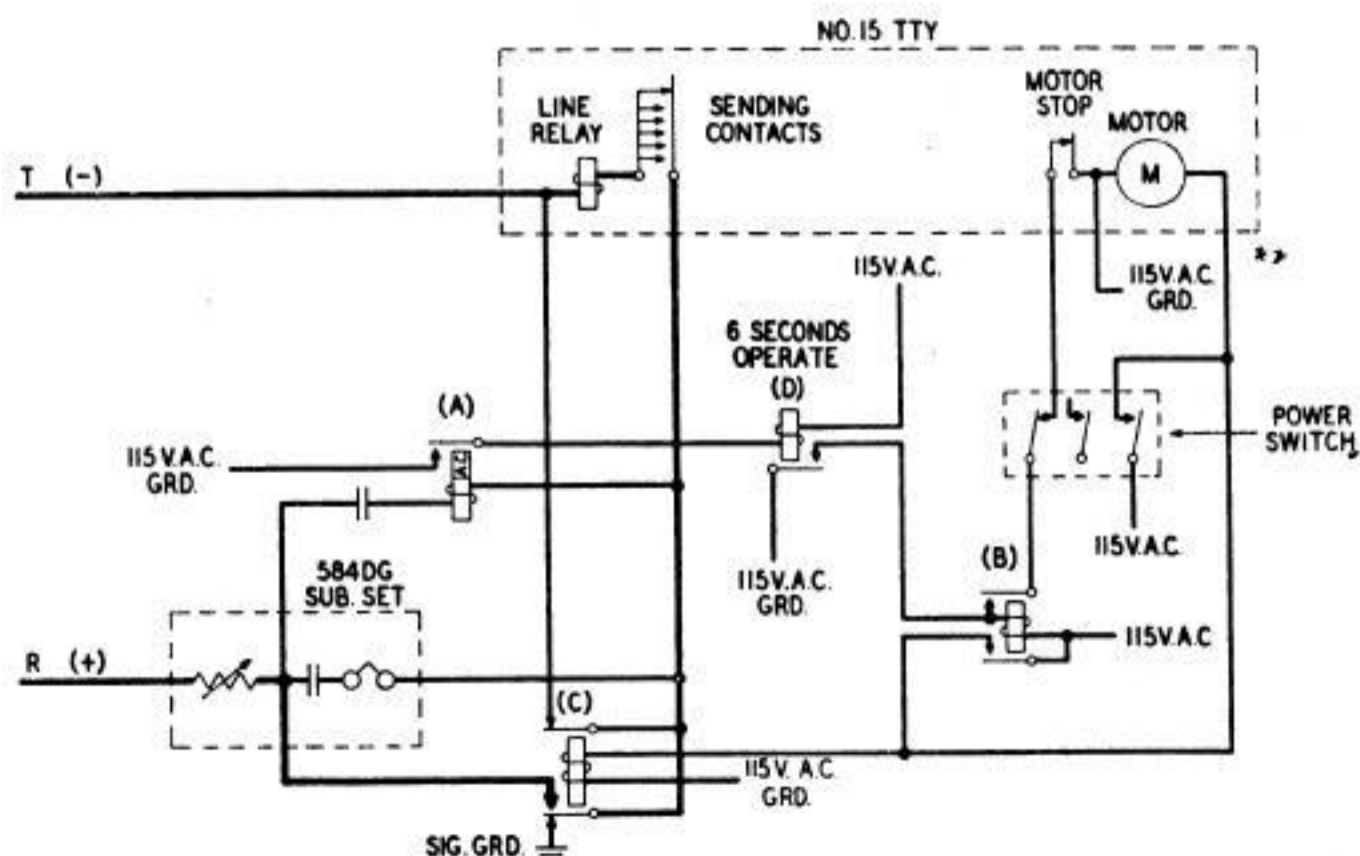


Fig. 2—Schematic of Typical Application—Local Unattended Station No. 15 TTY, A-C. Power Supply.

3.04 It will first be assumed that the teletypewriter is to be started by the switchboard operator. Ringing current is applied steadily to the ring conductor and this current passes through the ringer (which rings) and the (A) relay in parallel and thence to ground. The (A) relay is operated on the ringing current and applies a voltage to the (D) relay. When the (D) relay has been energized for approximately 6 seconds it will operate and close a circuit to the (B) relay. However, if the current through the (D) relay is interrupted for even a short time before the 6 seconds has elapsed it will release and the re-application of current for the full 6 seconds will be required to operate the relay. The operation of the latter relay will then operate the (B) relay which will apply power to the motor of the teletypewriter and to the (C) relay. The operation of the latter relay connects the tip and ring conductors together through the line relay winding and the sending contacts of the teletypewriter and at the same time removes the ground from the ringing circuit and opens the short circuit path from the sending contacts. The teletypewriter is now in a condition to receive a message.

3.05 At the termination of the communication the teletypewriter is stopped by transmitting to the station a motor stop signal combination ("Figs.", "Blank" and "H"). This momentarily opens the motor stop contacts which releases the (B) relay and then the (C) relay, after which the station is restored to its normal idle condition.

3.06 When the station is to be used on an attended basis the attendant operates the power switch to the "on" position. This starts the teletypewriter motor and operates the (C) relay which, as explained previously, connects the tip and ring conductors together thereby signaling the TWX switchboard operator. At the termination of the call the power switch is operated to the OFF position and the (C) relay releases thus restoring the set to the normal open circuit condition and causing a disconnect to appear at the switchboard.

3.07 When this set is used with switchboards which are provided with the flashing recall feature, such as the No. 5 switchboard the recall is accomplished by turning the power switch momentarily to the "OFF" position and back to the "ON" position. This will open one side of the line and ground the other momentarily to cause the recall signal to appear at the switchboard. When the switchboard has manual recall a 92 type key is provided in the control panel to open one side of the line and ground the other.

3.08 The teletypewriter may be stopped locally after it has been started remotely by operating the power switch to the ON position and then to the OFF position. The first operation opens up the locking winding of the (B) relay, releasing it and the second operation disconnects the power.

(B) No. 19 Teletypewriter Case

3.09 The station circuit for this case is shown schematically in Fig. 3.

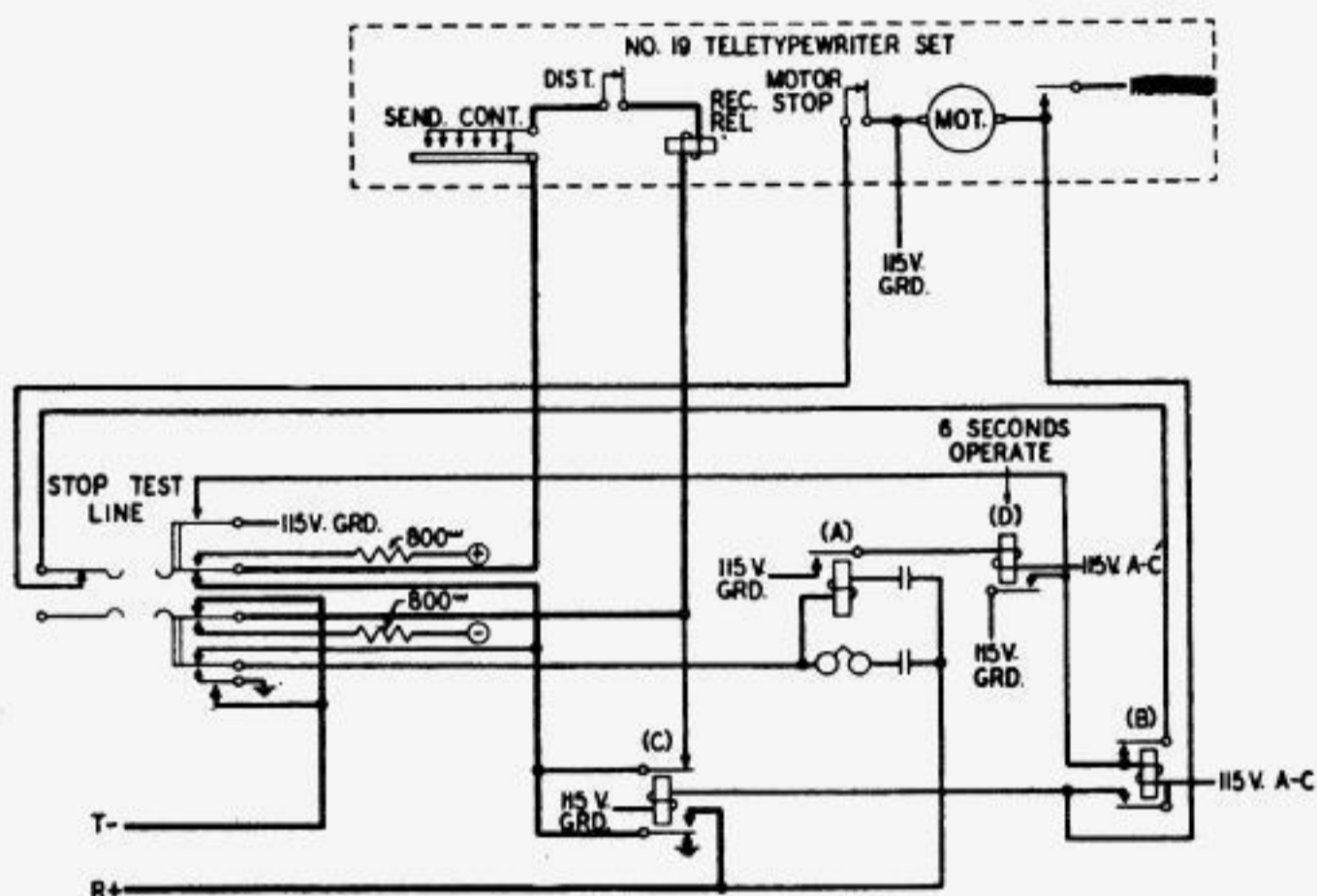


Fig. 3—Schematic of Typical Application—Local Unattended Station No. 19 TTY, A-C Power Supply.

3.10 A 6017 type key, designated "test-line-stop," is added to provide the control features needed and the "Line-test" key in the teletypewriter is rewired to make it inoperative.

3.11 When the attendant wishes to call the operator the "test-line-stop" key is operated momentarily to the TEST position and then to the LINE position. The operation to the test position connects power to relay (B) operating it after which relay (C) operates. The motor is thus started and

when the key is restored to normal the line circuit is completed to call the operator. While the key is in the TEST position the tip conductor (in this particular case) is grounded and the ring conductor is connected to the ringer so a ringing signal may be received. When the call is to be terminated the "test-line-stop" key is operated momentarily to the STOP position and then allowed to come back to normal. This opens the locking path of the (D) relay and the line is placed in its idle condition.

3.12 The remote starting and remote stopping are accomplished in the same manner as for the No. 15 teletypewriter described above.

4. OPERATING METHODS

4.01 The following gives the operating procedures applying when the 120C1 set is used in local service.

(1) Subscriber Calls Operator

4.02 In the case of the No. 15 teletypewriter the subscriber operates the power switch on the control panel in the 15N table to the ON position.

4.03 In the case of the No. 19 teletypewriter set the "test-line-stop" key is operated momentarily to the TEST position and then restored to the LINE position. If the machine is in the local test condition the operator can be called by restoring the "test-line-stop" key to the LINE position.

(2) Subscriber Recalls

4.04 In the case of the No. 15 teletypewriter the recall is accomplished the same way as in local attended open-line service.

4.05 In the case of the No. 19 teletypewriter the recall key is used when working with a switchboard with the manual recall feature. If the switchboard has the flashing recall feature the operator is recalled by operating the "test-line-stop" key in sequence to the STOP position, to the TEST position and then to the LINE position.

(3) Subscriber Disconnects

4.06 In the case of the No. 15 teletypewriter the subscriber disconnects by operating the power switch on the control panel of the 15N table to the OFF position.

4.07 In the case of the No. 19 teletypewriter set the disconnect is accomplished by momentarily operating the "test-line-stop" key to STOP (a non-locking position) and restoring to the LINE position.

(4) Operator Calls Subscriber

4.08 When the call is to be completed on an attended basis, the operator applies ringing current to the loop in the normal manner. This rings a bell but does not start the teletypewriter motor and the subscriber answers in the normal manner. If the call is to be completed on an unattended basis the operator applies ringing current steadily (for a period of approximately six seconds), until the supervisory light in the cord circuit is extinguished. When this light has been extinguished she will know that the teletypewriter motor at the station has been started. After the completion of the call the station teletypewriter motor is stopped by the transmission to the station by the operator of "Figs.", "Blank" and "H". When the motor has stopped the supervisory lamp will light and the operator will take down the connection.

(5) Emergency Stop of Teletypewriter

4.09 If the teletypewriter motor should get started in error and could not be stopped by the operator it may be stopped locally by the attendant. The procedure for doing this depends upon whether the set is being used with a No. 15 teletypewriter or the No. 19 teletypewriter set.

(a) No. 15 Teletypewriter—The power switch is operated momentarily to the ON position and is then restored.

(b) No. 19 Teletypewriter—The "test-line-stop" key is operated momentarily to the STOP position and is then restored to normal.

(6) Local Test

4.10 No local test feature is provided when the No. 15 teletypewriter is used. When an attendant desires to practice the teletypewriter may be operated over the regular station line. The maintenance man will also make whatever operating tests he needs to make over the regular station line.

4.11 When operating with the No. 19 Teletypewriter Set the local test is obtained by operating the "test-line-stop" key to TEST. When the key is in the TEST position the teletypewriter may be operated locally without signaling the operator. The bell will ring, however, in case the switchboard operator calls the station. After the set has been in the test condition the operator may be called in by restoring the "test-line-stop" key to the LINE position. If it is desired to stop the teletypewriter without calling the operator the key should be operated momentarily to the STOP position and then restored to the LINE position. Furthermore, if a call comes in

while the set is in local test the call may be answered by operating the key to the LINE position.

5. INSTALLATION INFORMATION

5.01 The station assembly and installation connections are shown on Plan drawings.

5.02 The teletypewriter should be equipped with remote control contacts arranged to open momentarily on the upper case H selection. The machine should also be equipped with the 87403 set of parts to prevent stopping except on the combination FIGS, BLANK, H.

6. REFERENCES

120C1 Equipment—ED-70177-01

120C1 Circuit —SD-70085-011-012

Equipment engineering
and engineering design
requirements —BSP AA 286.025