Repeater

GE MOBILE RADIO

MASTR

Progress Line

MAINTENANCE MANUAL

DESK MATE STATION

TWO-WAY FM
DESK MATE
STATION
COMBINATION

REPEATER CONTROL
LBI-3603D

SPEAKER

TABLE OF CONTENTS

WARNING

No one should be permitted to handle any portion of the equipment that is supplied with high voltage; or to connect any external apparatus to the units while the units are supplied with power. KEEP AWAY FROM LIVE CIRCUITS.

EQUIPMENT INDEX

EQUIPMENT	TYPE OR MODEL NUMBER
Transmitter	ET-55-A through ET-60-D
Receiver	ER-39-A through ER-42-H
Desk Mate Cabinet	7354211-G4
Station Power Supply	4EP38A11
Control Panel	4KC19A10
Microphone	4EM25A10
Microphone Mounting Kit	7141414-G2
Speaker	4EZ16A21
117-VAC Power Cable	7491206-P1
Two-Prong Plug Adapter	7160486-P1
Alignment Tools (hex slug type) (slotted screw type)	4038831-P2 4033530-G2
Keys	LL201

OPTIONAL EQUIPMENT

EQUIPMENT	OPTION NO.	TYPE OR MODEL NUMBER
Test Meter Panel	7609	19A121953-G1
Metering Switching Panel	7609	19A121460-G1
Transmitter Metering Cover	7648	19C303676-G3
Receiver Metering Cover	7649	19C303676-G2
220/110 volt Stepdown Transformer Kit	7608	19A121971-G1

SPECIFICATIONS *

DIMENSIONS (H x W x D)	30-3/8" x 14" x 25-1/2"
WEIGHT	Approximately 112 pounds
DUTY CYCLE (Transmit & Receive)	Continuous
INPUT VOLTAGE	117 VAC, ±10%, 50/60 Hz
INPUT POWER	Transmit: 2.9 amps max, 340 watts Receive: 0.8 amps max, 95 watts
OPERABLE TEMPERATURE RANGE	-30°C (-22°F) to +60°C (+140°F)

* These specifications are intended primarily for use by the serviceman. Refer to the appropriate Specification Sheet for complete specifications.

COMBINATION NOMENCLATURE

1st Digit Mechanical Package	2nd Digit Operating Voltage	3rd Digit RF Power Output Range	4th Digit Channel Spacing	5th Digit Control	6th Digit Number of Freq.	7th Digit Options	8th & 9th Digit Frequency Range
D Desk Mate Station	**M** 117 VAC	**5** 16—38 watts	**4** 20 kHz	**Y** Repeater Station	**A** 1-Freq.T 1-Freq.R	**S** Standard	**11** 25—33 MHz
		6 38—64 watts	**6** 30 kHz			**U** Channel Guard (71.9—156.7 Hz)	**22** 33—42 MHz
		7 64—128 watts	**7** 40 kHz			**V** Channel Guard (162.2—203.5 Hz)	**33** 42—50 MHz
			8 50 kHz				**44** 66—77 MHz
			9 60 kHz				**45** 77—88 MHz
							55 132—150.8 MHz
							66 150.8—174 MHz
							77 406—420 MHz
							88 450—470 MHz

DESCRIPTION

The General Electric MASTR Progress Line DESK-MATE Repeater Station is a complete two-way radio station designed to simultaneously receive and re-transmit signals in a communication system. The station is usually located in an appropriate area where the signal can be adequately received and re-transmitted to another base station or to mobiles.

The station cabinet can be placed adjacent to a desk to provide additional working area--or at any other suitable location. Both the transmitter exciter and the receiver are fully transistorized. Silicon transistors are used throughout for added reliability.

SERVICING

Both side panels on the station cabinet can be easily removed to gain access to the transmitter, receiver and power supply. The transmitter and receiver modules are equipped with centralized metering jacks, and are mounted on swing-out chassis for simplified alignment and troubleshooting.

The transmitter and receiver modules may be used interchangeably in mobile and station installations. No modifications are required when transferring the units from one type of operation to another.

The station may also be equipped with an optional built-in Test Set to facilitate servicing.

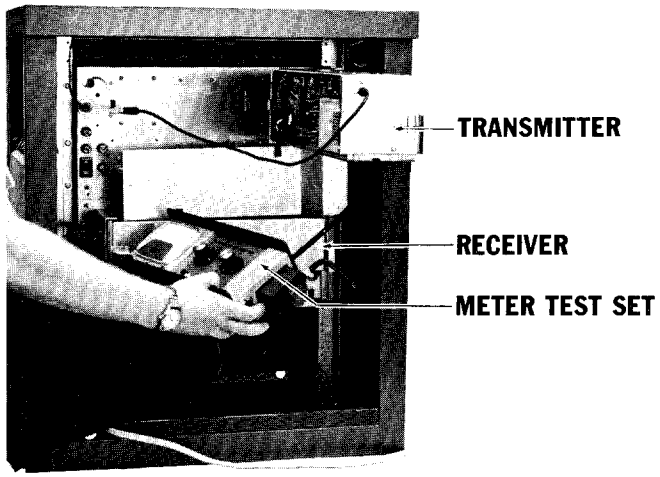


Figure 1 - Transmitter-Receiver Test

TRANSMITTER

The transmitter assembly consists of the transistorized exciter board and the power amplifier section. The standard transmitter may be equipped with Channel Guard (tone squelch).

RECEIVER

The fully transistorized receiver is completely contained in an aluminum casting, which provides excellent electrical shielding and reduces the effects of vibration. The standard receiver may be equipped with:

- Channel Guard (tone squelch)
- Noise Blanker

POWER SUPPLY

Station Power Supply Model 4EP38A11 provides operating voltages for both the transmitter and receiver. In addition to plate, screen and bias voltages for the transmitter, the power supply provides:

- Regulated -20 volts for the transistorized transmitter exciter-board.
- Regulated +10 volts for the receiver and for transmitter Channel Guard.
- Regulated +12.6 volt transmitter filaments, receiver audio, relays, and pilot lights.

Antenna Circuits

The receive antenna is connected to the left socket and the transmit antenna to the right socket on the antenna mounting bracket. From the antenna mounting bracket, the receive antenna is connected to receiver jack J441 and the transmitter antenna to transmitter jack J103.

CONTROL PANEL

The Control Panel contains the AC input circuit, audio coupler, carrier operated relay, 5-second and 3-minute timers, and the Channel Guard filter (if used). The panel is mounted on the chassis mounting frame below the Transmitter-Receiver Power Supply.

AC Input

The 117-volt AC input is connected directly to TB706-1 and 2. All power to the station is controlled by switch S701 on the control panel.

An optional 220/110 volt AC Stepdown Transformer Kit is available for use when the input line voltage is 220 volts AC.

> **WARNING**
>
> 117-volts AC is always present at TB706-1 and 2, even when S701 is in the OFF position. Always use care when servicing the Control Panel.

MICROPHONE (MODEL 4EM25A10)

A microphone is mounted inside the station for use during service and maintenance work by the serviceman. The Microphone is connected to mike jack J902 located on the front side of the power supply.

SPEAKER (MODEL 4EZ16A21)

Speaker Model 4EZ16A21 is designed for an audio output of five watts. Volume level is adjusted by VOLUME control (R511) on Transmitter-Receiver Power Supply.

The speaker leads connect to TB501-11 and TB502-5 on the Transmitter-Receiver Power Supply.

> **NOTE**
>
> When a speaker is not used, a 3.5-ohm, 10-watt resistor must be connected from TB501-11 to TB502-5 as a substitute for the speaker load impedance.

INITIAL ADJUSTMENT

After the MASTR Desk Mate Station has been installed as described in the Installation Manual, the transmitter, receiver, power supply and control panel must be adjusted by an electronics technician who holds a 1st or 2nd Class FCC Radiotelephone or Radiotelegraph license before the station can be placed in operation.

TEST EQUIPMENT REQUIRED

The following test equipment is required for the adjustment of both transmitter and receiver:

1. A tuning tool and a screwdriver.
2. G-E Test Meter Model 4EX3A10, built-in Station Test Metering Panel (Optional), or a 20,000 ohms-per-volt multimeter.
3. A signal source operating at the system frequency (preferably the transmitter which will normally be monitored by the receiver).

TRANSMITTER ADJUSTMENT

The initial adjustment for the transmitter includes:

- Loading the power amplifier into the antenna.
- Checking the frequency and modulation.

For the Initial Adjustment procedure, refer to the ALIGNMENT PROCEDURE in the MAINTENANCE MANUAL for the transmitter.

RECEIVER ADJUSTMENT

The initial adjustment for the receiver includes:

- Zeroing the receiver to the system operating frequency.
- Matching the antenna transformer to the antenna.

For the Receiver Initial Adjustment Procedure, refer to the FRONT END ALIGNMENT PROCEDURE in the MAINTENANCE MANUAL for the receiver.

POWER SUPPLY ADJUSTMENT

The initial adjustment for the power supply includes:

- Turning the power switch (S501) on.
- Adjusting the VOLUME (R511) and SQUELCH (R512) controls as follows: Set the SQUELCH Control to point at which noise disappears; then set VOLUME Control to optimum listening level.

CONTROL PANEL ADJUSTMENT

The initial adjustment for the control panel includes:

- Turning the power switch (S701) ON.
- Adjusting the AUDIO COUPLER LEVEL Control (R2) on Audio Coupler Circuit Board.

For the control initial adjustment procedure, refer to the Control Panel MAINTENANCE MANUAL.

MAINTENANCE

TEST AND TROUBLESHOOTING PROCEDURES

The individual Maintenance Manual for the transmitter and receiver describe standard test procedures which the serviceman can use to compare the actual performance of the transmitter or receiver against the specifications of the unit when shipped from the factory.

In addition, specific troubleshooting procedures are available to assist the

serviceman in troubleshooting the transmitter, receiver and power supply.

For best results in servicing the station, the TEST PROCEDURES should be used in conjunction with the TROUBLESHOOTING PROCEDURES. Both sheets are listed in the Table of Contents of the applicable Maintenance Manual.

PREVENTIVE MAINTENANCE

To insure high operating efficiency and to prevent mechanical and electrical failures from interrupting system operations, routine checks should be made of all mechanical and electrical parts. This preventive maintenance should include the maintenance checks listed below:

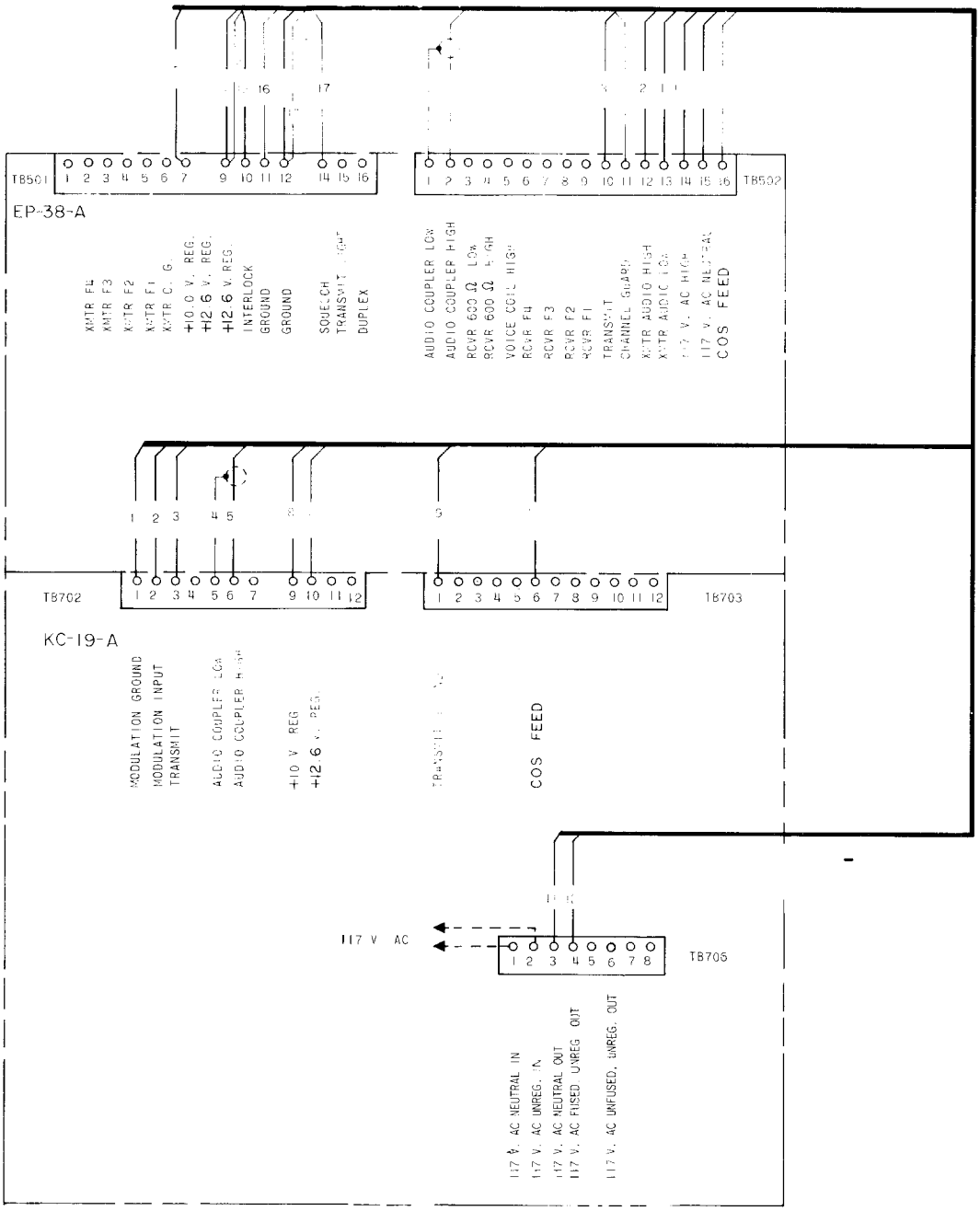
PREVENTIVE MAINTENANCE PROGRAM

CHECK THE FOLLOWING ONCE A YEAR:

1. Transmitter frequency and deviation (FCC requires this check-up ONCE a year. ☐
2. Measure and record the antenna system V.S.W.R. ☐
3. Check input voltage at TB706-1 and -2 on control panel. Reading should be within 10% of 117 VAC. (Also check during routine service calls). ☐
4. Compare and record transmitter meter readings with voltages taken during initial tune-up. Retune, if necessary. ☐
5. Compare and record receiver meter readings with voltages taken during initial tune-up. Retune, if necessary. ☐
6. Check for positive indication of pressure on transmission line pressure gauge (if pressurized line is used). ☐
7. Clean dust from fan blades and lubricate bearings. ☐
8. Burnish pitted or coated relay contacts to smooth out metallic deposits or remove the coating. ☐

MAKE THE FOLLOWING MAINTENANCE CHECKS DURING ROUTINE SERVICE CALLS:

1. Check antenna lines and mast for mechanical stability. ☐
2. Visually check: ☐
   - External cables
   - Internal cables
   - plugs
   - sockets
   - terminal boards
3. Check for tightness of nuts, bolts, and screws to make sure nothing is working loose from its mounting. ☐
4. Replace tubes as necessary. (It may be convenient to replace all station tubes during the yearly check-up). ☐



NOTES:

1. TB706-1 MUST BE CONNECTED TO GROUND OR NEUTRAL OF THE BUILDING WIRING SYSTEM.
2. [illegible] INPUT TO TB501-[illegible].
3. TO DISABLE RECEIVER CHANNEL GUARD, REMOVE WIRE FROM TB502-[illegible] AT KA-38A.

(19D402349, Rev. 8)

INTERCONNECTION DIAGRAM

MASTR DESK MATE STATION COMBINATION
REPEATER CONTROL PANEL

PARTS LIST

LBI-3561A

DESK-MATE STATION CABINET
7354211-G4

SYMBOL	GE PART NO.	DESCRIPTION
	7354211-P8	Door: (fits either side).
	4035449-P5	Bumper, door: rubber, sim to Atlantic India Rubber 1165.
	N529P38C	Plug. (for cable Knockouts at bottom of assembly).
	7354211-P7	Mounting rack. (2 drilled angles).
	5491682-P13	Lock and Key. Sim to Yale and Towne F7678DX1. Includes Key 5491682-P4 (Yale and Towne BF-10A).
	N80P19008C13	Screw, phillips: 12-24 x 1/2. (Used to secure rack panel assemblies).
	N403P21C13	Lockwasher: external tooth, No. 12. (Used to secure rack panel assemblies).
	19A121317-G2	Interconnection Harness.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

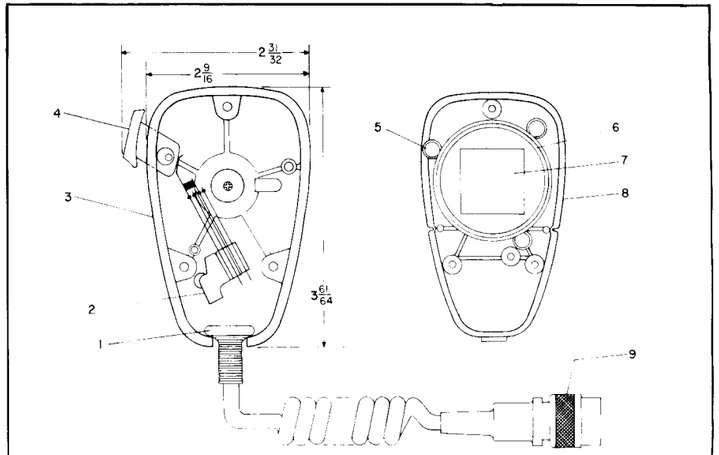
PARTS LIST

LBI-3558B

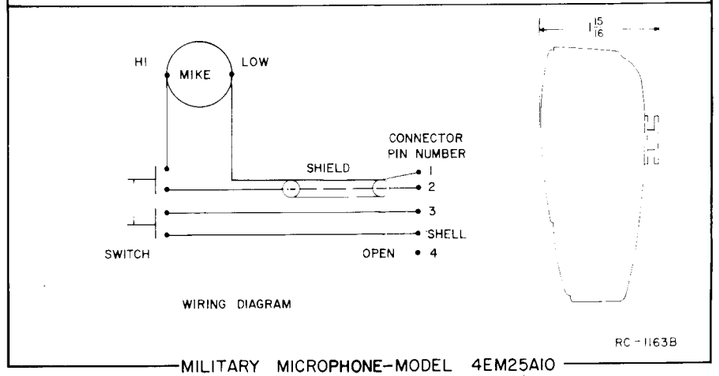
MILITARY MICROPHONE
MODEL 4EM25A10
(PL-19B209102-G1)
(SEE RC-1163)

SYMBOL	G-E PART NO.	DESCRIPTION
		MECHANICAL PARTS
		MODEL 4EM25A10
1		Cable clamp. Shure Brothers RP-16.
2		Switch. Shure Brothers RP26.
3		Case (back) and mounting button: plastic. Shure Brothers RP-67.
4		Switch button: red plastic. Shure Brothers RP-25.
5		Spring. Shure Brothers RP-1.
6		Shield. Shure Brothers RP-23.
7		Magnetic controlled cartridge. Shure Brothers RP-13.
8		Case (front) plastic. (Part of item 3).
9		Cable and plug: approx 6 feet long. Shure Brothers RP-14.

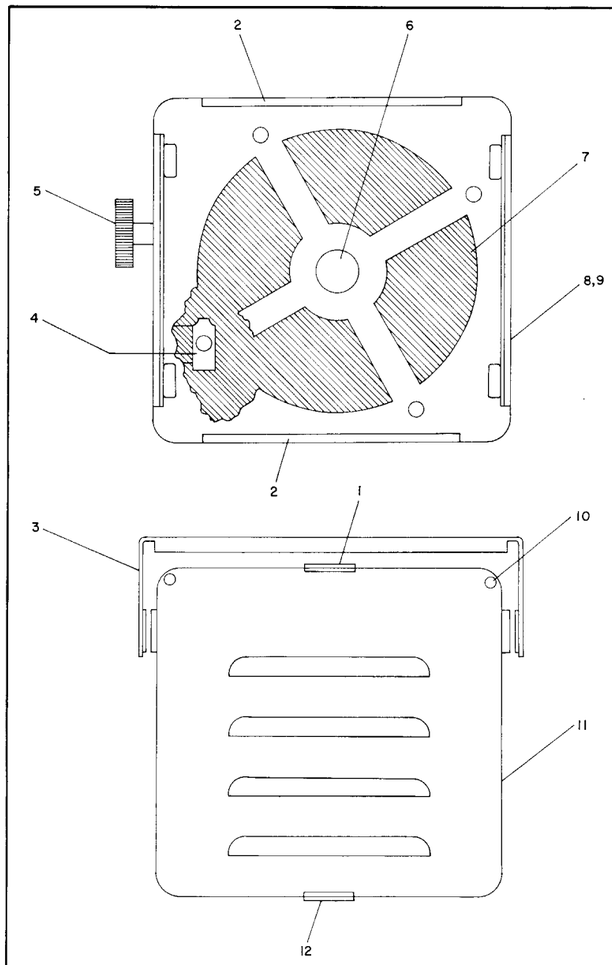
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

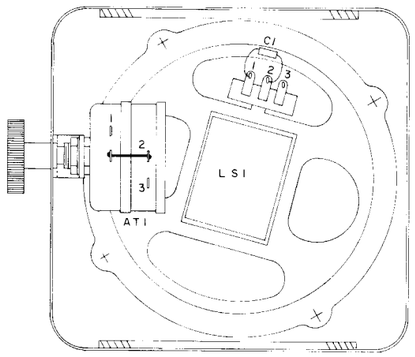


4EM25A10

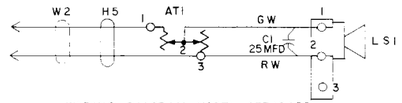


MILITARY MICROPHONE—MODEL 4EM25A10





NOTE: ATTENUATOR (AT1) USED ON MODEL 4EZ16A20 ONLY



WIRING DIAGRAM - MODEL 4EZ16A20

WIRING DIAGRAM - MODEL 4EZ16A21

RC-1164

The speaker leads connect to TB501-11 and TB502-5 on the Transmitter-Receiver Power Supply.

SPECIFICATIONS

Audio Power Input:	5-watts
Frequency Range:	300-3000 Hz
Input Impedance:	3.2 ohms
Attenuator:	3.5 ohms

PARTS LIST

LBI-4081

FIVE-WATT STATION SPEAKER

MODEL 4EZ16A20 19D402449-G13
MODEL 4EZ16A21 19D402449-G14

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - ATTENUATORS - - - - - - - - -
AT1	7478301-P48	L-pad, variable, audio: 3.5 ohms res, 4 w, 40 db min attenuation max, 294° rotation.
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1	19B209233-P1	Electrolytic, non-polorized: 25 µf ±20%, 25 VDCW; sim to Sprague 41D.
		- - - - - - - - - LOUDSPEAKERS - - - - - - - - -
LS3	19B209422-P1	Permanent magnet: 5 inch, 3.2 ohms ±10% imp, 2.98 ohms ±15% DC res, 7.5 w max operating.
		- - - - - - - - - - - CABLES - - - - - - - - - - -
W2	7484521-G7	Speaker: 2 conductor with 2 spade tongue terminals, approx 4 feet long.
		MECHANICAL PARTS (SEE RC-1164)
1	5490407-P3	Neoprene grommet.
2	19A121623-P1	(Not used).
3	19A121521-G1	Mounting support.
4	7160861-P20	(Not used).
5	19A115837-P1	Plastic knob. (Used in Model 4EZ16A20).
6	19A12467-P1	(Not used).
7	19C303500-P1	(Not used).
8	19B216269-G3	Can. (Used in Model 4EZ16A20).
9	19B216269-G2	Can. (Used in Model 4EZ16A21).
10	4037072-P10	(Not used).
11	19A121550-G3	Speaker cover.
12	19A115470-P1	Rubber grommet: approx 3/4 inch dia; sim to Atlantic Rubber 2279 (without hole).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES