

**NORTH  
ELECTRIC**  
*Ericofon*<sup>®</sup>  
**HANDBOOK**

- maintenance
- adjustment
- parts lists



***NORTH ELECTRIC***  
TELECOMMUNICATIONS DIVISION / GALION, OHIO

All rights reserved. No part of this book may be reproduced in any form, by mimeograph or any other means, without permission in writing from the publishers.

TD-3-61

# **NORTH ELECTRIC ERICOFON**

## **MAINTENANCE, ADJUSTMENT AND PARTS LISTS HANDBOOK**

**PREPARED BY**

*The Telecommunications Engineering Group*

*and*

*The Technical Publications Department*

*March 21, 1962*

*Reprinted*

*September, 1967*

**TD-3-61**

**TABLE OF CONTENTS**

**SECTION I  
INTRODUCTION**

Paragraph		Page
1-1	GENERAL .....	1
1-3	COMPONENTS .....	1
1-5	Housing .....	1
1-6	Base Assembly .....	1
1-7	Transmitter Unit .....	1
1-8	Ericotone .....	1
1-9	Line Cord .....	1
1-10	Ringers .....	1
1-12	LOCATION .....	4
1-14	CONNECTIONS .....	4
1-16	SUBSCRIBER INSTRUCTIONS .....	4

**SECTION II  
MAINTENANCE AND ADJUSTMENT**

Paragraph		Page
2-1	FIELD MAINTENANCE .....	4
2-3	INSPECTION .....	4
2-5	LUBRICATION .....	4
2-9	ADJUSTMENTS .....	5
2-10	Contact Pressures And Gap Spacing .....	7
2-11	Actuating Foot .....	7
2-12	Springs NO. 4 And NO. 6 .....	7
2-13	Springs NO. 2 And NO. 3 .....	7
2-14	Springs NO. 1 And NO. 2 .....	7
2-15	Springs NO. 2 And NO. 3 .....	7
2-16	Contact Pressure Adjustment .....	7
2-17	Impulse Spring .....	7
2-18	Main Spring Tension .....	7
2-20	Dial Speed .....	7
2-21	DISASSEMBLY OF COMPONENTS .....	7
2-23	Base Assembly .....	7
2-24	Rear Base Assembly Retainer .....	7
2-25	Transmitter Unit .....	7
2-26	Front Base Assembly Retainer .....	10
2-27	Neoprene Gasket .....	10
2-28	Standswitch Plunger .....	10
2-29	Finger Wheel .....	10
2-30	Number Plate .....	10
2-31	Ericotone .....	10
2-32	Spring Set .....	10
2-33	Induction Coil .....	10

TABLE OF CONTENTS  
(Continued)

SECTION II  
MAINTENANCE AND ADJUSTMENT  
(Continued)

Paragraph		Page
2-34	Main Drive Spring .....	10
2-35	REASSEMBLY OF COMPONENTS .....	10
2-37	Main Drive Spring .....	10
2-38	Number Plate .....	10
2-39	TROUBLE SHOOTING .....	10
2-40	The Trouble Shooting Table .....	14

SECTION III  
ILLUSTRATED PARTS BREAKDOWN

Paragraph		Page
3-1	GENERAL .....	14
3-3	COMPONENTS .....	14
3-5	Housing Assembly .....	15
3-6	Base Assembly, Partial .....	15
3-7	Ericotone Assembly .....	15
3-8	Ericofon Line Cord .....	15
3-9	Source Code .....	15
3-10	Ericofon Housing/Color Part Number By Model Designation Numbers .....	15
3-11	Ericofon, Complete Telephone-Color/Model Number Cross Reference .....	15
3-12	Ericofon Receiver Plate/Color Part Numbers-Housing Color Reference .....	15
3-13	Illustrated Parts Breakdown .....	15
3-14	Figure And Index Number Column .....	15
3-15	Part Number Column .....	15
3-16	Description Column .....	15
3-17	Attaching Parts .....	16
3-18	Units Per Assembly .....	16
3-19	Usable On Models Column .....	16
	<u>PARTS LISTS</u>	
	The Complete Ericofon (All Models) .....	21
	Base Assembly, Dial With Ericotone .....	22
	Base Assembly, Manual Without Ericotone .....	23
	Base Assembly (Partial) Part Number 506713 .....	25

TABLE OF CONTENTS  
(Continued)

SECTION III  
ILLUSTRATED PARTS BREAKDOWN  
(Continued)

Paragraph	Page
Ericotone Assembly, Part Number 588931 .....	26
Ericofon Line Cord, 3 Wire (All Models) .....	28

SECTION IV  
ERICOTONE OPERATING PRINCIPLES

Paragraph	Page
4-1 INTRODUCTION .....	29
4-2 For Whom Prepared .....	29
4-3 Advanced Technical Training Not Required .....	29
4-4 Models On Which Ericotone Can Be Found .....	29
4-5 How The Ericotone Is Electrically Related To The Ericofon .....	29
4-6 APPLICATIONS OF RINGING VOLTAGE .....	29
4-7 Condition Of Ericofon When Ringing Voltage Is Applied .....	29
4-8 TWO METHODS OF RINGING VOLTAGE APPLICATION .....	29
4-9 Bridged Ringing .....	29
4-10 Divided Ringing .....	29
4-11 HOW THE ERICOTONE CIRCUIT FUNCTIONS .....	31
4-12 The Ericotone Circuit .....	31
4-13 Divisions Of The Ericotone Circuit .....	31
4-14 The Voltage Doubling Power Supply .....	31
4-15 Resistor R1 .....	31
4-16 The Discharge Lamp .....	31
4-17 The Diode CR1 .....	31
4-19 Capacitor C4 .....	31
4-20 THE OSCILLATOR .....	33
4-21 Basic Description .....	33
4-22 Transistor Q1 .....	33
4-23 The Diode CR2 .....	33
4-24 Capacitor C2 And Resistor R2 .....	33
4-25 Resistor R3 .....	33
4-26 Transformer L2 .....	33
4-27 Frequency .....	33
4-28 Ericotone Utilizes Minimum Electrical Energy .....	33

TABLE OF CONTENTS  
(Continued)

LIST OF ILLUSTRATIONS

Number	Title	Page
1-1	ERICOFON (TYPICAL) .....	vi
1-2	Ericofon Wiring Diagram (Label) Number 520533, for Manual and Dial Base Models with Ericotone (Models 52L and 52J) .....	2
1-3	Ericofon Wiring Diagram (Label) Number 521031, for Manual and Dial Base Models without Ericotone (Models 52A and 52B) .....	3
2-1	Ericofon Adjustment Tools (Used on all models) .....	6
2-2	Ericofon Off-normal Spring and Gap Spacing Adjustments (Applicable to all models) .....	8
2-3	Ericofon Impulse Spring Adjustments (Applicable to Models 52B and 52L only) .....	9
2-4	Ericofon Main Spring Tension Adjustments (Applicable to Models 52B and 52L only) .....	11
2-5	Ericofon, Removal of Front and Rear Base Assembly Retainers, and Transmitter Unit (All Models) .....	12
2-6	Ericofon Standswitch Plunger Removal and Standswitch Contact Adjustment (All Models) .....	13
3-1	The Complete Ericofon (All Models) .....	20
3-2	Base Assembly, Dial with Ericotone .....	22
3-3	Base Assembly, Manual without Ericotone .....	23
3-4	Base Assembly (Partial) Part Number 506713 .....	24
3-5	Ericotone Assembly, Part Number 588931 .....	26
3-6	Ericofon Line Cord, 3 Wire (All Models) .....	28
4-1	Schematic Diagram Showing the Electrical Relationship between the Ericofon and Ericotone Circuits .....	30
4-2	Schematic Representation of the Ericotone Circuit .....	32

LIST OF TABLES

Number	Title	Page
1-1	Ericofon Models Available .....	1
2-1	Ericofon Adjusting Tool List .....	5
2-2	Ericofon Trouble Shooting Chart .....	14
3-1	Ericofon Characteristics/ And Design Data .....	16
3-2	Ericofon Housing/Color Part Numbers By Model Designation Numbers .....	17
3-3	Ericofon, Complete Telephone-Color/Model Number Cross Reference .....	18
3-4	Ericofon Receiver Plate/Color Part Numbers-Housing/ Color Reference .....	19
4-1	Ericotone Schematic Components and Where They are Illustrated ..	34



## PREFACE

This handbook has been prepared for you, the Ericofon installer, service technician, and others directly concerned with the maintenance, adjustment, and supply of the Ericofon and its components.

The recognition of the North Electric Company as a leader in the telephone industry is the result of a steadfast adherence to the company's original policy; comprehensive service assistance and the finest product quality, provided in a spirit of intelligent cooperation.



Figure 1-1. ERICOFON (TYPICAL)

SECTION I  
INTRODUCTION

1-1. GENERAL.

1-2. The Ericofon, figure 1-1, is a modern desk telephone, which may be used in all classes of common battery telephone service. It is available in four models (See Table 1-1).

1-3. COMPONENTS.

1-4. The main components of the Ericofon are identified in the following paragraphs.

1-5. HOUSING. The Housing of the Ericofon is constructed of a thermoplastic material with high resistance to impact breakage and scratches. With normal care, the Ericofon will maintain its luster indefinitely. The Receiver is mounted permanently within the Housing to prevent unnecessary removal (A principal cause of receiver trouble).

**NOTE**

If the Ericofon Housing is damaged, the Receiver is recoverable, and credit for its return is given by the North Electric Company.

1-6. BASE ASSEMBLY. The Base Assembly is located in the lower part of the Housing. It contains the Dial, Standswitch, Induction Coil, Spring Set, Capacitor, and Ericotone (if so equipped). When the Standswitch, in the center of the Dial, is raised, the Ericofon is connected. When the Ericofon is placed on its Base in a standing position, the

Standswitch is depressed, and the Ericofon is disconnected.

1-7. TRANSMITTER UNIT. The Transmitter is mounted within a metallic shell, and is fastened within the Housing by means of a Retaining Clip. This new Transmitter is more sensitive to voice, and because of a new frequency balance principle, the Transmitter gains in efficiency at high frequencies without loss of performance at low frequencies. Therefore, a natural voice is heard instead of a "telephone voice."

1-8. ERICOTONE. The Ericotone is a unique signaling device available for use with the Ericofon if a bridged or divided ringing system is employed. It has a pleasant "warble", and can be easily identified in high ambient noise areas (See figure 3-5).

1-9. LINE CORD. The Ericofon Line Cord is a combination straight and coiled cord. This feature permits the Ericofon to be extended seven feet from its terminal box, with the straight portion permitting free movement over desk tops and around corners.

1-10. RINGERS. Ringers, which are applicable to the Ericofon, are explained in THE NORTH TELEPHONE HANDBOOK. To obtain copies of this manual, write:

DIRECTOR OF ADVERTISING  
NORTH ELECTRIC COMPANY  
601 SOUTH MARKET STREET  
GALION, OHIO

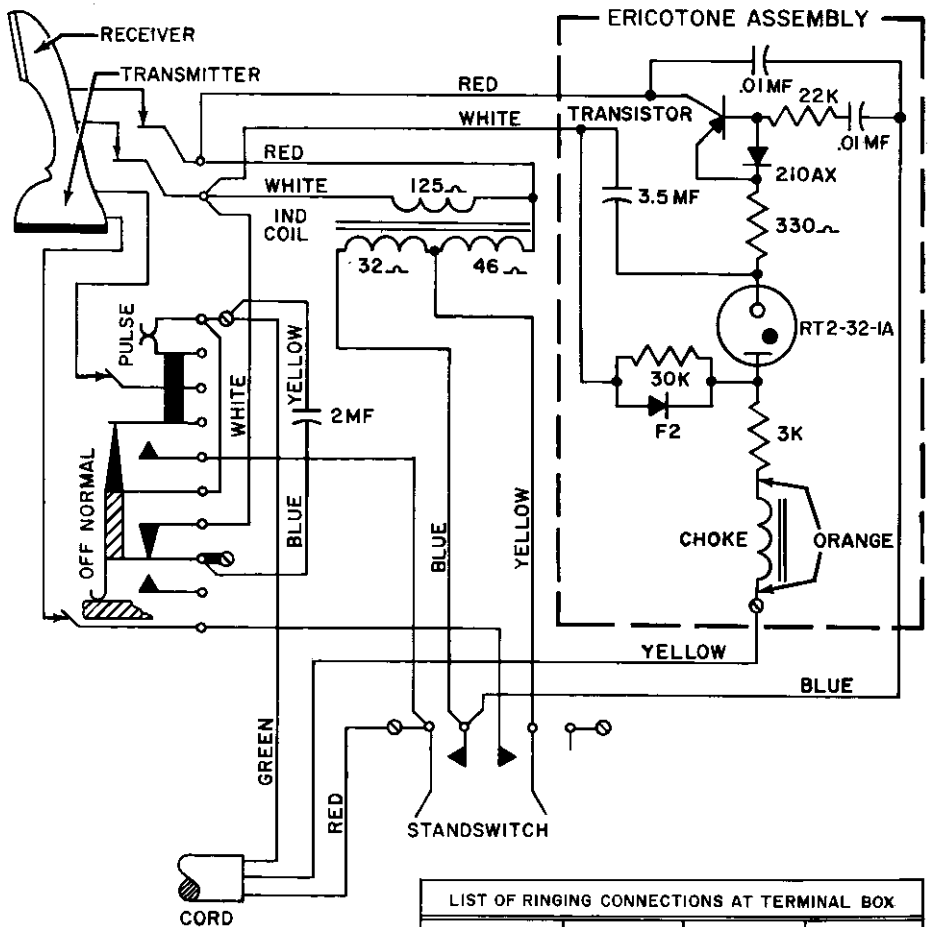
TABLE 1-1. ERICOFON MODELS AVAILABLE

MODEL NO.	* DESCRIPTION	WIRING LABEL OR DIAGRAM NO.	FIGURES WHERE MODEL IS ILLUSTRATED
52A	Manual Base and without ERICOTONE	521031	Figure 3-3 Section III
52B	Dial Base and without ERICOTONE		
52J	Manual Base and with ERICOTONE	520533	Figure 3-2 Section III
52L	Dial Base and with ERICOTONE		
REMARKS: * The four models listed in this table (52A, 52B, 52J, and 52L) are available in <u>all</u> of the eighteen colors (w/matching Line Cord) currently distributed by the North Electric Company.			

1

Section I  
Figure 1-2

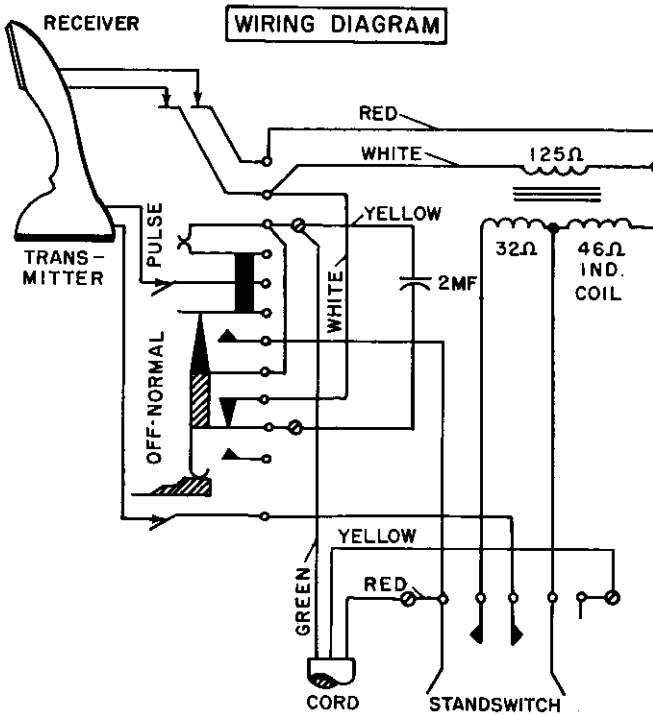
TD-3-61



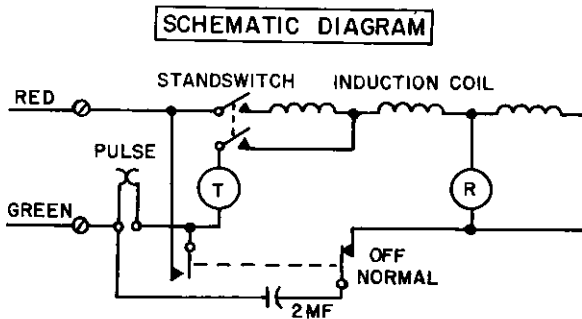
2

LIST OF RINGING CONNECTIONS AT TERMINAL BOX			
CONNECTION CLASS	RED LEAD TO	YELLOW LEAD TO	GREEN LEAD TO
BRIDGED RINGING	L <sub>2</sub>	L <sub>2</sub>	L <sub>1</sub>
RING PARTY (GROUNDED RINGING)	L <sub>2</sub>	GND	L <sub>1</sub>
TIP PARTY (GROUNDED RINGING)	L <sub>1</sub>	GND	L <sub>2</sub>

Figure 1-2. Ericofon Wiring Diagram (Label) Number 520533, for Manual and Dial Base Models with Ericotone (Models 52L and 52J)



3



**Figure 1-3. Ericofon Wiring Diagram (Label) Number 521031, for Manual and Dial Base Models without Ericotone (Models 52A and 52B)**

1-11. The Ericofon is attractively packaged in a triangular carton which is marked with the Color, Part Number, and Features of the Ericofon therein. For a reference to Color/Part Numbers, see Table 3-3, Section III.

**1-12. LOCATION.**

1-13. Installers should consider the customers desires, as the Ericofon may be installed in any practicable location. Standard telephone protective measures, such as, locating the Ericofon where it will not be subjected to extremes of heat and cold, away from extremely dusty or humid areas, and not unduly exposed to physical damage, should be observed when the Ericofon is installed.

**1-14. CONNECTIONS.**

1-15. Connect the incoming line and the Ericofon Cord at the terminal box to complete the circuit in the wiring diagrams, (See figure 1-2 or 1-3), using whichever is applicable.

**1-16. SUBSCRIBER INSTRUCTION.**

1-17. Installers should instruct the subscriber in the care and handling of the Ericofon. This includes the cleaning of exterior surfaces with a damp cloth, placing the Ericofon upright on a table or desk when a call is completed, and proper positioning of the instrument when it becomes necessary to leave the telephone momentarily.

**SECTION II**  
**MAINTENANCE AND ADJUSTMENT**

**4** **2-1. FIELD MAINTENANCE.**

2-2. Field maintenance is limited to inspection, and where necessary, replacement of the following items:

- a. Housing with built-in Receiver.
- b. Transmitter unit.
- c. Neoprene Gasket.
- d. Standswitch Plunger.
- e. Finger Wheel.
- f. Dial Face Plate.
- g. Dial Main Spring.
- h. Base Assembly.

Servicing of other items is to be performed at the Maintenance Department.

**2-3. INSPECTION.**

2-4. All defective parts should be removed and replaced as indicated in paragraphs 2-21 to 2-38. Inspect the Ericofon as indicated in the following paragraphs:

a. Inspect the Housing, Standswitch Plunger, Finger Wheel, and Dial Face Plate for cracks.

b. Make sure the Receiver and Transmitter springs make proper contact with their connections. These springs should not be bent out of shape.

c. Inspect the Impulse Cam for burrs, cracks, and scratches. The Impulse Cam should pass smoothly between the Impulse Spring.

d. Inspect the Ratchet Springs (located on the top and bottom surfaces of the Impulse Cam) for proper back-latch.

e. The gear wheel on the Intermediate Shaft should turn freely in one direction and lock securely in the other.

**2-5. LUBRICATION.**

2-6. Materials for lubricating the Ericofon are North Compounded Mineral Oil (Part NO. 903739), and North Lithium Grease (Part NO. 903740). Other lubricants should not be used. Apply lubricants with a small camel-hair brush. Keep brush clean when not in use.

**CAUTION**

Electrical Contacts, such as the Impulse Spring Contacts, Transmitter and Receiver Contact Springs, and the Multiple Contacts in the Off-normal Pile-up, must be kept free of lubricant at all times. In addition, the Governor Shoes, Governor Brake Drum, and all contact springs (with the single exception of the Pile-up Acting Foot in the Off-normal Pile-up, and the tips of the Standswitch Lever Springs) must not be lubricated under any circumstances, since lubricant applied to these Ericofon components will cause erratic operation, oxidation of the contact points, and electrical failure of the telephone.

2-7. Using North Compounded Mineral Oil, lubricate the following items:

- a. Standswitch Plunger Return Spring.
- b. Gear teeth of the Center Gear Wheel to the Intermediate Shaft.
- c. Gear teeth of the Governor to the Intermediate Drive Gear.

d. Sliding surfaces of the Ratchet Springs on both sides of the Impulse Cam Wheel.

e. Main Drive Spring.

2-8. Using North Lithium Grease, lubricate the following items:

a. Sliding surfaces on the Center Gear step for operation of the Pile-up Lift Spring.

b. Bearing surfaces on the Standswitch Plunger.

c. Sliding surfaces on the Standswitch Plunger.

d. All shaft bearings in the Frame and Intermediate Spindle Bearing Plate.

e. Standswitch Plunger Retainer Clip where it contacts the Standswitch Plunger.

2-9. ADJUSTMENTS.



Adjustments should not be made unless a trouble exists.

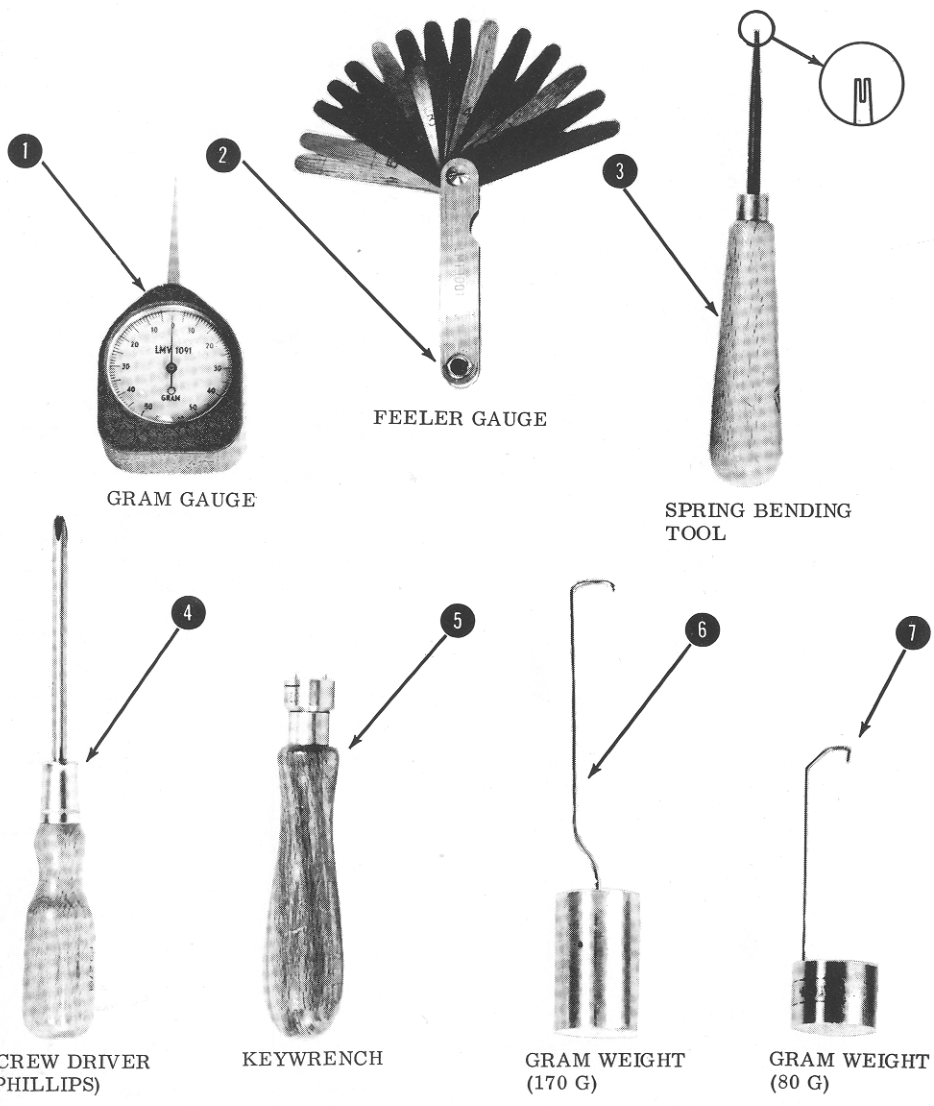
5

TABLE 2-1. ERICOFON ADJUSTING TOOL LIST

INDEX NO.	NOMENCLATURE	PART NUMBER
1	Gram Gauge	504812
2	Feeler Gauge	504813
3	Spring Adjusting Tool	504814
4	Phillips Screw Driver	SS-2701
5	Keywrench	560564
6	Gram Weight (170 Grams)	560563
7	Gram Weight (80 Grams)	560562

Section II  
Figure 2-1

TD-3-61



GRAM GAUGE

FEELER GAUGE

SPRING BENDING  
TOOL

SCREW DRIVER  
(PHILLIPS)

KEYWRENCH

GRAM WEIGHT  
(170 G)

GRAM WEIGHT  
(80 G)

Figure 2-1. Ericofon Adjustment Tools (Used on All Models)

2-10. CONTACT PRESSURES AND GAP SPACING. The proper contact pressure and gap spacing for the Off-normal Springs are indicated in figure 2-2, and are measured with a Gram Gauge, Part NO. 504812, and a Feeler Gauge, Part NO. 504813 (See figure 2-1). Before measuring pressure or gap, check for proper operation of the Off-normal Springs and the Actuating Foot by observing the following action taking place as the Finger Wheel is rotated clockwise.

2-11. ACTUATING FOOT. When the Dial mechanism is Off-normal, (See figure 2-2, position 1), the Actuating Foot should be clear of the Center Gear Wheel, even if pressure is applied inwardly with the thumb on the Finger Wheel (Near the numeral 2 on the Dial Face Plate).

2-12. SPRINGS NO. 4 AND NO. 6. When the Actuating Foot is raised by the first step of the Center Gear Wheel, there should be visible follow in the contacts of Springs NO. 4 and NO. 6 (See position 2).

2-13. SPRINGS NO. 2 AND NO. 3. It is permissible, when the Actuating Foot is on the first step (See position 2) for only one contact point on Spring NO. 2 to make contact with Spring NO. 3.

2-14. SPRINGS NO. 1 AND NO. 2. The contact pressure between these two springs should be 18 to 28 grams (See position 1). This pressure is measured with the point of the Gram Gauge placed about 1/16 inch from the tip of Spring NO. 2, beneath the nylon stud. If both contacts do not open simultaneously, the Gauge should be read when the last contact opens.

2-15. SPRINGS NO. 2 AND NO. 3. The contact pressure between these two springs should be 18 to 28 grams (See position 3). This pressure is measured with the point of the Gram Gauge placed about 1/32 inch from the tip of Spring NO. 3, and resting equally on both prongs of the Spring so that the contacts open simultaneously. Read the Gauge at the instant the contacts open.

2-16. CONTACT PRESSURE ADJUSTMENT. All contact pressure adjustments are made by use of the Spring Adjusting Tool, Part NO. 504814 (See figure 2-1).

2-17. IMPULSE SPRING. The Impulse Spring should be adjusted for a contact pressure of 25 to 35 grams. This pressure is measured in the area between the contact points and the Impulse Cam, placing the point of the Gram Gauge as near as possible to the contacts. When open, the contacts should have a gap spacing of 0.012 to 0.024 inch. For a complete pictorial of Impulse Spring gap spacings, see figure 2-3.

2-18. MAIN SPRING TENSION. The maximum Main Spring tension is measured by placing the 170 Gram Weight, Part NO. 560563 (See figure 2-1), in the finger hole opposite "zero" (Operator position) and then rotating the Finger Wheel to within 1/4 to 3/8 inch of the Finger Stop position, as shown in figure 2-4. The tension on the Main Spring should not prevent the Weight from rotating the Finger Wheel against the Finger Stop. The minimum Main Spring tension is measured by placing an 80 Gram Weight, Part NO. 560562 (See figure 2-1), in the finger hole opposite the numeral "one" and slowly moving the Finger Wheel down to the finger stop position as shown in figure 2-4. The Finger Wheel should return freely to its normal position.

2-19. The Main Spring tension is increased by rotating the Main Spring Housing as explained in paragraph 2-37.

2-20. DIAL SPEED. The Dial speed is regulated by adjusting the Yoke on the Governor to the desired position. The Governor is located on the Base Assembly (See figure 3-4).

2-21. DISASSEMBLY OF COMPONENTS.

2-22. Remove the individual components as outlined in the following paragraphs (Refer to figures 3-1 thru 3-4).

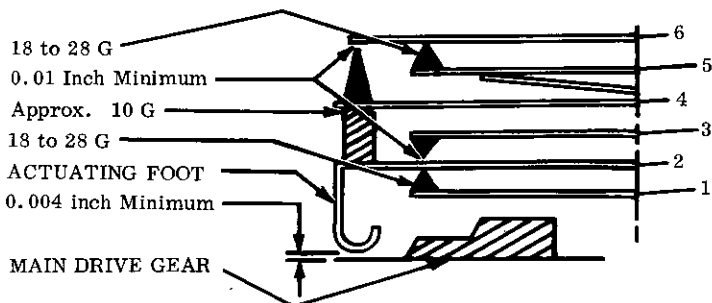
2-23. BASE ASSEMBLY. Loosen the four Captive Screws on the Base Assembly and lift the Base Assembly from the Housing (See figure 3-1).

2-24. REAR BASE ASSEMBLY RETAINER. Remove the Base Assembly from the Housing, then compress the Retainer and lift it from the Housing (See figure 2-5).

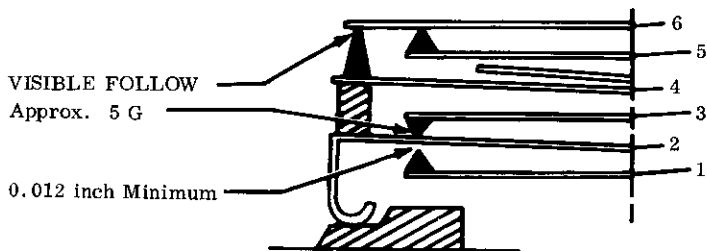
2-25. TRANSMITTER UNIT. Remove the Base Assembly and Transmitter Spring, and then lift the Transmitter from the Housing.

**Section II**  
**Figure 2-2**

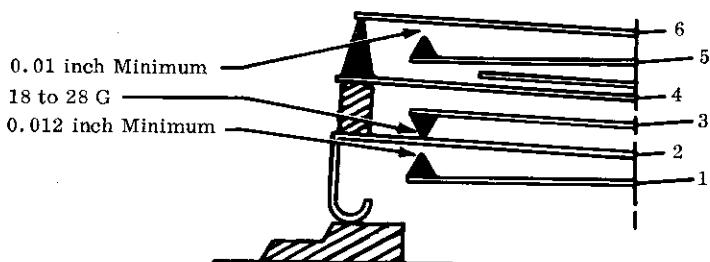
TD-3-61



POSITION 1

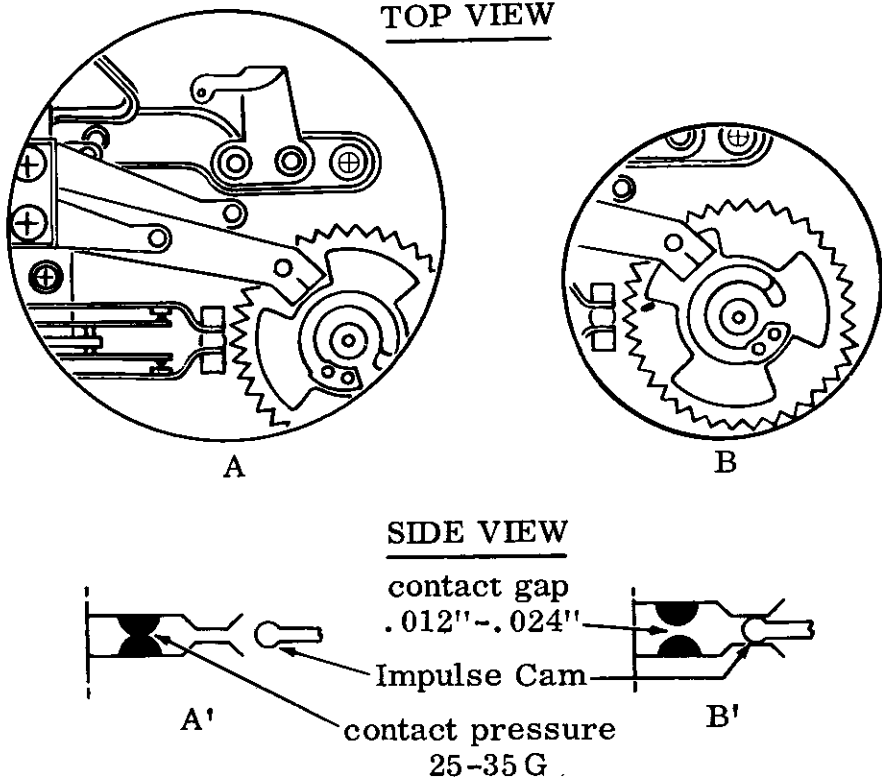


POSITION 2



POSITION 3

**Figure 2-2. Ericofon Off-normal Spring and Gap Spacing Adjustments  
(Applicable to All Models)**



9

View (A) illustrates the Impulse Cam in the "rest" position, with the Impulse Spring closed. View (B) shows the action of the Impulse Cam in separating or opening the Impulse Spring. Views (A') and (B'), respectively, display the conditions existing in Views (A) and (B), as they would appear if seen in a "side view."

**Figure 2-3. Ericofon Impulse Spring Adjustments (Applicable to Models 52B and 52L Only)**

**Paragraphs 2-26 to 2-39**

2-26. FRONT BASE ASSEMBLY RETAINER. Remove the Transmitter unit, then compress the ends of the Retainer toward each other and lift it from the Housing (See figure 2-5).

2-27. NEOPRENE GASKET. Remove the Base Assembly, then slip the Gasket from the edge of the Base Assembly (See figure 3-3).

2-28. STANDSWITCH PLUNGER. Remove the Base Assembly. Release the Standswitch Retainer Clip by sliding it toward the outside of the Base Assembly. The Standswitch and its Spring will release from the Base Assembly (See figure 2-6).

2-29. FINGER WHEEL. Remove the Base Assembly and Standswitch Plunger. Unscrew the Finger Wheel Nut using the Keywrench Tool, Part NO. 560564 (See figure 2-1), and lift the Finger Wheel from the Base Assembly (See figure 3-2).

2-30. NUMBER PLATE. Insert a knife blade under the Number Plate and lift the Number Plate and Cover from the Standswitch Plunger.

2-31. ERICOTONE. (If provided. If not provided, proceed to paragraph 2-32). Remove the Base Assembly (See figure 3-2 and 3-3). Identify the terminals to which the color-coded leads are soldered. Unsolder the leads. Remove the mounting screws and lift the Ericotone from the Base Assembly.

2-32. SPRING SET. Remove the Base Assembly. Identify the Spring Set terminals to which the color-coded leads are soldered. Unsolder the leads. Remove the mounting screws and lift the Spring Set from the Base Assembly (See figure 3-4).


**CAUTION**

Do not loosen the Spring Set Pile-up Retaining Screws (See figure 3-4). To do so would result in complete disassembly of the Spring Pile-up.

2-33. INDUCTION COIL. Remove the Base

Assembly and Ericotone if the Ericofon is so equipped. If the Ericotone is not furnished, remove the Spring Set mounting screws. Identify the terminals to which the color-coded leads are attached. Unsolder the leads. Insert a small bladed screwdriver between the Retaining teeth of the Induction Coil Clamping Clip and pry out the Clip. Lift the Induction Coil from the Base Assembly (See figure 3-4).

2-34. MAIN DRIVE SPRING. Remove the Main Spring Housing from the keyed Main Spindle and unwind the Spring. Remove the hooked inner end of the Spring from the bearing collar (See figure 3-4).

2-35. REASSEMBLY OF COMPONENTS.

2-36. The following paragraphs explain reassembly procedures for components requiring special attention.

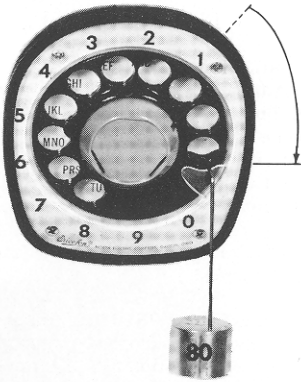
2-37. MAIN DRIVE SPRING. Before reassembling the Main Drive Spring, oil the Spring with a few drops of North Compounded Mineral Oil (Part NO. 903739). Turn the Main Spindle fully counterclockwise. Place the Spring Housing with the Main Spring on the keyed end of the Main Spindle, and engage the inner end of the Spring in the slot provided in the Bearing Collar. Turn the Housing approximately 90 degrees clockwise to build up tension on the Spring. Remove the Spring Housing from the Main Spindle enough to permit the housing to rotate one-half turn, then replace the Housing on the Spindle. Repeat until proper tension is obtained (See figure 2-4 for Main Spring tension adjustments).

2-38. NUMBER PLATE. Type the subscriber number on the Number Plate. Insert the Number Plate and Cover in the Standswitch Plunger.

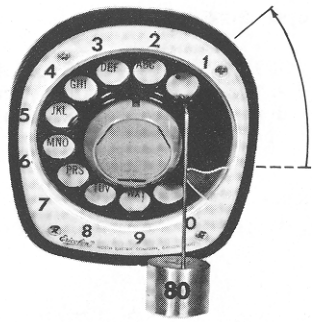
2-39. TROUBLE SHOOTING.


**NOTE**

It is important to check for proper line connections before proceeding with the following instructions.



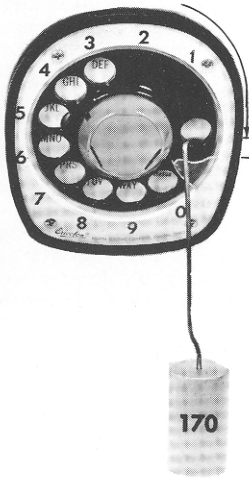
Position of the Finger Wheel and the 80 Gram Weight, after rotating the hole opposite the numeral "one" against the Finger Stop.



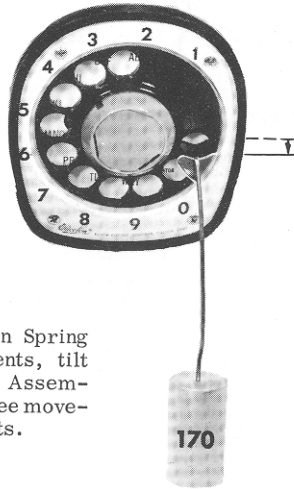
The Finger Wheel should return to its normal position, as shown.

MINIMUM MAIN SPRING TENSION

11



Hold  
1/4 to 3/8 inch



NOTE

When making Main Spring Tension Adjustments, tilt the top of the Base Assembly forward for free movement of the weights.

Position of the Finger Wheel after rotating the hole opposite "Operator" to the indicated distance from the Finger Stop.

The 170 Gram Weight should continue to rotate the Finger Wheel against the Finger Stop upon release.

MAXIMUM MAIN SPRING TENSION

Figure 2-4. Ericofon Main Spring Tension Adjustments (Applicable to Models 52B and 52L Only)

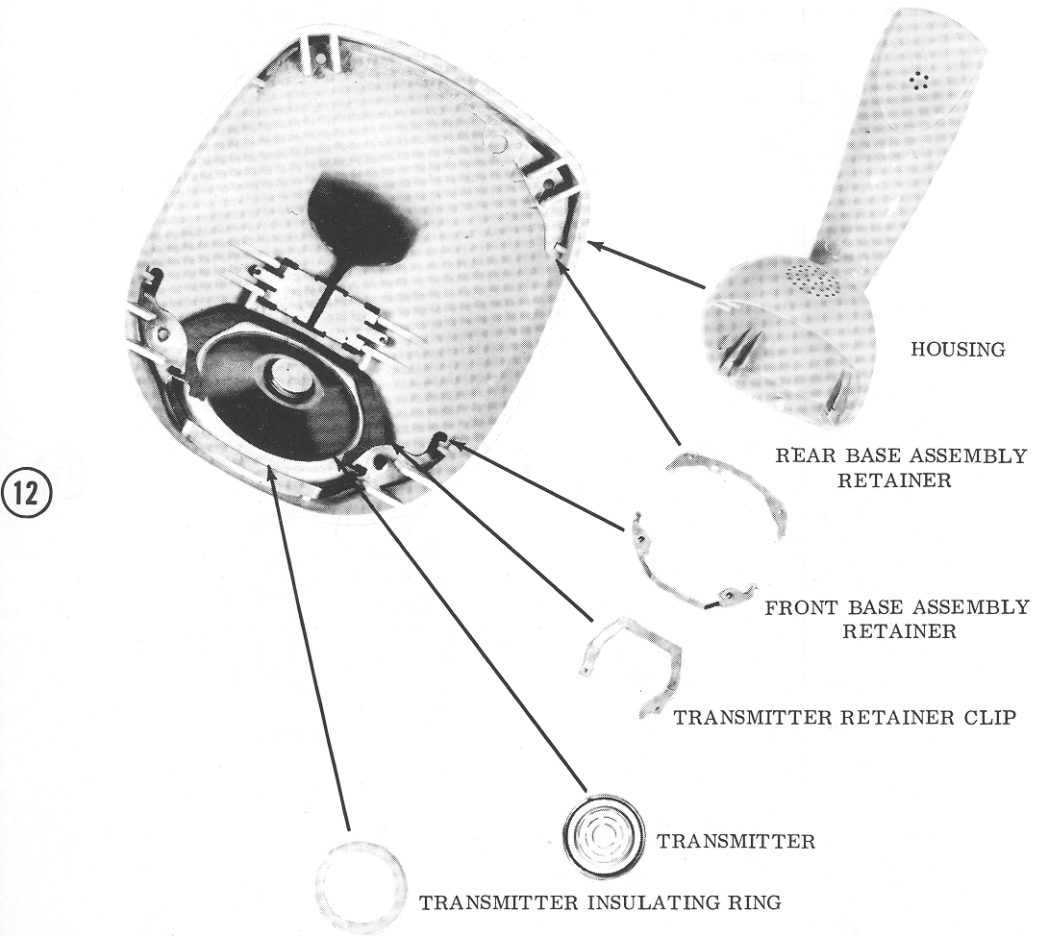
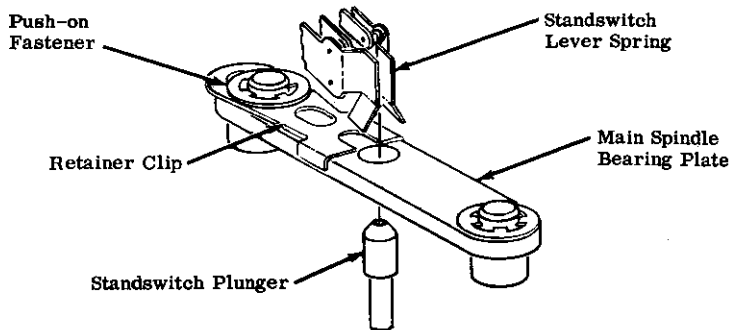
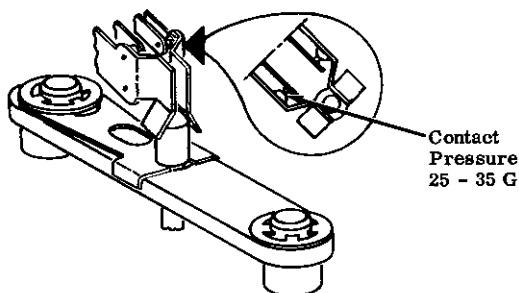


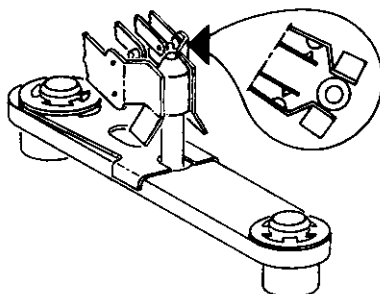
Figure 2-5. Ericofon, Removal of Front and Rear Base Assembly Retainers, and Transmitter Unit (All Models)



Position of Retainer Clip for Standswitch Plunger Removal.



Position of Standswitch Plunger and Standswitch Contacts when the Retainer Clip is locked and the Ericofon is "Off Hook."



Position of the Standswitch Plunger and Standswitch Contacts when the Ericofon is "On Hook."

Figure 2-6. Ericofon Standswitch Plunger Removal and Standswitch Contact Adjustment (All Models)

**Section III**  
**Paragraphs 3-1 to 3-4**

**TD-3-61**

2-40. THE TROUBLE SHOOTING TABLE, (Table 2-2), facilitates the location of the more common faults and indicates the recommended procedures to correct them. To use the Table, locate the trouble under the TROUBLE INDICATION column (column I). In the column directly adjacent to it (column II), are listed the suggested remedies in the sequence in which they should be applied. For example, if NO DIAL TONE is present, referring to column II, we find that the sequence of checks is 1-2-3. We then perform

remedy number 1 in column III (Check for continuity of the Cord. If defective, replace). If the trouble persists, perform remedy number 2 in column III (Check Receiver and Transmitter Contact Springs for proper closure and engagement). If the condition is still present, perform remedy number 3 (Replace Base Assembly). After all the suggested remedies have been performed, and the trouble is still present, the Ericofon must be replaced. Further repair of the Ericofon should not be attempted at the field maintenance level.

**TABLE 2-2. ERICOFON TROUBLE SHOOTING CHART**

(COLUMN I) TROUBLE INDICATION	(COLUMN II) SEQUENCE OF CHECKS	(COLUMN III) CHECKS AND REMEDIES
NO DIAL TONE	1-2-3	1. Check for continuity in the cord. If defective, replace.
CANNOT BREAK DIAL TONE	3	2. Check Receiver and Transmitter Contact Springs for proper closure and engagement.
CALLED PARTY CANNOT HEAR	2-6-3	3. Replace Base Assembly.
NO RECEPTION	1-2-5-3	4. Replace Ericotone.
ERICOTONE DOES NOT OPERATE	1-2-4-5-3	5. Replace Housing.
		6. Replace Transmitter unit.

**SECTION III**  
**ILLUSTRATED PARTS BREAKDOWN**

3-1. GENERAL.

3-2. The purpose of this Illustrated Parts Breakdown is to furnish information which will assist service and supply personnel in

repairing the North Ericofon, and in ordering and replacing its parts.

3-3. COMPONENTS.

3-4. The Ericofon and its assemblies are

14

illustrated in figures 3-1 thru 3-6. The following paragraphs contain instructions concerning the use and applications of the various Lists and Tables comprising this Illustrated Parts Breakdown.

**3-5. HOUSING ASSEMBLY.** The Ericofon Housing Assembly has been illustrated in one figure (See figure 3-1), since all Ericofon Housing Assemblies are identical except for color. Included in this illustration are two Base Assemblies, one showing the Manual Ericofon without Ericotone installed (Model 52A), and the other showing the Dial Ericofon with Ericotone (Model 52L). For complete breakdowns of these Base Assemblies, see figures 3-2 and 3-3, respectively.

**3-6. BASE ASSEMBLY, PARTIAL.** This breakdown (See figure 3-4), illustrates and describes the fundamental assembly for all Ericofon Base Assemblies. It is the starting point from which all Base Assemblies are derived by the addition of various Base Sub-assemblies (See figures 3-2 and 3-3).

**3-7. ERICOTONE ASSEMBLY.** The Ericotone Illustrated Parts Breakdown, shown in figure 3-5, is for informational purposes only. It is not within the scope of this handbook to supply detailed repair information to installers, concerning this assembly. However for principles of operation, see Section IV.

**3-8. ERICOFON LINE CORD.** Figure 3-6, Ericofon Line Cord Breakdown, is particularly useful in ordering Cords of the proper color.

**3-9. SOURCE CODE.** The Source Codes, appearing in the "Source Code" column of the various Illustrated Parts Breakdowns, are provided for the information of North Electric sales, engineering, and manufacturing personnel as an aid in determining quality sources of components not ordinarily manufactured by the North Electric Company.

**NOTE**

When ordering parts, subassemblies, etc., use only the "Part Number" appearing in the pertinent Illustrated Parts Breakdown, and the "Description" associated therewith.

**3-10. ERICOFON HOUSING/COLOR PART NUMBERS BY MODEL DESIGNATION NUMBERS.** Ericofon Housing/Color Part Numbers (See Table 3-2) are listed in the left-hand column, with corresponding Housing Color Description column at center. The right-hand column (Model Designation column), indicates by use of the symbol "X", the Ericofon Model Number in which the particular Housing Color is available.

**3-11. ERICOFON, COMPLETE TELEPHONE-COLOR/MODEL NUMBER CROSS REFERENCE.** This cross reference (See Table 3-3) lists the description of Ericofon Housing Colors (with matching cord), in the left-hand column; these are referenced to the Model Number and corresponding Part Number in the four right-hand columns for all Models currently available.

**3-12. ERICOFON RECEIVER PLATE/COLOR PART NUMBERS - HOUSING COLOR REFERENCE.** Table 3-4 lists Ericofon Receiver Plate Part Numbers in the left-hand column, with corresponding Color description in the Receiver Plate Color Description column. In addition, a Reference Number is given under the Housing/Color Part Number column, which indicates the correlated Part Number for the companion Housing Color.

**3-13. ILLUSTRATED PARTS BREAKDOWN.** The following paragraphs explain the methods used to extract information from the Illustrated Parts Breakdowns (See figures 3-1 thru 3-6).

**3-14. FIGURE AND INDEX NUMBER COLUMN.** This column lists the Figure Number in which the desired assembly or part is displayed, and the respective Index Number which pinpoints it in relation to its surrounding and attaching parts.

**3-15. PART NUMBER COLUMN.** Each Illustrated Parts Breakdown contains a "Part Number" column. In this column will be found the specific part number of each item listed. Unless otherwise indicated, all parts are assigned a North Electric, six-digit number.

**3-16. DESCRIPTION COLUMN.** Under the Description column will be found the approved nomenclature of each item comprising the Ericofon. The Description column of

**Section III**  
**Paragraphs 3-17 to 3-19**

TD-3-61

each Illustrated Parts Breakdown is associated with a figure which illustrates all the items making up the respective lists. In addition, the items are tabulated and indented to indicate relationship according to the following system:

1 2 3 4 5

End article (Ericofon, complete)

- Main groups of end article (Base Assemblies, Housing, etc.)
- Attaching parts of main groups (Screws, Base Retaining, etc.)
- Assemblies of main groups (Transmitter, Ericotone, etc.)
- Attaching parts of assemblies (Transmitter Retainer Clip, etc.)
- Detail parts of assemblies (Impulse Cam, Governor, etc.)
- Attaching parts of details of assemblies (Eyelets, Push-on Fastener, etc.)

Et cetera

3-17. ATTACHING PARTS. Whenever attaching parts are involved, the list of attaching parts is preceded by the words "ATTACHING PARTS", and is terminated by the symbol (---\*---).

3-18. UNITS PER ASSEMBLY. This column enumerates the quantity of items needed for one complete assembly of the item being illustrated.

3-19. USABLE ON MODELS COLUMN. The primary purpose of the Usable on Model (s) column is to indicate the Model Numbers of Ericofons on which any given part can be used. For example, a blank space in this column means that the given part or parts are usable on all Models of Ericofons. In the Ericotone Parts Breakdown (See fig. 3-5), the Usable on Models column is headed with Model Numbers 52J and 52L. These numbers indicate that all the parts listed under the "description" column of this particular breakdown, are usable only on these model numbers.



Non-standard abbreviations found in the following lists are:

NHA-Next higher assembly

REF-Reference-This item has been listed in a previous figure (NHA).

MF-Microfarad

Table 3-1 ERICOFON Characteristics/ And Design Data	
DESIGN	Light weight, one-piece, colored standset telephone
WEIGHT	Approximately 15 ounces
SHIPPING WEIGHT	Approximately 1 pound-7 ounces, in attractive triangular carton
BASE	Rigid cast base contains components in a compact arrangement
CASE	Molded thermoplastic, highly resistant to impact breakage
CORD	Extremely flexible cord; extended length of seven feet
DIAL	Standard type; "comes to the user"
STANDSWITCH	Connects or disconnects when the Ericofon is lifted or placed on its base
TRANSMITTER	Non-positional capsule unit
RECEIVER	Tamper-proof, permanently sealed
COLOR	See Table 3-3 for complete listing

Table 3-2  
ERICOFON Housing/Color Part Numbers By Model Designation Number

Housing/Color Part Number	Housing Color Description	* Model Designation Numbers			
		52A	52B	52J	52L
520536	Housing, Taj Mahal	X	X	X	X
520537	Housing, Sandal Wood	X	X	X	X
520538	Housing, Sahara	X	X	X	X
520541	Housing, Princess Pink	X	X	X	X
520546	Housing, Aqua Mist	X	X	X	X
520550	Housing, Mandarin Red	X	X	X	X
520552	Housing, Crystal Mint	X	X	X	X
520553	Housing, Candle Glow	X	X	X	X

17

REMARKS: Use this Table when ordering ERICOFON housings, where only the model number and/or housing color is known. Specify the Part Number found in the "Housing/Color Part Number" column.

\* The symbol "X" appearing in the various Model Designation columns indicates availability of that model (or models) in the color or colors listed in the adjacent "Housing Color Description" column.

**Table 3-3**  
**ERICOFON, Complete Telephone-Color/Model Number Cross Reference**

Housing Description	Model Number and Corresponding Part Number Per Housing			
	52A Manual	52B Dial	52J Manual W/Tone	52L Dial W/Tone
Taj Mahal	524519	522746	524537	522728
Sandalwood	524518	522745	524536	522727
Sahara	524517	522744	524535	522726
Princess Pink	524514	522741	524532	522723
Aqua Mist	524509	522736	524527	522718
Mandarin Red	524505	522732	524523	522714
Crystal Mint	524503	522730	524521	522712
Candle Glow	524502	522729	524520	522711

18

**REMARKS:** Use this Table when ordering the complete ERICOFON. Specify the Part Number found at the intersection of the desired color and Model.

Table 3-4  
ERICOFON Receiver Plate/Color Part Numbers-Housing/Color Reference

Receiver Plate Part Number *	Receiver Plate Color Description	Housing/Color Part No. Reference
510827	Receiver Plate, Taj Mahal	520536
510828	Receiver Plate, Sandal Wood	520537
510829	Receiver Plate, Sahara	520538
510832	Receiver Plate, Princess Pink	520541
510837	Receiver Plate, Aqua Mist	520546
510841	Receiver Plate, Mandarin Red	520550
510843	Receiver Plate, Crystal Mint	520552
• 510844	Receiver Plate, Candle Glow	520553

REMARKS: \* Part numbers in this column are provided for the information of manufacturing and engineering personnel, only. Receiver plates are permanently attached to their housing during the manufacturing process. Because of this, they cannot be ordered as separate items. If a new receiver is desired, order by the appropriate Part Number listed under the "Housing/Color Part No. Reference" column. See paragraph 1-5 and the "NOTE" thereunder.

Section III  
Figure 3-1

TD-3-61

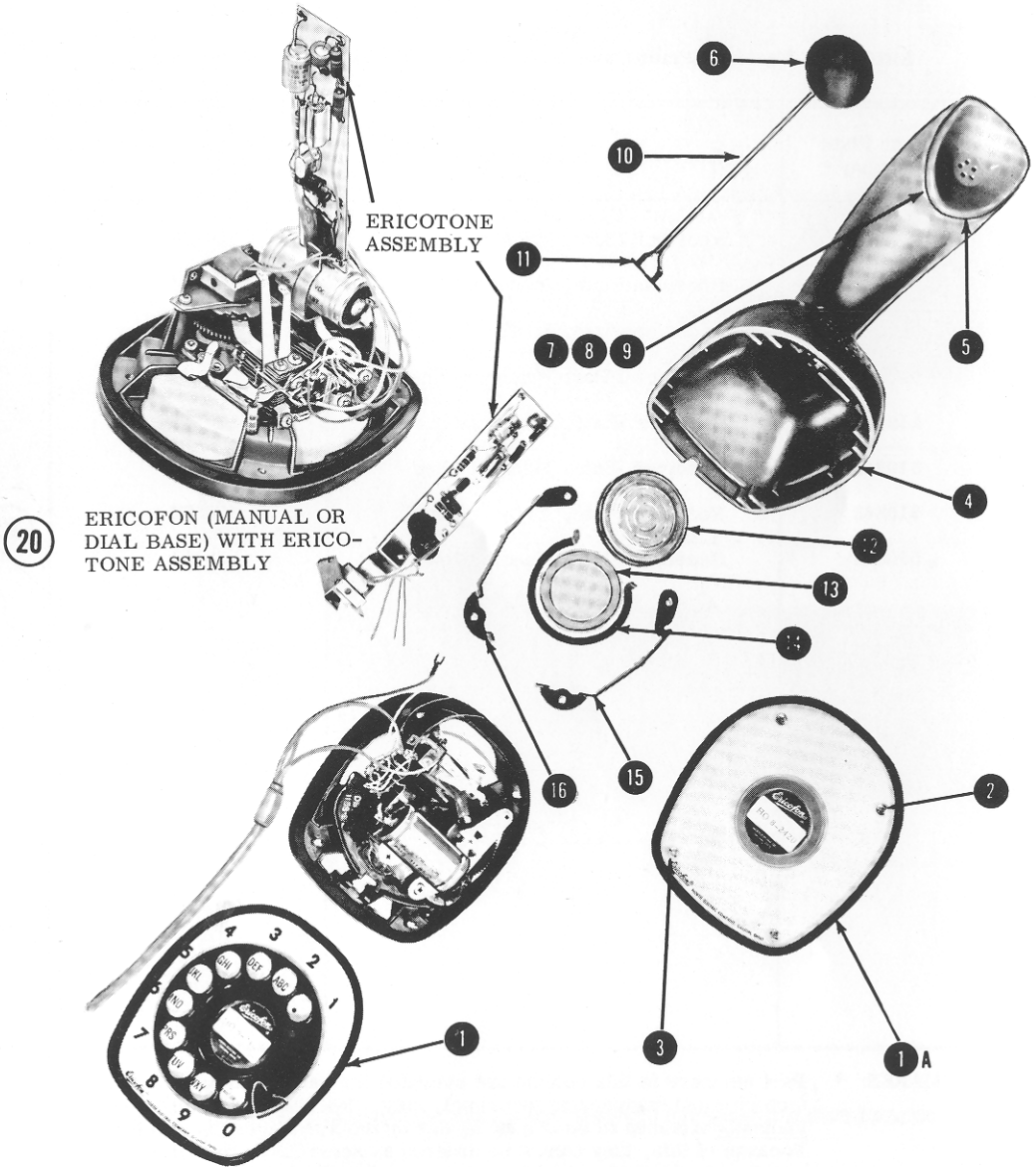
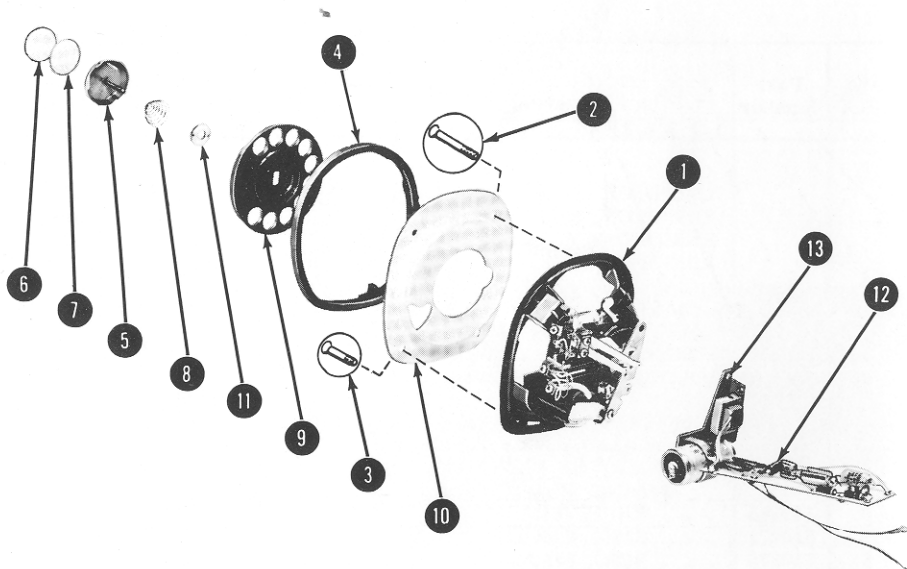


Figure 3-1. The Complete Ericofon (All Models)

Fig. And Index No.	Part Number	Description	Source Code	Units Per Assy	Usable On Model(s)
3-1-		ERICOFON, Model 52A (Manual)		1	52A
		ERICOFON, Model 52B (Dial)		1	52B
		ERICOFON, Model 52J (Manual)		1	52J
		ERICOFON, Model 52L (Dial)		1	52L
- 1		. BASE ASSEMBLY, Dial (see figure 3-2)		1	
- 1A		. BASE ASSEMBLY, Manual (see figure 3-3)		1	
		ATTACHING PARTS			
- 2	518656	. SCREW, Base retaining, front		2	
- 3	518657	. SCREW, Base retaining, rear		2	
		-----*			
- 4		. HOUSING, Ericofon (see Table 3-2 for Housing/Color Part Number)		1	
- 5		. . RECEIVER PLATE (see Table 3-4 for Receiver Plate/Color Part Number)		1	
- 6	512185	. . . RECEIVER		1	
- 7	510871	. . . RING, Spacer		1	
- 8	510870	. . . RING, Sealing		1	
- 9	512971	. . . PIN		1	
-10	520534	. . . LEADWIRE, 2 Conductor		1	
-11	520535	. . . ASSEMBLY, Contact plate		1	
-12	504821	. . . TRANSMITTER		1	
		ATTACHING PARTS			
-13	510872	. . RING, Insulating transmitter		1	
-14	512972	. . CLIP, Transmitter retainer		1	
		-----*			
-15	512974	. . CLIP, Retainer, base assembly, front		1	
-16	512973	. . CLIP, Retainer, base assembly, rear		1	
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">NOTE</div>					
<p>ITEMS 5, 6, 7, 8, 9, and 10 ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY. SINCE THEY ARE PERMANENTLY ATTACHED TO THE HOUSING AT THE TIME OF MANUFACTURE, THEY CANNOT BE ORDERED SEPARATELY.</p>					

Section III  
Figure 3-2

TD-3-61



22

Figure 3-2. Base Assembly, Dial with Ericotone

Fig. And Index No.	Part Number	Description	Source	Units	Usable
			Code	Per Assy	On Model (s)
		1 2 3 4 5			
3-2-		. BASE ASSEMBLY, Dial w/Ericotone (see fig. 3-1 for NHA) Consisting of the following:		REF	52L
- 1	523419	. . BASE SUBASSEMBLY		1	52L & 52B
		ATTACHING PARTS			
- 2	518656	. . . SCREW, Base retaining, front		2	
- 3	518657	. . . SCREW, Base retaining, rear		2	
		---*---			
- 4	506546	. . . GASKET, Neoprene		1	
- 5	506359	. . . PLUNGER, Standswitch		1	
- 6	506358	. . . . COVER, Number plate		1	
- 7	506357	. . . . NUMBER PLATE		1	
- 8	504831	. . . STANDSWITCH, Plunger, return spring		1	
- 9	506363	. . . WHEEL, Finger		1	52L & 52B
-10	506361	. . . FACE PLATE, Dial			52L & 52B
		ATTACHING PARTS			
-11	596746	. . . NUT, Finger wheel		1	
		---*---			
-12	588931	. . ASSEMBLY, Ericotone (see figure 3-5 for detailed breakdown)		1	52L & 52J
-13	561469	. . SCREW		1	52L & 52J
		---*---			

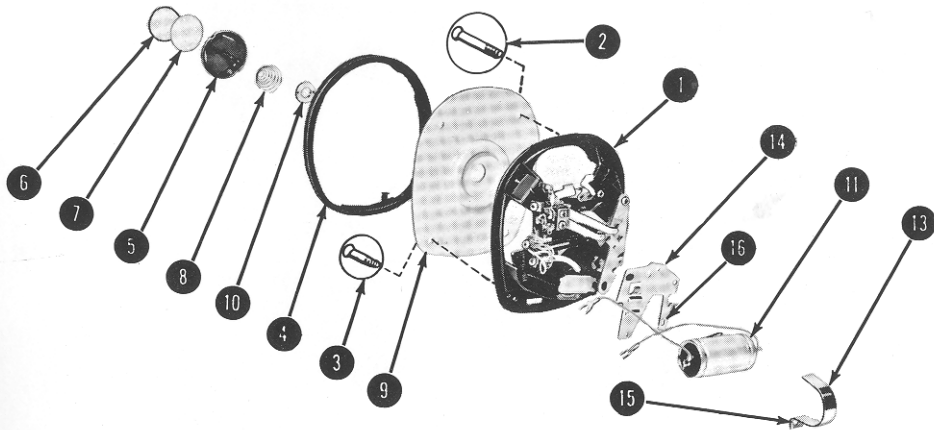


Figure 3-3. Base Assembly, Manual without Ericotone

Fig. And Index No.	Part Number	Description	Source Code	Units Per Assy	Usable On Model (s)
3-3-		. BASE ASSEMBLY, Manual without Ericotone (see fig. 3-1 for NHA) Consisting of the following:		REF	52A
- 1	524664	. . BASE SUBASSEMBLY, w/Dial blank ATTACHING PARTS		1	52A & 52J
- 2	518656	. . . SCREW, Base retaining, front		2	
- 3	518657	. . . SCREW, Base retaining, rear. ----*----		2	
- 4	506546	. . . GASKET, Neoprene		1	
- 5	506359	. . . PLUNGER, Standswitch		1	
- 6	506358	. . . . COVER, Number plate		1	
- 7	506357	. . . . NUMBER PLATE		1	
- 8	504831	. . . STANDSWITCH, Plunger, return spring		1	
- 9	506362	. . . DIAL BLANK ATTACHING PARTS		1	52A & 52J
-10	596746	. . . NUT, Finger wheel ----*----		1	
-11	504824	. . . CAPACITOR, 2 MF, 20%, 200 WVDC ATTACHING PARTS		1	52A & 52B
-12	599887	. . . SCREW ----*----		1	52A & 52B
-13	506355	. . . CLAMP, Capacitor		1	52A & 52B
-14	506354	. . . MOUNTING PLATE, Capacitor ATTACHING PARTS		1	52A & 52B
-15	599887	. . . SCREW		1	52A & 52B
-16	599888	. . . SCREW ----*----		1	52A & 52B

Section III  
Figure 3-4

TD-3-61

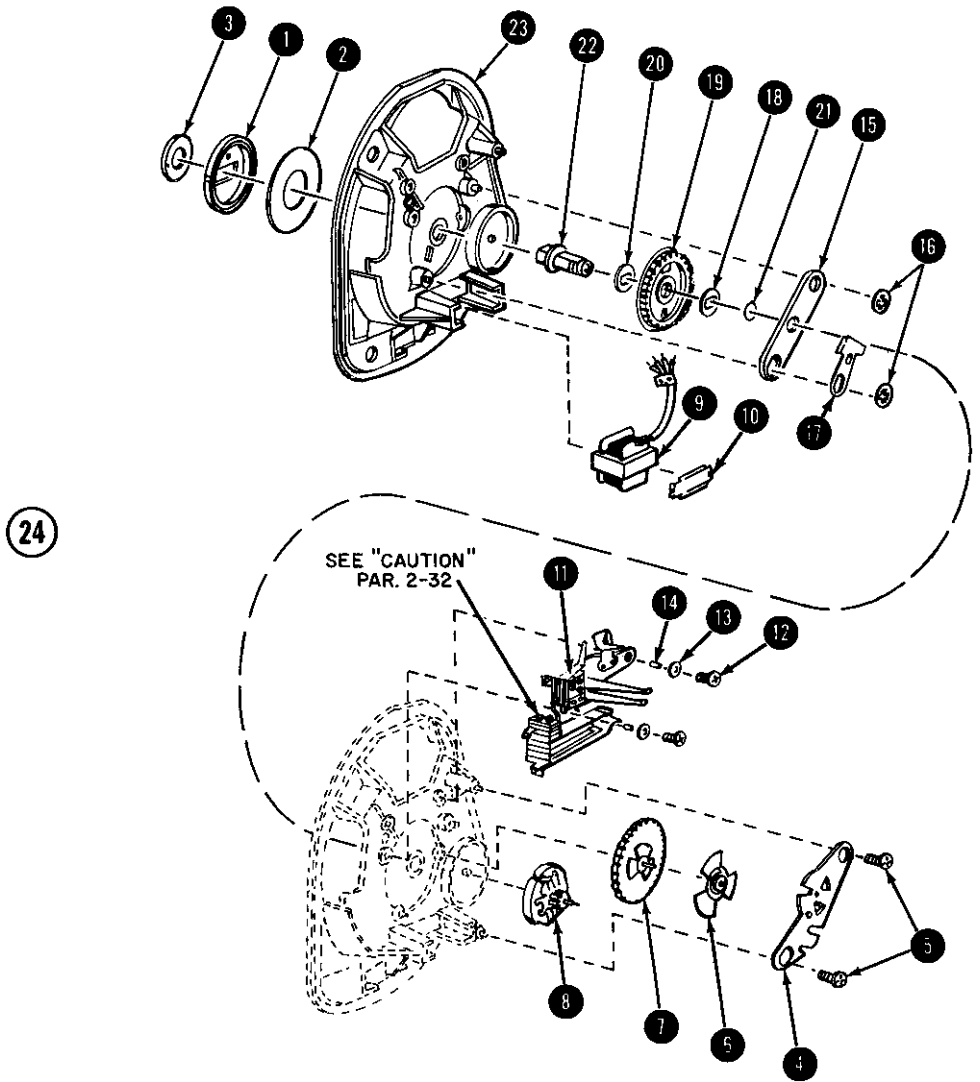


Figure 3-4. Base Assembly (Partial) Part Number 506713

Fig. And Index No.	Part Number	Description 1 2 3 4 5	Source Code	Units	Usable
				Per Assy	On Model (s)
3-4-	506713	. . . BASE ASSEMBLY, Partial (see fig. 3-2 and 3-3 for NHA) Consisting of the following:		REF	
- 1	504829	. . . MAIN DRIVE SPRING w/Housing		1	
- 2	SRB17001	. . . WASHER, Plastic ATTACHING PARTS		1	
- 3	596746	. . . NUT, Finger wheel -----*		1	
- 4	457330/3	. . . BEARING PLATE, Intermediate spindle ATTACHING PARTS		1	
- 5	599888	. . . SCREW, Bearing plate retaining -----*		1	
- 6	505416	. . . ASSEMBLY, Impulse cam		1	
- 7	457326	. . . ASSEMBLY, Intermediate gear		1	
- 8	504825	. . . ASSEMBLY, Governor		1	
- 9	504827	. . . COIL, Induction ATTACHING PARTS		1	
-10	457363	. . . CLIP, Induction coil, clamping -----*		1	
-11	508995	. . . ASSEMBLY, Spring set, pile-up ATTACHING PARTS		1	
-12	599888	. . . SCREW, Retaining		2	
-13	599886	. . . WASHER, Insulating		2	
-14	599885	. . . BUSHING, Insulating -----*		2	
-15	457324	. . . BEARING PLATE, Main spindle ATTACHING PARTS		1	
-16	504835	. . . FASTENER, Push-on -----*		2	
-17	457325	. . . CLIP, Standswitch plunger retainer		1	
-18	560152	. . . WASHER, Aluminum		1	
-19	360163	. . . WHEEL, Center gear		1	
-20	457332/2	. . . WASHER, Copper ATTACHING PARTS		1	
-21	5101-23-C	. . . RING, Retaining -----*		1	
-22	360151	. . . SPINDLE, Main		1	
-23	457320-U2	. . . FRAME		1	

Section III  
Figure 3-5

TD-3-61

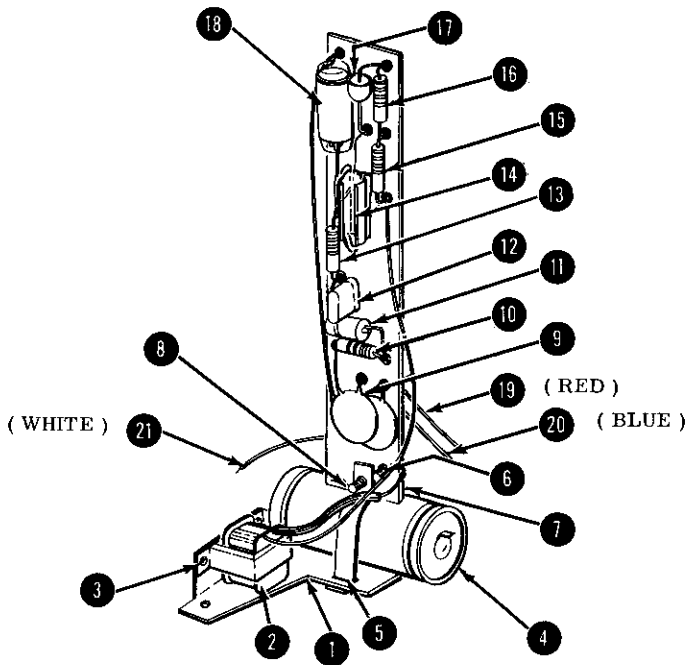


Figure 3-5. Ericotone Assembly, Part Number 588931

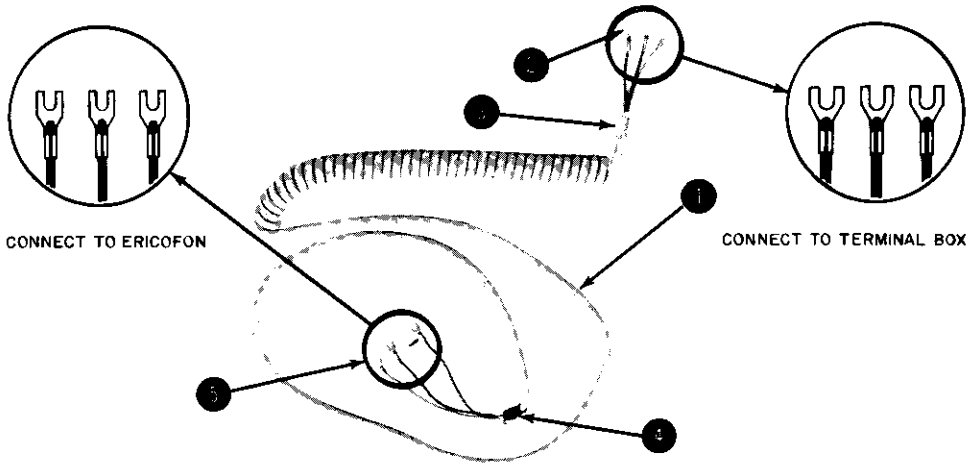
26

Fig. And Index No.	Part Number	Description	Source Code	Units Per Assy	Usable On Model (s)
3-5-	588931	. . . ERICOTONE Assembly (see fig. 3-2 for NHA)		REF	52J & 52L
- 1	507408	. . . BRACKET		1	
- 2	588926	. . . CHOKE		1	
- 3	568817	. . . ATTACHING PARTS . . . EYELET #3093 ---*---	NE-8	2	
- 4	504824	. . . CAPACITOR, 2 MF, 20%, 200 WVDC		1	
- 5	507407	. . . CLIP ATTACHING PARTS		1	
- 6	561469	. . . SCREW ---*---		1	
- 7	505340	. . . BOARD, Components, sub-assembly ATTACHING PARTS		1	
- 8	561469	. . . SCREW ---*---		1	

Fig. And Index No.	Part Number	Description	Source Code	Units Per Assy	Usable On Model (s)
3-5- 9	590794	. . . . CAPACITOR, 0.01 MF, 10%, 500 V	NE-4	2	
-10	650223	. . . . RESISTOR, 22K, 10%, 1/2 W	NE-1	1	
-11	588935	. . . . DIODE, 210 AX	NE-2	1	
-12	505218	. . . . TRANSISTOR, SO38	NE-7	1	
-13	505214	. . . . LAMP, Neon, RT2-32-1A	NE-6	1	
-14	650331	. . . . RESISTOR, 330 Ohm, 10%, 1/2 W	NE-1	1	
-15	595062	. . . . RESISTOR, 3K, 5%, 1/2 W	NE-1	1	
-16	595063	. . . . RESISTOR, 30K, 5%, 1/2 W	NE-1	1	
-17	599699	. . . . RECTIFIER, Silicon, F2	NE-5	1	
-18	505220	. . . . CAPACITOR, 3.5 MF, 20%, 50 WVDC	NE-3	1	
-19	576815	. . . . WIRE, Lead, 5.5 inches (RED)		1	
-20	576821	. . . . WIRE, Lead, 5.25 inches (BLUE)		1	
-21	598276	. . . . WIRE, Lead, 8.25 inches (WHITE)		1	

**Section III**  
**Figure 3-6**

TD-3-61



**Figure 3-6. Ericofon Line Cord, 3 Wire (All Models)**

28

Fig. And Index No.	Part Number	Description	Source Code	Units Per Assy	Usable On Model (s)
3-6-		. . CORD, Line, Ericofon, 3 Wire (Typical) See fig. 3-2 and 3-3 for NHA	NE-9	REF	
-1	516017	. . CORD, Line	NE-9	REF	
-2	561355	. . . Cord Tip, Spade, Solderless	NE-9	3	
-3	561356	. . . Clip, Strain Relief	NE-9	2	
-4	561357	. . . Sleeve	NE-9	1	
-5	561358	. . . Cord Tip, Spade, Solderless	NE-9	3	

SECTION IV  
ERICOTONE OPERATING PRINCIPLES

## 4-1. INTRODUCTION.

4-2. FOR WHOM PREPARED. This section was prepared for telephone engineering, manufacturing, and maintenance personnel desiring a brief but thorough explanation of the functional principles of operation of the Ericotone circuit.

4-3. ADVANCED TECHNICAL TRAINING NOT REQUIRED. Although the Ericotone incorporates some of the latest design features available to the telephone industry and is regarded by many as a significant contribution to telephone technology, still its straight-forward manner of operation can be grasped readily by those with a minimum of technical training. The figures and explanations which follow were designed and written so as to reduce the necessity of advanced technical knowledge to a practical minimum.

4-4. MODELS ON WHICH ERICOTONE IS FOUND. The Ericotone Assembly (see figure 3-5) is currently available on two models of the Ericofon--that is, Model 52J (Manual Base with Ericotone) and Model 52L (Dial Base with Ericotone). See Table 1-1 for additional details.

4-5. HOW THE ERICOTONE IS ELECTRICALLY RELATED TO THE ERICOFON. Figure 4-1 illustrates the relation of the Ericotone Assembly when it is present in the Ericofon. The circuit components which are displayed above the "dotted" line are present in all Ericofons whether they are equipped with the Ericotone or not; those which appear below the dotted line belong exclusively to the Ericotone circuit.

4-6. APPLICATION OF RINGING VOLTAGES.

4-7. CONDITION OF ERICOFON WHEN RINGING VOLTAGE APPLIED. With the Ericofon in its "on hook" condition (that is, properly connected but not being used), the

plunger switch on the base is depressed, the dial is in its rest position, and the various contacts of the Ericofon's circuit are in the positions shown in figure 4-1. Ringing is achieved when a voltage (70-120 VAC, at 16-66 cycles per second) is applied between points "A" and "B".

4-8. TWO METHODS OF RINGING VOLTAGE APPLICATION.

4-9. BRIDGED RINGING. Where bridged ringing is employed, the ringing voltage is applied (and originates at the telephone central) between lines L1 and L2 (refer figure 4-1). L1 is connected to point "B", and L2 is connected to point "A".

## NOTE

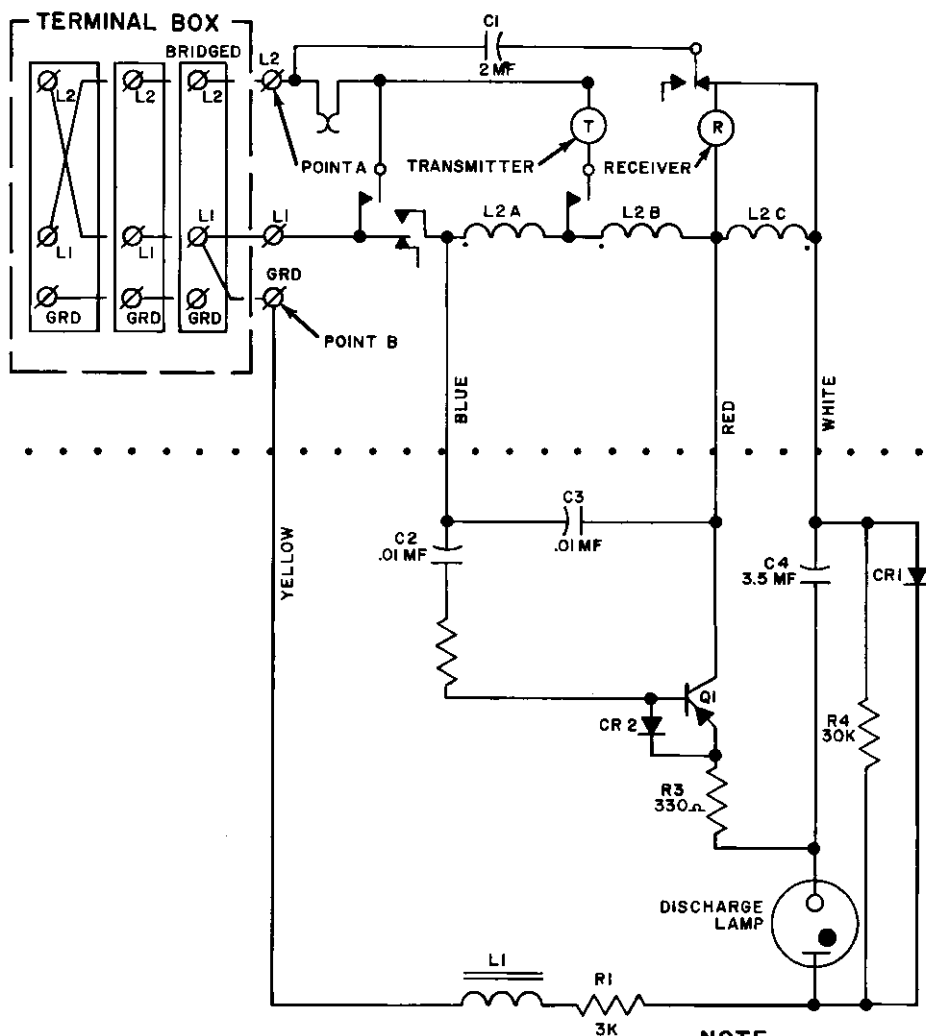
The connections detailed in paragraph 4-9 are made at the terminal box when the Ericofon, equipped with Ericotone Assembly, is installed.

4-10. DIVIDED RINGING. Where divided ringing is employed, the ringing voltage is impressed (same point of origin) between the line and ground--that is to say, the ground lead (GRD) is connected to point "B", and the line lead (which carries the ringing current) is connected to point "A" (refer, figure 4-1).

## NOTE

It should be noted that, regardless of which of the two ringing methods is used (bridged or divided), the ringing voltage is always applied between points "A" and "B", respectively. Only the manner of connection distinguishes one method from the other.

30



**NOTE**  
COMPONENTS SHOWN ABOVE THE "DOTTED" LINE ARE PRESENT IN ALL ERICOFONS. THOSE SHOWN BELOW THE LINE PERTAIN TO THE ERICOTONE ASSEMBLY ONLY.

Figure 4-1. Schematic Diagram Showing the Electrical Relationship between the Ericofon and Ericotone Circuits

4-11. HOW THE ERICOTONE CIRCUIT FUNCTIONS.

4-12. THE ERICOTONE CIRCUIT. Figure 4-2 displays the schematic representation of the Ericotone circuit. Components, appearing in figure 4-1 which do not affect the Ericotone's ringing circuit, have been removed to facilitate clarity and concentration.

4-13. DIVISIONS OF THE ERICOTONE CIRCUIT. The Ericotone Assembly, although one unit physically, divides naturally into two functional sections:

a. A Voltage Doubling Power Supply. The power supply converts AC ringing voltages into DC voltages containing ringing-frequency modulation (see 1, figure 4-2).

b. An Oscillator. The oscillator develops and applies an amplitude and frequency modulated tone to the Ericofon's receiver assembly (see 2, figure 4-2).

4-14. THE VOLTAGE DOUBLING POWER SUPPLY. The ringing voltage is applied between points "A" and "B" as previously described in paragraphs 4-9 or 4-10. Beginning at point "B" (GRD), the first component met with is choke L1. The choke serves the purpose of preventing the Ericotone circuit from "loading" the Ericofon's talking circuit when the bridged ringing method is used.

4-15. RESISTOR R1. Resistor R1 (3000 Ohms) serves two purposes in the power supply:

a. It is placed in series with choke L1 to assist in maintaining the intended ringing impedance. The Ericotone impedance to ringing frequencies is somewhat greater than 10,000 Ohms (measured at approximately 20 cycles per second); and to talking frequencies, its impedance is somewhat greater than 100,000 Ohms (starting at 1000 cycles per second, and up).

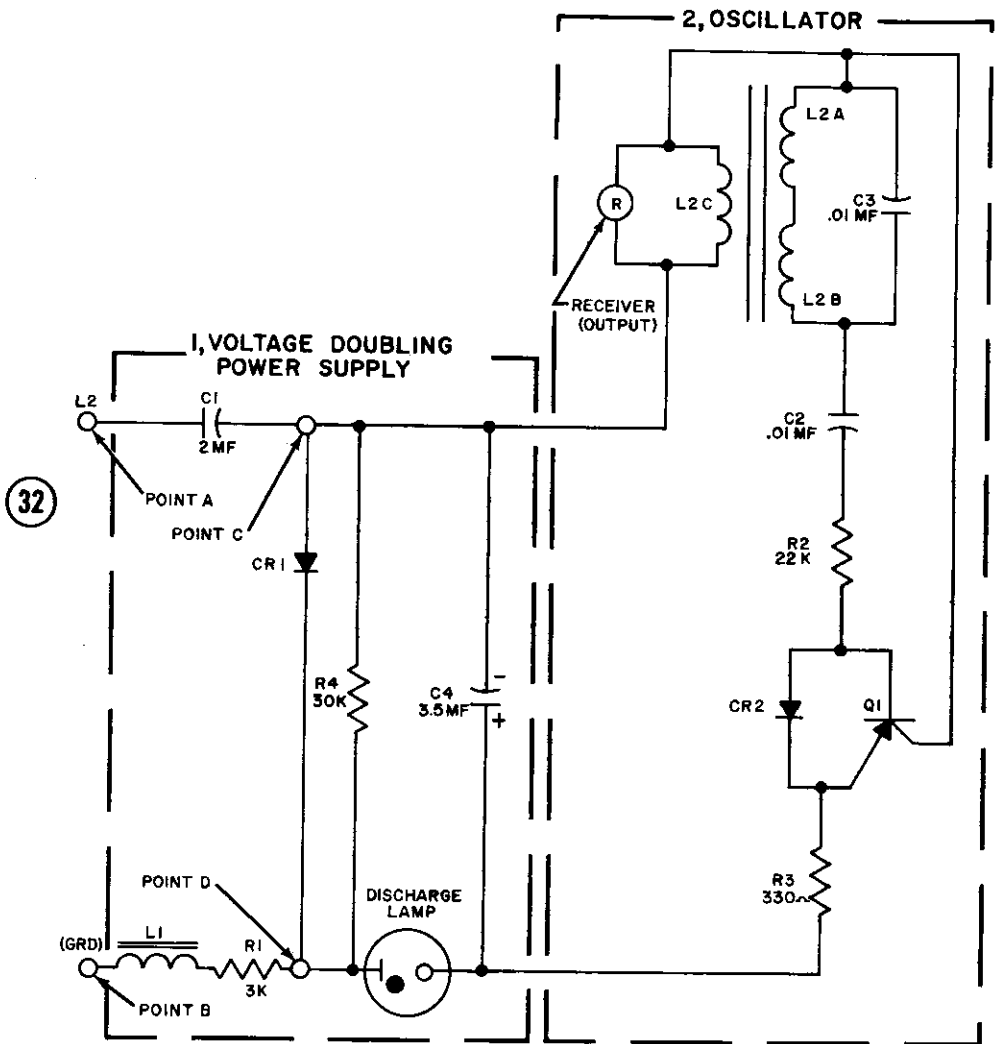
b. It associates with Resistor R4 (30,000 Ohms) and the Discharge Lamp (Neon) in forming a temporary circuit (when required) which prevents the Ericotone circuit from causing "dial tapping" when the Ericotone Assembly forms a part of an extension telephone, and a second telephone on the line (with or without the Ericotone Assembly) is being used to place an outgoing call.

4-16. THE DISCHARGE LAMP. The Discharge Lamp (Neon), which ordinarily may be considered an open circuit, "breaks down" and allows current to flow when approximately 40 VAC (RMS) at 20 cycles per second is impressed across points "A" and "B". The resulting current flow causes capacitor C4 (3.5 MF at 50 WVDC) to charge to a value of 15 to 30 VDC, depending on the applied voltage and ringing frequency.

4-17. THE DIODE CR1. The operation of CR1 (Diode) depends upon the polarity of point "B" with respect to point "A". When point "B" is positive (with respect to point "A"), CR1 being biased in the forward direction, offers a low resistance. Under these conditions, capacitor C1 (2 MF at 200 WVDC) charges to approximately peak-voltage value of the ringing voltage. When this condition prevails the voltage measured between points "C" and "D" is almost zero. This is due to the low resistance of CR1 at this phase.

4-18. When point "B" is negative (with respect to point "A"), CR1 now being biased in the reverse direction, offers a high resistance. The voltage resulting across capacitor C1 is now additive; that is, the charging current of the ringing voltage is of such a polarity that it increases the charge already existing across capacitor C1 (which resulted from the previous charging process described in paragraph 4-17). Under these conditions, the voltage now existing between points "C" and "D" is approximately twice the peak value of the applied ringing voltage.

4-19. CAPACITOR C4. Capacitor C4 (3.5 MF at 50 WVDC) is used as a "filter" in the power-supply portion of the Ericotone circuit. It is charged in series with the Discharge Lamp (previously described in paragraph 4-16). When 40 VAC (RMS) at 20 cycles per second is reached between points "A" and "B" (which is equivalent to a voltage of approximately 80 volts at points "C" and "D" when the power supply has reached its "doubling" voltage value) the Discharge Lamp "breaks down" and conducts (that is, becomes a path of very low resistance) and capacitor C4 charges. A minor amount of DC filtering takes place, the percentage of ripple being maintained at values between 80 to 90 per cent.



**NOTE**

COMPONENTS WHICH DO NOT AFFECT THE ERICOTONE'S RINGING CIRCUIT HAVE BEEN REMOVED FOR CLARITY.

**Figure 4-2. Schematic Representation of the Ericotone Circuit**

## 4-20. THE OSCILLATOR.

4-21. BASIC DESCRIPTION. The oscillator is a transformer-coupled oscillator, using a P-N-P transistor.

4-22. TRANSISTOR Q1. The voltage across capacitor C4 (during the cycle of ring voltage) rises to a typical peak of 30 volts and decays to a value of 2 volts. This rise and decay of voltage occurs at the same rate as the ringing voltage, and hence, the instantaneous voltage across capacitor C4 is of such a polarity and amplitude as to cause transistor Q1 to start conducting and amplifying. There is a positive feedback through transformer L2 at a frequency that is determined by L2A and L2B, in parallel with capacitor C3. More specifically, the oscillator is "pulled" to the exact resonant frequency of the receiver R.

4-23. DIODE CR2. The tuned circuit, in oscillating, causes the potential at the base of transistor Q1 to become increasingly more positive. When this occurs, diode CR2 conducts in the forward direction while the voltage at the base of transistor Q1 reaches a peak positive value, and thereafter decreases until the base attains the same value as the emitter. During the conduction cycle of diode CR2, its low forward resistance maintains a low voltage externally from base to emitter, thus protecting the transistor Q1 from high reverse voltage.

4-24. CAPACITOR C2 AND RESISTOR R2. Capacitor C2 (.0.1 MF, 500 WVDC), and resistor R2 (22,000 Ohms), form a coupling network which feeds to the base element of transistor Q1 and biases it negative, thus causing emitter-base current to flow. This condition, in turn, produces increase in emitter-collector current flow. The negative current is "fed back" to the base element which provides a sustained and increasing oscillation until "cutoff" occurs. When this point is reached, the tuned circuit consisting of L2A, L2B, and C3 "unwinds" the oscillator, and once again the cycle is repeated.

4-25. RESISTOR R3. As the voltage across capacitor C2 rises (refer to paragraph 4-19), a charging current flows through resistor R3 and the base-emitter circuit of transistor Q1,

through resistor R2, capacitor C2, and transformer L2. This charging current helps start the oscillator circuit by supplying forward bias to transistor Q1.

4-26. TRANSFORMER L2. The transformer L2, consists of winding L2A, L2B, and L2C. The capacitor C3 is connected across the primary windings L2A and L2B, which enables the oscillator to function at the desired frequency. The secondary winding, L2C, serves to couple the oscillator output to the receiver R.

4-27. FREQUENCY. Output frequencies at the receiver R will vary between 2200 and 2400 cycles per second. It can be seen that the power supply voltage across capacitor C4 will fluctuate between 2 to 30 volts, and that the amplitude of oscillation, the frequency, and the acoustical output will, therefore, follow the voltage variations of the power supply.

4-28. ERICOTONE UTILIZES MINIMUM ELECTRICAL ENERGY. As stated before, the Ericotone Assembly's output is, in effect, an amplitude-frequency modulated sine wave. The shape of the sine wave, along with its frequency content, provides the Ericotone with its pleasant and characteristic "warbling" sound. In addition, the nature of the output waveform prevents the resulting tone from being absorbed by most surrounding sounds (that is, those which occur at frequencies in the 2000 cycles per second range, or less). As a result, the tone given out will carry a distance of about 150 feet with no apparent interference being inserted by ambient noise or sound. Furthermore, the Ericotone achieves a maximum acoustical output while using a minimum of electrical energy.

4-29. Table 4-1 is furnished to assist installers and other interested persons in locating quickly, the various illustrations used in this handbook which depict the actual physical appearance of the components schematically referred to in the preceding paragraphs.

Table 4-1  
Ericotone Schematic Components and Where They Are Illustrated

Schematic Reference	Physical Description	Part No.	Where Illustrated (Fig. & Index No.)
L1	CHOKE	588926	Figure 3-5-1
R1	RESISTOR, 3K, 5%, 1/2W	595062	Figure 3-5-15
C1	CAPACITOR, 2 MF, 20%, 200 WVDC	504824	Figure 3-5-4
CR1	DIODE, 210 AX	588935	Figure 3-5-11
R4	RESISTOR, 30K, 5%, 1/2W	595063	Figure 3-5-16
DISCHARGE LAMP	LAMP, Neon, RT2-32-1A	505214	Figure 3-5-13
C4	CAPACITOR, 3.5 MF, 20%, 50 WVDC	505220	Figure 3-5-18
R3	RESISTOR, 330 Ohms, 10%, 1/2W	650331	Figure 3-5-14
CR2	RECTIFIER, Silicon, F2	599699	Figure 3-5-17
Q1	TRANSISTOR, SO38	505218	Figure 3-5-12
R2	RESISTOR, 22K, 10%, 1/2W	650223	Figure 3-5-10
C2	CAPACITOR, 0.01 MF, 10%, 500 WVDC	590794	Figure 3-5-9
C3	CAPACITOR, 0.01 MF, 10%, 500 WVDC	590794	Figure 3-5-9
L2A, L2B, & L2C	COIL, Induction *	504827	Figure 3-4-9

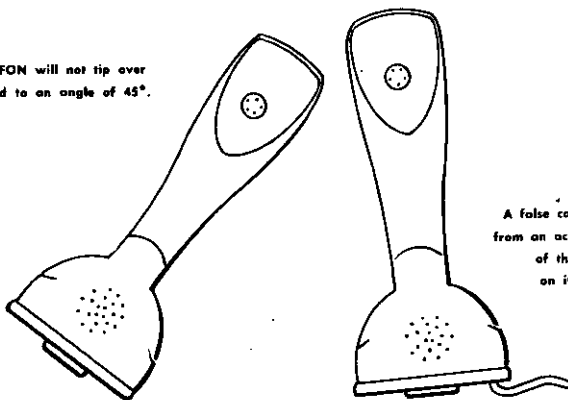
REMARKS: \* While the Induction Coil is a functional part of Ericotone Oscillator, it is listed physically as being part of the Ericofon Base Assembly (Partial), Part Number 506713.

34

**CAUTION**

Before performing the various checks, tests, and adjustments contained in this handbook, the Ericofon must be disconnected, at its terminal box, from all sources of power. This action will prevent the possibility of damage to the Ericofon or electrical shock to the installer or service technician.

The ERICOFON will not tip over  
unless tilted to an angle of 45°.



A false call will not result  
from an accidental placement  
of the ERICOFON  
on its own cord.

