ERICSSON

Mobile Communications

FMD™
SYNTHESIZED 800 MHz MOBILE RADIO COMBINATION

TABLE OF CONTENTS

Maintenance Manual

TABLE OF CONTENTS

CAUTION

Although the highest DC voltage in this mobile equipment is supplied by the vehicle battery, high currents may be drawn under short-circuit conditions. These currents can possibly heat objects such as tools, rings, watchbands, etc., enough to cause burns. Be careful when working near energized circuits!

High-level RF energy in the transmitter power amplifier assembly can cause RF burns upon contact. Keep away from these circuits when the transmitter is energized!

SPECIFICATIONS*

FREQUENCY RANGE	806-825 MHz and 851 - 870 MHz for transmit 851-870 MHz for receive
INPUT VOLTAGE	13.6 Vdc ±20%
BATTERY DRAIN (Maximum)	
Receive	
Squelched	0.7 Amperes at 13.6 Vdc
Unsquelched	1.5 Amperes at 13.6 Vdc
Transmit	
30 Watts	15 Amperes at 13.6 Vdc
12 Watts	7 Amperes at 13.6 Vdc
FREQUENCY STABILITY	0.0002%
TEMPERATURE RANGE	-30°C (-22°F) to +60°C (+140°F)
DUTY CYCLE	100% Receive, 20% Transmit (EIA)
DIMENSIONS (H x W x D) (less accessories)	69 mm X 187 mm X 278 mm (2.7 X 7.4 X 11.0 inches)
WEIGHT	3.2 kg (less accessories)

TRANSMITTER

CONDUCTED SPURIOUS	-61 dB (30 Watts) -57 dB (12 Watts)
MODULATION	±4.5 kHz
AUDIO SENSITIVITY	55 to 120 millivolts
AUDIO FREQUENCY CHARACTERISTICS	Within +1 dB to -4.5 dB of a 6 dB/octave pre-emphasis from 300 to 3000 Hz per EIA standards. Post limiter filter per FCC and EIA.
DISTORTION	Less than 3% (1000 Hz) Less than 5% (300-3000 Hz)
DEVIATION SYMMETRY	0.5 kHz maximum
MAXIMUM FREQUENCY SEPARATION	64 MHz

SPECIFICATIONS*
(continued)

MICROPHONE LOAD IMPEDANCE	600 ohms
POWER ADJUST RANGE	100% TO 50% of rated power
RF OUTPUT IMPEDANCE	50 ohms
FM NOISE	-45 dB
CARRIER ATTACK TIME	30 milliseconds
AUDIO ATTACK TIME	50 milliseconds
CHANNEL GUARD TX TONE DISTORTION	< 5%

RECEIVER

AUDIO OUTPUT	4 Watts with less than 5% distortion to 16 ohm speaker
SENSITIVITY	0.35 microvolts (12 dB SINAD, EIA method)
SELECTIVITY (EIA two-signal)	-70 dB (25 kHz channel spacing)
SPURIOUS RESPONSE	-70 dB
INTERMODULATION	-70 dB
MODULATION ACCEPTANCE	±7.0 kHz
MAXIMUM FREQUENCY SEPARATION	19 MHz
FREQUENCY RESPONSE	Within +2 and -8 dB of a standard 6 dB per octave de-emphasis curve from 300 to 3000 Hz (1000 Hz reference)
RF INPUT IMPEDANCE	50 ohms
HUM/NOISE RATIO	
Unsquelched	-45 dB
Squelched	-65 dB
RECEIVER RECOVERY TIME	250 milliseconds
RECEIVER ATTACK TIME	150 milliseconds
CHANNEL SPACING	25 kHz
CHANNEL RESOLUTION	12.5 kHz

* These specifications are intended primarily for use during servicing. Refer to the appropriate specfication sheet for complete specifications.

DESCRIPTION

The Ericsson GE FMD series mobile radio is designed to provide high reliability and performance for mobile communications using the Enhanced Digital Access Communications System (EDACS™). The radio is designed to meet MIL-STD-810C & D and comes in three models: Basic, Select and Scan having 12 or 30 watts output power.

The small size of the FMD series makes it ideal for front mounting in conventional vehicles, with all operating controls and indicators located on the front panel.

The Scan model radio is equipped with the following features:

- Microcontroller controlled frequency synthesizer.
- Digital trunking and conventional operation.
- Remote mount with optional kit. Radio front becomes the control head.
- Microcontroller design provides for personality programming using an IBM compatible PC.
- Clear visual Liquid Crystal Display (LCD) even in bright sunlight.
- Buttons and display have backlight for nighttime operation.
- External switch operation sends an instant emergency signal with identification to the dispatches with an alerting signal to the other group members.
- Supports data terminals with no radio modification (a single radio supports both voice and data).
- Provides tone and digital Channel Guard (CTCSS) in conventional mode.

The radio is housed in a weather-resistant case. The radio is secured to the vehicle by a mounting bracket, which allows the radio to be mounted on the vehicle ceiling as well as the dash board.

The radio circuitry consists of a front panel assembly and four printed wire boards mounted in a cast aluminum frame. A control panel assembly is located at the front of the radio. The four circuit boards that make up the radio are the Transmitter Board, Receiver Board, Frequency Synthesizer Board and the System Control Board. The Transmitter Board and the Receiver Board are located on the bottom of the radio, while the Frequency Synthesizer Board and System Control Board are located on the top. Test points for the transmitter, receiver and system functions are provided for simplified alignment and troubleshooting.

Interconnections are provided by cables between the boards. A cable connector for power and an antenna jack are provided at the rear of the radio. Access to each circuit board is achieved by loosening four screws in the bottom cover and then removing each cover. All turning controls are accessible from the top of the radio when the cover is removed. Access to the Front Panel circuitry is achieved by removing the four screws securing the front panel to the chassis.

TRANSMITTER

The transmitter consists of the frequency synthesizer, transmit VCO and the exciter/power amplifier (PA) assembly. The RF power output level is internally adjustable for rated power output. Once the level is set, a sensing control circuit holds the power constant over the temperature and/or voltage variations within specified limits.

The transmitter board also contains a solid-state antenna relay and a low-pass filter. The broadband transmitter requires no tuning. Audio, 9066 baud data and Channel Guard circuitry for the transmitter is located on the System Control Board.

FREQUENCY SYNTHESIZER

The synthesizer drives the transmit exciter and the receiver first mixer. The synthesizer consists of a synthesizer chip, pre-scaler, reference oscillator and two voltage controlled oscillators (VCOs). The frequency synthesizer, under control of the microcontroller, generates all transmit and receive RF frequency.

The Electrically Erasable PROM (EEPROM) on the System Control Board stores data for all RF frequencies, and all trunked and conventional information. The microcontroller accesses the EEPROM and provides the correct WALSH bits for the Channel Guard circuitry to generate the Channel Guard tone or digital code (on a per-channel basis) or high-speed data for trunked operation.

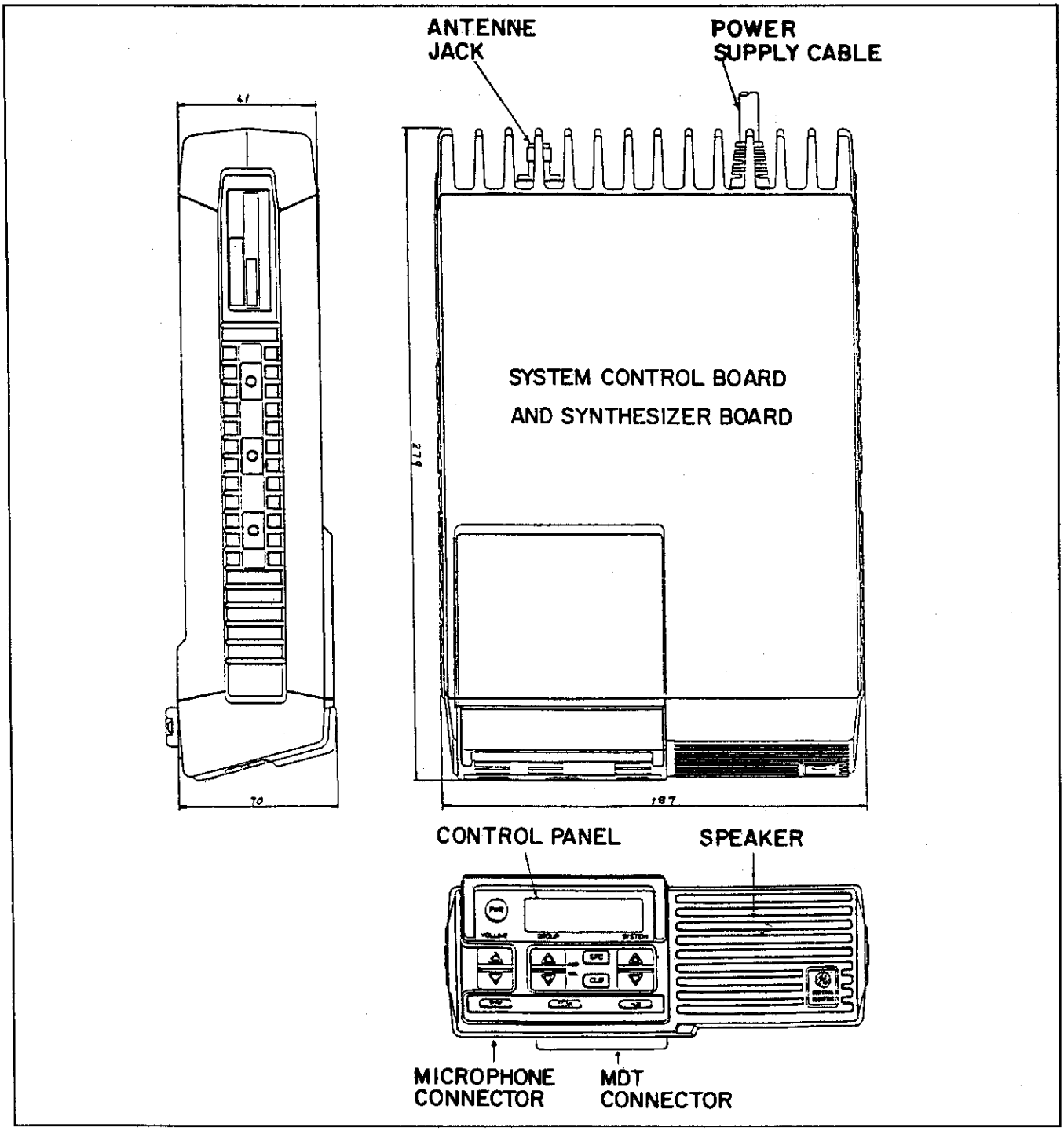


Figure 1 - FMD Scan Radio

PROGRAMMING

The EEPROM allows the radio to be programmed or reprogrammed as needed to adapt to changing system requirements. RF frequencies, Groups, Systems, Channel Guard tones and digital codes can be reprogrammed.

The EEPROM is programmed through the radio front connector using an IBM compatible PC. Programming instructions are provided in the respective programming manual.

NOTE

All programmed frequencies must be divisible by 12.5 Hz.

SYSTEM CONTROL FUNCTION

A microcontroller on the System Control Board controls the frequency synthesizer, transmit on/off, decoding of 9600 baud data, CTCSS tones, generation of 9600 baud data and CTCSS tones. The audio processor circuitry for the transmitter and the receiver are also located on the System Control Board, along with Squelch control and digital Voice Guard control circuitry.

CONTROL PANEL

The Control Panel assembly consists of the front panel housing, an internal speaker, Display Board, Panel Control Board and connectors for the microphone, mobile data terminal and accessories. The panel is made of high-durability plastic with rounded corners and recessed controls and indicators for passenger safety. There are three interchangeable control panels, which are removable allowing the radio to be trunk mounted.

OPERATING PROCEDURES

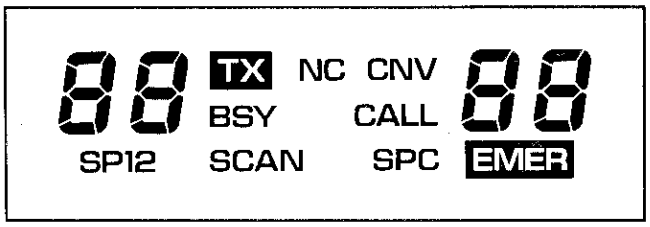
The operating instructions that follow are condensed instructions intended for use when servicing the FMD. Refer to the FMD Operator's Manual for complete operating information. Operating procedures for the Scan model are covered in this manual. If you are using a different model of the FMD some of the operating controls, indicators and procedures will not apply to your radio.

CONTROLS AND DISPLAYS

Controls and displays on the FMD Scan model are described in this section.

DISPLAYS

The display shows current operating information including Group, System or Channel. It also shows when the radio is in emergency operation and shows different status flags. An example of the display is shown below with all the status flags displayed. When you are using the radio, only the active performance indicators and characters will show. When the radio is turned on, the display will show the group and system selection.



TX	Transmit status flag. This status flag is on when the radio is transmitting.
BSY	Channel busy status flag. This status flag is on when the radio receives a call or when a conventional channel is in use. Flashes when a call is queued on a trunked system.
NC	No control channel status flag. This status flag is on when the control channel is not available (out of range or not operating). On supervisory units, the flag flashes when site equipment is in failsoft.
CNV	Conventional system status flag. This status flag is on when operating on a conventional system or when the selected trunked system is in conventional failsoft mode.
EMER	Emergency status flag. Displayed when the external emergency switch (optional) is activated. Flashes when an emergency call is received.
CALL	Active when programmed calls are received.

SPC	Special call status flag. Displayed when an individual call is received or special call is selected.
SCAN	This status flag is on when scan is on.
S	Non-priority scan status flag. This status flag is on when a non-priority conventional channel or trunked group is selected or scanned.
P1	Priority 1 status flag. This status flag is on when a priority 1 conventional channel is selected or scanned.
P2	Priority 2 status flag. This status flag is on when a priority 2 conventional channel is selected or scanned.
SP	Special call indication. Displayed in the System display when special call mode is active.
System	Shows the selected system number. Displays SP when Special Call mode is selected. Displays "nd" when mobile data is disabled.
Group	Shows the selected number.

The display has a backlight so you can read the display at night or in dimly lit areas.

Controls

PWR (Power)	A red pushbutton used to turn the radio on and off.
VOLUME	These buttons set the receive volume level. Press the ▲ button to increase the volume or press the ▼ button to lower the volume. Hold the button down until the desired audio tone is heard (a tone will not be heard if the radio is receiving a call). The radio stores the selected volume level even when the power is off.
GROUP	These buttons change the group or special call selection. Pressing ▲ or ▼ will change the trunked group/conventional channel selection. The ▲ button selects the next group/channel, and the ▼ button selects the previous group/channel.
SYSTEM	These buttons change the system selection. Pressing ▲ or ▼ will change the system selection. The ▲ button selects the next system, and the ▼ button selects the previous system.
SPC	Pressing this button causes the radio to enter the special call mode. Special call allows you to place calls to individual radios or telephone numbers. Use the Group ▲ and ▼ buttons to select special calls in special call mode.
CLR	Used to clear an emergency (supervisory units only), clear special calls and when setting the backlight level.
SCAN	Used to turn function on and off.
AUX	Auxiliary key defined by radio programming. May be programmed as an emergency key or some other function.
SPKR	This pushbutton selects between the internal speaker or an optional external speaker.
ADD	This pushbutton (GROUP ▲) is used with SCAN to add a group or channel to the scan list.
DEL	This pushbutton (GROUP ▼) is used with SCAN to delete a group or channel from the scan list.

Emergency Feature

Your radio is equipped with an emergency communications feature that may be activated through an optional externally mounted switch or in some cases through the AUX button. When you activate the external emergency switch (optional), you will be given the highest priority for voice communication. An emergency message with your radio ID will be sent to the dispatcher and your radio display will show the EMER status flag. Everyone in your group will see an emergency indication on their radios.

OPERATION

Group Selection

The GROUP buttons change your group (or conventional channel) selection. Press the ▲ button to view the next group choices or ▼ to view the previous group choices. Release the button when the display shows the group you want. If the displayed group does not change, you have reached the limit and will have to press the opposite direction (unless wraparound has been programmed) to see other selections. These buttons will automatically ramp when held down.

NOTE

On units with automatic login for wide-area tracking, the radio will transmit briefly after a group change.

System Selection

Select a trunked or conventional system by pressing the SYSTEM buttons. Press the ▲ button to see the next system choices or press the ▼ button to see the previous system choices. Release the button when the display shows the system you want. If the system message does not change, you have reached the limit and will have to press the buttons in their opposite directions to see other selections. These buttons will automatically ramp when held down.

NOTE

The group may change when the system selection is changed. This happens when the selected system does not contain the previously selected group. Make sure the GROUP selection is correct after selecting a SYSTEM.

On units with automatic login for wide-area tracking, the radio will transmit briefly after a system change.

Getting Started

1. Press the red PWR button to turn the radio on. The display status flag will become visible. The last selected Group and System will be displayed unless the radio has a predefined power up Group and System.
2. Adjust the volume using the VOLUME buttons.

NOTE

On units with automatic login for wide-area tracking, the radio will transmit briefly after first locking onto a trunked system.

Your radio is not set up for basic operation. The BSY status flag will be on when a call is received.

Adjusting Squelch (Conventional)

The squelch may be adjusted only in conventional (non-trunked) operation:

1. Press and hold the SCAN button while pressing the SYSTEM ▲ button until the BSY status flag is on continuously. Noise will be heard in the speaker if optional Channel Guard is not enabled.
2. Press and hold the SCAN button while pressing the SYSTEM ▼ button until the BSY status flag goes off.
3. Release the SCAN button.

Setting Backlight Level

The level of backlighting for the LCD may be adjusted as follows:

NOTE

Pressing the CLR button disables the squelch on conventional channels. You may want to reduce the volume before setting the backlight level to prevent excessive noise in the speaker.

1. Press and hold the CLR button.
2. Press the GROUP ▲ or ▼ button until the desired level of backlighting is obtained.
3. Release the CLR button.

Sending And Receiving Trunked Messages

When operating in a trunked system (normal operation), use the procedures in this section. Operation in the conventional channel mode is described under SENDING AND RECEIVING CONVENTIONAL MESSAGES.

Receiving A Message

1. Press the VOLUME button and listen for the desired level of audio tone.
2. Select the trunked system by operating the SYSTEM buttons.
3. Select the desired group by operating the GROUP buttons. The radio will now receive calls directed to the selected system and group. If an individual call (call directed only to your radio) is received, the CALL status flag will be displayed.

Sending A Message

1. Select the desired system by operating the SYSTEM buttons.
2. Select the desired Group by operating the GROUP buttons.
3. When the BSY status flag is off, press the PTT button on the microphone until the TX and BSY status flags are displayed and a tone is heard.
4. Hold the microphone about six inches from your mouth and speak normally.
5. Release the PTT button when the transmission is complete and listen for any reply.

NOTE

If PTT is released before the channel available tone, the channel available tone will be extended. The radio will transmit for up to two seconds, allowing time for you to press PTT and talk.

Groups may be programmed as receive-only. If a group is receive-only, nothing will happen when the PTT button is pressed.

On wide-area calls, if the BSY status flag is on but the channel-available tone has not sounded, you may release and press PTT quickly to override the wait period. This will only guarantee communication on your site. **Use this method with caution.**

Sending And Receiving Conventional Messages

The procedures described here are for operating in a conventional channel mode. Use these procedures if you have a conventional system, or in the event of a failure of the trunked system.

Receiving A Message

1. Press the VOLUME buttons and listen for the desired level of audio tone.
2. Select a conventional channel system by operating the SYSTEM buttons.
3. Select the desired channel by operating the GROUP buttons. The radio will now receive messages over the channel.

Sending A Message

1. Select a conventional channel system by operating the SYSTEM buttons.
2. Select the desired channel by operating the GROUP buttons.
3. Insure that there is no other transmission on the channel (BSY status flag off).
4. Press the PTT button on the microphone and wait until the TX status flag is displayed.
5. Hold the microphone about six inches from your mouth and speak normally.
6. Release the PTT button when the transmission is complete and listen for any reply. The TX status flag will go off.

SPECIAL FEATURES

Alert Tones

Your radio produces audio tones when the buttons are pressed and at other times during normal operation.

- Short tone when a button is pressed.
- Short tone when emergency operation is used.

- Short tone after PTT is pressed and radio is ready to transmit.
- Call-queued tone. A high pitched beep signaling the call has been queued and will be placed as soon as a channel is assigned. Wait until call is placed. The radio flashes the BSY status flag and disables PTT when a call is queued.
- System busy. Three low pitched beeps indicating the system is busy. Try your call later.
- Auto-key tone. A long tone if PTT is not pressed when the site equipment assigns a channel. You have up to two seconds to press PTT after the tone to keep the assigned channel.
- Carrier Control Timer (CCT) tone. A warning signal which sounds after the radio has been continuously transmitting for a preprogrammed time. The signal turns off when PTT is released. A five-beep signal followed by a low tone is used on trunked systems. On conventional systems, the low tone beep sounds until PTT is released.

Receiving An Emergency Call

From A Selected System/Group

When you receive an emergency call from the selected group and system a short beep will sound, the EMER status flag will flash, and the BSY status flag will come on. Follow your standard emergency procedures. The EMER indicator will flash until the emergency is cleared.

From A Scanned Group

When you receive an emergency call from a scanned group (scan operating), the display will show the calling group number. The EMER status flag will flash and a tone will sound. The EMER indicator will flash while the voice channel is active.

Sending An Emergency Call

To send an Emergency call to the selected System and Group, proceed as follows:

1. Activate the external emergency switch (optional) or the EMER button (if programmed for emergency) for at least 3/4 second. The EMER and TX status flags will come on (unless programmed off). A message will be sent to the dispatcher with your ID to declare an Emergency. You will be given the highest priority for voice communication.
2. Press the PTT button on the microphone and speak into the microphone in a normal voice.
3. Release the PTT button when the transmission is completed and listen for any reply. The TX status flag will go out.

Clearing An Emergency Call

If your radio has been programmed as a supervisory unit, you may clear emergency calls. When the emergency is no longer in effect, the emergency call may be cleared as follows:

1. Press and hold the CLR button while pressing the emergency switch.
2. Wait for the EMER status flag to go off.
3. Release both buttons.

Special Call

Receiving An Individual Call (Trunked Mode)

When you receive an individual call (call directed only to your radio), the CALL and BSY status flags will be displayed.

If you want to respond to the call, you have up to five seconds to press the PTT button. Your call will automatically be directed to the station calling you.

Sending A Special Call (Trunked Mode)

You may make Special Calls with your radio through the Special Call feature.

1. Press and release the SPC button. The SPC status flag will come on and the system display will change to SP. The group display will change to the previously selected special call number.
2. Press the GROUP buttons to search (forward or reverse direction) through the displayed list of special calls. When the desired special call appears on the display, release the GROUP button.

3. Press the PTT button on the microphone and make your call.

4. Release the PTT button when you are done talking and listen for any reply.

5. When the call is finished, press the CLR button. The display will change to the previously selected group and system.

Telephone Interconnect (Trunked Mode)

You may make telephone calls using the Special Call feature. Make a telephone interconnect call as follows:

1. Press the SPC button, the SPC status flag will come on. The system display will change to the letters SP. The group display will change to one of the previously selected special call numbers.

2. Press the GROUP buttons until the special call number for telephone interconnect appears in the group display.

3. Press the PTT button on the microphone and wait for a dial tone (or ringing if the number is pre-stored).

4. Enter the telephone number followed by * (star) using the keypad on the microphone. If the number is pre-stored, skip this step. Release the PTT button.

5. When the call is answered, press the PTT button and wait for the tone before speaking.

NOTE

You cannot talk and listen at the same time as with a regular telephone. Whenever you talk you will not hear the other party.

6. Release the PTT button and listen for any reply.

7. When your call is finished, press the CLR button. The previously selected group and system will appear on the display.

Scan

You may program your radio to scan a number of Groups or conventional Channels for activity. The scan function will not operate when the EMER status flag is on.

Adding To Scan

Set up (or add to) the Groups (or channels) to be scanned as follows:

1. Press the SCAN button, if the SCAN status flag is on, to turn scan off.

2. Select the Group or Channel to be added to Scan using the GROUP buttons.

3. Press and hold the SCAN button while pressing the GROUP ▲ (ADD) button to add the group or channel to scan. The S status flag will be displayed.

Deleting From Scan

Remove Groups (or channels) to be scanned as follows:

1. Select the group or channel to be removed from Scan using the GROUP buttons.

2. Press and hold the SCAN button while pressing the GROUP ▼ (DEL) button to remove the Group or Channel from scan. The S status flag will go off. When scanning a call, use this procedure to remove a scanned call from the scan list.

NOTE

Pressing the SCAN and ADD buttons will cause scan operation to go from S (non-priority scan), to P2 (priority two), to P1 (priority one) and return to S (non-priority scan).

Priority Scan Feature (Conventional Mode Only)

Priority-one status may be assigned to a conventional channel as follows:

1. Press the SCAN button, if the SCAN status flag is displayed, to turn off scan.

2. Select a conventional channel system using the SYSTEM buttons.

3. Select the desired channel by operating the GROUP buttons.

4. Press and hold the SCAN button while pressing the GROUP ▲ (ADD) button three times to assign priority-one status to the selected channel. The S and P2 status flags will be displayed followed by the P1 status flag.

5. Press and hold the SCAN button and press the GROUP ▲ (ADD) button:

   3 times if the channel is not already in scan
   2 times if the channel is already at S level
   1 time if the channel is at P2 level

   The S and P2 status flags will be displayed followed by the P1 status flag.

Priority-two status may be assigned to a conventional channel as follows:

1. Press the SCAN button, if the SCAN status flag is displayed, to turn off scan.

2. Select a conventional channel system by operating the SYSTEM buttons.

3. Select the desired channel by operating the GROUP button.

4. Press and hold the SCAN button while pressing the GROUP Δ (ADD) button three times to assign priority-two status to the selected channel. The S status flag will be displayed, followed by the P2 status flag.

5. Press and hold the SCAN button and press the GROUP Δ (ADD) button:

   2 times if the channel is not already in scan
   1 time if the channel is already at S level

   The S followed by the P2 status flag will be displayed.

Starting Or Stopping Scan

1. Press the SCAN button to turn on scan. The SCAN status flag will go on.

2. Press the SCAN button again to turn off scan. The SCAN status flag will go off. The scan function may be programmed to stop when the microphone is lifted off its hanger. The scan state is stored when power is removed from the radio (unless a predefined power-up state has been programmed).

MAINTENANCE

Maintenance information for the FMD is provided in the service section listed in the table of contents. The service section includes the following information:

- Disassembly procedures
- Transmitter alignment procedures
- Receiver alignment procedures
- Receiver test procedures
- Troubleshooting procedures
- Test point voltage readings
- Receiver voltage readings
- IC and chip component replacement procedures
- Data sheets

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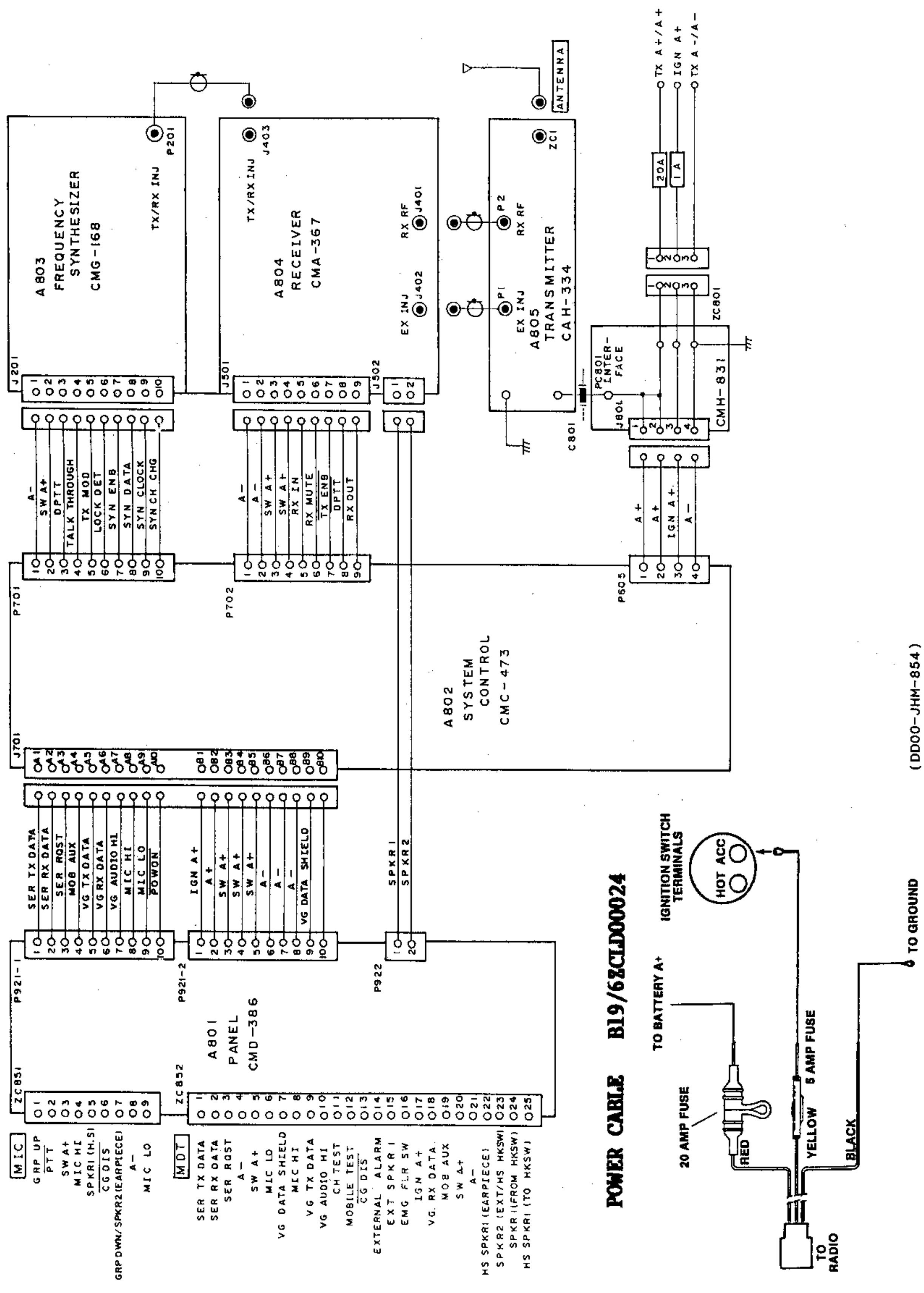
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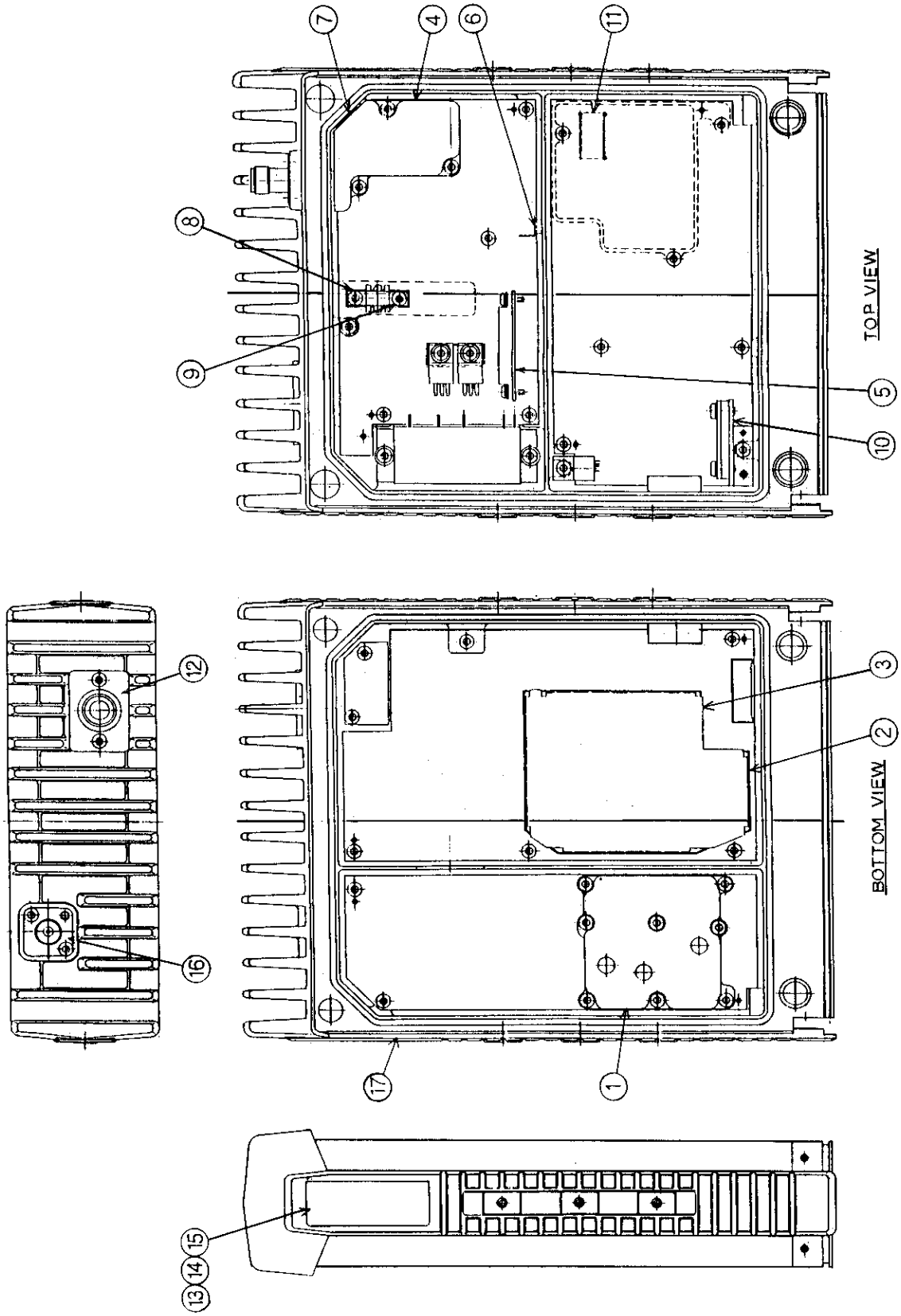
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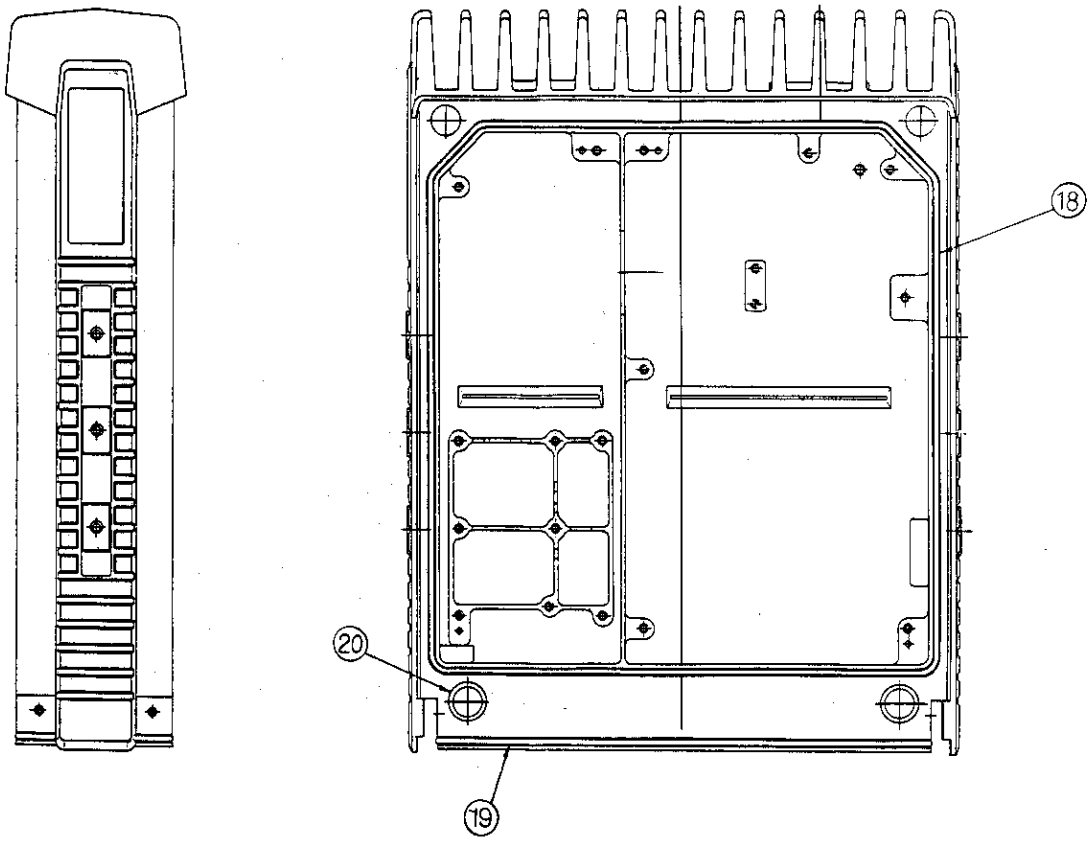
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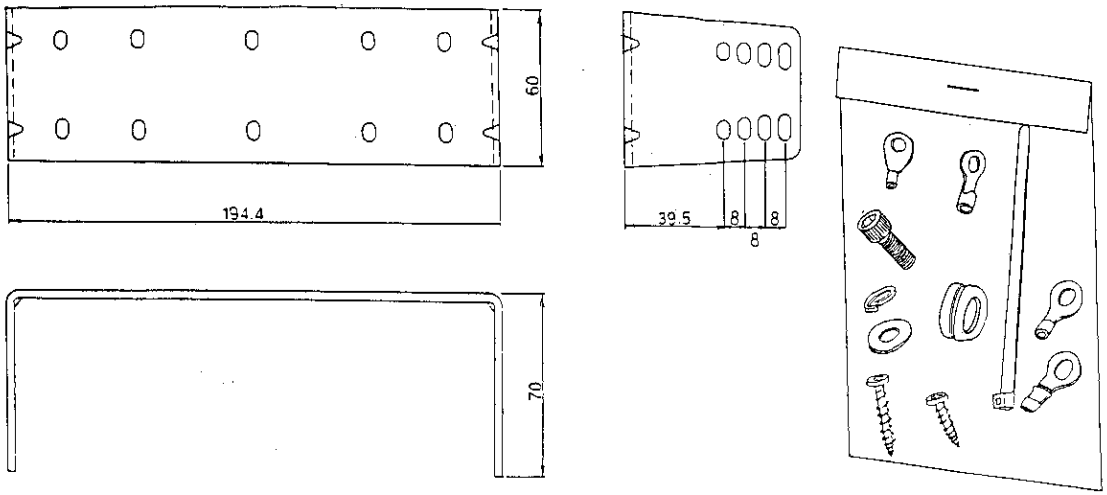
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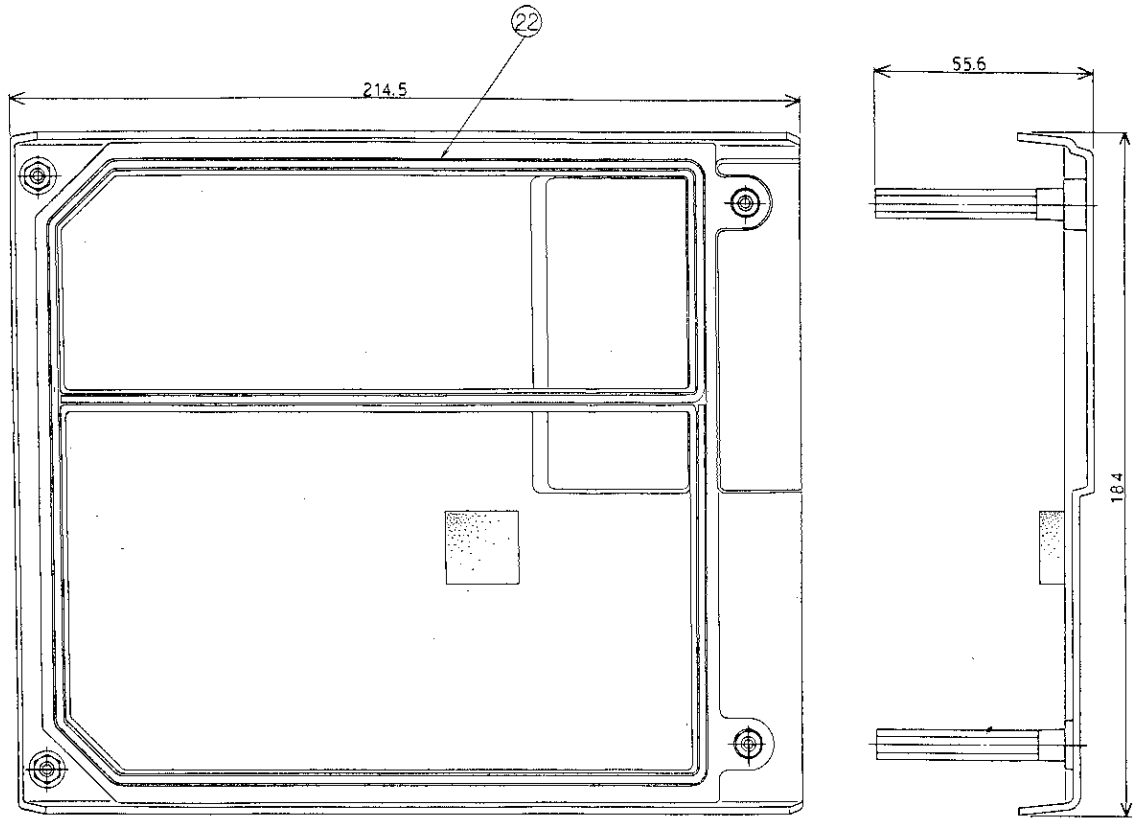
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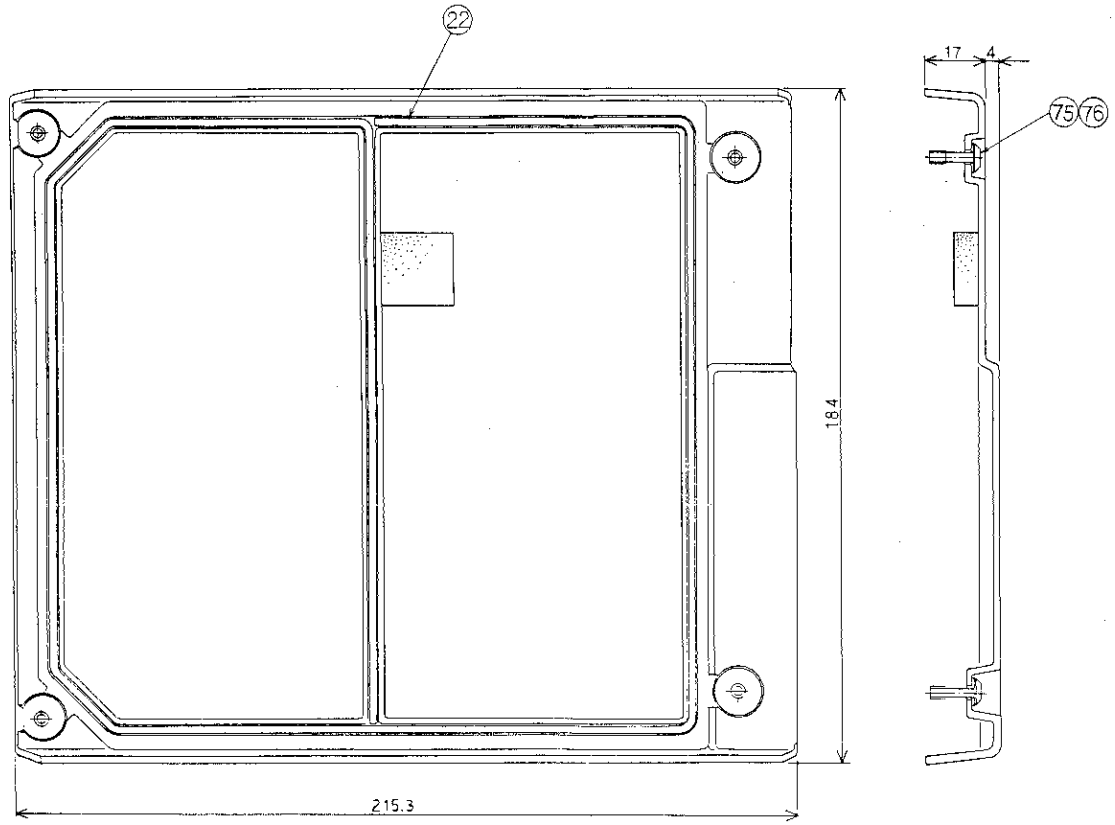
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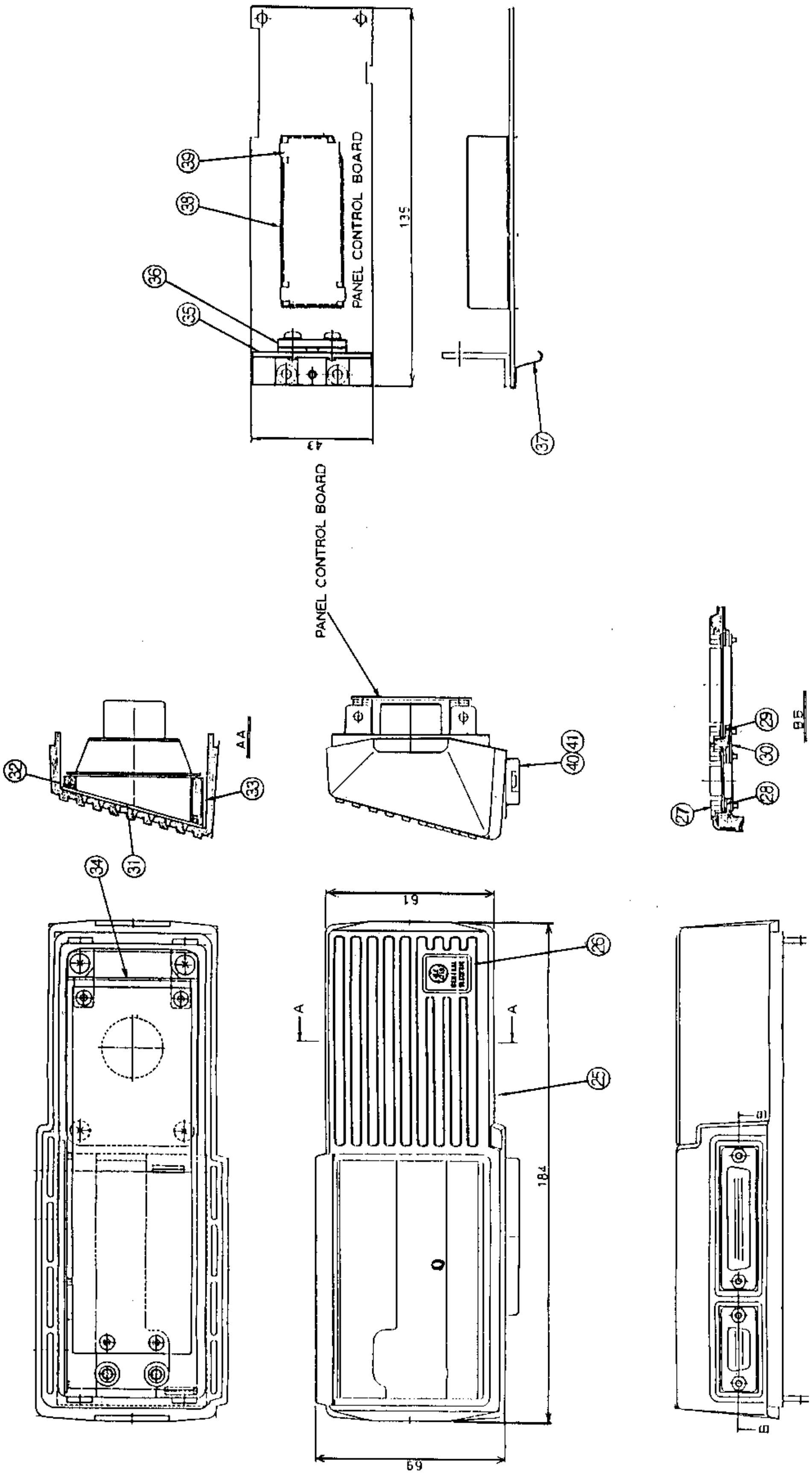
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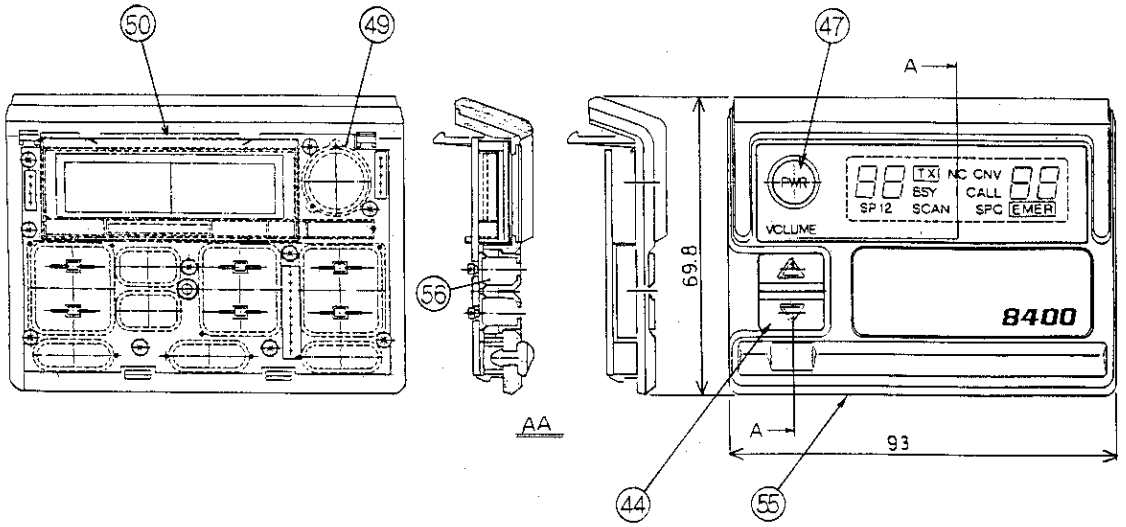
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SP12
SCAN
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EMER
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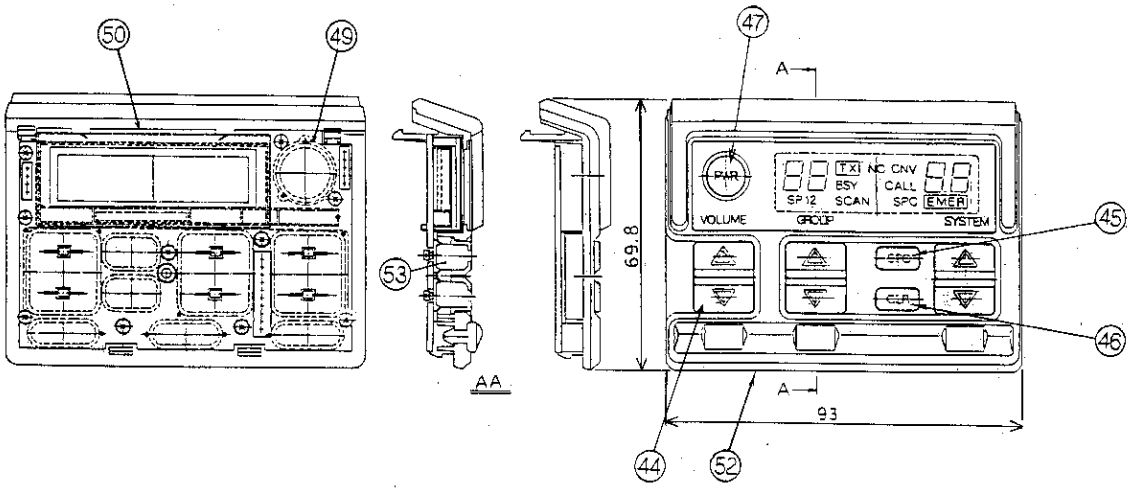
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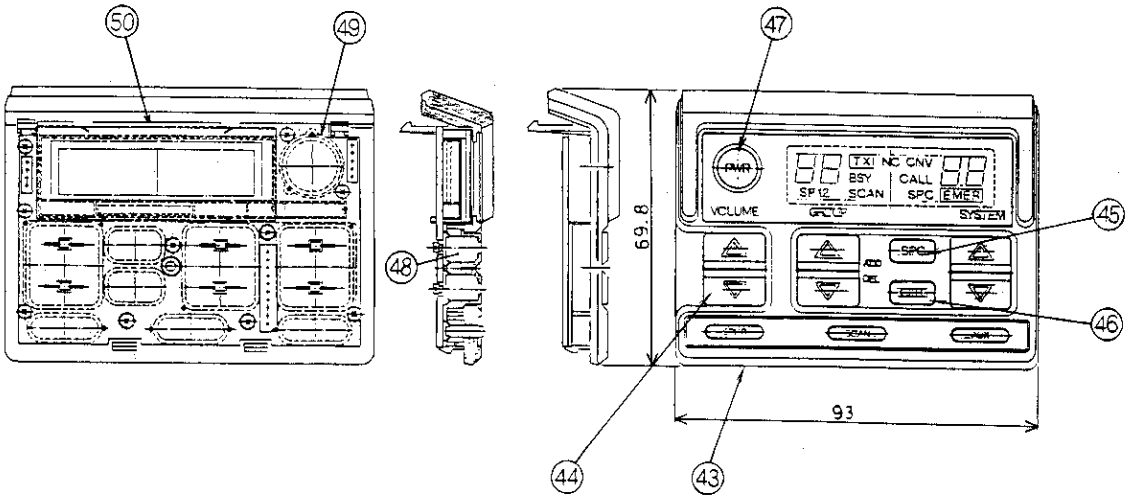
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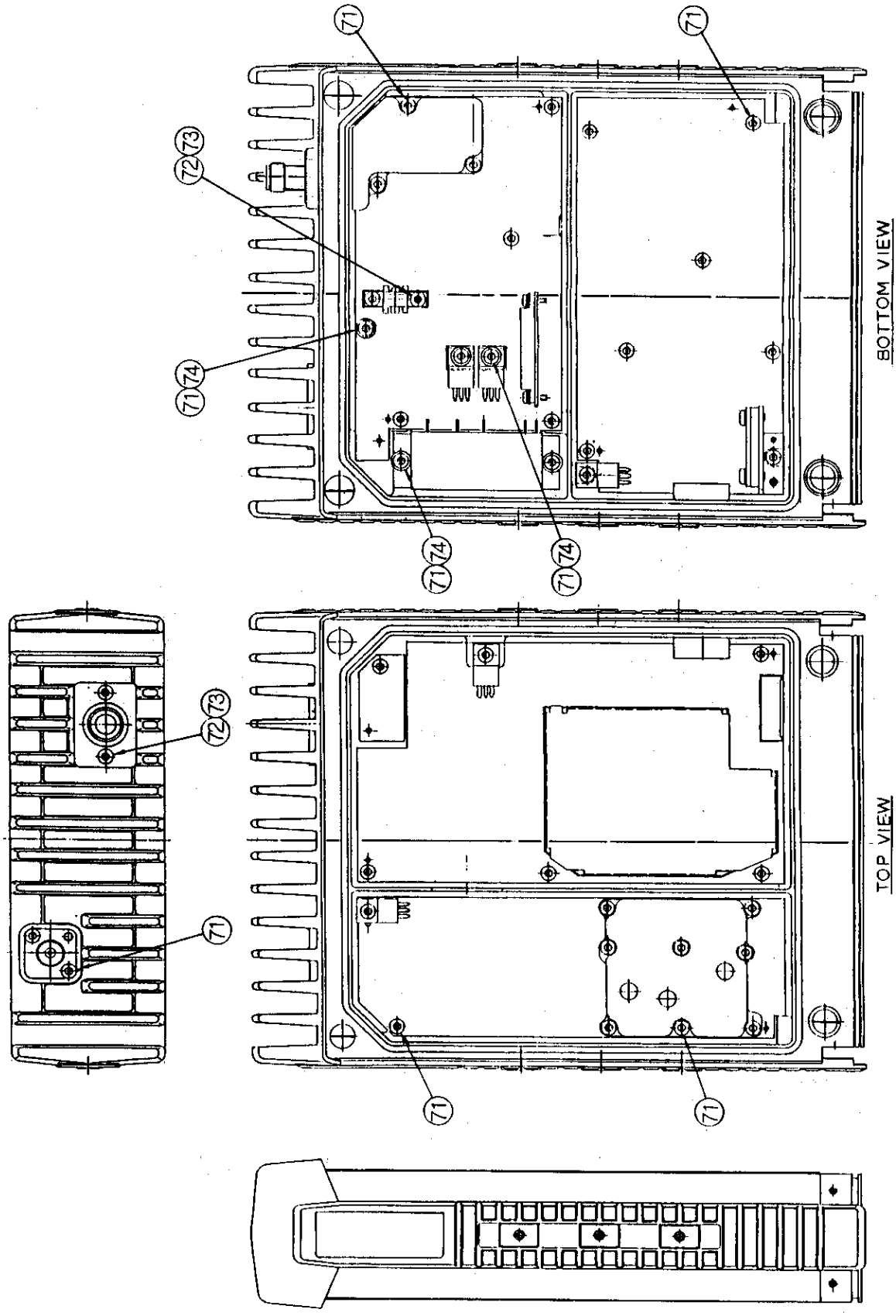
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72 73
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BOTTOM VIEW
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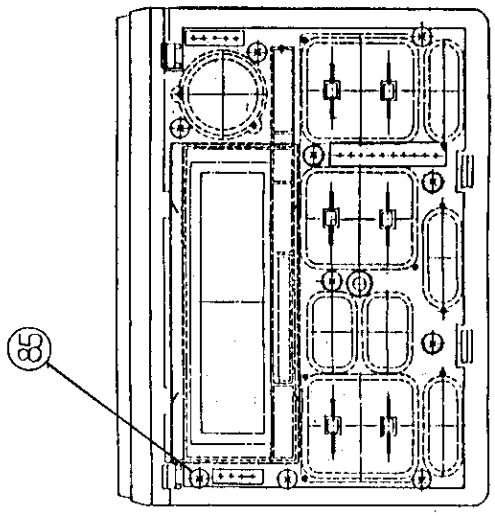
TOP VIEW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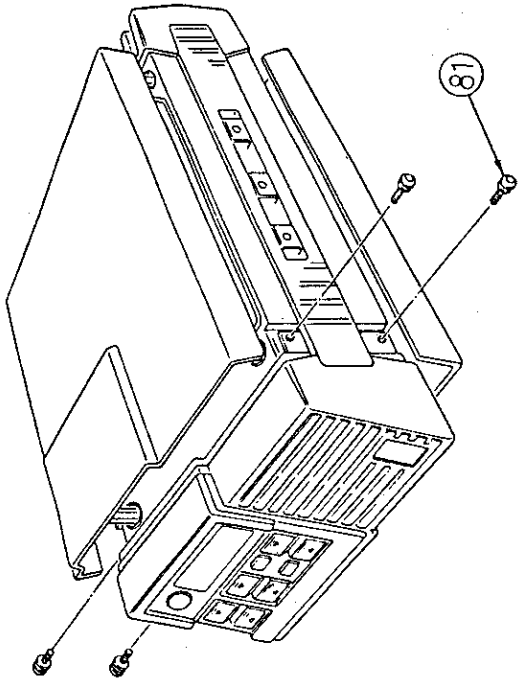
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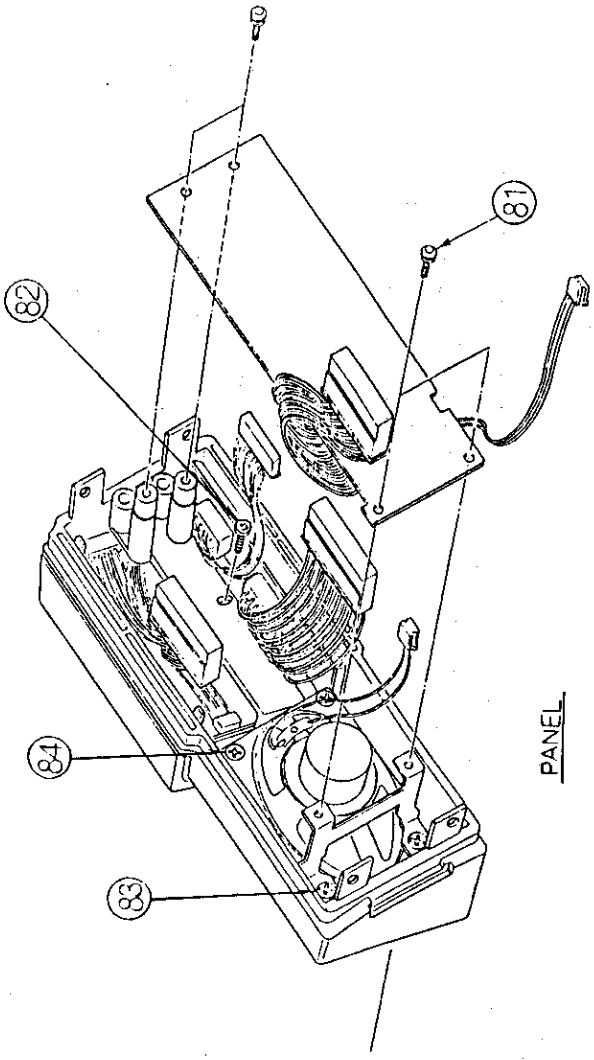
81
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84
83
PANEL

PARTS LIST

FRONT PANEL
MECHANICAL PARTS
ISSUE 1

SYMBOL	GE PART NO.	DESCRIPTION
1	B19/MTC002956	SHIELD CASE
2	B19/MTB169504A	SHIELD CASE
3	B19/MTB169503	SHIELD COVER
4	B19/MTC002963	SHIELD CASE
5	B19/MTB169543	GROUNDING PLATE
6	B19/MTB169508	GROUNDING PLATE
7	B19/MPSR02306	GROUNDING PLATE
8	B19/MTB167570	SPACER
9	B19/MTL035255	SPACER
10	B19/MTB167567A	HEATSINK PLATE
11	B19/MTB169471A	SHIELD PLATE
12	B19/MTC002955	MOUNTING PLATE
13	B19/MPNN21466	NAMEPLATE
14	B19/MPNN19349	OVERLAY
15	B19/MTZ002812	ADHESIVE TAPE
16	B19/MPPK01346	GASKET
17	B19/MPBC08175	FRAME ASM (COMPLETE ASM)
18	B19/MPPK01345B	GASKET
19	B19/MPPK01351A	GASKET
20	B19/MPPK01313A	GASKET
21	B19/MPBC08071	TOP COVER ASM (COMPLETE ASM)
22	B19/MPPK01402	SHIELD GASKET
23	B19/MPBC08072	BOTTOM COVER ASM (COMPLETE ASM)
24	B19/MPBC08061	PANEL UNIT ASM (COMPLETE ASM)
25	B19/MPBC08186	FRONT PANEL
26	B19/MPNL16972	CO. SIGNATURE MEDALLION
27	B19/MTL038553	LOCK SCREW
28	B19/MPPK01341	GASKET
29	B19/MPPK01344	GASKET
30	B19/MTB167581B	MOUNTING PLATE
31	B19/MTZ002839A	WEATHERPROOF GUARD
32	B19/MPPK01340	GASKET
33	B19/MTV003056	MOUNTING BASE FOR SP.
34	B19/MTB165051B	MOUNTING PLATE
35	B19/MTB167633B	HEATSINK PLATE
36	B19/MTB169472	SPACER
37	B19/MTB169509A	GROUNDING PLATE
38	B19/MTB169506	SHIELD CASE
39	B19/MTB169505	SHIELD COVER
40	B19/MTV003702A	CONNECTOR COVER
41	B19/MPPK01391	GASKET
42	B19/MPBC08057	CONTROL PANEL (SCAN) ASM (COMPLETE ASM)
43	B19/MPBC08185	CONTROL PANEL
44	B19/MTV003058	KNOB
45	B19/MTV003059A	KNOB
46	B19/MTV003747	KNOB
47	B19/MTV003060A	KNOB
48	B19/MTV003051D	RUBBER KEYPAD
49	B19/MTV003091A	RUBBER KEYPAD
50	B19/MTB162842	LCD COVER
51	B19/MPBC08056	CONTROL PANEL (SELECT) ASM (COMPLETE ASM)
52	B19/MPBC08184	CONTROL PANEL
53	B19/MTV003750A	RUBBER KEYPAD
54	B19/MPBC08055	CONTROL PANEL (BASIC) ASM (COMPLETE ASM)
55	B19/MPBC08183	CONTROL PANEL
56	B19/MTV003751A	RUBBER KEYPAD
57	B19/MPBX17505	MOUNTING BRACKET
58	B19/MPXP02079	MOUNTING HARDWARE KIT
59	B19/MPXP02081	HARDWARE (SCREW) KIT
60	B19/MPXP02082	HARDWARE (SCREW) KIT (PANEL)
71	B19/BRTG03830	SCREW (QUANTITY 38)
72	B19/BRTG03921	SCREW (QUANTITY 3)
73	B19/BRTG03493	SPRING LOCK WASHER (QUANTITY 3)
74	B19/BSFW03000S	PLAIN WASHER (QUANTITY 5)
75	B19/MPTG02230	SCREW (QUANTITY 4)
76	B19/MPTG02254	THRUST WASHER (QUANTITY 4)
81	B19/BRTG03830	SCREW (QUANTITY 8)
82	B19/BRTG03908	SCREW (QUANTITY 1)
83	B19/BSNA04008S	SCREW (QUANTITY 2)
84	B19/BRTG00294	SCREW (QUANTITY 2)
85	B19/BRTG03898	SCREW (QUANTITY 10)

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES