MOBILE RADIO

MAINTENANCE MANUAL

FOR

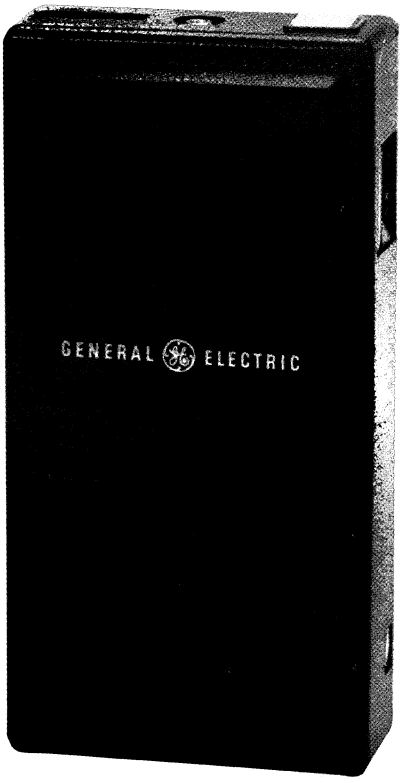
GENERAL ELECTRIC

Executive II

TONE AND VOICE PAGER

406-430, 450-512 MHz

LBI-31214A



GENERAL ELECTRIC

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TYPICAL SPECIFICATIONS

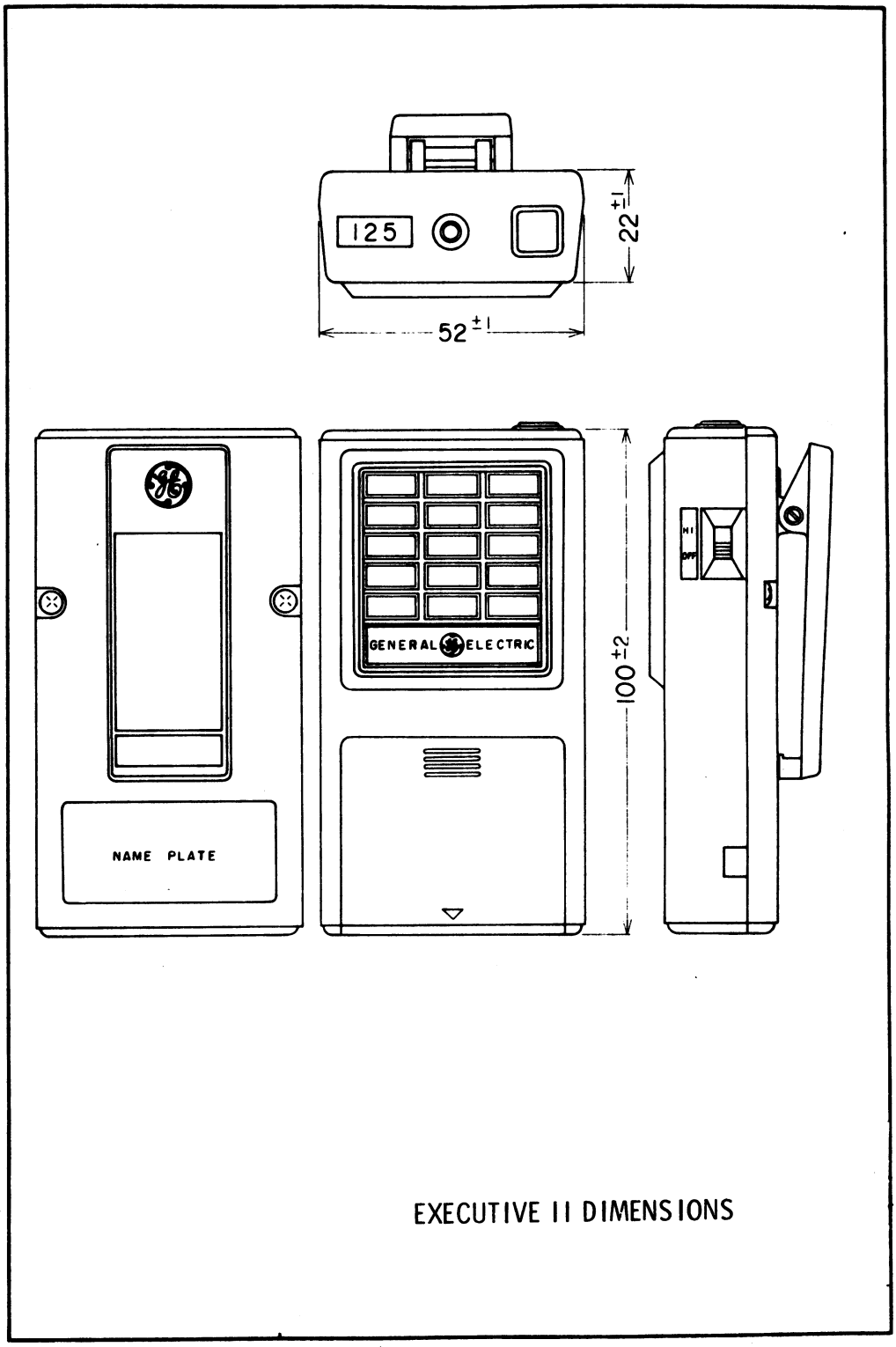
FCC Identification Number	AXA9ERER-147 A, B, C
GE Type Number	ER-147-A: 450-470 MHz ER-147-B: 406-430 MHz ER-147-C: 470-512 MHz
Frequency Range	406-430, 450-470, 470-512 MHz
Type of Operation	Tone and Voice
Signalling System	Two-Tone Sequential
Audio Power Output (4 Ohm Speaker)	
HI	150 milliwatts
LO	20 milliwatts
Current Drain (at 2.5 Volts)	
Standby	5.7 milliamperes
Receive	105 milliamperes
Battery Life	
Nickel-Cadmium	24 hours
Mercury	105 hours
Modulation Acceptance	±8 kHz
Channel Spacing	25 kHz
Selectivity (EIA)	-60 dB
Paging Sensitivity	15 uV/meter
Usable Sensitivity (12 dB SINAD)	30 uV/meter
Spurious Response	-40 dB
Frequency Stability	±5 PPM
Audio Distortion	5%
Dimensions (H x W x D)	100 x 52 x 36 millimeters (with belt clip) (4 x 2 x 1.4 inches)
Weight	150 grams (5-1/4 ounces) with battery and belt clip

COMBINATION NOMENCLATURE

Digits 1&2	Digit 3	Digit 4	Digit 5	Digit 6	Digit 7	Digit 8
Product Code	Tone Option	Control	Color	Channel Spacing	Frequency Range	Distribution
P8 Pager	**L** T99/Quick Call	**B** Push-to-reset	**W** Black	**5** 25 KHz	**M** 406-430 MHz	**A** All Other
					P 450-470 MHz	**D** Dealer
					S 470-512 MHz	**B** Minus Reeds, Crystals
						E Minus Crystals, Reeds (Dealer)

STRUCTURED OPTIONS

Digit A	Digit F
Crystal Package	Stock Availability
O Installed	**O** Outside Vendor
I Separate	**W** From Stock



EXECUTIVE II DIMENSIONS

(4MG-2250E)

DESCRIPTION

The General Electric Executive II Pager is a highly reliable, extremely compact receiver for tone and voice paging applications.

The Pager is equipped with a built-in speaker and antenna, and is shipped with two nickel-cadmium rechargeable batteries and an external earphone.

The receiver is housed in a ruggedly-constructed case, with all operating controls conveniently mounted on the top and side of the case. An accessory jack on the top of the radio is provided for an external earphone.

Power for the Pager is normally supplied by two rechargeable nickel-cadmium batteries that fit in a separate battery compartment in the bottom section of the case. The batteries can be recharged either in or out of the receiver.

If desired, the Pager can also be operated by mercury, alkaline or zinc-carbon batteries. However, these batteries are not rechargeable.

The spring clip on the Pager may be used to clip the radio to a pocket or belt.

OPERATION

Turn the receiver on by placing the Power/Volume switch to Volume HI position (See Figure 1). Several short bursts of tone should be heard. The receiver is now ready to receive messages.

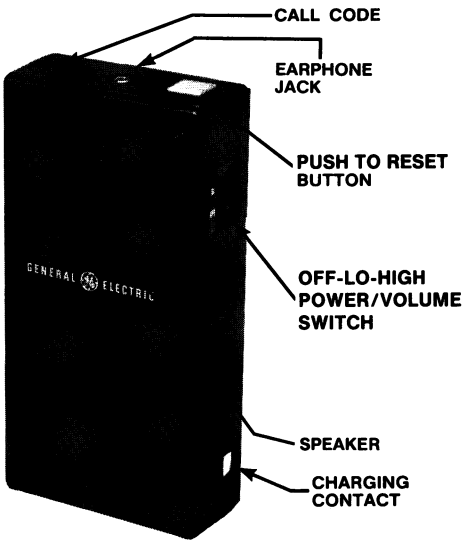


Figure 1 - Operating Controls

Before a message is received, a short, interrupted burst of tone will be heard, followed by a voice message. As soon as the message is completed, press the Reset/Monitor button to reset the receiver.

NOTE

Failure to press the Reset button after receiving a message may shorten battery life. Do not press the Reset button while receiving a message or an alert tone. Doing so will prevent you from receiving the message.

After receiving the first message, it may be desirable to reduce the volume by placing the Power/Volume switch in the LO position.

CHARGERS

A single unit desk-top charger is available for recharging the nickel-cadmium batteries in the radio as well as spare nickel-cadmium batteries.

NOTE

Temperature characteristics of nickel cadmium batteries prevent a full charge at temperature extremes. For maximum capacity, recharge the batteries at room temperatures between 65° to 85° Fahrenheit.

WARNING

Do not attempt to charge Mercury batteries. To do so may cause the batteries to explode.

To use the charger, connect the power cable to an appropriate power source. Place the Pager into the charger. The red light will turn on, indicating that the Pager is being charged. To charge spare nickel-cadmium batteries, place them into the battery insert. A second red light will come on to indicate that the batteries are being charged.

An earphone is available for use in high-noise areas, or for receiving messages in private. Plugging the earphone into the earphone jack disables the Pager speaker so that messages can only be heard through the earphone.

BATTERY INFORMATION

Two different types of batteries may be used in the Pager. The type and battery life for each battery is shown in the following chart.

Battery Type	Part Number	Typical Battery Life
Nickel-Cadmium (Rechargeable)	19A703502P1	24 Hours
Mercury (Not Rechargeable)	Duracell MP401H Eveready EP401E	105 hours

NOTE

Nickel-cadmium batteries should be fully re-charged before using.

BATTERY REPLACEMENT

The Pager is shipped from the factory ready for immediate operation upon installation of two fully charged batteries.

To install or replace the batteries:

1. Slide the Pager Power/Volume switch to the OFF position.
2. Press in the battery cover on the ridges at the top of the cover and slide cover down as shown.
3. Replace batteries according to the (+) and (-) signs in the battery compartment.

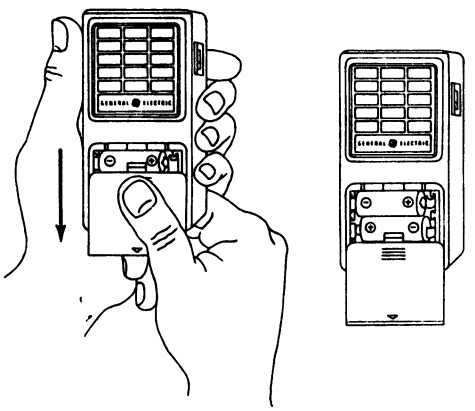


Figure 2 - Battery Replacement

WARNING

Do not dispose of either the rechargeable batteries or the Mercury batteries by burning. To do so may cause the batteries to explode.

NOTE

There is no way to dispose of mercury batteries without possible polution except by returning them to the manufacturer for recycling. Spent mercury batteries should be sent to a reclamation facility that can properly handle and dispose of them.

Duracell mercury batteries can be returned to their manufacturing facility where they can be disposed of properly, at no charge to the customer.

Spent Duracell mercury batteries may be shipped prepaid to:

DURACELL U.S.A.
PLANT #2
305 US Highway 64 East
Lexington, NC 27292

CIRCUIT ANALYSIS

RECEIVER

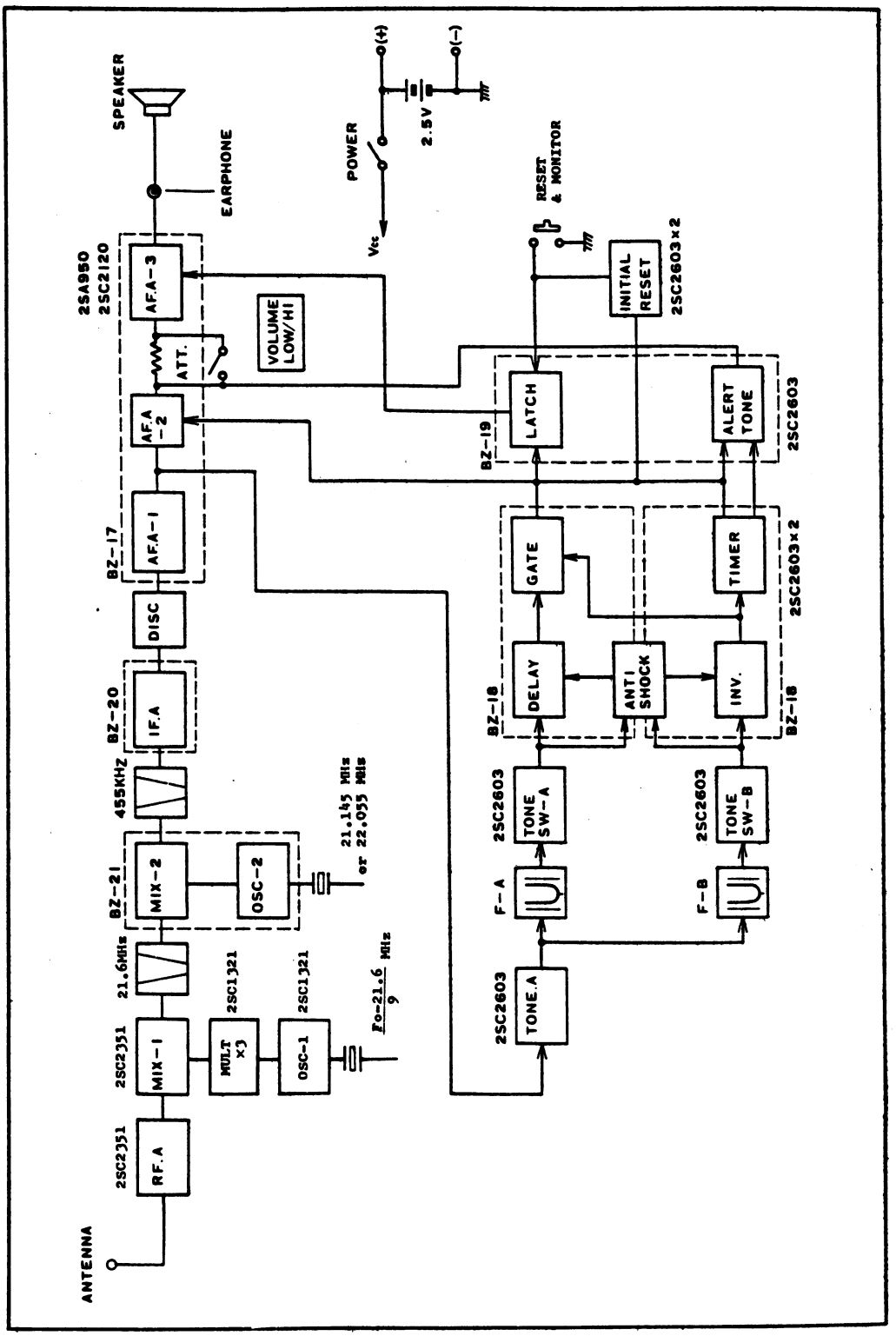
Paging receiver Type ER-147-A, B or C is a double-conversion, superheterodyne receiver for tone and voice paging in the 406-430, 450-512 MHz range. One circuit board contains both tone and voice circuits, and utilizes both discrete components and Thick Film Integrated Circuit Modules (IC's).

The receiver has intermediate frequencies of 21.6 MHz and 455 kHz. Adjacent channel selectivity is provided by using two, 2-pole ceramic filters.

References to symbol numbers mentioned in the following text are found in the Outline Diagram, Schematic Diagram and Parts List (See Table of Contents). A block diagram of the receiver is shown in Figure 3.

Receiver Front End

An RF signal from the antenna is coupled through the antenna circuit to the base of RF amplifier Q1. The antenna circuit consists of the back side of the belt clip and L1.



(4DC-5403E)

Figure 3 - Pager Block Diagram

RF from the antenna is amplified by transistor Q1 and maximum coupling is obtained by peaking CV1, CV2, and CV3 to the operating frequency. The output of L4 is coupled through C12 to the base of the first mixer Q4.

1st Oscillator

The first local oscillator consists of a quartz crystal unit and transistor Q2. The oscillating mode is 3rd overtone and the precise frequency adjustment is obtained by coil L5. The tripler output selects the first local frequency at coils L6 and L7 and it is tripled again by Q3 to be fed to the base of the first mixer Q4. The crystal frequency is the operating frequency (-) 21.6 MHz divided by nine as shown on the schematic. The injection frequency is the operating frequency (-) 21.6 MHz.

1st Mixer and IF Filter

RF from the Pager front end is applied to the base of first mixer Q4. Injection voltage from the first oscillator is also applied to the base of Q4. The 21.6 MHz first IF frequency is coupled through L9 to 21.6 MHz filter FL1. L9 is used to match the mixer output to the input of FL1.

The highly-selective filter provides the first portion of the receiver IF selectivity. The 21.6 MHz output of FL1 is applied to the second mixer IC.

2nd Oscillator, Mixer and IF Filter

A1 and associated circuitry make up the 2nd oscillator and mixer. The crystal for the oscillator is X2. The oscillator operates at 21.145 MHz for low side injection of the 2nd IF (standard), or 22.055 MHz for high side injection for those radios determined to be operating on a tweet frequency. This frequency is mixed with the 21.6 MHz input to provide the 455 kHz 2nd IF frequency.

The output of A1 is coupled through ceramic filter FL2 which provides the 455 kHz selectivity. The filter output is applied to IF amplifier A2.

IF Amplifier and Detector

A2 and associated circuitry make up the IF amplifier. The amplifier IC also provides the 455 kHz limiting. The output of A2 is applied to the discriminator.

A discriminator is used to demodulate the 455 kHz signal. This type of detector provides a high degree of AM rejection. The recovered audio, tone and noise is applied to audio amplifier IC A51.

Audio Stages

The discriminator output is applied to audio amplifier A51 and to the decoder circuitry. Applying the proper sequential tones to the receiver activates the decoder circuitry and audio stages, causing the alert tone to be heard at the speaker.

After the alert tone is heard, the output of A51 is applied to the push-pull audio amplifiers (Q51 and Q52), and then to the speaker.

TYPE 99 DECODER

The Type 99 Decoder is a two-reed, sequential tone decoder for operation in any system that uses two-tone sequential coding in individual call applications.

The two reeds mount at the bottom of the circuit board, and are available for operation on tone frequencies in the 288.5 to 2000 Hz range.

The pager is also compatible with Motorola two-tone paging systems, and operates in both individual call and group call applications.

Timing waveforms for the decoder are shown in Figure 4 and 5. It is recommended that these waveforms be studied in conjunction with the circuit analysis for a better understanding of the decoder operation.

INDIVIDUAL CALL (Figure 4)

Tone A

An RF signal with tone A is applied to the Pager for approximately one second. When the tone is applied, the output of the discriminator is applied to limiter-amplifier Q53. The square-wave output of Q53 drives reed FL51.

If the correct Tone A is received, the output of FL51 is applied to amplifier Q54 which provides approximately 20 dB gain. The output of Q54 is rectified by D53 and D54. This DC voltage is applied to A52-1. The voltage activates a 0.7 second delay timer (R69 and C68) and then causes a positive pulse to appear at A52-8.

Tone B

After Tone A has been received, Tone B is applied to the receiver for three seconds. The tone is amplified by Q53 and applied to reed FL52. The reed output is amplified by Q55 (approximately 20 dB gain and rectified by D55 and D56. This output is applied to A53-1.

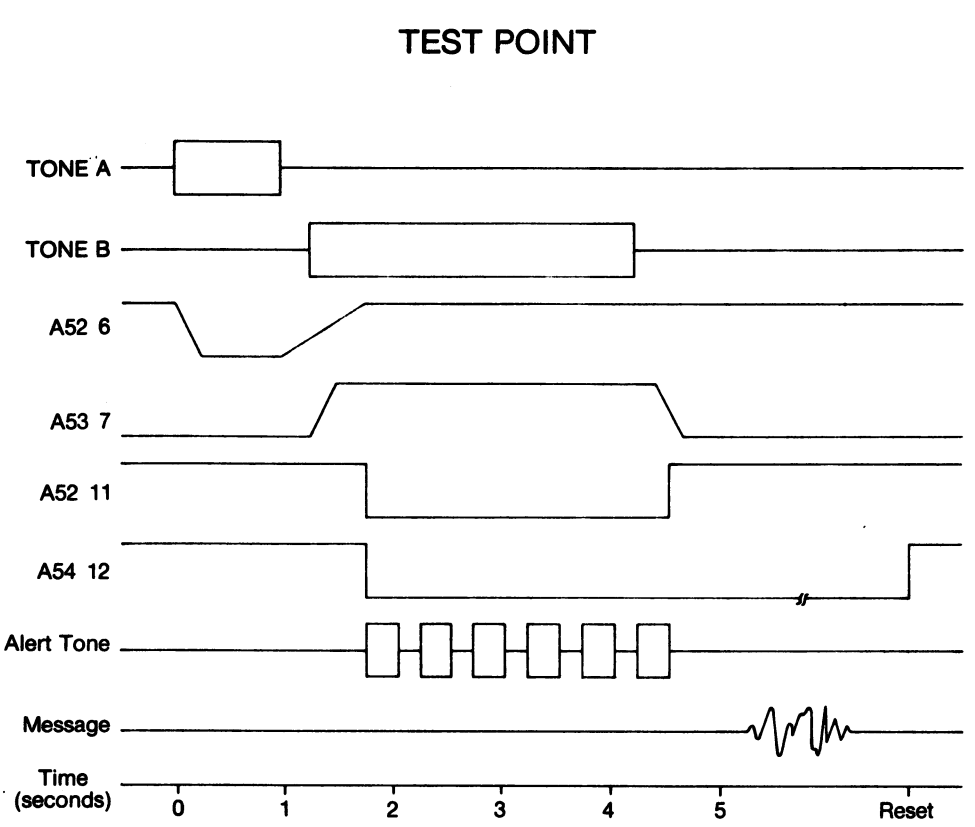


Figure 4 - Individual Call Timing Diagram

The voltages applied to A52-1 and A53-1 activate an "AND" gate in A52, causing the output at pin 11 to go low (ground) for approximately 2.5 seconds. The low is applied to A54-6 which activates the alert tone oscillator.

The continuous oscillator tone output is shunted to ground for 50 milliseconds at 100 millisecond intervals to provide the interrupted alert tone. The alert tone is then applied to pin 6 of A51.

At the same time the tone alert oscillator starts, pin 12 of A54 is switched to ground. This ground is applied to pin 9 of A51, turning the amplifier on. The amplifier remains on (A54-12 at ground potential) until the Reset button is pressed.

GROUP CALL (Figure 5)

In Group Call applications, only Tone B is applied in the same way as Tone B in Individual Call applications, and is applied for eight seconds. The low output (-0.2 VDC) of D55 and D56 is applied to A53-1. This allows C73 to charge through R72. This causes A53-11 to go low (Q56 off) and Q57 to turn on, causing the voltage at TP3 to go low. Turning off Q56 also applies a high (approximately 1.2 VDC) to A54-3, switching on the tone oscillator.

RESET CIRCUIT

Pressing the Reset button applies a negative pulse to A54-9. This causes A54-12 to go high and turns off audio amplifier A51 to reset the Pager.

ANTI-SHOCK CIRCUIT

When the Pager is subjected to a mechanical shock, both reeds may vibrate and apply a low to pin 1 of A52 and A53. This causes a high at pin 2 of A52 and A53 which disables A53 and A54 to prevent falsing.

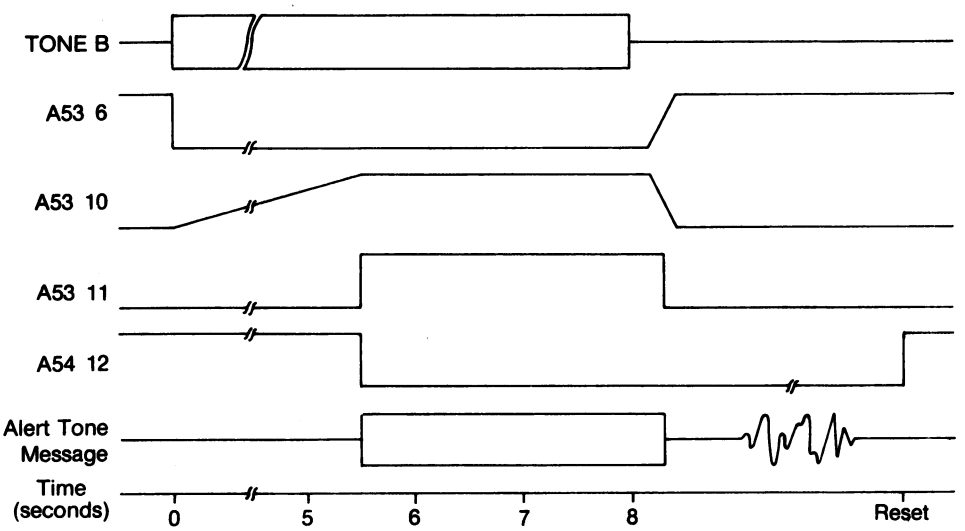


Figure 5 - Group Call Timing Diagram

DETERMINATION OF TONE FREQUENCIES

The Pager can receive and decode two-tone sequential signals coded in the GE Type 99 format or the Motorola format.

The GE tone frequencies range from 517.5 Hz to 997.5 Hz. Motorola tone frequencies range from 288.5 Hz to 1433.4 Hz. The Pager is capable of both Individual and Group Call. However, the Group Call will operate only with the Motorola signaling format.

GE FORMAT

INDIVIDUAL CALL

Tables I and II enable the technician to determine the tone frequencies without opening the radio to examine the reed networks.

For example, assume the paging number to be 123. The first digit of the paging number is a 1. Look in Table I, and read down the column labeled "100's Digit" to a 1. Read horizontally across to the column labeled "10's Digit". The tone group is B. The second digit of the paging number is a 2. The tone number is B2. Look in Table II and down the column labeled "Tone Designator" to find B2. Read horizontally across to the column labeled "Tone Frequency". The first tone frequency is 787.5 Hz.

To determine the second tone frequency look in Table I and as before, find the first digit of the paging number 1. Read horizontally across to the column labeled "1's Digit".

The second tone group is A. The third digit of the paging number is a 3 and the Tone Designator is A3. In Table II read down the column labeled "Tone Designator" and find A3. Read horizontally across the column labeled "Tone Frequency". The second tone frequency is 802.5 Hz.

For different paging numbers, locate the first digit in the "100's Digit" column and determine the tone frequencies as described in the example. For a complete description of tone applications see DATAFILE BULLETIN DF-5000-3A.

100's Digit	10's Digit	1's Digit
	For 1st Tone	For 2nd Tone
0	A	A
1	B	A
2	B	B
3	A	B
4	C	C
5	C	A
6	C	B
7	A	C
8	B	C
9	Not Used	

TABLE I - Tone Groups

TONE GROUP	TONE DESIGNATOR	TONE FREQUENCY
A	A0	682.5 Hz
	A1	592.5 Hz
	A2	757.5 Hz
	A3	802.5 Hz
	A4	847.5 Hz
	A5	892.5 Hz
	A6	937.5 Hz
	A7	547.5 Hz
	A8	727.5 Hz
	A9	637.5 Hz
B	B0	652.5 Hz
	B1	607.5 Hz
	B2	787.5 Hz
	B3	832.5 Hz
	B4	877.5 Hz
	B5	922.5 Hz
	B6	967.5 Hz
	B7	517.5 Hz
	B8	562.5 Hz
	B9	697.5 Hz
C	C0	667.5 Hz
	C1	712.5 Hz
	C2	772.5 Hz
	C3	817.5 Hz
	C4	862.5 Hz
	C5	907.5 Hz
	C6	952.5 Hz
	C7	532.5 Hz
	C8	577.5 Hz
	C9	622.5 Hz
Diagonal Tone		742.5 Hz

TABLE II - Tone Generator Frequencies

MOTOROLA FORMAT

INDIVIDUAL CALL

Tables III and IV may also be used to determine the tone frequencies.

The first digit of the code determines the tone groups used in the code (See Table III). Then Table IV is used to determine the actual tone frequencies.

For a code of 124, the tone groups used are shown in Table III. (Tone A and Tone B are both located in Tone Group 1.) Tone A is tone number 2 in Tone Group 1, and Tone B is tone number 4. Refer to the following examples for additional information.

EXAMPLE 1 - Code 098:

The digit "0" in Table III (First Digit of Code) shows that Tone A is in Tone Group 4, and Tone B is in Tone Group 2 (See Table IV).

Tone number 9 in Tone Group 4 is 524.6 Hz.

Tone number 8 in Tone Group 2 is 879.0 Hz.

EXAMPLE 2 - Code 265:

The digit "2" in Table III shows that both Tone A and Tone B are both in Tone Group 2.

Tone number 6 is 788.5 Hz.

Tone number 5 is 746.8 Hz.

First Digit of Code	Group from Which Tone A is Selected	Group from Which Tone B is Selected
1	1	1
2	2	2
3	1	2
4	4	4
5	5	5
6	2	1
7	4	5
8	5	4
9	2	4
0	4	2
A	3	3

TABLE III - Motorola-Type Coder Numbers

GROUP CALL

In Group Call application, the Tone Group is determined by Table V, while the frequency is determined by Table IV. Refer to the following examples.

NOTE

Group Call code numbers range from 00 to 99. However, there are several Group Calls with the same Tone B frequency. This limits the total number of Group Calls to 40.

EXAMPLE 1 - Group Call Code 07 (also code 27 and 37):

The digit "0" in Table V shows that Tone B is in Tone Group 2 along with 20 to 29 and 30 to 39. Tone number 7 in Tone Group 2 is 832.5 Hz (See Table IV).

Tone No.	Tone Group 1	Tone Group 2	Tone Group 3	Tone Group 4	Tone Group 5	Tone Group 6
1	349.0 Hz	600.9 Hz	288.5 Hz	339.6 Hz	584.8 Hz	1153.4 Hz
2	368.5 Hz	634.5 Hz	296.5 Hz	358.6 Hz	617.4 Hz	1185.2 Hz
3	389.0 Hz	669.9 Hz	304.7 Hz	378.6 Hz	651.9 Hz	1217.8 Hz
4	410.8 Hz	707.3 Hz	313.0 Hz	399.8 Hz	688.3 Hz	1251.4 Hz
5	433.7 Hz	746.8 Hz	953.7 Hz	422.1 Hz	726.8 Hz	1285.8 Hz
6	457.9 Hz	788.5 Hz	979.9 Hz	445.7 Hz	767.4 Hz	1321.2 Hz
7	483.5 Hz	832.5 Hz	1006.9 Hz	470.5 Hz	810.2 Hz	1357.6 Hz
8	510.5 Hz	879.0 Hz	1034.7 Hz	496.8 Hz	855.5 Hz	1395.0 Hz
9	539.0 Hz	928.1 Hz	1063.2 Hz	524.6 Hz	903.2 Hz	1433.4 Hz
0	330.5 Hz	569.1 Hz	1092.4 Hz	321.7 Hz	553.9 Hz	1122.5 Hz

Table IV - Motorola Tone Frequencies and Groups

EXAMPLE 2 - Group Call Code 98 (also code 48 and 88):

The digit "9" in Table V shows that Tone B is in Tone Group 4 along with 40 to 49 and 80 to 89. Tone number 8 in Tone Group 4 is 496.8 Hz.

GROUP CALL CODE NUMBER	TONE GROUP (Tone B)
00 - 09	TG2
10 - 19	TG1
20 - 29	TG2
30 - 39	TG2
40 - 49	TG4
50 - 59	TG5
60 - 69	TG1
70 - 79	TG5
80 - 89	TG4
90 - 99	TG4

TABLE V - Group Call Tone Groups (TG)

DISASSEMBLY

To gain access to the receiver board for servicing:

1. Loosen the two screws in the back cover and lift off cover.
2. With the speaker facing down, carefully loosen the board in front cover.
3. Carefully turn the Pager over in the palm of the hand (speaker facing up) and lift off the front cover.

When replacing the board in the case, hold the case with the speaker grill facing down and insert the earpiece jack through the hole in the top of the case. Make sure the speaker is properly located. Then gently press the board up into the case and tighten the two screws in the back cover.

GENERAL ELECTRIC COMPANY • MOBILE COMMUNICATIONS DIVISION
WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.

GENERAL ELECTRIC
U.S.A.

ALIGNMENT PROCEDURE

EQUIPMENT

1. 2.5 Volt Power Supply
2. Distortion Analyzer (with floating instrument circuit ground)
3. Test Fixture TQ0602
4. RF Signal Generator (2)
5. 2-Tone Generator

PROCEDURE

NOTE

Use short, direct cabling and wiring to keep RF interference to a minimum. Keep all cables as far away from pager while tuning as possible.

1. Remove Printed Board assembly from case and batteries from their compartment.
2. Insert the test antenna into the fixture.
3. Mount Printed Board assembly on alignment test fixture and connect test equipment as shown in Figure 6.
4. Turn on power to the pager (+2.5 VDC).
5. Set the pager to the receive mode by momentarily grounding TP3 (cathode of D51/D52). Audio noise or signal will be heard.
6. Set un-modulated RF signal generator to desired receiver operating frequency. Turn up RF output of the generator until receiver starts to quiet.
7. Loose couple an un-modulated RF signal at 21.60 MHz near L9.
8. Adjust L5 for desired frequency by tuning until a zero beat is heard in the speaker.
9. Modulate RF generator with 1 kHz at 3 kHz deviation and set output level to measure 12 dB SINAD at fixture's audio ouput on SINAD meter (distortion analyzer).
10. Adjust (L6, L7, CV4, L9, and front end tuning elements CV3, CV2, CV1) for best SINAD. Repeat tuning of CV3, CV2, CV1 for best SINAD. (The above order is recommended.)
11. Discriminator: Adjust discriminator only when absolutely necessary. Apply a strong RF signal (approximately 1 millivolt carrier with 1 kHz modulation at 3 kHz deviation) and adjust the discriminator coil (L12) for maximum audio output level.

    SERVICE NOTE: If there are two output peaks, set the coil to the higher peak.
12. Apply a strong RF signal (approximately 1 millivolt carrier with 1 kHz modulation at 2 kHz deviation). Set the Power/Volume switch to HI, and adjust the audio gain potentiometer (RV51) for rated audio output (150 milliwatts or 0.775 volts RMS across the 4-ohm speaker) at the audio output jack on the test fixture.

    Set the Power/Volume switch to LO. The audio output level should drop 10 dB ±2 dB.
13. Modulate the RF generator with the proper tone sequence from the 2-tone generator. Verify the alignment and performance by decoding pages several times.

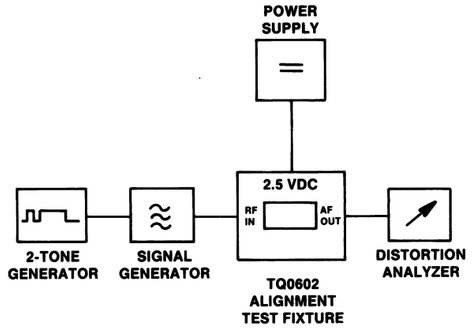
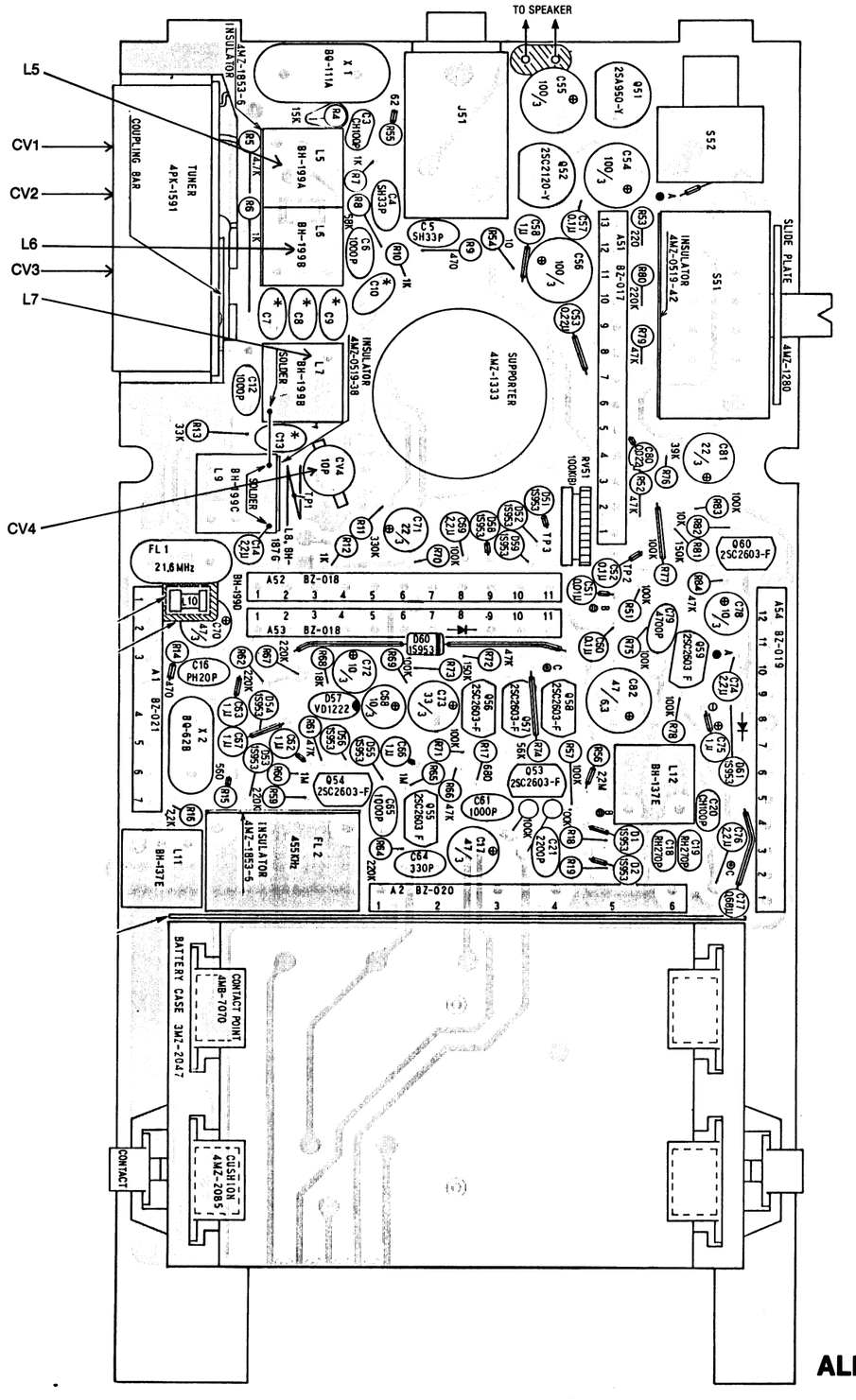


Figure 6 - Alignment Setup



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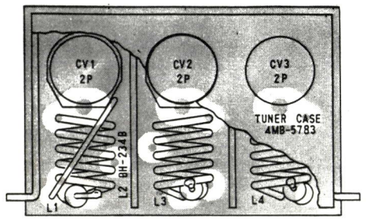

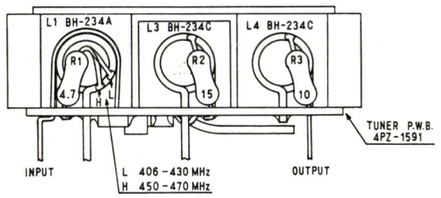

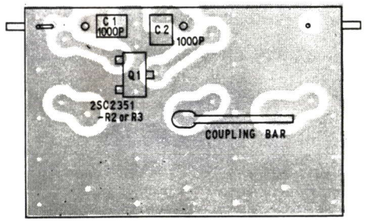

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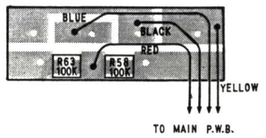

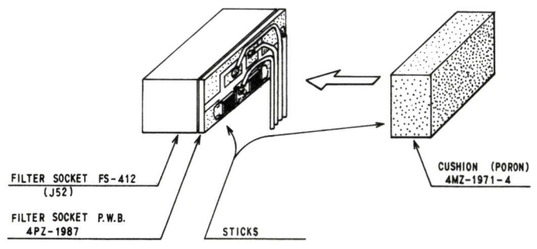

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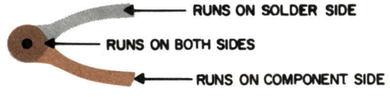
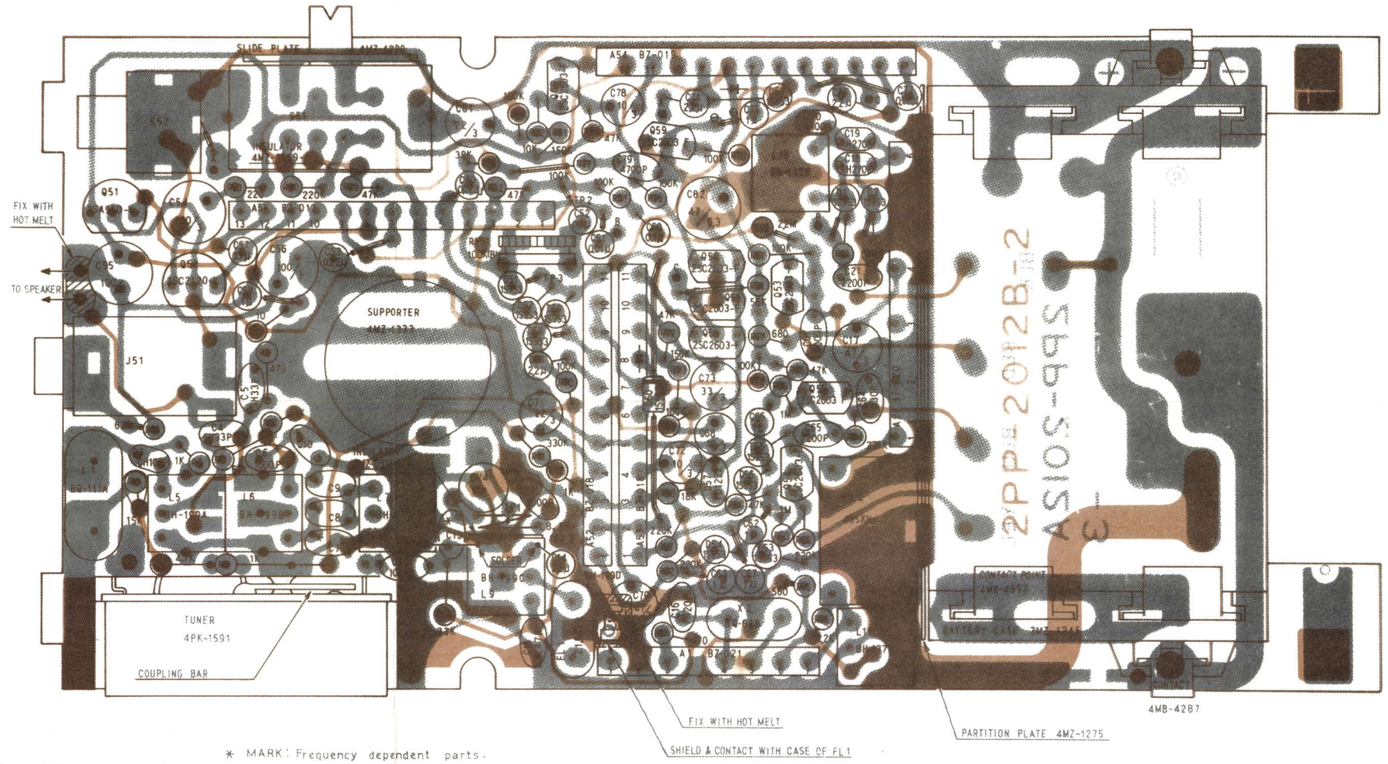
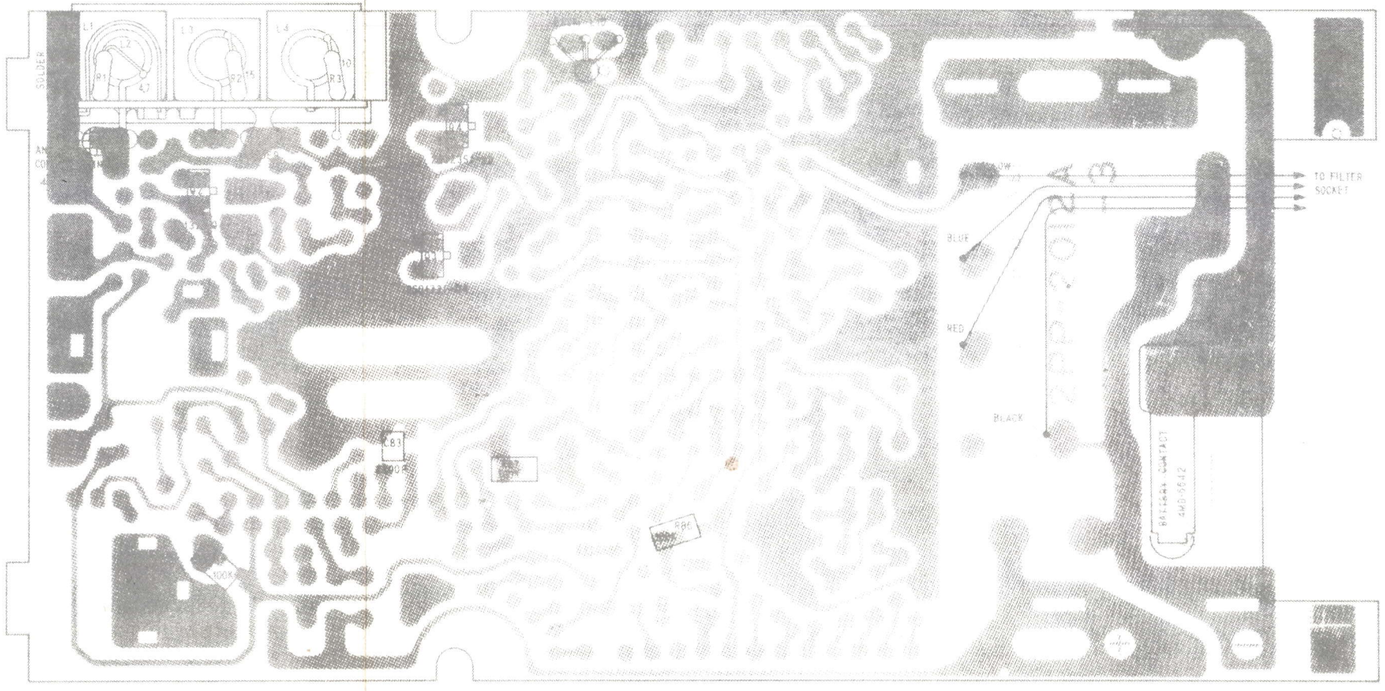
OUTLINE DIAGRAM



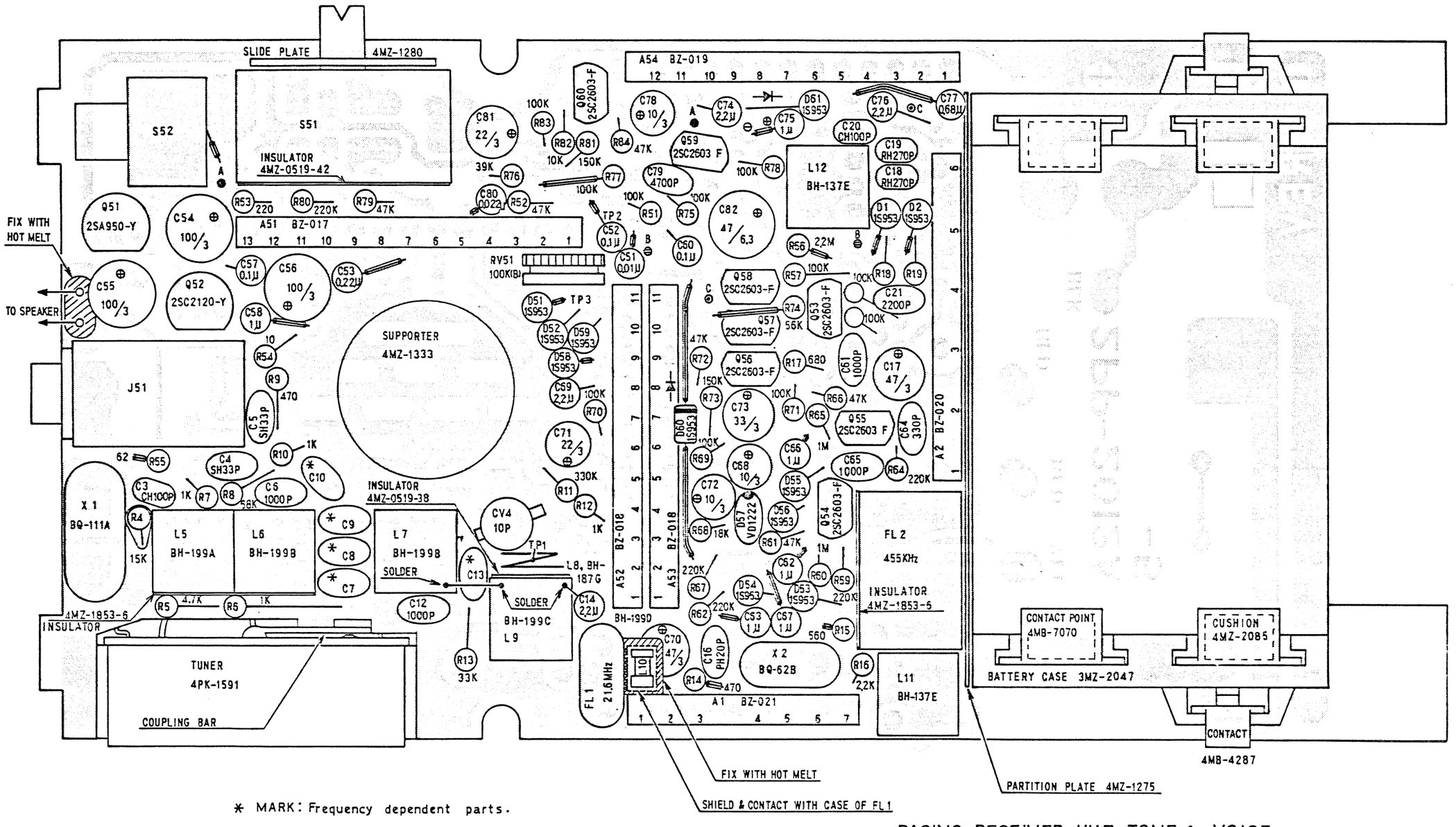


* MARK: Frequency dependent parts.

(3PK-2012BE-2)



(3PK-2012AE-2)



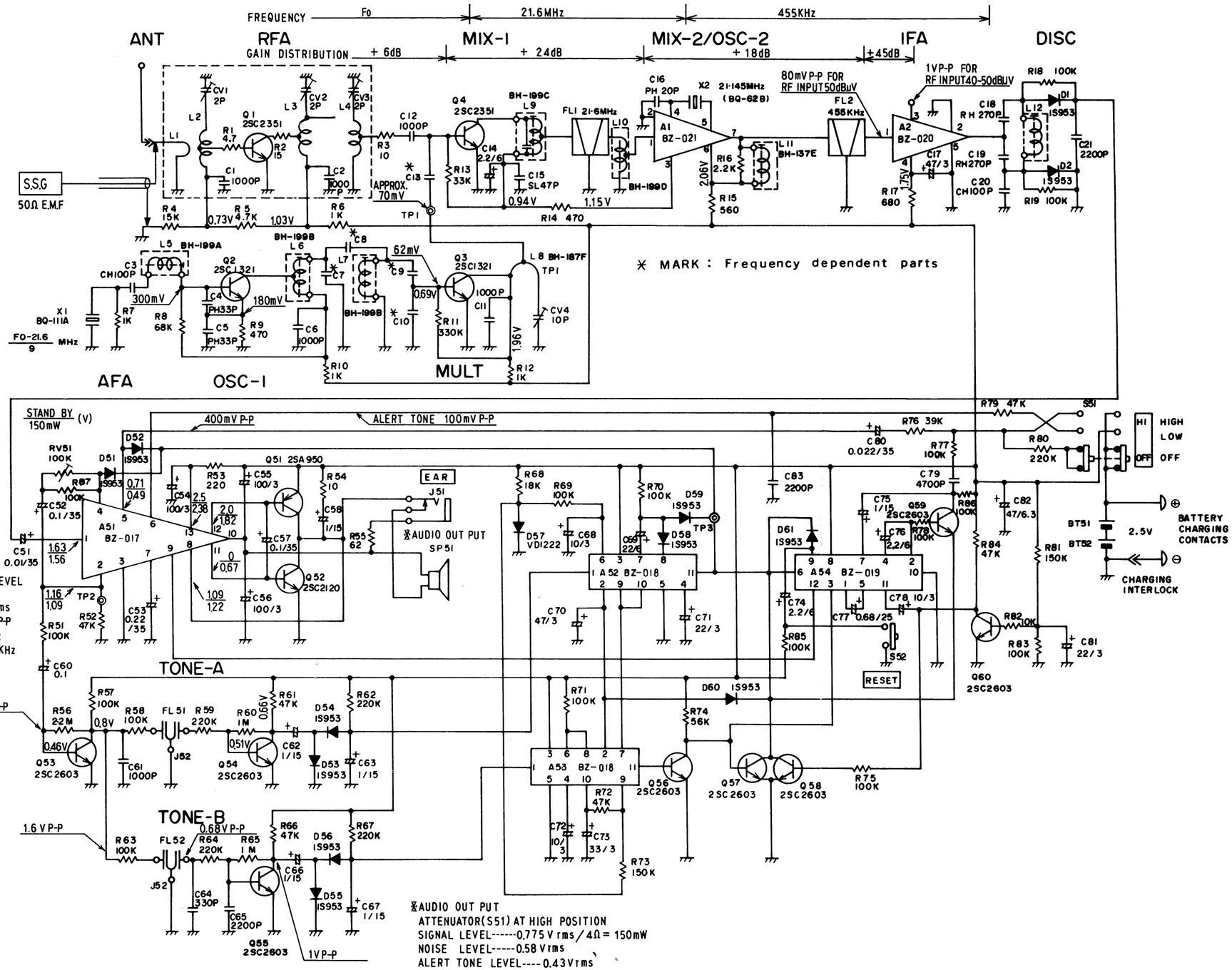
* MARK: Frequency dependent parts.

PAGING RECEIVER, UHF, TONE & VOICE

(3PK-2012BE-7 Rev. G)

OUTLINE DIAGRAM

Issue 1 11



SCHEMATIC DIAGRAM

(3DC-5405E)

PAGING RECEIVER, UHF, TONE & VOICE PARTS LIST

REF.NO.	DESCRIPTION		PARTS NO.	PARTS CODE
C51	Tantalum Capacitor	35V 0.01μF	SST103F	2012005501
C52	Tantalum Capacitor	35V 0.1μF	SST104F	2012011501
C53	Tantalum Capacitor	35V 0.22μF	SST224F	2012013501
C54	Tantalum Capacitor	4V 100μF	DN0F101M1S	2019002501
C55	Tantalum Capacitor	4V 100μF	DN0F101M1S	2019002501
C56	Tantalum Capacitor	4V 100μF	DN0F101M1S	2019002501
C57	Tantalum Capacitor	35V 0.1μF	SST104F	2012011501
C58	Tantalum Capacitor	15V 1μF	SST105D	2012003501
C59	———		———	———
C60	Tantalum Capacitor	35V 0.1μF	SST104F	2012011501
C61	Ceramic Capacitor	50V 1000pF	DD104B102K50V	2001400321
C62	Tantalum Capacitor	15V 1μF	SST105D	2012003501
C63	Tantalum Capacitor	15V 1μF	SST105D	2012003501
C64	Ceramic Capacitor	50V 330pF	DD104B331K50V	2001402321
C65	Ceramic Capacitor	50V 1000pF	DD104B102K50V	2001400321
C66	Tantalum Capacitor	15V 1μF	SST105D	2012003501
C67	Tantalum Capacitor	15V 1μF	SST105D	2012003501
C68	Tantalum Capacitor	4V 10μF	DN0F100M1S	2013040501
C69	Tantalum Capacitor	6.3V 2.2μF	SST225B	2012001501
C70	Tantalum Capacitor	4V 47μF	DN0F470M1S	2013041501
C71	Tantalum Capacitor	4V 22μF	DN0F220M1S	2013043501
C72	Tantalum Capacitor	4V 10μF	DN0F100M1S	2013040501
C73	Tantalum Capacitor	4V 33μF	DN0F330M1S	2013044501
C74	Tantalum Capacitor	6.3V 2.2μF	SST225B	2012001501
C75	Tantalum Capacitor	15V 1μF	SST105D	2012003501
C76	Tantalum Capacitor	6.3V 2.2μF	SST225B	2012001501
C77	Tantalum Capacitor	25V 0.68μF	SST684R	2012004501
C78	Tantalum Capacitor	4V 10μF	DN0F100M1S	2013040501
C79	Ceramic Capacitor	25V 4700pF	DD405SF472K25	2001902321
C80	Tantalum Capacitor	35V 0.022μF	SST223F	2012007501
C81	Tantalum Capacitor	4V 22μF	DN0F220M1S	2013043501
C82	Aluminum Capacitor	6.3V 47μF	ECEA0JS470	2020051803
C83	Chip Capacitor	25V 2200pF	CM21WR222M25VDC	2004406061
CV1	Variable Capacitor	250V 2pF	ECV-1ZW02X53T	2090006803
CV2	Variable Capacitor	250V 2pF	ECV-1ZW02X53T	2090006803
CV3	Variable Capacitor	250V 2pF	ECV-1ZW02X53T	2090006803
CV4	Variable Capacitor	50V 10pF	ECR-GA010D11	2090016803
D1	Diode (Silicon)		1S953	0500017501
D2	Diode (Silicon)		1S953	0500017501
D51	Diode (Silicon)		1S953	0500017501
D52	Diode (Silicon)		1S953	0500017501
D53	Diode (Silicon)		1S953	0500017501
D54	Diode (Silicon)		1S953	0500017501
D55	Diode (Silicon)		1S953	0500017501
D56	Diode (Silicon)		1S953	0500017501
D57	Diode Varistor		VD1222	0500028501
D58	Diode (Silicon)		1S953	0500017501
D59	Diode (Silicon)		1S953	0500017501
D60	Diode (Silicon)		1S953	0500017501
D61	Diode (Silicon)		1S953	0500017501

PAGING RECEIVER, UHF, TONE & VOICE PARTS LIST

REF.NO.	DESCRIPTION		PARTS NO.	PARTS CODE
A1	Integrated Circuit		BZ-021	0800210000
A2	Integrated Circuit		BZ-020	0800200000
A51	Integrated Circuit		BZ-017	0800170000
A52	Integrated Circuit		BZ-018	0800180000
A53	Integrated Circuit		BZ-018	0800180000
A54	Integrated Circuit		BZ-019	0800190000
BT51	Nickel-Cadmium Battery	1.2V/150mAh	P8PA10	5300170818
BT52	Nickel-Cadmium Battery	1.2V/150mAh	P8PA10	5300170818
C1	Chip Capacitor	25V 1000pF	CM21WR102K25VDC	2004400061
C2	Chip Capacitor	25V 1000pF	CM21WR102K25VDC	2004400061
C3	Ceramic Capacitor	50V CH100pF	RPE110CH101J50	2004135321
C4	Ceramic Capacitor	50V SH33pF	DD104SH330J50V	2001021321
C5	Ceramic Capacitor	50V SH33pF	DD104SH330J50V	2001021321
C6	Ceramic Capacitor	50V 1000pF	DD104B102K50V	2001400321
C7	Ceramic Capacitor			
	406MHz - 430MHz	50V PH8pF	DD104PH080D50V	2001207321
	430MHz - 450MHz	50V PH7pF	DD104PH070D50V	2001206321
	450MHz - 470MHz	50V PH7pF	DD104PH070D50V	2001206321
	470MHz - 512MHz	50V PH6pF	DD104PH060D50V	2001205321
C8	Ceramic Capacitor			
	406MHZ - 430MHz	50V AK0.35pF	USD04JAK35C50V	2009400310
	430MHz - 450MHz	-	-	
	450MHz - 470MHz	-	-	
	470MHz - 512MHz	-	-	
C9	Ceramic Capacitor			
	406MHz - 430MHz	50V PH15pF	DD104PH150J50V	2001213321
	430MHz - 450MHz	50V PH12pF	DD104PH120J50V	2001211321
	450MHz - 470MHz	50V PH12pF	DD104PH120J50V	2001211321
	470MHz - 512MHz	50V PH10pF	DD104PH100D50V	2001209321
C10	Ceramic Capacitor			
	406MHz - 430MHz	50V PH18pF	DD104PH180J50V	2001215321
	430MHz - 450MHz	50V PH15pF	DD104PH150J50V	2001213321
	450MHz - 470MHz	50V PH15pF	DD104PH150J50V	2001213321
	470MHz - 512MHz	50V PH12pF	DD104PH120J50V	2001211321
C11	Chip Capacitor	25V 1000pF	CM21WR102K25VDC	2004400061
C12	Ceramic Capacitor	50V 1000pF	DD104B102K50V	2001400321
C13	Ceramic Capacitor			
	406MHz - 430MHz	50V CK1pF	DD104CK010C50V	2001101321
	430MHz - 450MHz	50V CK0.5pF	DD104CK0R5C50V	2001100321
	450MHz - 470MHz	50V CK0.5pF	DD104CK0R5C50V	2001100321
	470MHz - 512MHz	50V CK0.5pF	DD104CK0R5C50V	2001100321
C14	Tantalum Capacitor	6.3V 2.2μF	SST225B	2012001501
C15	Chip Capacitor	50V CH47pF	CM21CH470J50VDC	2004906061
C16	Ceramic Capacitor	50V PH20pF	DD104PH200J50V	2001216321
C17	Tantalum Capacitor	4V 47μF	DN0F470M1S	2013041501
C18	Ceramic Capacitor	50V RH270pF	RPE110RH271J50	2004441321
C19	Ceramic Capacitor	50V RH270pF	RPE110RH271J50	2004441321
C20	Ceramic Capacitor	50V CH100pF	RPE110CH101J50	2004135321
C21	Ceramic Capacitor	50V 2200pF	DD105E222P50V	2001901321

PAGING RECEIVER, UHF, TONE & VOICE PARTS LIST

REF.NO.	DESCRIPTION		PARTS NO.	PARTS CODE
FL1	Crystal Filter	21.6MHz	21N15AB	5020003221
FL2	Ceramic Filter	455KHz	CFX 455E	5010003321
FL51	Reed Filter		EFM-R15M or S	5010002803
FL52	Reed Filter		EFM-R15M or S	5010002803
J51	Earphone Jack	2.5φ	HSJ0465-01-010	3700070718
J52	Filter Socket		FS-412	3700130901
L1	RF Coil		BH-234A	3002340101
L2	RF Coil		BH-234B	3002340201
L3	RF Coil		BH-234C	3002340301
L4	RF Coil		BH-234C	3002340301
L5	RF Coil		BH-199A	3001990101
L6	RF Coil		BH-199B	3001990201
L7	RF Coil		BH-199B	3001990201
L8	RF Coil		BH-187G	3001870701
L9	IF Coil		BH-199C	3001990301
L10	IF Coil		BH-199D	3001990401
L11	IF Coil		BH-137E	3001370501
L12	IF Coil		BH-137E	3001370501
Q1	Transistor (NPN)		2SC2351-R2	0223512501
			or 2SC2351-R3	0223513501
Q2	Transistor (NPN)		2SC3545-T43 or T44	0235451501
Q3	Transistor (NPN)		2SC3545-T43	0235452501
Q4	Transistor (NPN)		2SC2351-R2	0223512501
Q51	Transistor (PNP)		2SA950-Y	0009502324
Q52	Transistor (NPN)		2SC2120-Y	0221202324
Q53	Transistor (NPN)		2SC2603-F	0226033806
Q54	Transistor (NPN)		2SC2603-F	0226033806
Q55	Transistor (NPN)		2SC2603-F	0226033806
Q56	Transistor (NPN)		2SC2603-F	0226033806
Q57	Transistor (NPN)		2SC2603-F	0226033806
Q58	Transistor (NPN)		2SC2603-F	0226033806
Q59	Transistor (NPN)		2SC2603-F	0226033806
Q60	Transistor (NPN)		2SC2603-F	0226033806
R1	Carbon Film Resistor	1/8W 4.7Ω	ERD10TJ4R7	1000016803
R2	Carbon Film Resistor	1/8W 15Ω	ERD10TJ150	1000028803
R3	Carbon Film Resistor	1/8W 10Ω	ERD10TJ100	1000024803
R4	Carbon Film Resistor	1/8W 15KΩ	ERD10TJ153	1000097803
R5	Carbon Film Resistor	1/8W 4.7KΩ	ERD10EJ472	1001085803
R6	Carbon Film Resistor	1/8W 1KΩ	ERD10EJ102	1001070803
R7	Carbon Film Resistor	1/8W 1KΩ	ERD10EJ102	1001070803
R8	Carbon Film Resistor	1/8W 68KΩ	ERD10EJ683	1001112803
R9	Carbon Film Resistor	1/8W 470Ω	ERD10EJ471	1001062803
R10	Carbon Film Resistor	1/8W 1KΩ	ERD10EJ102	1001070803
R11	Carbon Film Resistor	1/8W 330KΩ	ERD10EJ334	1001128803
R12	Carbon Film Resistor	1/8W 1KΩ	ERD10EJ102	1001070803
R13	Carbon Film Resistor	1/8W 33KΩ	ERD10EJ333	1001105803
R14	Carbon Film Resistor	1/8W 470Ω	ERD10TJ471	1000062803
R15	Carbon Film Resistor	1/8W 560Ω	ERD10TJ561	1000064803

PAGING RECEIVER, UHF, TONE & VOICE PARTS LIST

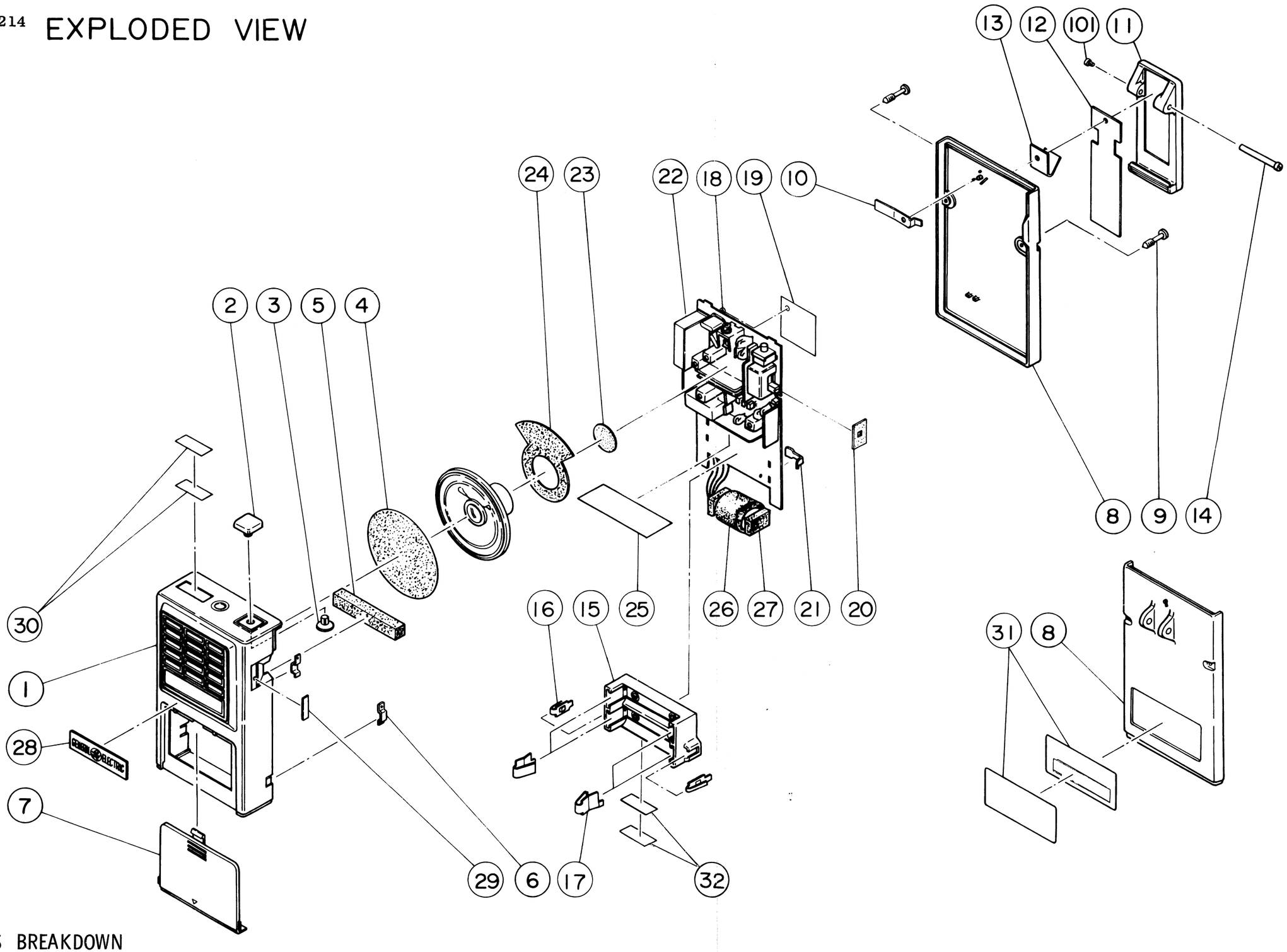
REF.NO.	DESCRIPTION		PARTS NO.	PARTS CODE
R16	Carbon Film Resistor	1/8W 2.2KΩ	ERD10EJ222	1001078803
R17	Carbon Film Resistor	1/8W 680Ω	ERD10EJ681	1001066803
R18	Carbon Film Resistor	1/8W 100KΩ	ERD10EJ104	1001116803
R19	Carbon Film Resistor	1/8W 100KΩ	ERD10EJ104	1001116803
R51	Carbon Film Resistor	1/8W 100KΩ	ERD10EJ104	1001116803
R52	Carbon Film Resistor	1/8W 47KΩ	ERD10EJ473	1001108803
R53	Carbon Film Resistor	1/8W 220Ω	ERD10EJ221	1001055803
R54	Carbon Film Resistor	1/8W 10Ω	ERD10EJ100	1001024803
R55	Carbon Film Resistor	1/8W 62Ω	ERD10TJ620	1001042803
R56	Carbon film Resistor	1/4W 2.2MΩ	ERD25PJ225	1000346803
R57	Carbon Film Resistor	1/8W 100KΩ	ERD10EJ104	1001116803
R58	Chip Resistor	1/16W 100KΩ	CR21-116-104J-T	2004904061
R59	Carbon Film Resistor	1/8W 220KΩ	ERD10EJ224	1001124803
R60	Carbon Film Resistor	1/8W 1MΩ	ERD10EJ105	1001139803
R61	Carbon Film Resistor	1/8W 47KΩ	ERD10EJ473	1001108803
R62	Carbon Film Resistor	1/8W 220KΩ	ERD10EJ224	1001124803
R63	Chip Resistor	1/16W 100KΩ	CR21-116-104J-T	2004904061
R64	Carbon Film Resistor	1/8W 220KΩ	ERD10EJ224	1001124803
R65	Carbon Film Resistor	1/8W 1MΩ	ERD10EJ105	1001139803
R66	Carbon Film Resistor	1/8W 47KΩ	ERD10EJ473	1001108803
R67	Carbon Film Resistor	1/8W 220KΩ	ERD10EJ224	1001124803
R68	Carbon Film Resistor	1/8W 18KΩ	ERD10EJ183	1001099803
R69	Carbon Film Resistor	1/8W 100KΩ	ERD10EJ104	1001116803
R70	Carbon Film Resistor	1/8W 100KΩ	ERD10EJ104	1001116803
R71	Carbon Film Resistor	1/8W 100KΩ	ERD10EJ104	1001116803
R72	Carbon Film Resistor	1/8W 47KΩ	ERD10EJ473	1001108803
R73	Carbon Film Resistor	1/8W 150KΩ	ERD10EJ154	1001120803
R74	Carbon Film Resistor	1/8W 56KΩ	ERD10TJ563	1000110803
R75	Carbon Film Resistor	1/8W 100KΩ	ERD10EJ104	1001116803
R76	Carbon Film Resistor	1/8W 39KΩ	ERD10EJ393	1001144803
R77	Carbon Film Resistor	1/8W 100KΩ	ERD10TJ104	1000116803
R78	Carbon Film Resistor	1/8W 100KΩ	ERD10EJ104	1001116803
R79	Carbon Film Resistor	1/8W 47KΩ	ERD10EJ473	1001108803
R80	Carbon Film Resistor	1/8W 220KΩ	ERD10EJ224	1001124803
R81	Carbon Film Resistor	1/8W 150KΩ	ERD10EJ154	1001120803
R82	Carbon Film Resistor	1/8W 10KΩ	ERD10EJ103	1001093803
R83	Carbon Film Resistor	1/8W 100KΩ	ERD10EJ104	1001116803
R84	Carbon Film Resistor	1/8W 47KΩ	ERD10EJ473	1001108803
R85	Chip Resistor	1/8W 100KΩ	CR32-108-104J-T	2004603061
R86	Chip Resistor	1/8W 100KΩ	CR32-108-104J-T	2004603061
R87	Chip Resistor	1/8W 100KΩ	CR32-108-104J-T	2004603061
RV51	Variable Resistor	100KΩ-(B)	EVMF0GA00B15	1049011803
S51	Slide Switch		S-J0725	4200001224
S52	Push Switch		S-J4792	4100001224
SP51	Speaker	40φ 4Ω/0.1W	SS-40A	5210001370
X1	Crystal		BQ-111A	4511101331
X2	Crystal	21.145MHz	BQ-062B	4506213221
		or 22.055MHz	BQ-062B	4506214221

PARTS BREAKDOWN

SYMBOL NO.	NAME OF PARTS	DESCRIPTION	QTY	REMARKS
1	FRONT CASE	SW/2MZ-1892	1	
2	PUSH BUTTON (1)	SW/4MZ-1760-2	1	
3	PUSH BUTTON (2)	SW/4MZ-1761-2	1	
4	SPEAKER NET	SW/4MZ-1277	1	
5	CUSHION	SW/4MZ-0489-57	1	
6	CONTACT	SW/4MB-4288	2	
7	BATTERY COVER	SW/3MZ-1895	1	
8	REAR COVER	SW/2MZ-1893	1	
9	ANTI REMOVABLE SCREW	SW/4MH-0634	2	
10	ANTENNA CONTACT METAL	SW/4MB-6644	1	
11	CLIP	SW/3MZ-1894	1	
12	ANTENNA PLATE	SW/4MB-6643	1	
13	SPRING	SW/4MB-5960	1	
14	CLIP PIN	SW/4MH-0829	1	
15	BATTERY CASE	SW/3MZ-1245	1	
16	CONTACT	SW/4MB-4287	2	
17	CONTACT POINT	SW/4MB-4992	4	
18	ANTENNA CONTACT POINT	SW/4MH-0841	1	
19	INSULATOR	SW/4MZ-1936	1	
20	SLIDE PLATE	SW/4MZ-1280	1	
21	BATTERY CONTACT	SW/4MB-6642	1	
22	TUNER CASE ASS.	SW/4MB-5783	1	
23	SUPPORTER	SW/4MZ-1333	1	
24	INSULATOR	SW/4MZ-1308	1	
25	PARTITION PLATE	SW/4MZ-1275	1	
26	CUSHION (PORON)	SW/4MZ-1971-1	1	
27	CUSHION (PORON)	SW/4MZ-1971-2	1	
28	NAME PLATE	SW/4MN-1770	1	
29	SWITCH NAME PLATE	SW/4MN-1741	1	
30	CALL SEAL	SW/4MN-1771	1	
31	MAIN NAME PLATE	SW/3MN-1772-3	1	
32	NUMBER SEAL	SW/4MN-1883	1	
33	JACK COVER	SW/4MZ-2074	1	
34	CUSHION	SW/4MZ-2085	4	
35	CUSHION (PORON)	SW/4MZ-1971-3	1	
36	DEALER LABEL	SW/4MZ-2088	1	
37	NON. SLIDING PARTS	SW/4MZ-1258	1	
101	CYLINDER SCREW	SW/ - M1.7X5	1	

4DT-1795E

EXPLODED VIEW



(3MK-2469E)