37 KEYBOARD SEND-RECEIVE (KSR) TELETYPEWRITER SET

GENERAL DESCRIPTION

CONTENTS

1. GENERAL

1.01 This section provides a general description of the 37 Keyboard Send-Receive (KSR) 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 KSR Set is a heavy duty terminal that functions with ASCII (American National Standard Code for Information Interchange). The set generates data from a keyboard and converts received data into printed page copy. It operates at 150 wpm (words per minute).

1.03 The styling and equipment are designed to complement modern office furnishings. The operator interface including keyboard layout and touch, quality of printed copy, and equipment noise is comparable to that of an office typewriter. The equipment has a modular design which permits rapid conversion from one type of set to another.

1.04 References to left or right, front or rear, top or bottom, etc, apply to the set in its normal position as viewed by the operator.

1.05 The 37 KSR Set originates data from its keyboard in the form of voltage signals. Voltage signals received from a distant station or the local set, are used by the 37 KSR Set to copy the data on page size paper or business forms.

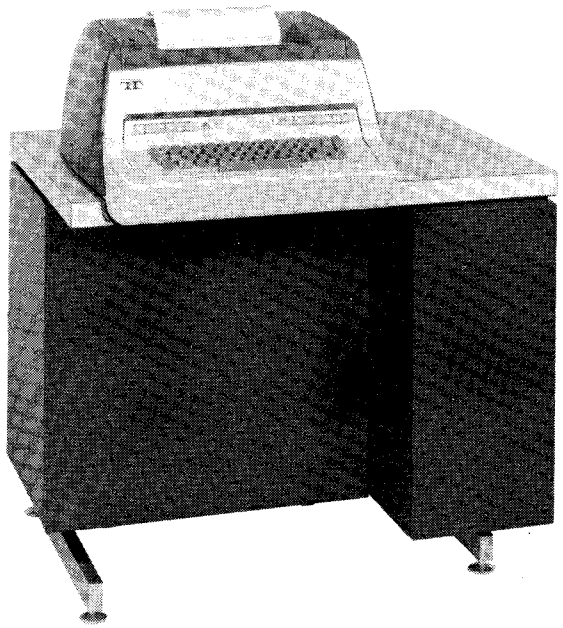


Figure 1 - Typical 37 KSR Teletypewriter Set

Prepared for American Telephone and Telegraph Company by Teletype Corporation

2. DESCRIPTION

2.01 Figure 1 shows a typical KSR set which consists of the following components:

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

STANDARD FEATURES

2.02 The following features are standard on KSR sets:

- Sends on-line from keyboard.
- Sends and receives at the speed of 150 wpm (15 characters a second) with a 10-unit code transmission pattern.
- Generates all 128 ASCII combinations with even parity.
- Receives all 128 ASCII combinations — 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.
- End of printed line indication (lamp) which is craftsman adjustable.
- 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.
- Roll paper (friction feed sets) or fan-folded, form-feed paper with marginal perforations (sprocket feed sets).
- Print position indicator (next character indicator).
- Print position scale.

VARIABLE FEATURES

2.03 In addition to standard features, certain options and accessories can be obtained. Some variable features and/or station arrangements prohibit use of other features. The appropriate station document lists the features of the particular station arrangement.

Interfacing that conforms with EIA (Electronics Industries Association) Standards.

- Two-color printing.
- Printed graphics extension.
- On-line horizontal tab set and clear.
- On-line vertical tab set and clear.
- Half-forward, half-reverse, and reverse line feed.
- Carriage return on receipt of VT or FF characters, in addition to performance of VT or FF function.
- Dedicated half-duplex, dedicated full duplex, or line control of home copy.
- Answer-back triggered either automatically or manually.
- Keyboard transmission blinded on NAK character, unblinded on ACK character.
- Indication of incorrect vertical parity.
- Even parity sensitive control functions — vertical parity required on all control functions.
- Character repeat feature — craftsman adjustable.

Note: This feature is normally disabled on all keys except the following:

Space	Period (.)
NEW LINE	Hyphen (-), Equal (=)
BACKSPACE	Underscore (_)
NULL	Colon (:), Asterisk (*)
DELETE	Character X

- Alarm indication for low-paper (friction feed sets) or paper-out condition (sprocket feed sets).
- Carriage return and line feed on NEW LINE character.
- Form advance (form-out).
- Vertical tabulation (craftsman adjustable).
- Horizontal tabulation (craftsman adjustable).
- Automatic carriage return at end-of-line.
- Print suppression.
- "Character received" contact mechanism.
- Code reading contacts.

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.

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 its retracted 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.

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 80 characters. Line feed provides for spacing six lines per vertical inch.

2.08 Two types of paper feed options are available.

(a) The friction feed typing unit accommodates roll paper widths of 3 to 8-1/2 inches and can provide multiple copies consisting of one original and up to two carbons.

(b) The sprocket feed typing unit accommodates 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 can provide multiple copies consisting of one original and up to five carbons.

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

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

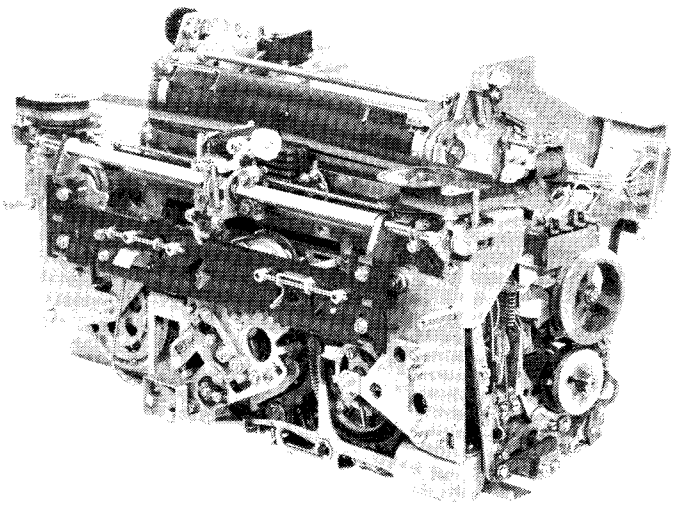


Figure 2 - Typical Typing Unit

(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 approximately 15 inches in length, adjustable by a craftsman, may be accommodated. The typing unit form feeds three lines during one character interval. Form feed will not function when the paper is positioned to print on the first line of the form.

(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 Tab Set and Clear — 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 Tab Set and Clear — 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. Keyboard

2.11 A 4-row keyboard configuration (Figure 3) is used. The keytop arrangement is consistent with a standard office typewriter (Figure 4), but certain keytop designations may vary slightly for system requirements.

2.12 The keyboard is an electromechanical device for generating ASCII combinations. It converts the mechanical depression of a key into electrical code paths. Keys move codebars which control electrical contacts. The electrical contacts present a parallel wire output to a keyboard control logic card and a distributor card in the electrical service unit, which converts the signals into a serial output with even vertical parity.

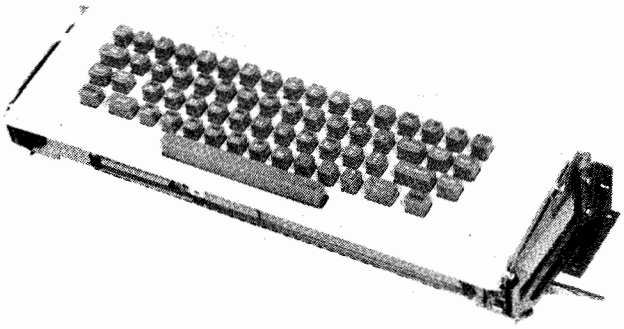


Figure 3 - Typical Keyboard

2.13 It is possible to generate all 128 code combinations of ASCII. Upper and lower case alpha characters, numerics, and special graphic characters are designated on the keytops. Control characters are designated on the keyboard in two ways. The most often used controls appear on separate keys and are active in both the shifted and unshifted conditions without use of the CONTRL key. Another group of controls appear on the same keytop with a graphic. To generate these code combinations, it is necessary to depress the CONTRL key while the particular key is struck. All control character designations requiring the depression of the CONTRL key, as well as the individual key, are printed on the keytops in charcoal grey.

2.14 A repeat feature is provided on each key generating a character. Further depression of the key beyond its normal stop position will cause the associated character to be generated repetitively at the maximum character rate. The repeat feature can be enabled or disabled by a craftsman.

C. Base

2.15 The base provides mounting facilities for the typing unit, motor unit, and intermediate gear assembly. Holes are also provided on the base for mounting the keyboard reset mechanism and printer margin indicator switch.

D. Control Panel

2.16 The control panel which is located above the keyboard contains a number of 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.

E. Motor Unit

2.17 The function of the motor is to drive the typing unit and keyboard reset mechanism.

2.18 The motor is a synchronous-type, rated at 1/20 horsepower, and is operated from a 115 volt $\pm$10 percent ac, single phase, 60 Hz $\pm$0.45 Hz source of commercial power.

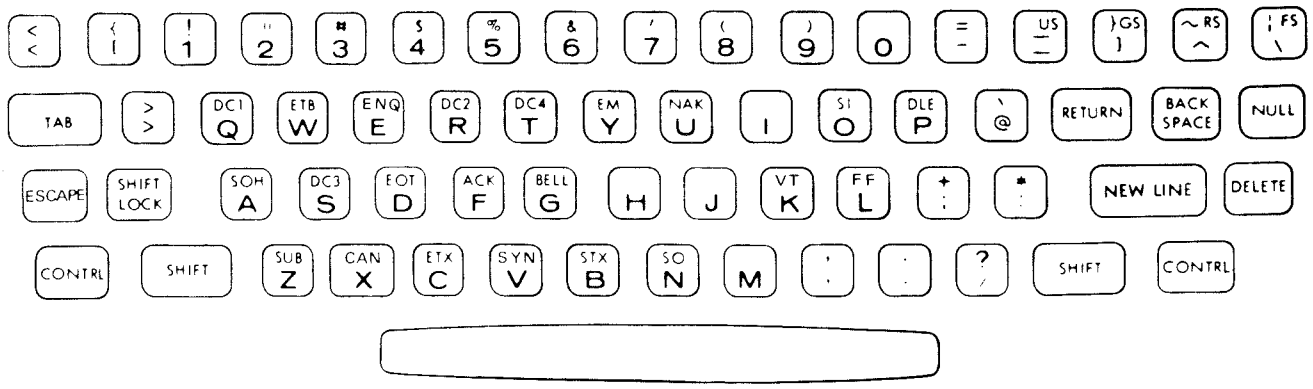


Figure 4 - Typical Keyboard Arrangement

It consists of a 2-pole wound stator with two windings (a main running winding and a start winding), and a ball bearing rotor. In addition, the motor is protected by a start relay, capacitor, and thermal cutout switch which are mounted in a compartment of the motor mounting cradle.

F. Typing Unit Cover and Pan

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

2.20 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.

2.21 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.

G. Table

2.22 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 ac 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.

2.23 Three optionally available tables may be obtained: A double-compartment table and two single-compartment tables which differ primarily in overall depth dimension (Figure 6).

H. Electrical Service Unit

2.24 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, a wiring field, and is equipped with card connectors. A set of circuit cards is selected for a given arrangement to provide set logic. The cards mount into the card connectors.

2.25 Wiring from the card connectors terminates at the wiring field which provides a centralized wiring location for the set. A cable assembly with several plugs also terminates at the wiring field. The plugs connect to the typing unit, keyboard and base, control panel, copylights, etc. An interface connector provides a signal interchange point.

2.26 A power cord from the electrical service unit plugs into a commercial ac power source. Some electrical service units contain a utility strip, with ac receptacles. The ac power cord from the utility strip plugs into a commercial power source, and the power cord from the electrical service unit chassis plugs into the utility strip receptacle.

2.27 A bell assembly, copylight transformer, and motor control relay are also a part of the utility strip and derive their power from the multivoltage power supply in the chassis through a second utility strip terminal board.

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

TYPICAL CIRCUIT CARD SETS

Cards	Quantity
Mode Control (150 wpm)	1
Receive Device Control	1
Receive Control	1
Alarms (or alarms and automatic control)	1
Keyboard Control	1
Distributor	1
Send Control	1
Channel Control	1
Two-Color Ribbon Control*	1

*Optional

ACCESSORIES

A. Answer-Back Assembly

2.29 The answer-back assembly provides for automatically transmitting a maximum of 20 characters for set identification. The assembly consists of a mechanism, an electronic circuit, and a mounting arrangement.

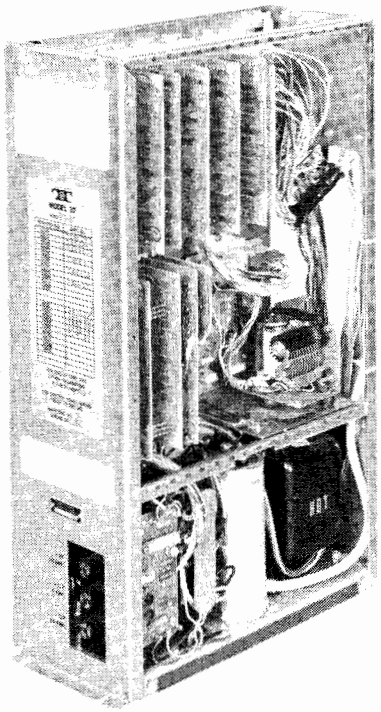


Figure 5 - Typical Electrical Service Unit

2.30 The mechanism (answer-back unit) has a magnet assembly which, each time it is pulsed and released, moves a 20-character codeable drum. Contact wires ride tines of the drum. The electronic circuit (answer-back driver card) drives the magnet and provides read-out for the contacts.

B. Paper Handling Accessories

2.31 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 approximately 14 to 15 inches long can be loaded from the rear of the table. A form accumulator is also available as an accessory if desired.

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

3.02 Physical Characteristics

(a) Dimensions . . . . . See Figure 6

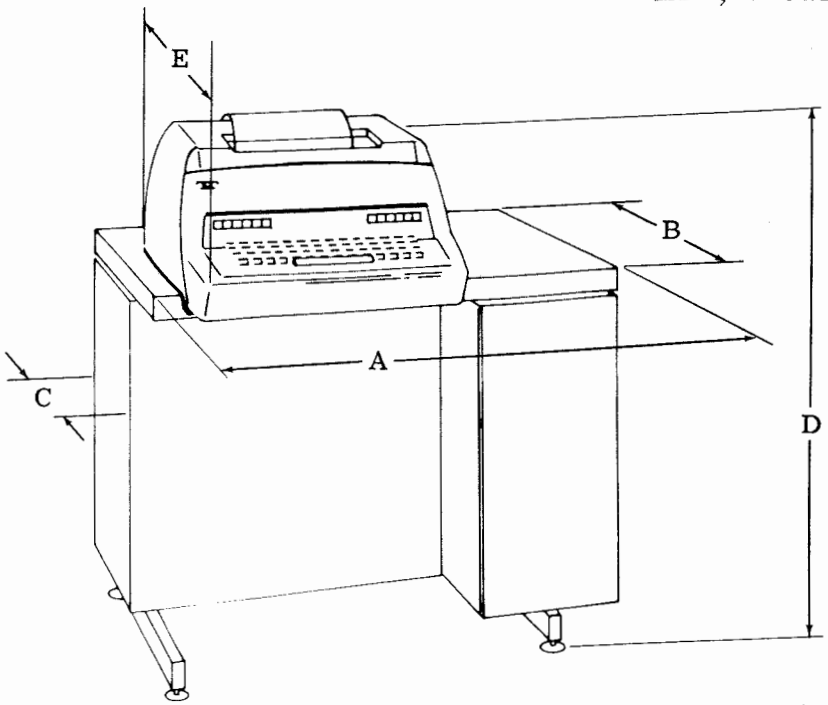
(b) Weight . . . . . 204 pounds

(c) Power cord

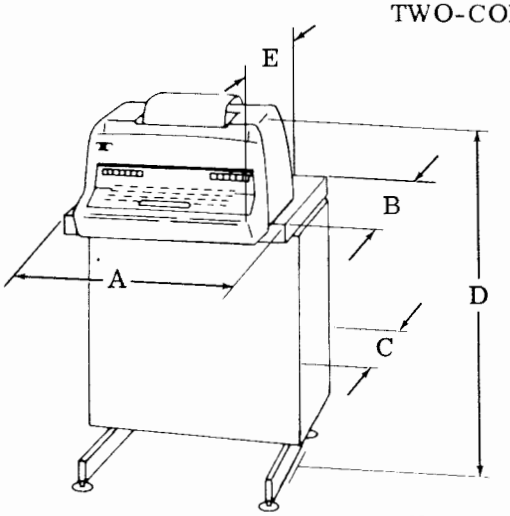
Purpose . . . . . Provides ac power for entire set

Type . . . . Single 3-pin polarized cord

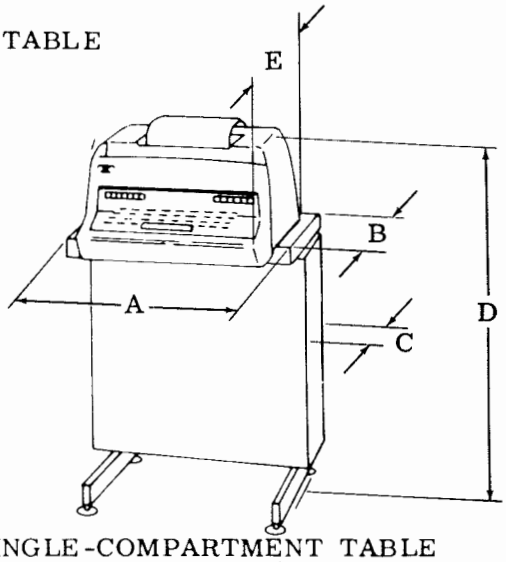
Length . . . 8 feet from back of cabinet



TWO-COMPARTMENT TABLE



SINGLE-COMPARTMENT TABLE
(Standard Depth)



SINGLE-COMPARTMENT TABLE
(Narrow Depth)

DIMENSION	TWO-COMPARTMENT (INCHES)	SINGLE-COMPARTMENT (STD DEPTH) (INCHES)	SINGLE-COMPARTMENT (NARROW DEPTH) (INCHES)
A	32-1/2	22-1/2	22-1/2
B	23	23	17-1/8
C	14-1/2	14-1/2	8-5/8
D	36	36	36
E	27-3/8	27-3/8	21-1/2

Figure 6 - 37 KSR Set Dimensions

(d) Interface cord

EIA type . . . . . 25-pin EIA connector

Length . . . . . 6 feet

Non-EIA . . . . . Connector varies

3.03 Set Internal Power Supply

(a) Multivoltage power supply

Output voltages . . . . . Nominal +12.5 volts dc 6 amperes
Nominal -12.5 volts dc 3 amperes
Nominal +5.25 volts dc 3 amperes

Convenience receptacle . . . 115 volts ac

Copylight transformer. . . . 5.5 volts ac

4. REFERENCES

4.01 Information to supplement the set section may be found in related component literature. (See reference list.) Differences in sets due to specific station arrangements are covered in the appropriate station section. The Bell System Teletypewriter Catalog and the Bell System Teletypewriter Station Engineering Arrangements also contain related information.

4.02 Reference List:

KSR SET

Removal and Replacement of Components	574-301-702

TYPING UNIT

Description and Principles of Operation	574-320-101
Wiring Diagrams	574-320-400
Adjustments	574-320-703
Lubrication	574-320-704
Disassembly and Reassembly	574-320-705
Parts	574-320-800

KEYBOARD

Description and Principles of Operation	574-321-101
Wiring Diagrams	574-321-400
Adjustments	574-321-703
Lubrication	574-321-704
Disassembly and Reassembly	574-321-705
Parts	574-321-801

TABLES

Description and Principles of Operation	574-323-101
Adjustments	574-323-703
Parts	574-323-801

ANSWER-BACK

Wiring Diagrams	574-325-400
Adjustments	574-325-703
Parts	574-325-800
Parts	574-325-801

TYPING UNIT COVER AND PAN

Description and Operation	574-326-101
Adjustments	574-326-703
Lubrication	574-326-704
Parts	574-326-801

BASE

Wiring Diagrams	574-331-400

PAPER WINDER

Wiring Diagrams	574-332-400

MOTOR UNITS

Description and Principles of Operation	570-220-100
Wiring Diagrams	570-220-400
Adjustments	570-220-700
Lubrication	570-220-701
Disassembly and Reassembly	570-220-702
Parts	570-220-800

ELECTRICAL SERVICE UNIT

Description and Operation YESU823, 825, 827, 829	574-322-101
Description and Operation	574-322-102