17 Operator's Manual

Please see the following pages.

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Odyssey 2000

Mobile Radio Instruction Manual

The 800MHz DC/MA® Mobile Radio including Direct Frequency Assignment (DFA) with Digital LTR® Trunking

575-0000-0001

DC/MA® DIGITAL CHANNEL MULTICARRIER ARCHITECTURE

Table of Contents

Introduction

This Manual covers the Odyssey 2000 800MHz Mobile Radio for Digital Channel/Multicarrier Architecture, DCMA®, with Trunking. The unit is a compact two-way radio transceiver featuring digital technology developed by ComSpace™ Corporation, that greatly increases the traffic carrying capabilities of the radio network while at the same time improving the quality of communications. The principle features are:

1) Digital Modulation with DCMA® technology.

2) Digital Trunking (Direct Frequency Assignment) compatible with E.F. Johnson LTR® network protocols.

3) Enhanced voice quality via AMBE+® vocoder.

THANK YOU!

We believe that this "*Technology development for the wireless future*" will be an easy-to-use transceiver that will provide dependable communications to allow peak operating efficiency. We are grateful you chose ComSpace Corporation for your professional mobile radio applications and believe that you will be pleased with the quality and features of our products.

ONE OR MORE OF THE FOLLOWING STATEMENTS MAY BE APPLICABLE:

FCC WARNING

This equipment generates or uses radio frequency energy. Changes or modifications to this equipment may cause harmful interference unless the modifications are expressly approved in the Operator's Manual. The user could lose the authority to operate this equipment if an unauthorized change or modification is made.

INFORMATION TO DIGITAL DEVICE USER REQUIRED BY THE FCC

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This equipment generates, uses and can generate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit breaker different from that to which the receiver is connected.
- Consult the dealer for technical assistance.

NOTICES TO THE USER

- **GOVERNMENT LAW PROHIBITS THE OPERATION OF UNLICENSED RADIO TRANSMITTERS WITHIN THE TERRITORIES UNDER GOVERNMENT CONTROL.**
- **ILLEGAL OPERATION IS PUNISHABLE BY FINE OR IMPRISONMENT OR BOTH.**
- **REFER SERVICE TO QUALIFIED TECHNICIANS ONLY.**

SAFETY:

It is important that the operator is aware of, and understands, hazards common to the operation of any transceiver.

WARNING:

- **EXPLOSIVE ATMOSPHERES (GASES, DUST, FUMES, etc.)** Turn OFF your transceiver while taking on fuel or while parked in gasoline service stations. Do not carry spare fuel containers in the trunk or your vehicle if your transceiver is mounted in the trunk area.
- **INJURY FROM RADIO FREQUENCY TRANSMISSIONS** Do not operate your transceiver when somebody is either touching the antenna or standing within two to three feet of it, to avoid the possibility of radio frequency burns or related physical injury.
- **DYNAMITE BLASTING CAPS** Operating the transceiver within 500 feet of dynamite blasting caps may cause them to explode. Turn OFF your transceiver when in an area where blasting is in progress, or where "TURN OFF TWO-WAY RADIO" signs have been posted. If you are transporting blasting caps in your vehicle, make sure they are carried in a closed metal box with a padded interior. Do not transmit while the caps are being placed into or removed from the container.

ANTENNA AND INSTALLATION CONSIDERATIONS:

- All equipment must be properly installed in accordance with ComSpace installation instructions.
- To assure compliance with United Stated FCC regulations on RF exposure, the user of the equipment must position the antenna in such a way to maintain a separation of at least 8 inches (20 cms) between the antenna and the body of any user and nearby person.
- Ensure that the antenna is properly installed external to the vehicle and in accordance with the requirements of the antenna manufacturer/supplier.
- Use only the supplied or an approved antenna. Unauthorized antennas, modifications, or attachments could impair call quality, damage the equipment, or result in violation of the ICNRP or the FCC.

PRECAUTIONS

Please observe the following precautions to prevent fire, personal injury, and transceiver damage.

- Do not attempt to configure the transceiver while driving; it is dangerous.
- Do not modify the transceiver for any reason.
- Do not expose the transceiver to long periods of direct sunlight, nor place it near heating appliances.
- Do not place the transceiver in excessively dusty, humid or wet areas, or on unstable surfaces.
- If an abnormal odor or smoke is detected coming from the transceiver, turn OFF the power immediately. If the unit does not turn OFF, remove the power source. Contact your ComSpace dealer.

Odyssey® Series Model 2000-800 Specifications

GENERAL

No.	Parameter	Requirement	Comments
1	Frequency Range Receiver: Transmitter:	 851 MHz – 869 MHz 806 MHz – 824 MHz	
2	Channel Spacing	25 kHz	12.5KHz steps
3	Duty Cycle	100% – RX 10% – TX	
4	Input Voltage	13.8V ±10% DC negative ground	
5	Operating Voltage Range	15.2V – 12.4V Operational > 10.8VDC	Degraded operation below 12.4V
6	Current Drain	1.25A Standby 1.50A Receive 3.50A Transmit	At 13.8 VDC. With approximately +10% margin.
7	RF Impedance	50 Ω	Unbalanced
8	Dimensions	171.5mm (6.75”) W x 54.0mm (2.125”) H x 203.2mm (8.0”) D	
9	Weight	3.1 Kg (6.7 lb.)	Mobile 2 Kg (4.42 lb.) Microphone 245 g (0.54 lb.) Bracket 567 g (1.25 lb.) Pwr. Cable (12ft. with fuse) 227 g (0.5 lb.)
10	Conducted Emissions	-81dBm in RX Band -61dBm in TX Band -57dBm elsewhere	
11	FCC ID	TBA	To Be Assigned
12	FCC Compliance	FCC Part 15 & Part 90	Part 15, Class B digital device
13	Normal Test Conditions	Temperature +20°C Relative Humidity 75% Max. Test Voltage 13.8V	
14	Sub-channel Data Rate: Time Slot Data Rate:	16 kbps for single sub-channel 8.0 kpbs for single time slot	An 800 MHz, 25 kHz DC/MA® channel is divided into four sub-channels with channel offsets of ±2400 Hz and ±7200 Hz.
15	Temperature Range	-30°C to +60°C	
16	Shock	TIA/EIA 603, Section 3.3.4	
17	Vibration	TIA/EIA 603, Section 3.3.5	

TRANSMITTER

No.	Parameter	Requirement	Comments
1	Modulation Type	DC/MA®	16QAM (2 level 8 phase) – Digital Channel/Multicarrier Architecture
2	Output Power	4 Watts Pulsed Average (Maximum)	
3	Output Impedance	50 Ω	
3	Harmonic Distortion	-57dBc	Two tone, third order products.
4	Microphone Impedance	3 kΩ	
5	Microphone Input	750 Ω	Parallel of microphone input and microphone impedance is 600 Ω
6	Frequency Stability	Initial = 0.1 PPM Temperature = 2.5 PPM Aging = 1 PPM/yr.	Improved stability when synchronized to the repeater. The repeater clock is stable to ± 0.002 PPM.
7	Channel Frequency spread	18 MHz	
8	Adjacent Channel Power Ratio	60 dBc	
9	Occupied Bandwidth	20 kHz	An 800 MHz, 25 kHz DC/MA® channel is divided into four sub-channels with channel offsets of ±2400 Hz and ±7200 Hz. Each of the individual sub-channels is about 4 kHz.
10	Transmitter Carrier Attack Time	< 0.5 msec	< 2 symbols with each symbol being 0.25 msec

RECEIVER

No.	Parameter	Requirement	Comments
1	Modulation Type	DC/MA®	16QAM (2 level 8 phase)
2	Sensitivity	0.45 µV (-114 dBm)	Based on 6% BER.
3	Input impedance	50 Ω VSWR < 2.5:1	
4	Intermediate Frequency	1st IF 86.85 MHz 2nd IF 450 kHz	
5	Frequency stability	Initial = 0.1 PPM Temperature = 2.5 PPM Aging = 1 PPM/yr.	Improved stability when synchronized to the repeater. The repeater clock is stable to ± 0.002 PPM.
6	Channel frequency spread	18 MHz	
7	Spurious rejection	>70 dB	
8	Adjacent Channel Selectivity	>70 dB	Adjacent-channel FM-signal rejection measured 25 kHz from the receiver carrier.

No.	Parameter	Requirement	Comments
9	Receiver IM Margin	>70 dB	Intermodulation of the receiver. Based on cellular alternate channel definition with F_1 at 50 kHz and F_2 at 100 kHz from test channel.
10	Image rejection	>70 dB	
11	Rated Audio output	0.5 W RMS into 8 Ω (internal) 3.5 W RMS into 8 Ω (external)	At < 5% @ 1kHz THD

UNPACKING and CHECKING EQUIPMENT

Note: The following unpacking instructions are for use by your ComSpace dealer, an authorized ComSpace service facility, or the factory.

Carefully unpack the transceiver. ComSpace recommends that you identify the items listed in the following table before discarding the packing material. If any items are missing or have been damaged during shipment, file a claim with the carrier immediately.

SUPPLIED ACCESSORIES

Item	Part Number	Quantity
Microphone	700-00000-0100	1
Microphone Hanger Hardware Kit	400-00000-0001	1
DC Power cable, Fuses and Fuse Holders	060-00004-0100	1
Mounting Bracket with Hardware Kit	400-00001-0001	1
Accessory Plug	060-00003-0100	1
Instruction Manual	575-00000-0001	1

Microphone with Hardware Kit

DC Power Cable, Fuses and Fuse Holders

Mounting Bracket with Hardware Kit

Accessory Plug

Instruction Manual

PREPARATION

WARNING! ***VARIOUS ELECTRONIC EQUIPMENT IN YOUR VEHICLE MAY MALFUNCTION IF THEY ARE NOT PROPERLY PROTECTED FROM THE RADIO FREQUENCY ENERGY WHICH IS PRESENT WHILE TRANSMITTING. ELECTRONIC FUEL INJECTION, ANTI-SKID BRAKING, AND CRUSE CONTROL SYSTEMS ARE TYPICAL EXAMPLES OF EQUIPMENT THAT MAY MALFUNCTION. IF YOUR VEHICLE CONTAINS SUCH EQUIPMENT, CONSULT THE DEALER FOR THE MAKE OF THE VEHICLE AND ENLIST HIS AID IN DETERMINING IF THEY WILL PERFORM NORMALLY WHILE TRANSMITTING.***

Note: The following preparation instructions are for use by your ComSpaceCorporation dealer, an authorized ComSpace Corporation service facility, or the factory.

TOOLS REQUIRED

Note: *Before installing the transceiver, always check how far the mounting screws will extend below the mounting surface. When drilling mounting holes, be careful not to damage wiring or parts.*

The following tools are required for installation of the transceiver:
¼ inch (6 mm) or larger electric drill
drill bits (sizes listed below)

Description	Purpose
Drill size 9 (0.196”)	Pre-drill 0.196” holes for #12-24 self-threading screws for use with Mounting Bracket
Drill size 9/64”	Pre-drill 0.141” holes for M4x6 self-threading screws for use with Microphone Hanger
Phillips screwdriver or torx driver	Drive the self-threading screws into the plastic or metal
Crimp Tool	Thomas & Betts No. WT-1300; Radio Shack No. 64-409; General Electric – U.S. & Metric Terminal Tool

POWER CABLE CONNECTION

CAUTION: *THE TRANSCEIVER OPERATES IN 12 V NEGATIVE GROUND SYSTEMS ONLY! CHECK THE BATTERY POLARITY AND VOLTAGE OF THE VEHICLE BEFORE INSTALLING THE TRANSCEIVER.*

1. Many vehicles provide a hole that is conveniently located in the firewall to allow for the installation of equipment cables. Check for an existing hole that can be used to pass the power cable from the engine compartment, through the firewall, to the passenger compartment.
2. Run the two power cable leads from the passenger compartment through the firewall and into the engine compartment.

3. Select a location in the two power cable leads for the fuse holder location and cut each wire at that location.
    - Locate the fuse as close to the battery as possible
4. Strip insulation from each end of the two power cable leads that have been cut (approximately 3/8-inch).
5. Insert wire in fuse holder.
6. Crimp terminal through body.
7. Repeat steps 5 and 6 for other half of the holder and for the holder on the second power cable lead.
8. Insert fuses in each holder.
9. Snap housing for the two holders together being cautious to keep the holders for the red lead and the holders for the black lead together.
10. Connect the red lead to the positive (+) battery terminal and the black lead to the negative (-) battery terminal.
11. Recoil and secure the surplus power cable.
    - Be sure to leave enough slack in the cables so that the transceiver can be removed for servicing while keeping the power applied.

INSTALLING THE TRANSCEIVER

WARNING! *FOR PASSENGER SAFETY, THE TRANSCEIVER MUST BE INSTALLED SECURELY. USE THE SUPPLIED MOUNTING BRACKET TO MOUNT THE TRANSCEIVER.*

1. Mark the position of the holes in the dash or other location of the transceiver within the passenger compartment by using the mounting bracket as a template. Drill 0.196 inch holes and attach the mounting bracket using the supplied #12-24 thread cutting screws.
    - For user convenience and safety, be sure to mount the transceiver in a location where the user can easily reach the controls. Also, be sure that there is sufficient clearance to provide cable clearance for both front and rear and side clearance for the installation of the thumbscrews that hold the transceiver in the mounting bracket.
2. Insert the Accessory Plug into the Accessory Connector.
3. With an antenna mounted in compliance with the warning provided in this manual, connect the antenna and the supplied power cable to the transceiver rear.
4. Slide the transceiver into the mounting bracket and secure it using the four thumbscrews.
5. Using the supplied M4x6 screws, mount the microphone hanger in a location where it will easily be in reach of the user.

- It is important that the microphone and microphone cable not be mounted such that they interfere with the safe operation of the vehicle.
- Use the microphone hanger bracket as a template to mark and drill the 0.141 inch holes.

6. Connect the microphone to the jack on the front of the transceiver. The connector is an RJ-45 type and is keyed to allow connection in only one direction. Place the microphone on the hang up clip.

Antenna Mounting

Large, flat conductive surfaces provide the best mounting location for the antenna. In almost all vehicles, the requirement for a large, flat surface are best satisfied by mounting the antenna at the center of the roof. In the case where the vehicle has a large trunk lid, the lid provides a good antenna location. If the trunk lid is used, grounding straps should be connected between the trunk lid and the vehicle chassis to improve grounding of the lid and ensure it is at chassis ground.

Types of antennas which can be used include:

1. Magnetic Mount Antennas
2. Mobile Window Mounted Antennas
3. Mobile Roof Mount Antennas

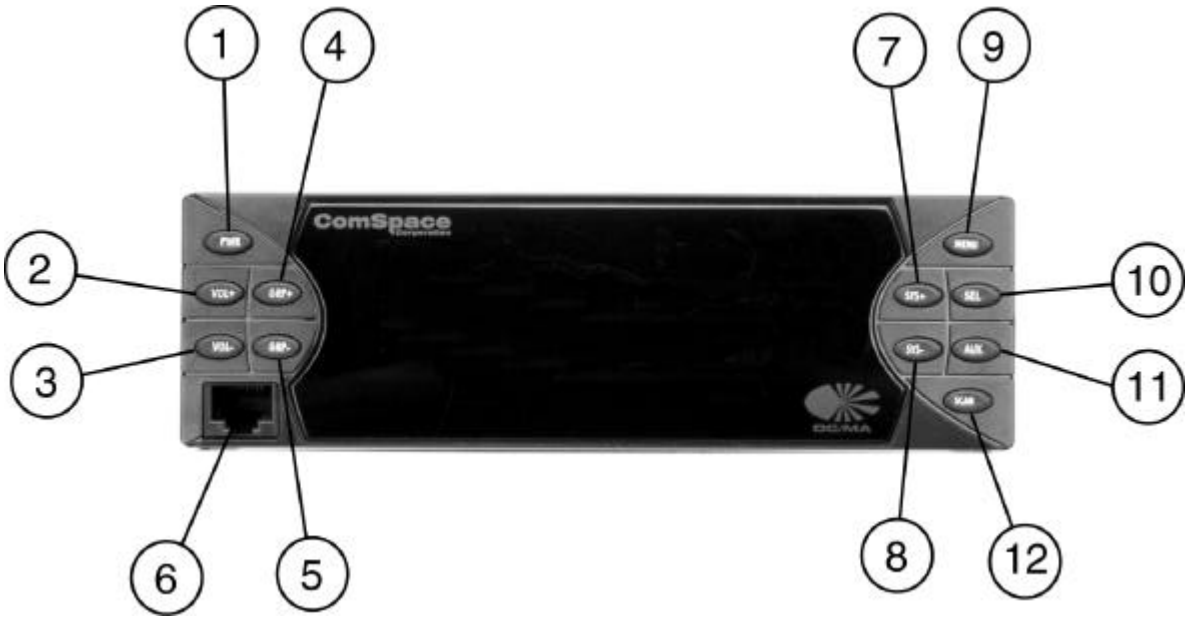
Suggested antennas for mobile are listed in the following table:

Manufacturer	Model	Gain	Application
Maxrad, Inc.	MAX8055	5 dB	Rooftop, Mag, Trunk Lip
Larsen Electronics	KG825UD	3 dB	Glass Mount
Antenna Specialists	ASPR1980	3 dB	Rooftop, Mag, Trunk Lip

Antennas with gains of less than or equal to 5 dB comply with the FCC RF exposure regulations and are allowed for use with this product.

CONTROLS AND CONNECTIONS
FRONT PANEL

All front panel keys are momentary push buttons and are backlit for nighttime viewing.



Push Button Functions

	Function	Description
1	Pwr: power on/off	Momentarily pressed for power on and held for more than 1 second for power off. At power off, the unit will delay 5 seconds before shutdown is complete.
2	Vol+: Volume Up	Pressed to increase volume. Held down to continuously increase volume up to the maximum level. Tone volume varies with volume.
3	Vol-: Volume Down	Pressed to decrease volume. Held down to continuously decrease volume down to a mute condition. Tone volume varies with volume.
4	Grp+: Group Up	Pressed to scroll up in the group list within currently selected system. Held down to scroll cyclically through the groups.
5	Grp-: Group Down	Pressed to scroll down in the group list within currently selected system. Held down to scroll cyclically through the groups.
6	Microphone connector	RJ-45 microphone connector.
7	Sys+: System Up	Press the SYS+ button to display current system. A second press within one second or continuous depression will display a next to the system number and increment up through the list of systems. Additional key presses or continuous depression will result in scrolling up through the systems.
8	Sys-: System Down	Press the SYS- button to display current system. A second press within one second or continuous depression will display a next to the system number and decrement down through the list of systems. Additional key presses or continuous depression will result in scrolling down through systems.
9	Menu	Used with the select key to allow the user to scroll through to a function and change its value.
10	Sel: Select	Used with menu key to enable and/or disable the functions selected.
11	Aux: Auxiliary	Software programmable key.
12	Scan: System/Group Scan	Enables/disables System and Group Scan. Pressed once to display “Grp-Scan” message and scan the groups. Pressed twice to display “Sys-Scan” message and scan the systems.

Microphone

The microphone connector is a multi-purpose connector that allows for voice and data.

RJ-45 Microphone Connector Pin-Out

Pin	Function	Description
2	Microphone	Microphone input required for voice. This input is biased to +VDC with respect to ground.
7	Ground	Ground reference for external accessories
5	TxD – Transmit Data	Transmit data utilizing XON/XOFF software handshaking
6	RxD – Receiver Data	Receive data utilizing XON/XOFF software handshaking
3	PTT	Push-To-Talk
4	On/Off Hook	Trigger to detect whether the microphone is on/off hook
8	Second Audio Output	Future use for external handset
1	+5v	5 volt supply (250 ma maximum current)

DISPLAY

The alphanumeric display will provide all visual indicators.

REAR PANEL CONNECTORS

1 Power Input Connector
2 Accessory Connector
3 Antenna Connector

Power Input Connector Pin-Out

Pin	Function
1	+12 V
2	Ground

ACCESSOry Connector Pin-Out

The connector plug is a MOLEX 03-06-2152. It is a 15-pin connector with several unassigned pins which are reserved for future use.

Pin	Function
13	Speaker – P1 (internal)
7	Speaker – N1 (internal)
14	Speaker – P (external)
8	Speaker – N (external)
11	Ground
4	Horn Honk
5	Ignition (See note)
10	External Speaker Select
1,2,3,6, 9,12,15	Reserved for future use.

Note: All speaker leads (both internal and external) are biased with respect to vehicle ground and should be not be in contact with vehicle ground.

Note: In the event the vehicle is powered off, the unit detects this condition via the ignition sense line. A programmable timer establishes when the unit will power off after detecting that the vehicle has been powered off. This timer is programmable between 1 minute and 16 hours. If the unit is in Horn-Honk mode, the mobile will continue with normal operation.

18 BASIC OPERATIONS

Operating Features

The Odyssey 2000 Mobile Unit is the first in a new generation of high performance, digital transceivers for the Specialized Mobile Radio ("SMR") and Private Mobile Radio ("PMR") marketplace.

Transceiver Features

- Up to 32 Systems (programmable).
- Up to 250 Groups per system (programmable).
- Up to 512 Groups total (programmable).
- 2 line by 20 characters Alphanumeric display.
- Indication of various operational conditions via the alphanumeric display (volume, PTT, etc.).

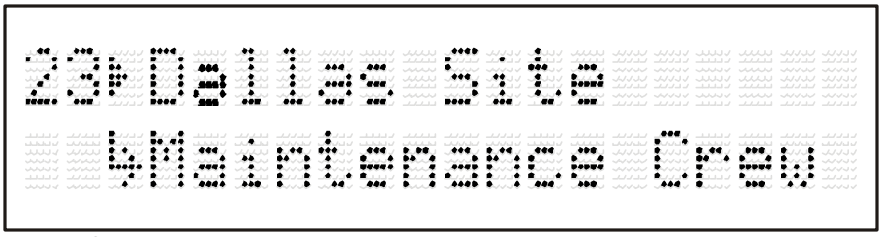
Trunked System Features

- One Home channel programmable per Group: in DC/MA®, a specific frequency, sub-channel, and slot identify a Home Channel (HC). The maximum number of HC's allowed per trunking system is 20. Therefore, LTR assigns 5 bits to this field for Over-The-Air (OTA) protocol.
- One ID code programmable per Group: The maximum number of ID's as per LTR definition is 250. Therefore, there are 8 bits identifying the ID code OTA.
- Programmable Group and System Scan.
- Programmable transmit inhibit.
- Programmable transponder for each Group.

System Key

Up to 32 systems can be programmed within the unit. Each system can be represented by up to 17 alphanumeric characters and will also be identified with a number from 1 through 32.

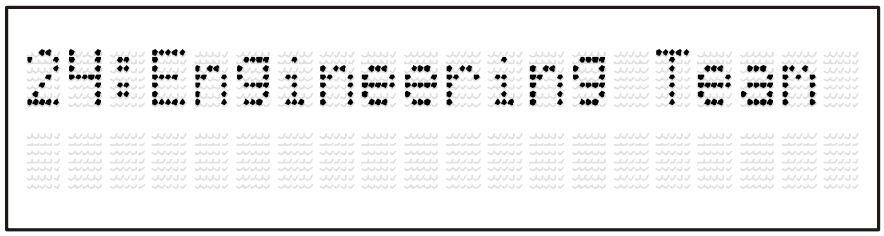
~~4.2.2.2.~~Example System Information Display:

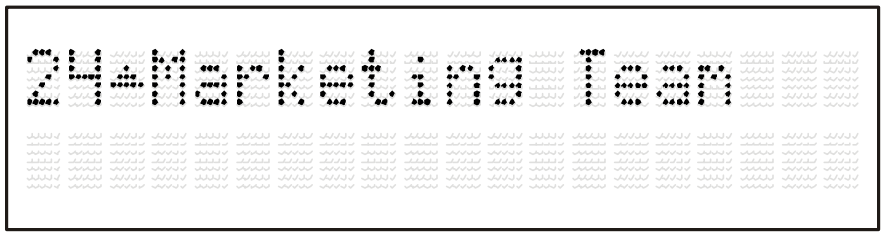


~~4.2.3.~~Group Soft key

Up to 512 groups can be programmed in the mobile unit. Out of the 512 groups, up to 250 groups can be programmed per system. Each group can be represented by up to 17 alphanumeric characters. The group name will follow the system number on the top display line.

Group Information Display (Pressing the key twice)





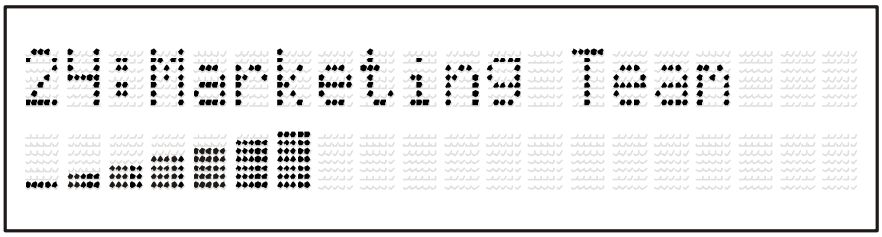
~~4.2.4.~~Volume Soft key

The two volume soft keys control the volume levels. There are a total of 28 volume steps in the volume table.

~~4.2.4.1.~~Volume Specifications

There are 28 settings for the speaker volume. Step 1 is mute. Steps 2 through 28 provide approximately an approximate 2 dB per step. The volume is displayed using rows of the 5 x 7 character display matrix. Each of the seven rows of the display character matrix represents 4 levels of the total range.

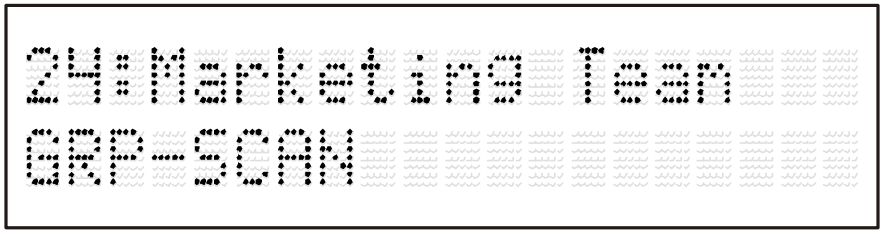
~~4.2.4.3.~~Example Volume Level Display (shown at full volume)



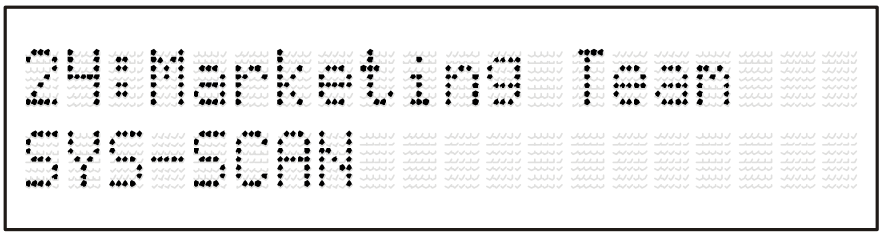
~~4.2.5.~~Scan Soft key

The Scan soft key has two purposes. It enables and disables both System and Group Scan.

Example Group Scan



Example System Scan:



~~4.2.6.~~Menu and Select Soft Key

The menu and select keys are to be utilized together. The menu soft key allows the user to scroll through to the function that needs to be enabled and/or disabled. Each menu selection can be represented by up to 17 alphanumeric characters. The select key is used to enable and/or disable the functions previously selected with the use of the menu key.

When scrolling through the menu selection, the options are listed on the status line as well as the status of the function.

Menu Selections:

Display Intensity	There are four levels of intensity with the VFD display, 25 percent, 50 percent, 75 percent, and 100 percent. Using the menu soft key, scroll to the **"Display XX%"** menu location.

Horn-honk	Toggle the Horn-Honk feature ON and OFF. (Enabled by option)
Group Display	Toggles group display between a pre-programmed label and a group number.
Home Group	Automatically takes the user back to home group within the currently selected system.
FCC ID	Display FCC ID

Tone Information:

~~4.6.1.~~Alert Tone Definitions

All of the tones follow the LTR convention as described by E.F. Johnson.

~~4.6.2.~~Generic Tones

General tones are tones that are generated for more than one function. The following is a list of tones that fall into the generic class.

Tone	Description
Key Touch Tone	700 Hz, 40 msec tone - indicates when a soft key is pressed
Wrap Around Tone	700 Hz, 80 msec tone followed by an 800 Hz, 80 msec tone – indicates that the highest or lowest programmed system or group was displayed and that wrap-around has occurred
Error Tone	1050 Hz, 80 msec tone followed by a 700 Hz, 80 msec tone – indicates an error condition occurred. For example: HORN HONK NOT ALLOWED, PROGRAMMING ERROR, etc.

Specific Tones:

Specific tones are tones that have one function only. Their function is not described in this section. Only how the tone is generated is described in this section.

Tone	Description
POWER ON/OFF	1400 Hz, 200 msec tone – indicates that power to the unit is ON and that it is safe to release the power button
SYSTEM BUSY	Tone similar to the standard telephone busy tone – indicates that the LTR radio system is currently busy. Note: Produced by turning combined 480 and 620 Hz tones on and off at a 5 Hz rate.
CALL GRANTED	tone composed of two short 700 Hz, 20 msec tones, separated by a short 900 Hz, 20 msec tone – sounds after the call has been granted upon pressing PTT to indicate when talking can begin
CHANNEL AVAILABLE	Composed of three short 1000 Hz, 20 msec tones, separated by two short 1200 Hz, 20 msec tones – sounds after the radio has been waiting in queue for an available channel
Intercept	Siren-like tones consisting of 700 Hz and 800 Hz tones alternating at approximately at 2 Hz rate – indicates error conditions like: OUT OF RANGE, TRANSMIT INHIBIT, RECEIVE ONLY CHANNEL, TRANSMIT WHILE RECEIVING, and TIME-OUT TIMER.
AUX FUNCTION ACTIVE	a short (900 Hz, 40 msec) tone that sounds to indicate that the Aux function key is now activated/deactivated.
TIME OUT TIMER WARNING	a short high beep 1400 Hz, 20 msec tone to indicate that the Time-Out timer is about to go off
INCOMING CALL	This is composed of two short 1400 Hz, 40 msec tones, separated by one short 1000 Hz, 40 msec tones which sounds a call is received.
VOLUME SET	900 Hz.tone to indicate the volume setting level.
ENTERED PROGRAMMING MODE	a 1000 Hz, 40 msec tone, followed by a 1200 Hz, 40 msec tone, followed by a 800 Hz, 40 msec tone, repeated twice back to back

19 TRUNKED OPERATION

Placing a Dispatch Call

1 Select the desired system and group using the System and Group keys.

2 Press the PTT Switch

3 If a tone does not sound, communication is possible; start speaking into the microphone. Release the PTT switch to receive.

- For best sound quality at the receiving station, hold the microphone approximately 1.5 inches (3 ~ 4 cm) from your mouth and talk across the microphone not directly into it.

4 When your conversation is finished, return the microphone to the hang up clip.

Receiving a Dispatch Call

1 Select the desired system and group using the System and Group keys. (If the Scan function has been programmed, it can be switched ON or OFF as desired.)

2 When the dispatcher's voice is heard, readjust the volume as necessary.

20 Conventional Operation

Transmitting

Note: Before transmitting, monitor the channel to make sure it is not already in use.

1 Select the desired system and group using the System and Group keys.

- If the channel is busy, wait until it becomes free.

2 Press the PTT switch and speak into the microphone. Release the PTT switch to receive.

- For best sound quality at the receiving station, hold the microphone approximately 1.5 inches (3 ~ 4 cm) from your mouth and talk across the microphone not directly into it.

3 When the conversation is finished, return the microphone to the hang up clip.

Receiving

1 Select the desired system and group using the System and Group keys.

2 When you hear the dispatcher's voice, readjust the volume as necessary.