# 37 RECEIVE-ONLY (RO) TELETYPEWRITER SET

## GENERAL DESCRIPTION

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## 1. GENERAL

1.01 This section provides a general description of the 37 Receive-Only (RO) Teletypewriter Set (Figure 1). Set information, which applies to a specific station arrangement only, will be found in the station documentation. REFERENCES, in this section, provides a guide to more specific information.

1.02 The 37 RO Set is a heavy duty terminal that functions with ASCII (American National Standard Code for Information Interchange). The set converts received data into printed page copy. It receives at a speed of 150 words per minute (wpm).

1.03 The styling and equipment are designed to complement modern office furnishings. The printed copy and the equipment noise are comparable to that of an office typewriter.

1.04 References to left or right, front or rear, top or bottom, etc, apply to the set in its normal operating position with the operator facing the control panel.

1.05 The 37 RO Set receives data in the form of voltage signals which are used by the RO set to copy the data on page size copy paper or business forms.

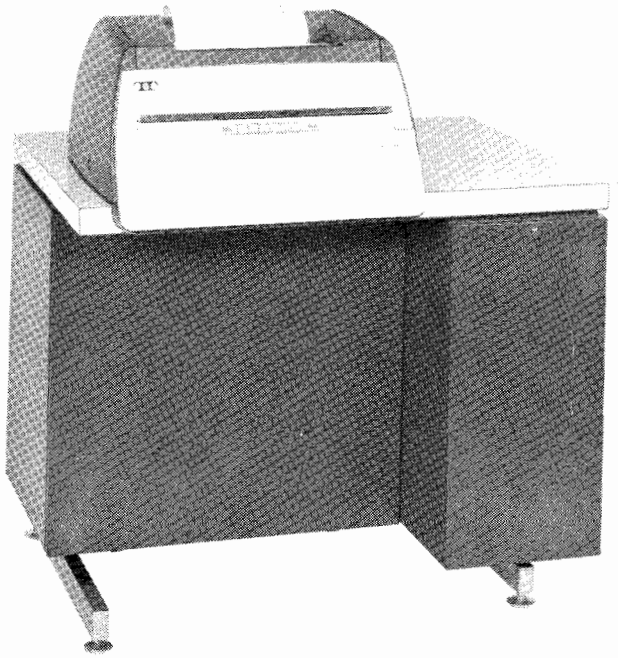


Figure 1 - 37 RO Teletypewriter Set

Prepared for American Telephone and Telegraph Company by Teletype Corporation

## 2. DESCRIPTION

2.01 A typical RO set (Figure 1) consists of the following components:

Typing Unit
Base
Control Panel
Motor Unit
Typing Unit Cover and Pan
Table
Electrical Service Unit

### STANDARD FEATURES

2.02 The following features are standard on RO sets:

- Receives at the speed of 150 wpm (15 characters per second) with a 10-unit code transmission pattern.
- Receives all 128 ASCII characters — prints 94 graphics including upper and lower case alphabet.
- Seventy-two characters on a line (10 per inch) (craftsman adjustable for shorter or longer lengths up to 80 characters).
- On-line backspace.
- On-line carriage return and line feed.
- Local carriage return.
- Local paper feed-out.
- Operator control of multiple copy.
- Operator control of vertical spacing:
  - (a) 3 lines per inch
  - (b) 6 lines per inch.
- Single color printing.
- Uses roll paper (friction feed sets) or flat-folded, form feed paper with margin perforations (sprocket feed sets).
- Print position indicator (next character indicator).
- Print position scale.
- Indication of incorrect vertical parity.

### VARIABLE FEATURES

2.03 In addition to the above standard features, certain options and accessories can be obtained which provide the following variable features:

- Two-color printing.
- Printed graphics extension (prints symbols for all 128 ASCII characters).
- Horizontal tabulation, on-line control.
- Vertical tabulation, on-line control.
- Half-forward, half-reverse, and full reverse line feed.
- Nonrepeat form feed.
- Carriage return on receipt of NEW LINE, VT, or FF characters.
- Optional operating speed of 100 wpm (10 characters per second) with an 11-unit code pattern.
- Front or rear loading of forms.
- Form accumulation shelf.
- Eighty-six characters on a line (12 per inch).
- Vertical tabulation (craftsman adjustable).
- Horizontal tabulation (craftsman adjustable).
- Alarm indication for low-paper (friction feed sets) or paper-out condition (sprocket feed sets).
- Wide platen (132 character line) typing unit and cabinetry.
- Answer-back triggered manually with HERE IS pushbutton, or automatically by receipt of ENQ character.

### COMPONENTS

#### A. Typing Unit

2.04 The typing unit (Figure 2) receives information serially by means of a single magnet (two coils) type of selector. A function box is provided for character and character sequence recognition.

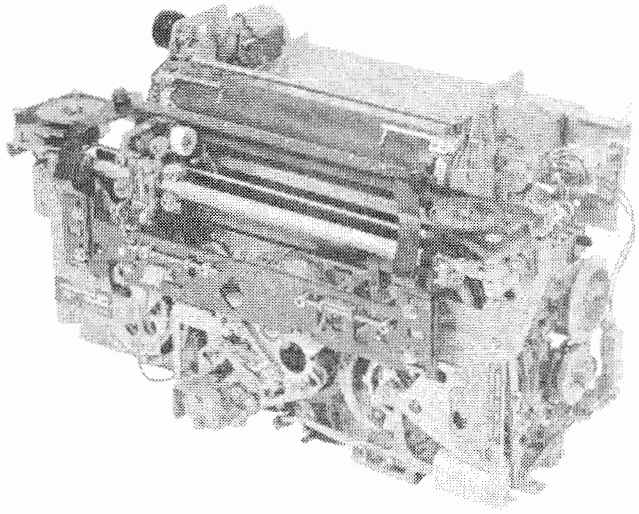


Figure 2 - 37 Typing Unit

2.05 Page copy is provided by the typing unit which prints both upper and lower case characters utilizing a typebox positioned by an aggregate motion mechanism. The typebox is moved from character to character and is returned to "home" position when reception stops, thus making all characters visible when the machine is idle.

2.06 The typing unit is capable of printing symbols for all 128 ASCII characters. Normally, however, it will be arranged to print the 94 graphic, numeric, and alpha characters of ASCII.

2.07 Normally the typing unit will print ten characters per inch allowing 72 characters on an 8-1/2 inch platen with normal margins on the paper. Optionally, other typing units may be arranged to print 12 characters per inch allowing 86 characters on an 8-1/2 inch platen with normal margins on the paper. Line feed provides for spacing six lines of type per vertical inch.

2.08 Two types of paper feed options are available:

(a) A typing unit arranged for friction feed is capable of accommodating roll paper widths of 3 to 8-1/2 inches and capable of providing multiple copies of one original and two carbons.

(b) A typing unit arranged with sprocket feed is capable of handling sprocket feed paper 11 inches long and 9-1/2 inches wide. One-half inch is needed on each side of a page to allow for sprocket holes. The typing unit is capable of providing multiple copies consisting of one original and up to five carbons.

2.09 An optional wide platen typing unit will print 132 characters per line at 10 characters per inch. The typing unit is available in sprocket feed only, and is capable of handling sprocket feed paper 14-7/8 inches wide. One-half inch is needed on each side of a page to allow for sprocket holes. The typing unit is capable of providing multiple copies consisting of one original and up to five carbons.

2.10 All typing units are equipped with line feed and carriage return (both on-line and local), on-line backspace, and craftsman adjustable margins.

2.11 Optional paper positioning controls are provided for either friction feed or sprocket feed typing units:

(a) Form-Feed — When the typing unit detects the form-feed character, it will position the paper for printing on the first line of the next page. Pages up to 15 inches in length, adjustable by a craftsman, may be accommodated. The typing unit form feeds three lines during one character interval. Two successive form feeds are prevented unless there has been an intervening line feed.

(b) Horizontal Tabulation — This feature is a fixed tabulator stop type. The fixed stops are set by a craftsman to customer specifications.

(c) Vertical Tabulation — This feature is a fixed tabulator stop type. The fixed stops are set by a craftsman to customer specifications.

(d) Horizontal Tabulation On-Line Control — This is an on-line feature used to set and clear tabulation stops in the typing unit horizontal tabulation mechanism. The characters ESC 1 are used to set tabulator stops and the characters ESC 2 are used to clear the stops.

(e) Vertical Tabulation On-Line Control — This is an on-line feature used to set and clear the tabulation stops in the typing unit vertical tabulation mechanism. The characters ESC 5 are used to set the tabulator stops and the characters ESC 6 are used to clear the stops.

B. Base

2.12 The base provides mounting facilities for the typing unit, motor unit, and intermediate gear assembly.

C. Control Panel

2.13 The control panel (Figure 3) which is located above the keyboard contains six nonlocking pushbuttons. In addition, there are two mechanical pushbuttons designated PAPER ADVANCE and LOCAL RETURN. The designations on the nonlocking pushbuttons vary according to customer requirements. The pushbuttons, in general, reflect the condition of the set or components, or cause certain components to become operational.

D. Motor Unit

2.14 The function of the motor is to provide mechanical rotating motion for operating the typing unit.

2.15 The motor is a synchronous type, rated at 1/20 horsepower, and is operated from a 117 volt ±10 percent ac, single phase, 60 hertz ±0.45 hertz source of commercial power. It consists of a 2-pole wound stator with two windings (a main running winding and a start winding), and a ball bearing rotor. The start winding is in series with a start relay, capacitor, and thermal cutout switch which are mounted in a compartment of the motor mounting cradle.

E. Typing Unit Cover and Pan

2.16 The typing unit cover and pan includes copylights and provides the housing for the typing unit, base, motor and control panel. The cover and pan with assembled components normally mount onto a table.

2.17 The cover is hinged to the pan and can be easily removed, or it may be raised and extended over interior components while maintenance is being performed.

2.18 Two lids at the top of the cover provide access to the typing unit for ribbon changing, replenishing paper supply, adjusting print hammer for multiple copy, etc.

F. Table

2.19 The table provides a mounting surface for the typing unit cover and pan and the other components which the cover and pan houses. In addition, a compartment of the table provides facilities for mounting the electrical service unit. The power for the set components is obtained from the electrical service unit when its ac power cord is plugged into a commercial source of power.

2.20 A double-compartment table is available for both standard and wide platen units. Also available are two single-compartment tables for standard platen and one single-compartment table for wide platen units. Their dimensions are given in Figure 4.

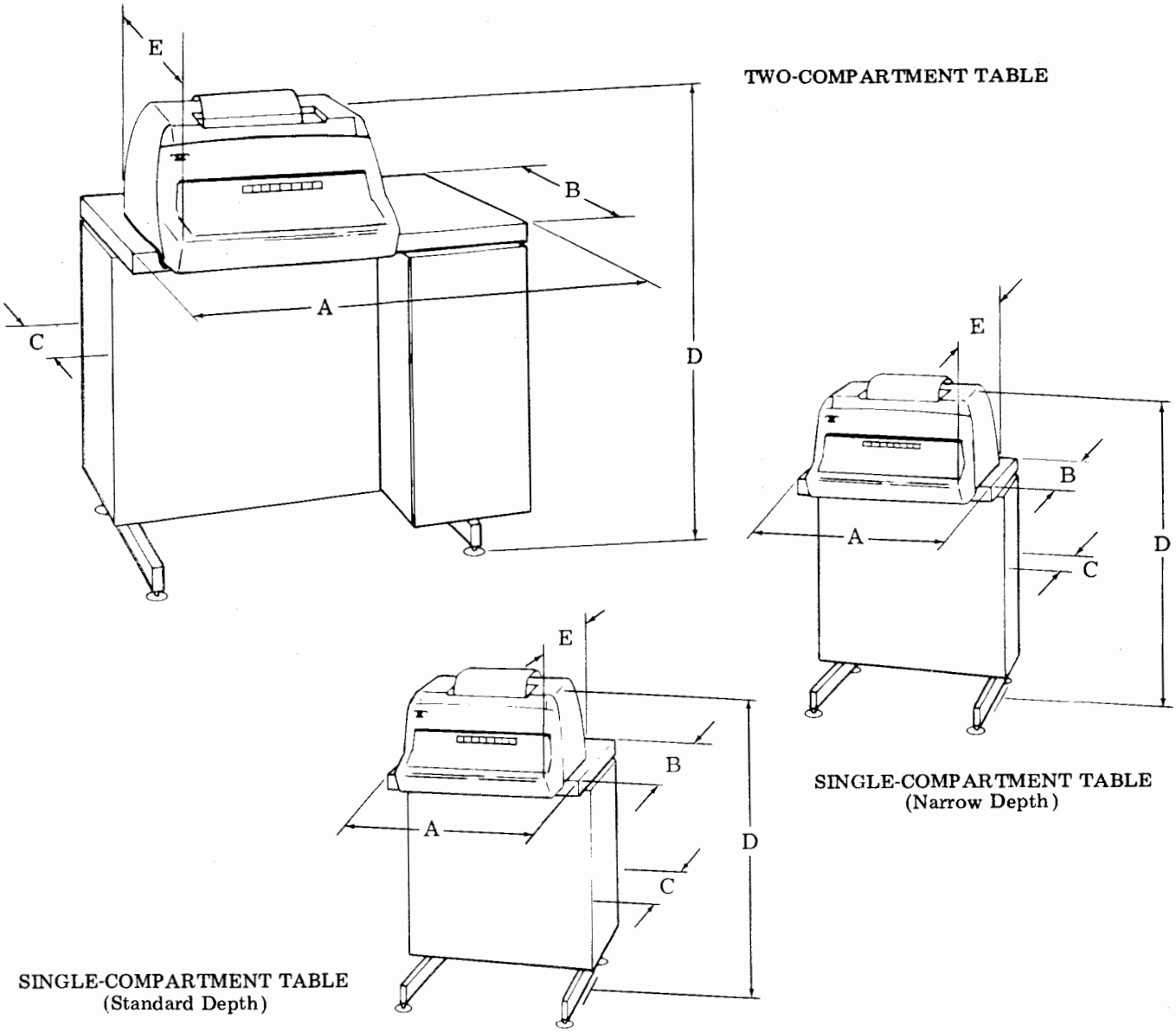
G. Electrical Service Unit

2.21 The electrical service unit (Figure 5) consists of a chassis assembly which mounts into the lower part of the knee well of the table. The chassis assembly has a multivoltage power supply, copylight transformer, motor control relay, fuses, duplex ac receptacle, a wiring field, and circuit card connectors. A set of circuit cards selected for a given arrangement provides the set logic. The cards mount into the card connectors.

2.22 Wiring from the card connectors terminate at the wiring field which provides a centralized wiring location for the set. Cable assemblies with several plugs also terminate at the wiring field. The plugs connect to the typing unit, base, control panel, copylights, etc. An interface connector provides a signal interchange point which conforms with the EIA (Electronic Industries Association — Standard RS-232-B).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PAPER ADVANCE | INTRPT | OFF LINE | HERE IS | OUT OF SERVICE | PAPER ALARM | ERROR | LOCAL RETURN |

Figure 3 - Typical Control Panel Arrangement




| DIMENSION | TWO-COMPARTMENT (STANDARD AND WIDE PLATEN) (INCHES) | SINGLE-COMPARTMENT (STD DEPTH) (STANDARD PLATEN) (INCHES) | SINGLE-COMPARTMENT (NARROW DEPTH) (STANDARD PLATEN) (INCHES) | SINGLE-COMPARTMENT (WIDE PLATEN) (INCHES) |
|---|---|---|---|---|
| A | 32-1/2 | 22-1/2 | 22-1/2 | 29 |
| B | 23 | 23 | 17-1/8 | 23 |
| C | 14-1/2 | 14-1/2 | 8-5/8 | 14-1/2 |
| D | 36 | 36 | 36 | 36 |
| E | 24-1/2 | 24-1/2 | 18-5/8 | 24-1/2 |

Figure 4 - 37 RO Sets — Dimensions

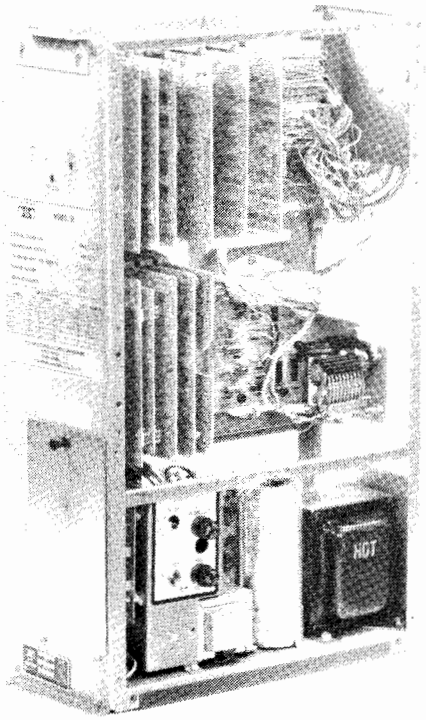



Figure 5 - Electrical Service Unit

2.23 An electrical service unit variation utilizes a utility strip (Figure 6). The utility strip is a separate chassis containing some of the components normally contained in the main chassis. These components are the copylight transformer, motor control relay, ac receptacles, a circuit breaker instead of a fuse, and the signal bell which is normally mounted separate from the main chassis.

2.24 The ac power for the set is provided over a single ac power cord which terminates at the electrical service unit main chassis. If the electrical service unit utilizes the utility strip, the ac power cord from the utility strip plugs into an externally provided ac receptacle, and the ac power cord from the electrical service unit main chassis plugs into an ac receptacle on the utility strip.

2.25 The multivoltage power supply converts ac power into appropriate dc power which is used for internal set operation, ie, the regulator, solenoids, lamp driver amplifiers, motor control relay, bell, integrated and discrete semiconductor circuits, etc.

ACCESSORIES

A. Answer-Back Unit

2.26 The answer-back unit provides for automatically transmitting a maximum of 20 characters for set identification. The unit consists of a mechanical device, an electronic circuit, and a mounting arrangement.

2.27 The mechanical device has a magnet which, each time it is pulsed and released, moves a 20-character codeable drum. Contacts ride tines of the drum. The electronic circuit (answer-back driver card) drives the magnet and provides readout for the contacts.

B. Paper Handling Accessories

2.28 A number of paper handling accessories are available for sets with sprocket feed typing units. Modification kits are available for either front or rear loading of a standard box of paper forms. Front loading of forms can be used for forms up to 14 inches in length. Forms up to 15 inches long can be loaded from the rear of the table. A form accumulator is also available as an accessory.

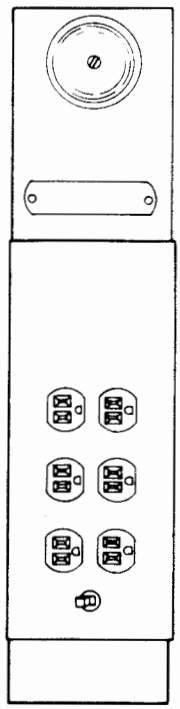


Figure 6 - Utility Strip

## 3. TECHNICAL DATA

3.01 Electrical and Environmental Characteristics

(a) Power . . . . . 115 volts ac ±10%, 60 Hz ±0.45 Hz, 15 ampere fused circuits, single phase (3-wire)

(b) Temperature ranges — This equipment is intended to be operated in a room environment within the temperature range of 40°F to 110°F. Serious damage to it could result if this range is exceeded. In this connection, particular caution should be exercised in using acoustical or other enclosures.

(c) Ambient relative humidity . . . From 0 to 95 percent

(d) Power consumption . . . . 300 watts

3.02 Physical Characteristics

(a) Dimensions . . . . . See Figure 4

(b) Weight

Standard platen . . . . approximately 214 pounds
Wide platen . . . . . approximately 239 pounds

(c) Power cord

Purpose . . . . . Provides ac power for entire set
Type . . . .Single 3-pin polarized cord
Length . . . . . 8 feet from back of cabinet

(d) Interface cord

Purpose . . . . Provides the interface with data set
Type . . . . . .Varies with customer requirement
Length . . . . . 6 to 8 feet (varies with requirements)

3.03 Set Internal Power Supply

(a) Multivoltage power supply

Output voltages (dc) . . (nominal), +12.5 volts maximum 4 amperes (nominal), -12.5 volts maximum 3 amperes (nominal), +5.25 volts maximum 3 amperes

(b) Utility strip (if present)

Output voltages . . . . . 115 volts ac
5.5 volts ac (for copylights)

## 4. REFERENCES

4.01 The following sections, relating to components of the 37 RO Set, may be referred to for supplemental information:

| TITLE | NUMBER |
|---|---|
| MOTOR UNIT | |
| Description and Principles of Operation | 570-220-100 |
| TYPING UNIT | |
| Description and Principles of Operation | 574-320-101 |
| ELECTRICAL SERVICE UNIT YESU823, 825, 827 and 829 (Without Utility Strip) | |
| Description and Operation | 574-322-102 |
| TABLE | |
| Description and Operation | 574-323-101 |
| ANSWER-BACK UNIT | |
| Description and Principles of Operation | 574-325-101 |
| TYPING UNIT COVER AND PAN | |
| Description and Operation | 574-326-101 |
| TYPING UNIT BASE | |
| Description and Operation, Adjustments, and Lubrication | 574-331-100 |

## 5. RO SETS FOR NO. 1 ESS-ADF (ADNET) 85A2, 86A2, AND 86B2 SELECTIVE CALLING

5.01 The 37 RO Sets used in a No. 1 ESS-ADF (ADNET), 85A2, 86A2, or 86B2 Selective Calling System include a special service unit and related components which permit it to operate as a terminate-only receiver or an auxiliary receiver. The type of service is determined by cabling and adjunct equipment.

OPERATION

5.02 The RO may be used as a primary receiver in the 85A2 and 86A2 terminate-only station, and in the 86B2 originate-terminate and terminate-only station. The primary receiver is interfaced, through appropriate cabling, to an 820-type data auxiliary set (station controller) and 804-type attendant set. In this application, the RO is controlled by the data auxiliary sets. The attendant set controls and indicators are identified in Table A and Table B.

5.03 When used as an auxiliary receiver, the RO is connected by cable to a primary receiver, which may be either an RO or ASR. The auxiliary RO receives its signals from the primary receiver controller, and must be unblinded manually by means of a pushbutton operation from the primary receiver, or by appropriate line control signals from the primary receiver stunt box.

5.04 The indicators or controls used on the RO control panel are shown in Figure 7. Their functions are described in Table C.

5.05 In all applications the power switch on the electrical service unit is used to turn the terminal on. The ON switch position turns the terminal on for test purposes without energizing the motor start relay. In the NORMAL switch position, the motor start relay must be energized by the data auxiliary set (controller) in order for the motor to turn on.

Set Accessories and Options

5.06 A two-color printing control option provides for on-line control of the typing unit ribbon by use of two character sequences. The typing unit shifts to red ribbon upon the detection of the character ESCAPE (ESC) followed by the character "3". The ribbon will remain shifted until the detection of ESCAPE followed by "4" or the detection of ETX.

5.07 A print suppression option can be used on primary receivers where an auxiliary receiver is used. This feature will suppress all printing and paper affecting functions on the primary receiver when the auxiliary receiver is unblinded. The print suppression mechanism is energized upon reception of the device control code DC2. The typing unit will suppress all printing and paper affecting functions until the receipt of either device control code DC4 or ETX.

TABLE A

ATTENDANT SET CONTROLS — 37 RO PRIMARY RECEIVER FOR 86A2 AND 86B2

| DESIGNATION | FUNCTION |
|---|---|
| MSG REC | Message Reception Alarm — lights when switcher interrupts delivery of message or at negative roll-call response or carrier fail. |
| ERROR | Lights when a character with parity error is received or when the clock is out of sync with incoming data. |
| PAPER LOW | Lights when paper supply needs replenishing. Can be reset only after paper supply has been replenished. |
| AUD OFF | Lights when pushbutton is depressed to indicate disabling of audible alarm. |
| REC | Lamp lights when station is selected as a receiver. |
| CALL | Flashes momentarily as the station is called. Remains lighted at a call-in if terminal is not ready to receive. |
| OUT OF SVC | When depressed, marks receiving terminal not ready so that station cannot be selected as a receiver. OUT OF SVC pushbutton operated while station is selected will not interfere with normal operation; it will take effect only after station subsequently becomes unselected. |

TABLE B

ATTENDANT SET CONTROLS — 37 RO PRIMARY RECEIVER FOR 85A2

| DESIGNATION | FUNCTION |
|---|---|
| SEL | Lights when the station is selected to receive. Lights momentarily when the station is not ready to receive and its station controller detects its call-in code. |
| OUT OF SVC | When depressed, marks receiving terminal not ready so that station cannot be selected as a receiver. OUT OF SVC pushbutton operated while station is selected will not interfere with normal operation; it will take effect only after station subsequently becomes unselected. |
| PAPER | Lights when paper supply needs replenishing. Can be reset only after paper supply has been replenished. |
| MSG ERROR | Lights when the last message improperly received response (CAN), is to be given on the next poll or the next call-in. |
| AUD OFF | Lights when pushbutton is depressed to indicate disabling of audible alarm. |

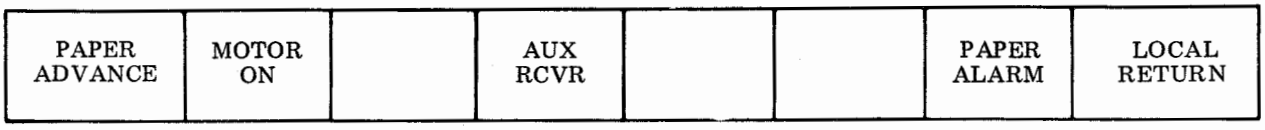



Figure 7 - 37 RO Control Panel

TABLE C

RO CONTROL PANEL

| DESIGNATION | FUNCTION |
|---|---|
| PAPER ADVANCE | Depressing this pushbutton causes the paper to advance continuously until the pushbutton is released. This pushbutton should be operated in conjunction with the MOTOR ON pushbutton if the set motor is off. |
| MOTOR ON | This nonlocking pushbutton turns typing unit motor on for as long as the pushbutton is held depressed. This pushbutton is to be used in conjunction with the PAPER ADVANCE pushbutton. |
| AUX RCVR | This pushbutton unblinds and blinds the auxiliary receiver, if one is used. |
| PAPER ALARM | This lamp lights if the paper supply runs low. It can be reset only after the paper supply has been replenished. |
| LOCAL RETURN | This pushbutton initiates the carriage return. Motor operation is not required for this function. |

5.08 The form feed detected and tabulation in process inhibit option will defeat the detection of the form feed character by the stunt box of an associated printer. This option is for friction feed typing unit applications, and negates the tabulation indication to the station controller. This is an installer's wiring option.

5.09 The character detected inhibit option defeats the character detected signal when a paper alarm occurs. The loss of the character detected signal causes the station controller to treat the message reception as unsatisfactory. This is an installer's wiring option.

5.10 The Mode Control II feature is achieved for primary receivers using an auxiliary receiver. By adding interconnecting cables and plug-in circuit cards, the auxiliary receiver will respond to:

(a) Local control by a pushbutton switch on the primary receiver control panel and/or

(b) Remote control using the device control codes DC2 (on) and DC4 or ETX (off), ETX being the terminate code of a received message.

TECHNICAL DATA

Voltage Levels

5.11 All logic level signals between circuit cards, and from circuit cards to data set (P303 connector) are as follows:

(a) Low — 0.0 to +0.5 volts dc

(b) High — +3.2 to +5.5 volts dc.

5.12 All DTL (diode transistor logic) level signals from the data auxiliary set to the teletypewriter set (P303 connector) are as follows:

(a) Low — -0.5 to +0.95 volts dc

(b) High — +2 to +25 volts dc (current limited to 10 ma maximum).

5.13 The receive data level signal from the data auxiliary set to the teletypewriter set (pin 43 P303 connector) is as follows:

(a) Low — +0.5 to -25 volts dc

(b) High — +3 to +25 volts dc.

Wiring Description

5.14 The circuits in the Electrical Service Unit (ESU) are divided into three functional subunits, arranged on individual circuit cards:

(a) Receiving device

(b) Two-color ribbon control (optional)

(c) RO control.

5.15 Interface cables are provided for the following:

P101 — power cord for ac input, 8 feet

P303 — data auxiliary set with 50-pin microribbon connector, 8-1/2 feet

P304 — motor interface with 9-pin connector, 2-1/2 feet

P306 — printer interface with 15-pin connector, 3 feet

P103 — J103 — power supply interface with 12-pin connector (internal)

Control panel connector and cable

P302 — 2-pin copylight connector

P308 — stunt box interface with 36-pin microribbon connector, 3 feet.

5.16 An example of interface leads on the P303 connector for RO applications is as follows:

| Pin No. | Function |
|---|---|
| 1, 2, 3 | Circuit Ground |
| 14 | Character Detected |
| 16 | Send Data (unused) |
| 24 | Motor Control |
| 25 | Space |
| 27 | Tabulation or Form Feed in Process |
| 30 | Reader Status (unused) |
| 31 | Paper Alarm |
| 33 | Mode (unused) |
| 34 | Mode (unused) |
| 37 | Mode (unused) |
| 42 | Mode (unused) |
| 43 | Receive Data |
| 44 | Form Feed Detected |
| 50 | Frame Ground |

REFERENCES

| TITLE | NUMBER |
|---|---|
| ELECTRICAL SERVICE UNIT | |
| Description and Operation | 574-322-104 |
| STATIONS | |
| 85A2 Data Selective Calling Service — 150 wpm Operation Description and Operation | 581-131-100 |
| 86A2 Data Selective Calling Service — 150 wpm Operation Description and Operation | 581-136-101 |
| 86B2 Data Selective Calling Service — 150 wpm Operation Description and Operation | 581-136-103 |