35 ELECTRICAL SERVICE UNIT

GENERAL DESCRIPTION AND PRINCIPLES OF OPERATION

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1. GENERAL

1.01 This section has been generally revised to include information on recent 35 electrical service units. Because this issue is a general revision, marginal arrows that indicate changes have been omitted.

1.02 The 35 electrical service unit serves as an area of concentration for the wiring of 35-type apparatus and provides mounting facilities for various electrical assemblies and components.

1.03 The operational facilities provided by the electrical service unit vary, depending upon the number and complexity of functions performed by the set.

1.04 Complete operation of an electrical service unit requires connections with other components of a set with which it is used. Additional information concerning the support functions of the unit may be found in sections discussing specific components and complete sets. Only independent features in the electrical service unit are discussed in this section, under principles of operation.

1.05 The electrical service units discussed in this section are used in all models of the following sets:

(a) 35 Receive Only (RO) Set.

(b) 35 Keyboard Send-Receive (KSR) Set.

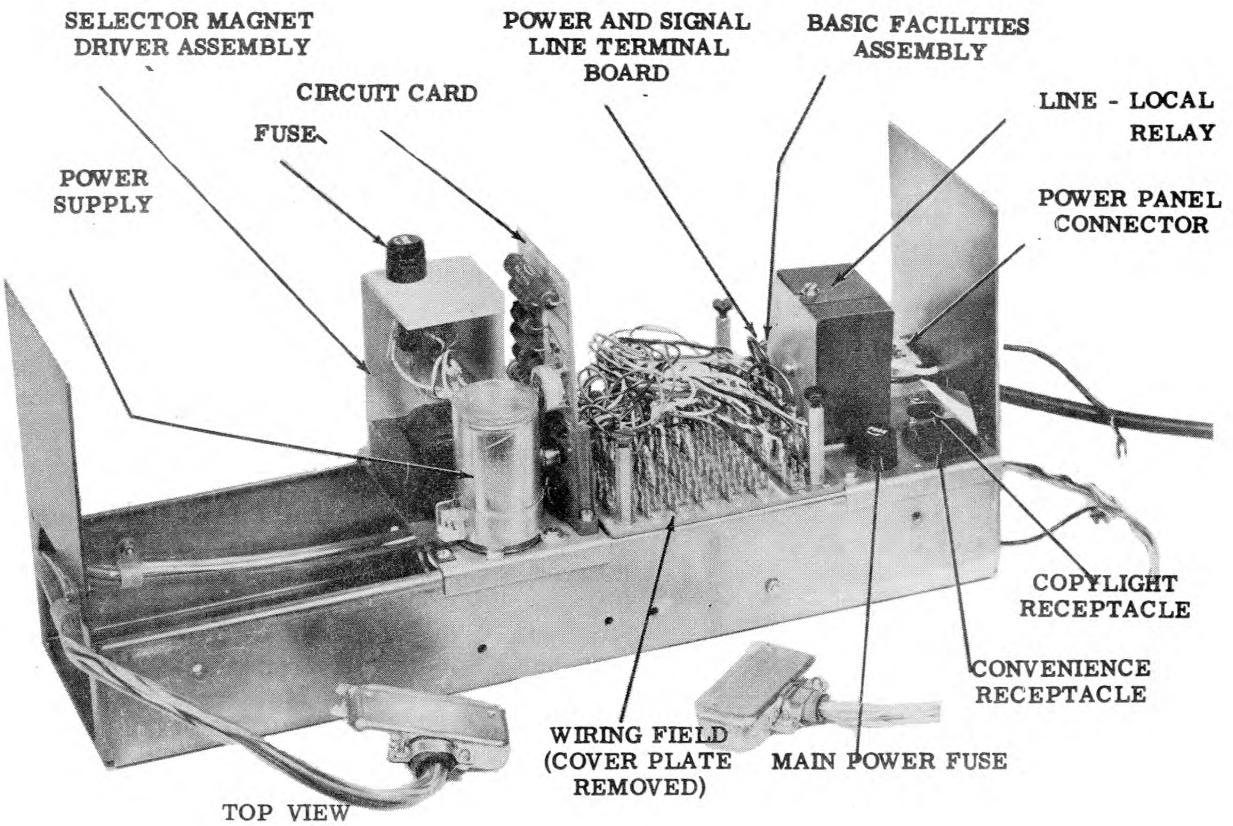
(c) 35 Automatic Send-Receive (ASR) Set.

(d) 35 Receive Only Typing Reperforator (ROTR) Set.

These sets may be utilized in a variety of installation configurations, including: private line applications, data communications networks, circuit switching networks, and computer installations.

2. DESCRIPTION (See Figures 1, 2, and 3)

2.01 The electrical service unit consists, basically, of a rectangular, metal chassis (or container) and a number of mounting plate assemblies. Each mounting plate assembly consists of a functional group of components. They are mounted on the chassis and are interconnected, as required, with strapping.



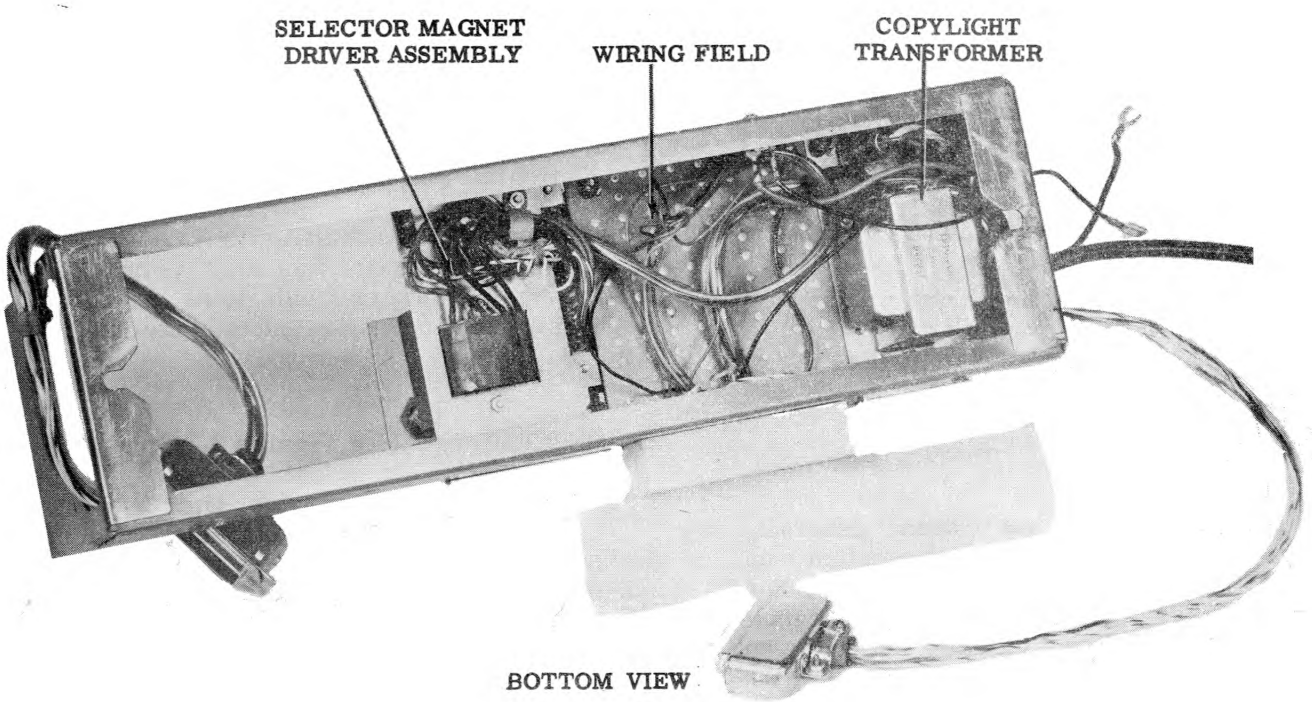


Figure 1 - Typical Electrical Service Unit for 35 KSR Set

2.02 Some of the features that may be mounted on the unit are listed below:

(a) A copylight transformer to supply power to the set's copylights.

(b) A copylight receptacle.

(c) A convenience receptacle.

(d) Fuses for protection of the main power and other circuits.

(e) A power and signal line terminal board.

(f) A line-local relay to provide switching to either online or independent, local operation.

(g) A main terminal board to provide a wiring field for connection of cable assemblies to the electrical service unit.

(h) A motor control relay for remote control of the set's motor.

(i) A main power on-off switch.

(j) Ground strapping.

(k) Cable assemblies, as required, for interconnection with other components of the set. The set's power cord may also be included.

(l) A transistorized selector magnet driver assembly, to amplify the incoming line signal to 500 milliamperes for operation of the receiving circuit selector magnets. More than one assembly may be installed to accommodate the receiving circuits of a set. For example, in an ASR set, two assemblies may be used: one for the typing unit, the other for a reperforator.

(m) A signal regenerator circuit to improve the output of the keyboard signal generator.

(n) A tape feed-out relay to pulse a reperforator's tape feed-out magnet.

(o) A reperforator control relay to blind a typing reperforator's selector magnets to line signals.

(p) An automatic turn around traffic control circuit card and disabling switch.

(q) Control panel and cable assemblies, typically consisting of two panels and cabling. One panel may support the mode and other pushbutton controls, the other the end-of-line indicator lamp. In some electrical service units, only the cabling to the external controls panels is provided.

(r) A noncontention (NCT) relay to prevent a sending station's answer-back from operating when transmitting a WRU code.

(s) Automatic mode switch relays, or a manually operated rotary mode selector switch.

(t) A line jack connected across the external signal line for testing purposes.

(u) An auxiliary power supply.

(v) Character counter suppression components.

(w) A line-shunt relay, used in conjunction with a line test key and an auxiliary power supply, to allow local set operation.

2.03 The electrical service unit used with standard (dc) sets is wired to provide half duplex signal line operation. The unit may be wired (optional) to obtain full duplex operation, which permits receiving messages and transmitting them at the same time without interference between the two signals. This is accomplished by electrically separating the sending and receiving loops of the set by making wiring changes in the electrical service unit and connecting the loops to the appropriate duplex signal lines.

3. PRINCIPLES OF OPERATION

GENERAL

3.01 Since the major function of the electrical service unit is to provide support for circuit facilities, only general operating principles of selected components are presented below. Detailed operating principles will be found in the sections which discuss these components in relation to set operation.

3.02 The wiring diagram for the electrical service unit is incorporated into the schematics which appear in the appropriate section for each 35 set (ie, RO, KSR, and ASR).

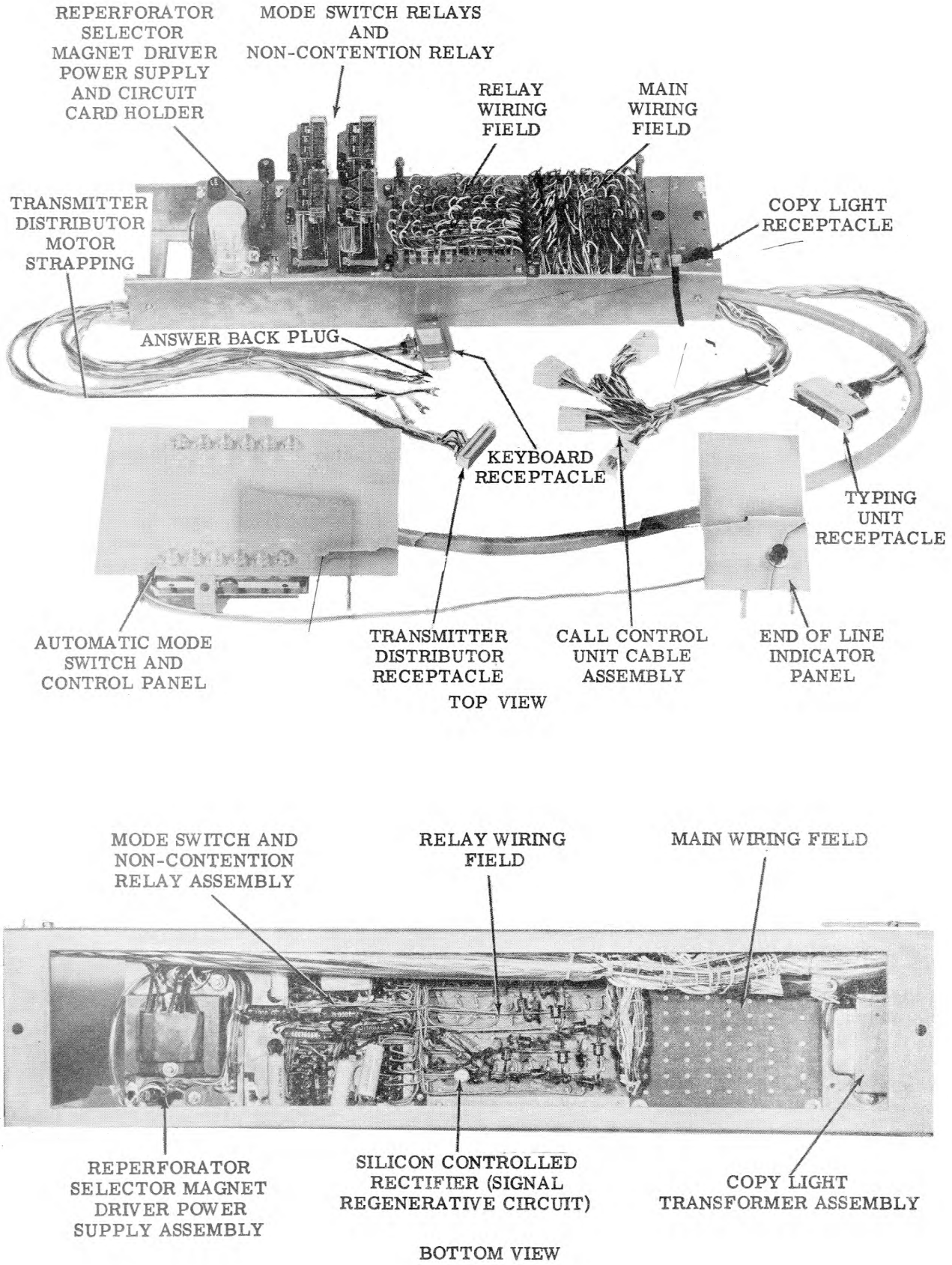
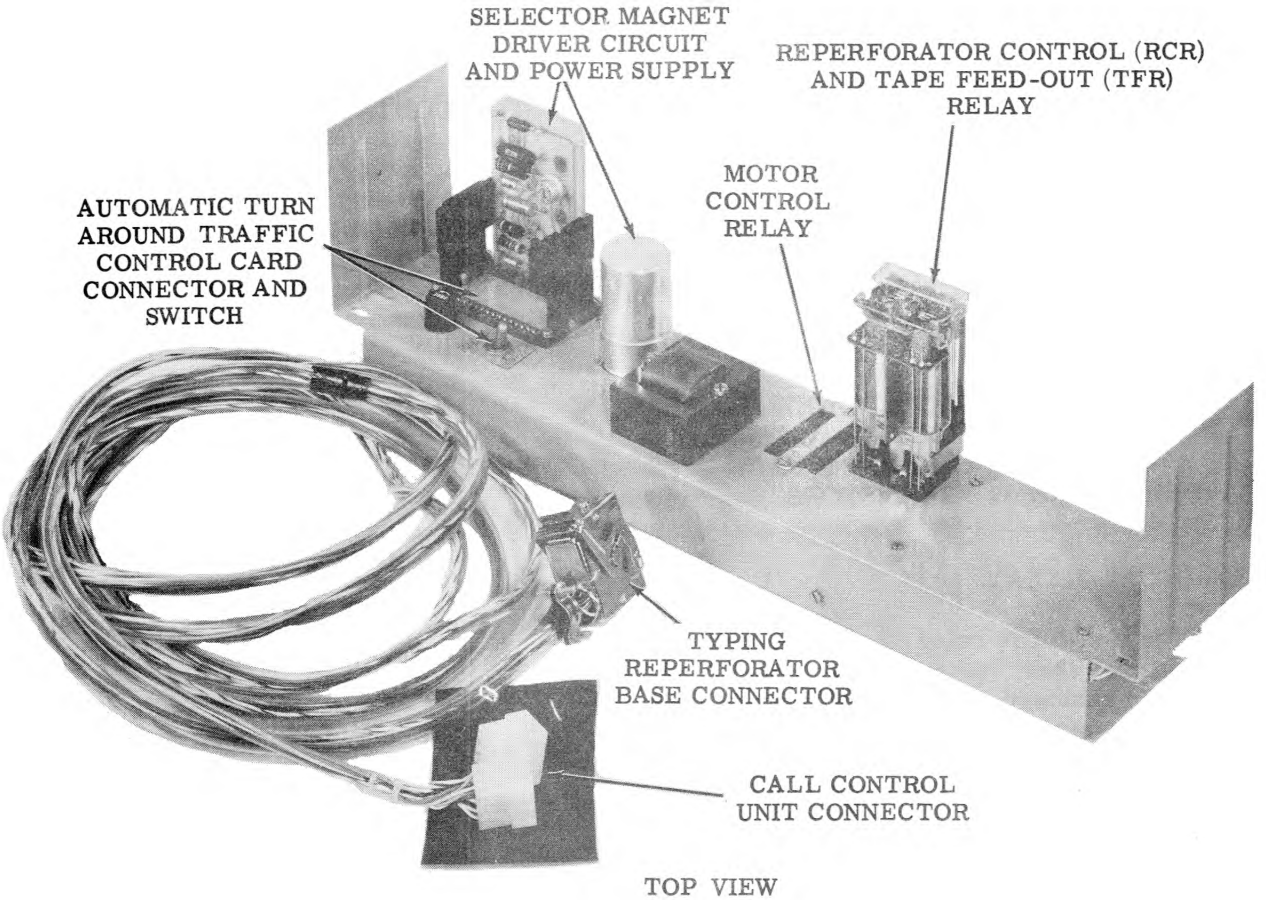


Figure 2 - Typical Electrical Service Unit for 35 ASR Set



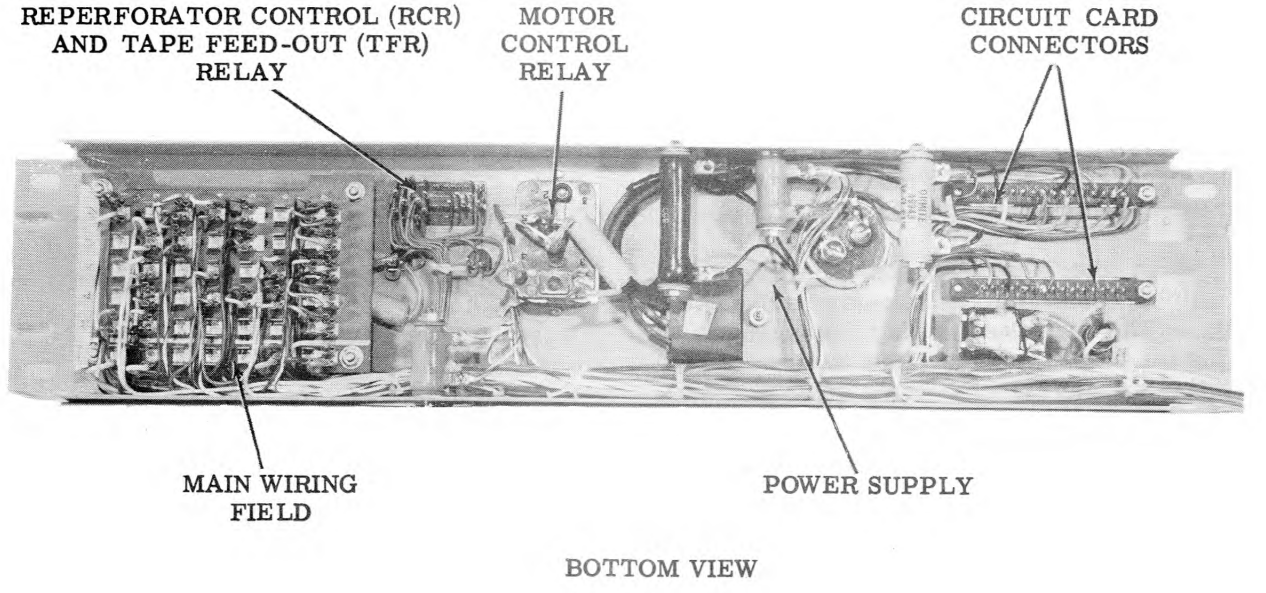


Figure 3 - Typical Electrical Service Unit for 35 ROTR Set

SELECTOR MAGNET DRIVER

3.03 The selector magnet driver assembly is a two stage transistorized amplifier capable of switching high output currents (0.500 ampere) at very closely controlled input current levels. The output of the driver is adjustable to 0.500 ampere output, but may change slightly due to normal supply voltage and component variations. Selector magnet driver assemblies are available which operate from either a 20 milliampere or a 60 milliampere line signal input.

CAUTION: DISCONNECT POWER TO SELECTOR MAGNET DRIVER ASSEMBLY - BEFORE REMOVING CIRCUIT CARD - TO AVOID DAMAGING TRANSISTORS.

LINE-LOCAL RELAY

3.04 The line-local relay is used to switch a set to either online or local operation. It is used in standard sets (dc) and is controlled by a rotary type power switch. With the switch in the ON position, the line-local relay energizes, placing the set's sending and receiving circuit in series with the signal line. The relay is energized via the selector magnet driver power supply (3.03).

3.05 Turning the power switch to the OFF position de-energizes the line-local relay. The external signal line to the set is shunted, but the selector magnets in the set's receiving circuits are held energized to prevent spurious characters from being typed or punched when the set is turned on and off.

3.06 With the power switch in the ONLINE position, the line-local relay is energized, and the signal generating and monitoring circuits of the set are connected into the signal line.

3.07 When the power switch is in the LOC (local) position, the set may be operated offline. The line-local relay de-energizes, shunting the external signal line to the set and connecting a local signal battery in series with the set's signal circuit.

ELECTRICAL MOTOR CONTROL

3.08 This feature permits a set's motor to be controlled remotely via the signal line. So equipped, the set may operate unattended. The sending station can turn the set on by sending a break, or turn it off after the data has been transmitted by sending the EOT code.

MOTOR CONTROL RELAY

3.09 The motor control relay is energized by the closing of the OR/AN relay contacts in the ASR or KSR set (a local key in these sets is also provided to energize this relay). The motor control relay is held operated until the motor hold contact on the feed-out mechanism of the typing reperforator breaks at the end of the feed-out cycle.

REPERFORATOR CONTROL RELAY

3.10 The reperforator control relay (RCR) has five sets of contacts used for the following functions:

(a) Selector magnet driver control.

(b) RCR relay locking.

(c) Tape-feed relay control.

(d) Feed-out magnet control.

(e) ROTR on lamp (in ASR) control.

The relay is energized by the closing of the R1 on contact in the ASR or KSR stunt box, or the ROTR ON key on the ASR control panel. The RCR relay is held energized by one of its own contacts, which is in series with the R1 off contact in the ASR or KSR stunt box.

3.11 The selector magnet driver control contact is normally closed, and shunts the signal line to the selector magnet driver, binding it to any signal. When the RCR relay is energized, the selector magnet driver will respond to the incoming signal.

AUTOMATIC TURN AROUND TRAFFIC CONTROL

3.12 The purpose of the automatic turn around traffic control (ATATC) is to blind the typing reperforator selector magnet driver to locally (ASR or KSR set) generated traffic, while allowing incoming traffic through. An all-traffic switch is provided to disable the ATATC.

TAPE FEED-OUT CONTROL RELAY

3.13 The tape feed-out control relay (TFR) is controlled by the reperforator control relay (RCR). A make contact on the TFR relay and a break contact on the RCR relay are wired in series with the tape feed-out magnet on the typing reperforator. When both relays are operated, the RCR contact is opened and the TFR contact is closed. When the RCR relay releases, the RCR contact closes and the TFR contact remains closed for 65 milliseconds (slow release). This allows the tape feed-out magnet to energize, initiating tape feed-out.

LINE-SHUNT RELAY

3.14 This feature permits local operation of a set in addition to online operation. When the LINE-TEST key is placed in the TEST position, the line-shunt relay de-energizes, shunting the external signal line and switching in an auxiliary power supply in series with the set's signal circuit.

CHARACTER COUNTER SUPPRESSION

3.15 Suppression of the character counter mechanism (ASR sets) is desirable from a standpoint of operating flexibility. Suppressing the character counter allows the operator to prepare tape in the tape mode, switch to keyboard mode and use the keyboard, and return to the tape mode without disturbing the character count.

MODE SWITCHING COMPONENTS

A. Automatic

3.16 Automatic mode switching components for ASR sets provide the following operating features:

(a) The ability to prepare tape while transmitting or receiving traffic.

(b) The ability to transmit or receive traffic using codes foreign to the set.

(c) The ability to receive traffic on tape and by page printer simultaneously.

(d) The ability to revert to a common mode of operation when clearing the set.

3.17 To provide these features, mode switching relays, which operate in conjunction with a pushbutton control panel, allow the operator to automatically select the set's operating mode. One of five modes may be selected: keyboard (K), keyboard-tape (KT), tape (T), tape-tape send (TTS), or tape-tape receive (TTR).

B. Manual

3.18 Manual mode switching components for ASR sets provide the (a), (b), and (c) operating features listed in Paragraph 3.16. A conveniently located rotary selector switch allows the operator to manually select the set's operating mode. One of five operating modes may be selected: K, KT, T, TTS, or TTR (see 3.17).