

Mobile Communications

# **DESK TOP STATION**





Ericsson GE Mobile Communications Inc. Mountain View Road • Lynchburg, Virginia 24502

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# **Maintenance Manual**

Printed in U.S.A.

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# **SYSTEM SPECIFICATIONS \***

# PACKAGE NUMBERS

FREQUENCY RANGE	Refer to the applicable <b>MVS</b> , <b>TMX</b> or <b>MTD</b> Mobile Radio	Package Number	Includes	<b>Description</b>
INPUT VOLTAGE	90-130 Vac @ 50-60 Hz 180-260 Vac @ 50-60 Hz (Standby Battery 13 & Vdc nominal)	DSTA01		120 VAC Desk Top station v radio and appropriate micro modify power supply by cha
A C INDUT DOWED	500 Wette @ 4 empered (maximum)		DSML1F0	Desk Top Station package c
Transmit	300 Watts @ 2.4 amperes (maximum) 70 Watts @ 1.8 amperes (maximum)		DSPS3L	120/240 VAC, 50\60 Hz Pov
	70 watts @ 1.8 amperes (maximum)		DSCP3G	Standard Control Panel Opt
POWER OUTPUT RATINGS	Maintenance Manual	DSTA02		Same as DSTA01 with CY1
DUTY CYCLE (EIA)	Receiver 100%, Transmitter 20%		DSML1F0	Desk Top Station Package C
TEMPERATURE RANGE	-30°C to + 60°C (-22°F to + 140°F) (Performance specified per EIA)		DSPS3L	120/240 VAC, 50/60 Hz Pov
	LIA)		DSCP3H	Remote Control Front Panel
STEARER	4 onnis		DSCY1K	Remote Board Interface Kit
DIMENSIONS (HAWAD)	14x50x45  cm (5.5x20x17  m.)	DSTA03		Same as DSTA01 with Key
	20 kg (44 lb.)		DSML1F0	Desk Top Station Package C
* For detailed transmitter and receiver specifications, refer to	o the appropriate mobile Maintenance Manual.		DSPS3L	120/240 VAC, 50/60 Hz Pov
			DSCP3J	Standard Front Control Pane
			KE1F	Keypad/Freq Select Bd Kit
		DSTA04		Same as DSTA01 with keyp
			DSML1F0	Desk Top Station Package C
			DSPS3L	120/240 VAC, 50/60 Hz Pov
			DSCP3K	Remote Control Front Panel
			DSCY1K	Remote Board Interface Kit
			KE1E	Keypad/Freq Select Bd Kit
		DSTA05		Same as DSTA02 with CY1
			DSML1F0	Desk Top Station Package C
			DSPS3L	Same as above
			DSCP3H	Same as above
			DSCY1K	Same as above

with standard control panel. Order MVS style ophone (mobile or desk top) separately. Field anging straps for 240 VAC.

- combination
- ower Supply
- tion
- 1F DC Remote
- Combination
- ower Supply

- pad on Standard front panel.
- Combination
- ower Supply
- el with Keypad
- (Keypad only)
- pad and Remote Control Front Panel
- Combination
- ower Supply
- l with Keypad
- (keypad and CY1J Tone Remote)
- 1G Tone Remote
- Combination

# **OPTIONS**

Option <u>Number</u>	Description
DSCY1F	1-Frequency DC Remote Board (Field Install)
DSCY1G	1-Frequency Tone Remote Board (Field Install)
DSCY1J	5-Frequency PST Tone Remote Board (Field Install)
DSCY1K	Remote Interface Board Kit (Standard On DSTA02 And DSTA04 And DSTA05)
DSCP3G	Standard Control Panel (Standard On DSTA01)
DSCP3H	Remote Control Panel With Intercom (Standard On DSTA02 And DSTA05)
DSCP3J	Standard Control Panel With Keypad (Standard On DSTA03)
DSCP3K	Remote Control Panel With Keypad (Standard on DSTA04)

# **DESCRIPTION**

Ericsson GE's MVS, TMX or MTD Desk Top Station is an all solid state station for local/remote control operation. The most advanced manufacturing techniques are used to provide the highest quality and reliability.

The station is available in all frequency bands and power levels available in the MVS, TMX or MTD Mobile Radio Units as follows:

- MVS Conventional Radio in all frequency bands
- MTD 900 MHz Trunked Radio (GE-NET)
- MTD 800 MHz Trunked Radio (EDACS)

# MECHANICAL PACKAGE

The station is housed in an attractively styled Desk Top cabinet and operates over a wide range of AC power sources. The basic station consists of a Control Panel, a 13-ampere power supply and an MVS, TMX or MTD mobile radio unit. The Desk Top Station operates from 120 or 240 VAC sources @ 50/60 Hz. Input power variations of  $\pm 20\%$  are tolerated (see Figures 1 and 2). The basic Desk Top Station package combination is equipped with:

- AC Power Supply (120/240 Volt, 50/60 Hz)
  - Interconnect Board
  - DC/Tone Remote Control Panel with Intercom Control
  - Optional DC/Tone Remote Interface Board combination, with 1 of 4 types of Remote Board:
  - 1. DC Remote Board (19A704686P3)
  - 2. Tone Remote Board, 1 Channel (19A704686P4)
  - 3. EDACS Tone Remote Board, 5-Channel (19A704686P8)



- Speaker, 3.5 inches for improved radio audio quality
- Slow speed, low noise, 12 Vdc fan

- TMX-8825 Radio

NOTE

The "DSCP" options come standard with the Desktop Station Package. Order only to switch control panels in the field.

DSCD1A Standby Power Transfer Kit (Field Install)

DSZM1K External Weatherproof Speaker And Cord Set (Delta Style)

# **APPLICABLE MAINTENANCE MANUALS**

Installation Instruction	LBI-38633
Operator's Manual	LBI-38634
DC Remote Board (Option DSCY1F)	LBI-31594
Tone Remote Board (Options DSCY1G)	LBI-31552
Tone Remote Board (Option DSCY1J)	LBF38119

# LBI-38635

The transmitter power output of the Desk Top Station is the same as the selected mobile radio. The station meets all applicable radio EIA standards.

#### **Interconnect Board**

The Interconnect Board interconnects the radio in the Desk Top Station with the controls and options. When the radio and options are connected, the following functions are controllable:

- Receiver Muting (Rx Mute)
- Audio Switching
- Local and Remote Keying
- Channel Guard Monitor
- Volume Adjustment
- Frequency Selection
- Intercom
- Remote **ON/OFF** Control
- Voltage Regulator and Power Supply choice

The Interconnect Board is provided with jacks for connecting to:

- Radio
- Control Panel
- Power Supply, or Standby Power Transfer Option
- DC/Tone Remote Interface Board (Option)
- Keypad/Frequency Select Board (Option)
- Station Speaker
- Station Fan
- Desk Microphone

A single transistor (Q201) is used to reduce the 13.8 Vdc power supply voltage to a suitable voltage to power the station fan. Q201 is turned on and off by the temperature control circuit consisting of thermistor R212 and Q202 and Q203. The only other circuitry on the Interconnect Board consists of jack interconnections.



Figure 1 - Interconnect Board Without Remote Interface Board Audio Connections

#### **DC/Tone Remote Interface Board (Optional)**

The optional Remote Interface Board is used to interface the radio with other remote boards as follows:

- DC Remote Board 19A704686P3
- Tone Remote Board 19A704686P4 (1-Channel)
- EDACS Tone Remote Board 19A704686P8 (5-Channel)

The DC or Tone remote boards allow use of the Ericsson GE RCN-1000 Remote Control Consoles with the Desk Top Station. There is a choice of 2-wire or 4-wire interface to the consoles for transmit, receive and intercom audio.

The intercom allows communication between the Desk Top Station and the Remote Control Consoles without keying the transmitter. All intercom or transmit conversations from the Remote Consoles are heard on the station speaker. The Remote Consoles can be set to also hear all intercom and radio transmit conversations from the Desk Top Station. Intercom messages from the Remote Consoles are muted when the station is receiving radio messages or is being used as a radio transmitter. Transmitting from the Desk Top Station overrides a radio transmission from the Remote Consoles.

#### **Desk Top Station Audio Switching**

The audio connections made with the Interconnect Board, with no Remote Interface Board, are shown in Figure 1. The processed audio output of the radio comes from the power amplifier and is connected to the station speaker through the **SW SPKR HI** and **SW STATION SPKR HI** lines. The Desk microphone is connected to the radio microphone input through the **SW DESK MIC HI** and **MIC HI** lines.

Figure 2 shows the audio paths when using the Remote Interface Board.

All of the Station audio paths are controlled by bilateral switches with exception of two FET switches in the **VOL SQ HI** to **RX AUDIO** connection. When the control input is low, the switch is turned off. When the control input goes high the switch is turned on to input audio to the selected circuit. The function of each audio switch is described, showing the operation of the system with a Remote Interface Board:



Figure 2 - Interconnect Board With Remote Interface Board Audio Switching

- <u>**U304-1**</u> Normally muted, passes audio from the Desk Top microphone and Intercom Mic Level potentiometer to the Remote Console speaker. Passes audio when:
  - 1) Desk Mic PTT AND Remote Sw ON

#### <u>OR</u>

- 2) Intercom Sw ON AND Dcsk Mic PTT AND (Remote Sw **OFF OR** Rx Muted)
- <u>U304-2</u> Connects the audio from the Desk Top microphone to the MIC HI input to the radio transmitter. Passes audio when:

Desk Mic PTT AND Intercom Sw OFF

**U304-3** Normally muted, connects the audio from the Remote Console microphone line to the MIC HI input to the radio. Passes audio when:

Remote PTT AND no Desk Mic PTT

<u>U304-4</u> Normally unmuted, connects the audio from the Remote Console microphone line, through the VOLUME potentiometer on the Desk Top Control Panel, to the Station speaker. Mutes audio when:

#### Rx active OR

Desk Mic to Remote Speaker audio line active

An FET switch, which for an MVS radio, passes 0301 the non-processed audio from the radio VOL SQ **HI** through the audio processing in the Desk Top Station and to the Remote Board. For the **MVS** radio the plugs P303 and P304 must be set for a 1-2 connection. The conditions for transmission are:

Rx Active AND Remote Sw ON

**O302** An FET switch, which for an MTD or a TMX radio, passes processed audio from the radio audio PA through the **SW SPKR HI** line to the Remote Board with line to Remote Console Speaker. For this condition the plugs P303 and P304 must be set for a 2-3 connection. The conditions for transmission are:

Rx Active AND Remote Sw ON

The pre-emphasis circuit following Q302 on the Interface Board is for canceling a de-emphasis circuit in the audio circuit of the Remote Board.

#### **Keypad/Frequency Select (Optional)**

The Keypad/Frequency Select Board interfaces a 12 key keypad (344A3366P1) to serial data lines used for communication with the radio. Also, the board handles the protocol to use the 5 frequency select lines from the EDACS Tone Remote Board (19A704686P8) and converts these lines to serial data to the radio.

Four connectors provide all the external connections. The board plugs into the Desk Top Station Interconnect Board (EGE drawing 19D902928) on P207 and P208 and is held on by these connectors. No mounting screws are needed. A cable from the keypad plugs into J401 and a cable from the Tone Remote Board plugs into J402.

#### PC Programing Notes For Desktop Station Operation

- 1) From the "Radio Personality" screen, enter the "Mobile Radio Options" screen (F7). Program the "Hookswitch to "NORMAL. This will allow the station to disable group scan when the MONITOR button is engaged on the desk microphone. Program the "Minimum Volume" to 9.
- From the "Mobile Radio Options" screen, enter the 2) "Desk Top Options" screen (F6). Program the desired system and group combinations. Note that exact system/group/special call definitions are not required. For instance, if the system field is left blank and only group selections are programmed, the radio will select the defined group on the currently selected system when the remote selects a function. Select "Fixed Volume" = "Yes" to disable the radio volume ramp control so that only the rotary volume control will set the volume.
- Individual call ID range limits for the keypad are de-3) fined in the special call set. From the "Radio Personality" screen, "Detail" (F1) the special call set and then select "Option" (F7) to define the allowed ID range.



Figure 3 - Base Station Controls And Indicators

# **OPERATION**

#### **INTRODUCTION**

The front panel of the Ericsson GE Desk Top Station, as shown in Figure 1, includes the front of an MVS conventional radio or a TMX or MTD trunking radio, as well as a Control Panel. The Station is assembled as a standard Station with or without one of the combinations of options. The control panel is illustrated for each combination:

• Standard Desk Top Station, Without Options - The standard Station has only a single RED LED to indicate when the power supply is **ON** (see Figure 4).



Figure 4 - Control Panel With Single LED Power Indicator

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LBI-38635
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The power supply **ON/OFF** switch is mounted on the rear of the Station housing.

• Standard Station with Remote Option - In addition to the LED **POWER** indicator, there is a **REMOTE ON/OFF** switch, an **INTERCOM ON/OFF** switch and a **VOLUME** control (see Figure 5).



Figure 5 - Control Panel With Remote Option

#### **OPERATION OF THE STANDARD** STATION WITHOUT OPTIONS

Operation of the Standard Station without any option begins with turning **ON** the **POWER** switch. The **POWER** switch is located on the rear of the power supply, accessible at the rear of the Desk Top Station housing. The **POWER** indicator lights, showing that the power supply is **ON**. The radio is not **ON** yet. The Power Supply provides power to the Station cooling fan. The fan is **ON** when there is enough heat inside the cabinet for the Temperature Control circuit to activate it. The radio has its own **ON/OFF POWER** Switch.

The radio uses the Station Speaker mounted behind the front cap of the Station. The radio's internal speaker is not used.

Further operation of the Station is that of the radio used, MVS, TMX or MTD. Refer to the applicable Operator's Manual for more detailed information.

# **STATION WITH REMOTE OPTION**

The DC/Tone Remote Options permit use of Ericsson GE's RCN-1000 Remote Control Consoles with the Desk Top Station. Any of these options require that the Station have a DC or Tone Remote Board with a Remote Interface Board. These options provide for a two or four wire interface to the consoles for these functions:

- Transmit, Receive and Intercom Audio
- Transmit Keying (PTT) Control
- Channel Guard Monitor

#### **OPERATION OF THE STATION WITH REMOTE OPTION**

Operation of the Desk Top Station is described for four combinations of the INTERCOM switch and the RE-MOTE switch positions. These two switches control the various audio paths between remote and local microphones, the radio, and remote and local speakers.

#### 1. Desk Top Intercom Switch ON, Remote Switch <u>ON</u>

With this switch arrangement, intercom communication is possible between the Desk Top Station and the Remote Console. Also, the Remote Console can key the radio transmitter and hear the receiver's audio output.

When the Desk Mic PTT is keyed, there is no connection to the radio transmitter. If the radio receiver is squelched, the speaker at the Remote Console hears the audio as an intercom conversation. Should the radio receiver be unsquelched, receiver audio is heard on both the Desk Top speaker and the Remote Console speaker, with priority over the intercom message from the Desk Mic to the Remote speaker.

The audio from the microphone at the Remote Console is heard on the Desk Top Station speaker. The Remote Console's INTERCOM switch must be **OFF** to key the station's radio transmitter.

The audio from the unsquelched radio receiver is heard on both the Station speaker and the Remote Console speaker.

Intercom messages from the Remote Consoles are muted when radio messages are being received, or

when the Desk Top Station operator is using the Desk Mic PTT.

#### 2. Desk Top Intercom Switch ON, Remote Switch OFF

This arrangement offers intercom service only. Neither the Desk Top Station nor the Remote Console microphone can be used to key the radio transmitter. The radio receiver's audio can be heard on the Station speaker, but not on the Remote Console speaker.

A message from the Desk Mic is heard on the Remote speaker.

An intercom message from the Remote Mic can be heard on the Station speaker, but only if the Desk Mic is not active. The Desk Mic has priority over the Remote Console microphone in the intercom connection.

#### 3. Desk Top Intercom Switch OFF, Remote Switch ON

These switch settings are for remote control of the radio, without an intercom connection.

When the Desk Mic is keyed, the radio transmitter is keyed and the Remote Console is able to monitor the transmission.

The Remote Console microphone is connected to the radio transmitter if the Remote Console Mic is keyed and the Desk Mic is not keyed. Also, the Remote Console Mic is connected to the Station speaker if the radio receiver is squelched and the Desk Mic is not keyed (So that the "Desk Mic Audio to Line Path" is inactive).

The radio receiver audio is connected to the Remote Console speaker if the receiver is unsquelched. The P.A. output from the receiver is unconditionally connected to the Station speaker, but is subject to the radio's internal squelch.

#### Desk Top Intercom Switch OFF, Remote Switch 4. OFF

This arrangement is for operating the Desk Top Station as a radio.

The Desk Mic is connected only to the radio transmitter, when the Desk Mic is keyed.

The radio receiver's P.A. audio output is connected only to the Station speaker.

A summary of the audio path connections for the four combinations of **INTERCOM** and **REMOTE** Switches is given in the Table Remote and Intercom Audio Interface Summary.

The **VOLUME** Control is a rotary potentiometer on the Desk Top Station Control Panel which controls the level of the audio signal fed to the Station speaker as determined by the choice of INTERCOM and REMOTE switch positions.

An MVS conventional radio has volume control buttons to control the receiver audio level to the Station speaker independently of the intercom volume. The Station's rotary VOL-**UME** controls the intercom volume only.

With the TMX and MTD trunked radios, the rotary VOL-UME control adjusts both the receiver and the intercom audio levels. The radio volume control buttons are disabled by a PC programming option so that the receiver audio volume level is fixed and the internally adjusted Intercom Level adjusts the intercom audio relative to the receiver audio. This arrangement allows all Alert Tones generated by the radio to pass to the Remote Consoles at a suitable level independent of the Desk Top Station rotary VOLUME control. Refer to applicable Operator's Manual for specific information on setting the audio level of the particular radio installed.

## **KEYPAD/REMOTE INTERFACE BOARD OPERATION**

When the desktop station is equipped with the Keypad/Remote board the unit will be capable of placing individual calls to other mobiles on the system as well as making interconnect calls. The board also allows operation with a 5 function remote RCN-1000 controller when the tone remote control board (19A704686P8) is installed in the station.

# **Keypad Operation**

To make an individual call from the keypad:

- mode.
- 2.
- 3. gress.

1. Push MENU button on the radio to select special call

Enter the unit ID of the radio to be called using the keypad. The allowed range is from 1 to 16382. (This range may be restricted by the PC programmer).

Key the desk microphone to call the individual unit. The radio will transmit and receive only to the individual radio in this mode and no other units in the fleet can hear the call. The individual unit ID will be displayed on the radio as long as the call is in pro-

4. Push either the CLR button on the radio or the pound "#" key on the keypad to end the call and return to normal operation.

To make a telephone interconnect call from the keypad:

- 1. Push MENU button on the radio to select special call mode.
- 2. Enter the desired phone number using the keypad.
- 3. Push the star "\* " key on the keypad and wait for the radio to dial the number.
- 4. Key the desk microphone PTT switch to talk and release it to listen.
- 5. Push either the CLR button on the radio or the pound "#" key on the keypad to end the call and return to normal operation.

#### **Tone Remote Operation**

The RCN-1000 Remote Controller is capable of selecting up to 5 predefined radio system/group/special call combinations. The presets are programed into the radio by the PC Programmer.

The remotes and desktop station can operate as an intercom by setting the INTERCOM switch to "ON."

Remotes can be disabled by setting the station's REMOTE switch to "OFF."

To place a call from the remote:

- 1. Select the desired "SF" function switch on the RCN-1000. The LED next to the function switch will illuminate.
- 2. Key the microphone PTT switch and wait for a short beep before you begin to speak. Release the PTT when you are finished.
- 3. Adjust the volume as needed while receiving a call.

# **REMOTE & INTERCOM AUDIO INTERFACE SUMMARY**

Desk Toj	p Intercom Swite	ch ON, Remote	Switch ON
	Remote Mic		> Radio Xmtr
	Remote Mic		> Station Spkr
	Desk Mic	/	> Radio Xmtr
	Desk Mic	/	> Ramote Snkr
	Desk Mie	,	otherwise
			outerwise
			and Station
	Rx Audio	;	> Station Spkr &
Desk Toj	p Intercom Swite	ch ON, Remote	Switch OFF
	Remote Mic	/;	> Radio Xmtr
	Remote Mic	;	> Station Spkr,
	Desk Mic	/;	> Radio Xmtr
	Desk Mic		> Remote Spkr
	Ry Audio	/	> Remote Spkr
	Rx Audio	/	Station Spkr
	KX Audio		> Station Spri
Desk Toj	p Intercom Swite	ch OFF, Remote	e Switch ON
	Remote Mic		> Radio Xmtr,
			Desk Mic
	Remote Mic		> Desk Spkr, if
			otherwise
	Desk Mic		> Radio Xmtr y
	Desk Mic		> Remote Snkr
	Desk Mile Py Audio		> Remote Spki
	Dr DA Andia		> Station Splin
	KX PA Audio		> station spkr
Desk Toj	p Intercom Swite	ch OFF, Remote	Switch OFF
	Remote Mic		> Radio Xmtr
	Remote Mic	/	> Station Spkr
	Desk Mic		> Radio Xmtr
	Desk Mic	/ `	> Remote Snkr
	Desk Mile	/	> Remote Spri
	RX Audio	/	> Remote Spkr
	Rx PA Audio	/ >	> Station Spkr
Key:			
	Connection		
	No Connection	- / >	
	No Connection	/	~

if Desk Mic PTT inactive

if no Desk Mic; otherwise with PTT, Desk Mic ——— > Radio Xmtr f Desk Mic PTT inactive, Remote Mic muted with Desk Mic PTT

r, if Rx unmuted

# **CIRCUIT ANALYSIS**

## **INTERCONNECT BOARD WITHOUT A REMOTE INTERFACE BOARD**

#### **Transmit Audio Path**

The Desk microphone is used to modulate the radio transmitter. The Interconnect Board connection between the microphone at J201-2 DESK MIC HI and the radio transmitter input at J202-4 MIC HI is made through the 0 ohm resistor (R207) connection between the **DESK MIC HI** line and SW DESK MIC HI line and a jumper connecting P104-1 SW DESK MIC HI and P104-2 MIC HI. P104 is a jumper plug for J204 in lieu of Interface Board P204. There is no active circuitry in the path.

#### **Receive Audio Path**

The Station Speaker is driven by the radio audio PA output, available on J209.9 SW SPKR HI. The Interface Board connection between the SW SPKR HI line and J210-1 SW STATION SPKR HI is made through 0 ohm resistor R208 and a jumper connecting P104-7 SW SPKR HI and P1 04-8 SW STATION SPKR HI. P104 is a jumper plug for J204 in lieu of Interface Board P204. There is no active circuitry in the path.

## **INTERCONNECT BOARD WITH REMOTE INTERFACE BOARD**

The Remote Interface Board interfaces the radio to the DC or Tone Remote boards. Desk Mic and receiver audio are gated and summed on the Interface Board. This combined audio is then sent to the Remote Board which feeds the phone line to the Remote Console Speaker.

Conversely, Remote Console Mic audio from the phone line is buffered by the Remote Board and sent to the Remote Interface Board, which gates the audio to the radio transmitter or to the Station Speaker.

#### Audio Path From Desk Microphone To **Remote Board**

Audio from the Desk Microphone enters the Interconnect Board at J201-2 DESK MIC HI. The 0 ohm resistor (R207) connects the DESK MIC HI to the SW e Interface Board at P204-1 and to INTERCOM MIC LEVEL potentiometer R323, a level adjustment on the board for the Desk Microphone signal.

The bilateral switch (U304-1), next in the path, controls connection of the signal through to the Remote Board. The logic on the Interface Board applies 0 Vdc to control pin 13 to keep the gate normally muted, but switches this control voltage to + 10 Vdc to unmute the gate for the following conditions:

Desk Mic PTT Keyed AND Remote Switch ON <u>OR</u> Intercom Sw ON, Desk Mic PTT Keyed and Remote Sw OFF <u>OR</u> Intercom Sw ON, Desk Mic PTT Keyed AND Rx

Muted

When the signal is gated through switch U304-1, it goes through amplifier U302-1 and to the J302-9 output as **RX** AUDIO, where connection is made for the Remote Board.



Figure 6 - Logic For Desk Mic to Remote Spkr Path

Since the audio circuitry in the Remote Board has built in deemphasis, the amplifier U302-1 includes audio pre-emphasis.

The switching logic for this path is shown in Figure 6:

#### Audio Path from Desk Microphone to Radio Transmitter

Audio from the Desk Microphone enters the Interconnect Board at J201-2 **DESK MIC HI**. The 0 ohm resistor R207 connects the DESK MIC HI to the SW DESK MIC HI line which brings the signal into the Interface Board at P204-1.

Next, bilateral switch U304-2 gates the audio path. The logic on the Interface Board normally grounds U304, Pin 5 to keep the gate muted, but switches it to + 10 Vdc to unmute the gate and pass the audio for the following conditions:

#### Desk Mic PTT Keyed AND Intercom Sw OFF

A combining amplifier U305-2 follows and the output labeled MIC HI goes to the Interconnect Board through P204-2 and then through the 0 ohm resistor R209 connection to the Radio Option connector J202-4. This is the transmitter audio input line.

The microphone audio from the phone line is controlled by the volume control on the Desk Top Station and summed into audio PA U303.

For the MTD and TMX radios, Plug 303 jumpers J303 for a Pin 2 to Pin 3 connection. This routes the signal to the combining amplifier U305-1 where it is amplified and sent through J301-4 VOLUME HI to the VOLUME potentiometer R1 on the Desk Top Control Panel. This potentiometer is a level control for both the Remote Console microphone audio and audio from the radio PA. The signal returns to the Remote Interface Board at J301-5 VOLUME WIPER and is amplified in Desk Top Station 3 Watt Audio PA U303.

Finally the path connects to the Interconnect Board J204-8 STATION SPKR HI and then through the 0 ohm resistor R208 to J210-1 SW STATION SPKR HI for connection to the Station Speaker.

There is no switching control logic for this path.

## Path For Processed Audio From The Radio PA To The Remote Board, For MTD And TMX Radios

The radio internal speaker is disconnected when installed in the Desk Top Station. The audio signal from the radio PA en-

ters the Interconnect Board at J202-9 SW SPKR HI and then the Remote Interface Board at P204-7.

For the MTD and TMX radio, Plug 303 jumpers J303 for a Pin 2 to Pin 3 connection. This routes the signal to FET switch Q302. The gate is controlled by the logic on the Remote Interface Board and the switch is normally OFF with 0 Vdc applied, but switched ON with + 5 Vdc applied as to pass the audio signal for the following conditions:

Rx Active (Unsquelched) AND Remote Sw itch ON

When the signal is passed through switch transistor Q302, it goes through amplifier U302-1 which feeds the J302-9 output as RX AUDIO to the Remote Board. Since the audio circuitry in the Remote Board has built in de-emphasis, the amplifier U302-1 includes audio pre-emphasis.

The path from the radio to the Remote Console Speaker is set up with Remote Switch ON and is complete only when the radio is unsquelched.

The condition for audio gating in this path is activation of the Desk Microphone PTT for radio transmission, unless the Intercom Switch is **ON**. In the intercom mode the transmitter is not keyed.

The switching control logic for this path is shown in Figure

# Audio Path from Remote Board To Radio **Transmitter**

The Remote Console microphone audio signal from the phone line comes through the Remote Board to J302-1 MIC AUDIO on the Remote Interface Board. The audio is gated by bilateral switch U304-3. The control, Pin 6 of U304-3, is controlled by logic on the Interface Board. The gate is normally muted with 0 Vdc. This control voltage is switched to + 10 Vdc to unmute the gate for the following conditions:

7.

Combining amplifier U305-2 follows and its output labeled MIC HI goes to the Interconnect Board through P204-2 and then through the 0 ohm resistor R209 connection to the Radio Option connector J202-4. This is the transmitter audio input line.

The condition for gating in this path is that the Remote Switch must be **ON** and that the Desk Microphone has priority over a remote microphone for radio transmission.

Remote Mic PTT keyed AND Desk Top Mic PTT keyed AND Remote Sw ON





Figure 7 - Logic for Desk Mic To Radio Xmtr Path

The switching control logic for this path is shown in Figure 8

#### Audio Path From Remote Board To Station **Speaker**

The Remote Console microphone audio signal from the phone line comes through the Remote Board to J302-1 MIC AUDIO on the Remote Interface Board. The signal level can be independently adjusted by the **INTERCOM LEVEL** from **REMOTE** potentiometer R325.

Next, the audio is gated by bilateral switch U304-4, where the control pin 12 is controlled by logic on the Interface Board. The gate is normally **ON** with + 10 Vdc applied. This control voltage is switched to 0 Vdc to mute the gate for the following conditions:

#### **Rx** Active OR Audio Path Active from Desk Mic To Remote Line

The second condition is a restatement of the gating conditions for the Desk Top Mic to Remote Spkr Line path previously listed.

The signal is amplified in combining amplifier U305-1 and sent through J301-4 VOLUME HI to VOLUME potentiometer R1 on the Desk Top Control Panel. This control is a level control for both the remote microphone audio and audio from the radio PA when plug P304 is jumpered as required for the TMX and MTD type radios. The signal returns to the Remote Interface Board at J301-5 VOLUME WIPER and is amplified in Desk Top Station 3-watt Audio PA U303.

Finally the path connects to the Interconnect Board J204-8 STATION SPKR HI and then through 0 ohm resistor R208 to

J210-1 SW STATION SPKR HI for connection to the Station Speaker.

The gating conditions for this path are that the path is normally unmuted for connection of the Remote Console Microphone to the Station Speaker, except when the receiver is active or the "Desk Mic To Line" path is active. Without muting, undesirable feedback between the Desk Mic and speaker is possible.

The switching control logic for this path is shown in Figure 9.

#### Path For Non-Processed Audio From The Radio **VOL SQ HI Line to Remote Board For MVS** Radio

The unprocessed audio from the MVS radio comes to the Interconnect Board at J203-11 VOL SQ HI and on to the Remote Interface Board at P205-9. FET switch Q301 is next in the path. The gate of Q302 is controlled by logic on the Remote Interface Board. This switch is normally **OFF** with 0 Vdc applied, but switched **ON** with + 5 Vdc applied to pass the audio signal for the following conditions:

Rx Active (Unsquelched) and Remote Switch ON

The audio signal then goes through audio processing on the Remote Interface Board, with de-emphasis in the U301-1 amplifier stage and 300 Hz high pass filtering in Channel Guard filter U301-2.

For the MVS radio, P303 jumpers pins 1 and 2 of J303.

A second FET switch (Q302) in the path is in the same state as Q301 and similarly controlled, with the same condiFigure 8 - Logic For Remote Mic To Radio Xmtr Path



Figure 9 - Logic For Remote Mic To Station Spkr Path

tions for switching. But, its purpose is for a "Radio PA to Station Speaker Path".

When the signal is passed through the Q302 switch it goes through amplifier U302-1 and to the J302-9 output as **RX** AUDIO, where connection is made for the Remote Board with line to the Remote Console speaker. Since the audio circuitry in the Remote Board has built in de-emphasis, amplifier U302-1 includes audio preemphasis.

The path from the radio to the remote speaker is set up with the Remote Switch ON and is complete only when the radio receiver is unsquelched.

The switching control logic for this path is shown in Figure 10.

The radio internal speaker is disconnected when installed in the Desk Top Station. The audio signal from the radio PA enters the Interconnect Board at J202-9 SW SPKR HI and then the Remote Interface Board at P204-7.

For the MVS radio P304 jumpers pin 1 and 2 of J304. This routes the receiver audio to audio PA U303. The radio volume control buttons adjust the receiver volume.

LBI-38635

## Processed Audio From The Radio Audio PA To **The Station Speaker**

The Switching Logic for this path is shown in Figure 11.



Figure 10 - Logic For Radio VOL SQ HI To Remote spkr Path



Figure 11 - Logic For Radio PA to Remote Spkr Path

#### **RUS Path**

The Receiver UnSquelch (RUS) Signal is generated on the Remote Interface Board. It is a high (logical 1) sent to the Remote Board to connect the audio signal through the phone line to the Remote Console speaker, when the RX AUDIO line output is to be connected to the remote speaker. For an active high RUS signal to be passed through to the Remote Board the conditions that must be met are:

> Rx Audio to Line path active OR Station Mic to Line path active

These conditions are met for switch conditions:

Remote Switch ON <u>OR</u> Intercom Switch ON

The RUS signal at J308-12 is generated at the collector of transistor Q308 as a high when Q308 is turned OFF. This is done with a low on the base as determined by the logic controlling the paths of either the radio **VOL SQ HI** line or the radio audio PA line to the Remote Console speaker, shown in Figure 12.

#### **Channel Guard Disable Path**

The Channel Guard Disable (CGD) signal is generated on the Remote Board by either remote tones or DC current from the Remote Console. When Channel Guard is disabled in the radio, all audio transmissions on the receive frequency are heard. The CGD Disable signal enters the Desk Top Station from the Remote Board at J302-1 1 CG DISABLE, as a logical low to disable the Channel Guard control of the radio.

Plug P305 jumpers J305 for a Pin 1 to Pin 2 connection when the CGD signal is used. The CGD signal is not used



Figure 12 - Logic For Generation Of the RUS Signal

with PST tone remote applications with P305 moved to Pins 2 to 3.

The disabling logical low signal becomes a high at the collector of transistor Q309, where it can be overridden by a Remote Switch OFF condition which through diode D308 pulls the signal low with grounding. This acts to enable the Channel Guard in the radio with an output high.

After another inversion in transistor Q304, the CGD signal is sent on to the radio at P206-10 CGD as a logical low for disabling and as a logical high for enabling.

#### **PTT Path**

The PTT signal comes from the Remote Board at J302-4 PTT as a low to key the radio transmitter. After two inversions in transistors Q306 and Q307, the signal is found at P204-6 PTT, as a logical low to key the radio. It is connected to the radio through the 0 ohm resistor R209 connection to J203-7 on the Interconnect Board.

# **Keypad/Frequency Select Option**

The keypad/frequency select board is microprocessor controlled. It connects a 12 key keypad to serial data lines for communication with the radio. The board also converts to serial data the information from the EDACS tone remote board 19A704686P8.

The keypad data is inputed through J401 to the Octal Bus Transceiver ICS U702 & U704. The outputs of U702 & U704 are connected to the EPROM chip U703 and the microprocessor U701. The EDACS tone remote board's signal path is J402 through microprocessor U701 to EPROM U703 and then back to microprocessor U701. The connections to the radio are made through plugs P207 and P208 and the station interconnect board.

# **BILATERAL SWITCH** 19A700029P44 (U304)

DUAL OPERATIONAL AMPLIFIER 19A700086P4 (U301 U302 & U305)





INDENT

PIN "i"

**VOLTAGE REGULATOR** 19A701999P1 (U307)





PIN I ADJUST PIN PIN 2 OUTPUT PIN 3 INPUT

# AUDIO AMPLIFIER 19A701830P1 (U303)

SUPPLY VOLTAGE 5 OUTPUT 4  $\bigcirc$ GROUND (TAB) 3 INVERTING INPUT 2 NON-INVERTING INPUT 1

PIN INDENTIFICATION



# LBI-38635

PIN CONFIGURATION

VDD = PIN 14  $V_{SS} = PIN 7$ 

> **REMOTE INTERFACE BOARD** 19D902928G1

**VOLTAGE REGULATOR** 

IC DATA

**QUAD 2-INPUT AND GATE** 

## **8-BIT MICROPROCESSOR** (U701)



# **3-STATE BUS/LINE TRANSCEIVER** 19A703471P108 (U702, U704)











**QUAD 2-INPUT NOR GATE** 19A703483P101 (U712)

**VOLTAGE REGULATOR** 

EPROM 3443758G1 (U703)





AL: Y= A + B <u>10</u> Y3 A3-83 <u>13</u> γ4 A4-12 84

LOGIC DIAGRAM

PIN 14= Vcc PIN 7= GND

# **KEYPAD/FREQUENCY SELECTOR BOARD** 344A3383P1

FUNCTION DIAGRAM		
INPUTS		OUTPUT
А	6	Y
L	L	14
L	н	L
н	Ľ	L
н	H	L

YI[	I 🖷	14	]V¢¢
AI(	2	13	]Y4
B1 (	3	12	] в4
Y2[	4	П	<b>]</b> A 4
A2[	5	10	]¥3
B2[	6	9	]83
GND [	7	6	] A3
	L		1

PIN ASSIGNMENT



QUAD 2-INPUT NAN GATE

19A703483P302 (U713)

# IC DATA

# PARTS LIST

INTERCONNECT BOARD A1 19D902928G1/G2

Issue 2

# 4 2 13 14 Н



# SCHMITT-TRIGGER-INVERTER 19A703483P321)

PIN ASSIGNMENT A1[1 14 🕽 Vcc Y1[2 13 🛛 A6 12 Y6 A2 🛛 3 Y2 🕻 4 11 🛛 A5 A3 🕻 5 10 🛛 Y5 Y3 🕻 6 9 🕽 A4 GND 7 8 🛛 Y4

14

FUNCTION TABLE		
Input	Output	
Α	Y	
L	H	
	L L	

## **KEYPAD/FREQUENCY SELECTOR BOARD** 344A3383P1

LOGIC DI	AGRAM
----------	-------





PIN 14 = Vcc PIN 7 = GND

SYMBOL	PART NO.	DESCRIPTION
		CAPACITORS
C201 thru C212	19A702061P61	Ceramic: 100 pF <u>+</u> 5%, 50 VDCW, temp coef 0 <u>+</u> 30 PPM.
C215 thru C221	19A702061P61	Ceramic: 100 pF <u>+</u> 5%, 50 VDCW, temp coef 0 <u>+</u> 30 PPM.
C225 thru C248	19A702061P61	Ceramic: 100 pF <u>+</u> 5%, 50 VDCW, temp coef 0 <u>+</u> 30 PPM.
C249 and C250	19A702061P61	Ceramic: 100 pF <u>+</u> 5%, 50 VDCW, temp coef 0 <u>+</u> 30 PPM. (Used in G2).
J200	344A3197P1	JACKS TB
J201 thru J203	19A703248P11	Post: Gold Plated, 10 mm length.
J204 and J205	19A703248P15	Post: Gold Plated, 21 mm length.
J206	19A704852P30	Printed wire: 4 contacts rated @ 2 1/2 amps; sim to Molex 22-29-2041.
J207 and J208	19A703248P15	Post: Gold Plated, 21 mm length.
J209	19A703248P11	Post: Gold Plated, 10 mm length.
J210 and J211	19A704852P28	Printed wire: 2 contacts rated @ 2.5 amps.
J212	19A700072P28	Printed wire: 2 contacts rated @ 2.5 amps; sim to Molex 22-27-2021.
J213	19A703248P11	Post: Gold Plated, 10 mm length. (Used in G2).
		TRANSISTORS
Q201	344A3238G1	TSTR PNP
Q202 and Q203	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile. (Used in G2).
		RESISTORS
R201 and R202	19B800607P821	Metal film: 820 ohms <u>+</u> 5%, 1/8 w.
R203 and R204	19 <b>B800607P681</b>	Metal film: 680 ohms <u>+</u> 5%, 1/8 w.
R205 and R206	19B800607P391	Metal film: 390 ohms <u>+</u> 5%, 1/8 w.
R207 thru R210	19B800607P1	Metal film: Jumper.
R211	19B800607P154	Metal film: 150K ohms +5%, 1/8 w. (Used in G2).
R212	19A701864P4	Thermal 10K ohms <u>+</u> 10%, im to Midwest Component 2H-103. (Used in G2).
R213	19B800607P223	Metal film: 22K ohms +5%, 1/8 w. (Used in G2).
R214	19B800607P334	Metal film: 330K ohms +5%, 1/8 w. (Used in G2).
R215	19B800607P103	Metal film: 10K ohms +5%, 1/8 w. (Used in G2).
,	10 4 70025 48208	Marking army TOP7 Drive N. Marking army
+ 5	13A/02304F308	Machine Screw, 1 OKZ Drive: No. M3-0.3 x 8.
6	19470008404	Nut here No. M3 v 0 5MM
COMPONENT	IS ADDED, DELET	ED OR CHANGED BY PRODUCTION CHANGES

# REMOTE INTERFACE BOARD 19D902931G1

#### Issue 2

SYMBOL	PART NO.	DESCRIPTION
C301	104 7049 70 99	Capacitor Flattrohytics 2 20 E + 20 E - 50 VDCW
C302	19A 702061 P61	Ceramic: 100 pF <u>+</u> 5%, 50 VDCW, temp coef 0 <u>+</u> 30 PPM.
C303	19A 702052 P7	Ceramic: 2200 pF + 10%, 50 VDCW.
C304	т644АСР368Ј	Polyester: .068 uF + 5%, 50 VDCW.
C305	T644ACP33SJ	Polyester: .033 uF + 5%, 50 VDCW.
ad C306		
C307	T644ACP368J	Polyester: .068 uF + 5%, 50 VDCW.
C309 and C310	T644ACP333J	Polyester: .033 uF <u>+</u> 5%, 50 VDCW.
C311	19A701534P4	Tantalum: 1 uF <u>+</u> 20%, 35 VDCW.
C312	19A 704879P8	Capacitor, Electrolytic: 2.2uF +20%, 50 VDCW.
C313	19A 702052 P14	Ceramic: 0.01 uF + 10%, 50 VDCW.
C314	19A 702061P61	Ceramic: 100 pF $\pm$ 5%, 50 VDCW, temp coel 0 $\pm$ 30 PPM.
C315	19A 702052 P26	Ceramic: 0.1 uF + 10%, 50 VDCW.
C316	19A701225P11	Electrolytic: 470 uF -10% to +75%, 16 VDCW.
C317	19A 702052P26	Ceramic: 0.1 uF + 10%, 50 VDCW.
C318	19A 701225P11	Electrolytic: 470 uF -10% to +75%, 16 VDCW.
C319	19A 701534P7	Tantahum: 10 uF +20%, 16 VDCW.
C320	19A 702052P26	Ceramic: 0.1 uF + 10%, 50 VDCW.
C321	19A 702061 P61	Ceramic: 100 pF <u>+</u> 5%, 50 VDCW, temp coef 0 <u>+</u> 30 PPM.
C322	19A 702061P17	Ceramic: 12 pF <u>+</u> 5%, 50 VDCW, temp coef 0 <u>+</u> 30 PPM.
C323	19A 702052P122	Ceramic: 0.047 uF + 5%, 50 VDCW.
C324	19A 704879P8	Capacitor, Electrolytic: 2.2uF +20%, 50 VDCW.
C325 thru C327	19A702061P61	Ceramic: 100 pF $\pm 5\%$ , 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C328	19A701534P7	Tantalum: 10 uF <u>+</u> 20%, 16 VDCW.
C329	19A 702061 P61	Ceramic: 100 pF <u>+</u> 5%, 50 VDCW, temp coef 0 <u>+</u> 30 PPM.
C330	19A 704879P8	Capacitor, Electrolytic: 2.2uF +20%, 50 VDCW.
C331 and C332	19A 702061 P61	Ceramic: 100 pF <u>+</u> 5%, 50 VDCW, temp coef 0 <u>+</u> 30 PPM.
C333	19A 704879P8	Capacitor, Electrolytic: 2.2uF + 20%, 50 VDCW.
C334 and C335	19A702061P61	Ceramic: 100 pF <u>+</u> 5%, 50 VDCW, temp coef 0 <u>+</u> 30 PPM.
C336	19A 702052 P14	Ceramic: 0.01 uF + 10%, 50 VDCW.
C350 thru C352	19A 702052 P26	Ceramic: 0.1 uF <u>+</u> 10%, 50 VDCW.
C353 and C354	19A 702061 P61	Ceramic : 100 pF <u>+</u> 5%, 50 VDCW, temp coef 0 <u>+</u> 30 PPM.
C355	19A 703314P2	Tantalum: 220 uF, -10 + 50%, 10 VDCW.

SYMBOL	PART NO.	DESCRIPTION
D301	19A 700053P2	Silicon: 2 Diodes in Series; sim to BAV99.
D307		
D308 and D309	19A 700053P3	Silicon: 2 Diodes in Series, Common Cathode; sim to MBAV70L.
D310	19A 703561 P2	Silicon, fast recovery (2 diodes in series).
D311	19 <b>A 700055PS</b>	Silicon: 2 Diodes in Series, Common Cathode; sim to MBAV70L.
H \$301	19A702917P7	Heat Sink, Transistor: Sim to Thermalloy Cat 6030B-TT.
J301 thru J307	19A 7032 48 P1 1	Post: Gold Plated, 10 mm length.
		PLUGS
<b>P204</b> and P205	19A704779Pi1	Connector; sim to Molex 22-17-2122.
P303 thru P307	19A702104P2	Connector: Shorting Jumper, Gold Plated. (Housing Color: White).
		TRANSISTORS
Q301 and Q302	19A700060P4	N-type, field effect.
Q303 thru Q310	19A 700023P2	Silicon, NPN: sim to 2N3904.
R301 and R302	19B801251P473	RESISTORS Metal film: 47K ohms <u>+</u> 5%, 1/10 w.
R303	19B801251P334	Metal film: 330K ohms + 5%, 1/10 w.
R304	19A702931P289	Metal film: 8250 ohms + 1%, 200 VDCW, 1/8 w.
R305	19A 702931 P333	Metal film: 21.5K ohms + 1%, 200 VDCW, 1/8 w.
R306	19B801251P561	Metal film: 560 ohms +5%, 1/10 w.
R307	19B801251F223	Metal film: 22K ohms +5%, 1/10 w.
R308	19B801251P273	Metal film: 27K ohms +5%, 1/10 w.
R309 thru R314	19B800607P2R2	Metal film: 2.2 ohms +5%, 1/8 w.
R315	19B801251P153	Metal film: 15K ohms <u>+</u> 5%, 1/10 w.
R316	19B801251P222	Metal film: 2.2Kohms + 5%, 1/10 w.
R317	19B801251P102	Metal film: 1Kohms +5%, 1/10 w.
R318 and R319	19B800607P2R2	Metal film: 2.2 ohms <u>+</u> 5%, 1/8 w.
R320	19B801251P221	Metal film: 220 ohms + 5%, 1/10 w.
R321	19B801251P100	Metal film: 10 ohms + 5%, 1/10 w.
R322	19B801251P103	Metal film: 10K ohms <u>+</u> 5%, 1/10 w.
R323 thru R325	19B800779P10	Variable: 10Kohms. 25%, 100 VDGW, .3 watt.
R326	19B801251P823	Metal film: 82K ohms + 5%, 1/10 w.
R327	19B801251P562	Metal film: 5.6K ohms + 5%, 1/10 w.
R328	19B801251P223	Metal film: 22K ohms + 5%, 1/10 w.
R329	19B801251P563	Metal film: 56K ohms + 5%, 1/10 w.
R330	19B801251P331	Metal film: 330 ohms +5%, 1/10 w.

-			

SYMBOL	PART NO.	DESCRIPTION
R331	19B801251P332	Metal film: 3.3K ohms + 5%, 1/10 w.
R332	19B801251P153	Metal film: 15K ohms <u>+</u> 5%, 1/10 w.
R333	19B801251P473	Metal film: 47K ohms + 5%, 1/10 w.
R334	19B801251P333	Metal film: 33K ohms + 5%, 1/10 w.
R335	19B801251P561	Metal film: 560 ohms + 5%, 1/10 w.
R336	19B801251P562	Metal film: 5.6K ohms + 5%, 1/10 w.
R337	19B801251P154	Metal film: 150K ohms + 5%, 1/10 w.
R338	19B801251P104	Metal film: 100K ohms + 5%, 1/10 w.
R339	19B801251P470	Metal film: 47 ohms + 5%, 1/10 w.
R340	19B801251P104	Metal film: 100K ohms + 5%, 1/10 w.
R341	19B801251P102	Metal film: 1Kohms + 5%, 1/10 w.
R342	19B801251P470	Metal film: 47ohms +5%, 1/10 w.
R343	19B801251P224	Metal film: 220K ohms + 5%, 1/10 w.
R344		
R345	19B801251P223	Metal film: 22Kohms +5%, 1/10 w.
R350	19A702931P137	Metal film: 237 ohms +1%, 200 VDCW, 1/8 w.
R351	19A 702931 P221	Metal film: 1620 ohms +1%, 200 VDCW, 1/8 w.
R352	19A 702931 P137	Metal film: 237 ohms +1%, 200 VDCW, 1/8 w.
R353	19A702931P185	Metal film: 750 ohms +1%, 200 VDCW, 1/8 w.
R354	19B801251P103	Metal film: 10K ohms <u>+</u> 5%, 1/10 w.
R355 and	19B801251P104	Metal film: 100K ohms + 5%, 1/10 w.
R356		
R357 thru	19B801251P473	Metal film: 47K ohms +5%, 1/10 w.
R359		
R360 and	19B801251P103	Metal film: 10K ohms +5%, 1/10 w.
R361		
R362 and	19B801251P104	Metal film: 100Kohms + 5%, 1/10 w.
R363		
R364	19B801251P473	Metal film: 47K ohms +5%, 1/10 w.
R365 and	19B801251P103	Metal film: 10K ohms +5%, 1/10 w.
R366		
R367	19B801251P473	Metal film: 47K ohms <u>+</u> 5%, 1/10 w.
R368 and Bacc	19B801251P104	Metal film: 100K ohms <u>+</u> 5%, 1/10 w.
R369		
R370	19B801251P103	Metal film: 10K ohms $\pm 5\%$ , 1/10 w.
R371 and	19B801251P473	Metal film: 47K ohms <u>+</u> 5%, 1/10 w.
R372	1000000510104	No
and Base	1388012511104	Metal film : $100$ k ohms $\pm 5\%$ , 1/10 w.
D 975	1084012518103	Marcal Silver, 10K -k , 596 - 1/10 m
thru R 377	150012511105	iveral lum : 10x coms <u>+</u> 570, 1/10 w.
D 170	1984012518102	Marcal Silver 1 K alama 1 5% 1/10 m
and 8 379	1010014011104	weigi ium ( 1 % 0005 <u>*</u> 376, 1/10 W.
R 140	1988012512301	Meral film: 390 ahme + 596 1/10 w
and R381		
R 182	19B801251 P478	Maral film: 47K above: 4.5% 1/10 w
thru P 39A		Action finter tractioning TOP, 1110 W.
11.50 1		

\* COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

YMBOL	PART NO.	DESCRIPTION
		RESISTOR NETWORK
RN301	19A 704885P8	Resistor Network, Custom: 9 pins, .125 W.
		INTEGRATED CIRCUITS
U301 and U302	19A 700086P4	Línear: Dual Op Amp; sim to 4558.
U303	19A 701830P1	Linear, Audio AMPLIFIER; sim to TDA 2003.
U304	19A 700029P44	Digital: BILATERAL SWITCH.
U305	19A 700086P4	Linear: Dual Op Amp; sim to 4558.
U307	19A701999P1	Linear: Voltage Regulator; sim to LM317T.
<b>U308</b>	19A 701999P4	Linear, (Positive Voltage Regulator): sim to LM317LZ.
U309	10A 7001 76P2	Digital: Hex Buffer; sim to 4069UB.
U310	19A 700029P47	Digital: Quad 2-Input AND Gate; sim to 4081B.
<b>U31</b> 1	19A 700029P46	Digital: QUAD 2-INPUT OR GATE.
		MISCELLANEOUS
2	19D902932P1	BD PW
3	19D902931G7	CPNT BD REM
4	19A 702364P308	Machine screw, TORZ Drive: No. M3-0.5 x 8.
5	19A 701312P4	Flatwasher: 3.2 ID.
6	19A 700034P4	Nut, hex: No. M3 x 0.5MM.
9	19A700033P5	Lock washer, external tooth: No. 3.

# **PRODUCTION CHANGES**

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions.

**Revision A** - to change volume control range, add time delay and add jumpers to accomodate the keypad option. Added capacitor C311, Jacks J306 and J307, plugs P306 and P307, transistor Q310, and resistors R324 and R342 through R345.

1401

#### **COMPONENT SIDE**



(42-001022-0628#, Marking) (42-001022-0601#, Side A, Layer 1) (42-001022-0602#, VCC, Layer 2)

# KEYPAD/FREQUENCY SELECTOR BOARD 344A3383P1, REV. A

Issue 1

SYMBOL	PART NO.	DESCRIPTION
		CAPACITORS
Ci thru C29	19A702061P61	Cer, 0805, 5%, 50V, NPO, 100pf
C699, C701, C702, C707, C709, C710,	19A702052P26	Cer, 1206, 20%, 50VMIN, Z5U, 0.1 «F
C705	19A702061P13	Cer, 0805, 5%, 50V, OOG, 10pf
C706	19A702061P25	Cer. 0805, 5%, 50V, COG, 18pf
C711	19A705205P111	Tant, (D), 20%, 10V, 47 uF
CR1 thru CR23, and CR696 thru CR696	19A700053P2	DIODES DIO, SW Dual, SOT23, 7000, 100V
CRUS		JACKS
<b>J40</b> 1	19A703248P11	HDR, 14, S RW, V MT, W/PP, 10U" AU CT
J402	19A703248P11	HDR, 06, S RW, V MT, .1CTR, 10U* AU CT
P207, P208	19A704779P11	PCBCON, 12, BTM, NTRY, .ICTR, 10U* AU CT
Q701 thra Q706	19 <b>A700076P</b> 2	General Purpose, NPN, SOT23, 3904
R1 thru R23	1988012519331	
R24 thru R39	19B801251P104	0605, 5%, 1/10W, 100K Ohms
R701 thru R703 and R705 thru R707	19 <b>B8</b> 01251P103	0805, 5%, 1/10W, 10K Ohms
R708	19B801251P472	0805, 5%, 1/10W, 4.7K Ohms
R709	19B801241P473	0805, 5%, 1/10W, 47K Ohms
11701		INTEGRATED CIRCUITS 8-BIT MICROPROCESSOR, N80C31BH
U702 and U704	19A703471P108	BUS/LINE TRANSCEIVER, 74HC245
U703	344A3758G1	EPROM, 87C257
U705	19A704970P1	VOLTAGE REGULATOR (5V), L387A
U712	19A703483P101	2-INPUT NOR GATE, 74HC02
U713	19A703483P302	2-INPUT NAND GATE, 74C00
U726	19A703483P321	SCHMITT-TRIGGER-INVERTER, 74HC14
XU703	19A700156P3	DIP28, D WP, 0/BD, 10U" AU CT
¥701		CRYSTAL SMT, 20PF, 100PPM, 11.0592 MHz

COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

**KEYPAD/FREQUENCY SELECTOR BOARD** 344A3383P1

#### LBI-38635

**SOLDER SIDE** 



(42-001022-0628#, Marking (flipped) (42-001022-0604#, Side B, Layer 4) (42-001022-0603#, Ground Plane, Layer 3)



(19D902928, Sh. 1, Rev. 1)

(19D902929, Solder Side, Rev. 1)



**REMOTE INTERFACE BOARD** 19D902931G1

# LBI-38635

# **INTERCONNECT BOARD A1** 19D902928G1



### **COMPONENT SIDE**

INTERCONNECT BOARD A1 19D902928G1

	1	Issue 2				12, 13 (4
SYMBOL	PART NO.	DESCRIPTION				
		ASSEMBLIES	((ه ره	l l		_ v1
AI		CPNT BD INTR 19D902928G2			(P101) -0	< \h
		FAN				
M1	5493477P8	FAN AX.			$\bigcirc$	O M
P104	194 149448P7	IMPR		000	<u> </u>	
		CARLES		000		
<b>W</b> 1	19A 705301 P4	CA ASM RF				
W2	19C851585P12	CA				
W3	19C852054P1	CA ASM		00	(#905)	
		MISCELLANEOUS		000		
3	19D903044P1	CHASSIS			0	
5	19D903046P1	SPT CARD			f' mm	29,85 - V
6	344A3328P1	CARD GUIDGRD				LKA]
7	344A3336P1	CARD GUIDPLSTC		" \ \		
8	344A3284P1	PLATE COVER		$\mathbb{N}$	P104 AL	
10	19A902364P455	SCR MACH				
11	19A901312P5	Flatwasher: M3.5.	° °	F	77	\
12	19A700034P5	Hex nut: No. M3.5 x 0.6.		11,15 + PLACES	• • • • • • • • • • • • • • • •	0.0
13	19A700033F6	Lockwasher, external tooth, M3.5.				
15	19A 702364P408	Machine screw: TORX Drive, M3.5 - 0.6 x 8.			$\bigcirc \bigcirc $	
17	344A332P1	BUMPER RUBBER				
23	N329P38B6	BUT PLG			0000000000000	00
24	5493477P11	FAN AX.			0	
25	N210P16B6	Nut, steel: No. 10-32.				
26	N403P19B6	Lockwashez: No. 10.				
		ASSOCIATED ASSEMBLIES				
	19D903043P1	COVER TOP				
	19D903159G1	CAP FRONT				- 3
	344A3346G1	KIT HARDWARE		1		ĥ
	344A3347G1	KIT HARDWARE				
			BJ210 ₹ 55 51 51 51 51 51 51 51 51 51			
			JJ206 W3 PLUG			
			W2 PLUG			
					<u>\</u>	Ľ
			VIEW "A" ROTATED 180°	`(A1)	4	R
						- 15, 17 (4 PLACES)

\* COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

# LBI-38635



# CHASSIS ASSEMBLY 19D903101G1

(19D903101, Rev. 2)

FORM	70		OF MADING
FRUM	10	I WIRE	REWARK2
W6	S1 - 2	BLACK	GPS 2 & 4 DNLY
S1 - 5	SS - S	ITEM 13	L L L
W6 - P1	LED1 - CATHODE	DRANGE	T A
₩6	\$2 - 3	BROWN	
L L	51 - 1	GREEN	
1	R1 - 3	BLUE	
Ţ	R1 - 2	WZVIOLET.	•
¥6	R1 - 1	WHITE	1
W6 - P1	LED1 - ANDDE	RED	GPS 2 & 4 ÖNLY 🛕



SECTION 'A - A'





REAR VIEW WIRING DMITTED FOR CLARITY



NDTES:

(1)

AFTER PLUGGING P1 ON TO LED1 LEADS, BEND BOTH LEADS TO LOCK P1 INTO POSITION.

SWITCHES S1 & S2 ORIENTATION UNIMPORTANT.



### **CONTROL PANEL** 19D903102G1-G4

(19D903102, Sh. 1, Rev. 0)

# LBI-38635

PARTS LIST CONTROL PANEL 19D903102G1 - G4 Issue 1

SYMBOL

A2

LEDI

**R**1

Si and S2

W6

3

4 5

6 7

8 9

10

11 12

13 15

PART NO.	DESCRIPTION		
244 4 2266 81	ASSEMBLIES		
3 <b>41A</b> 3300F1	NEITAD (Osed in Os and Os).		
19A134354P1	Optoelectronic: Red; sim to HP 5082-4655.		
	RESISTORS		
19B800762P1	Variable, carbon film: 5K ohms <u>+2</u> 0%, 150 VDCW, .1 w; sim to TOCOS RPR124. (Used in G2 and G4).		
344A3334P1	SW TGL (Used in G2 and G4).		
19B801735P1	CABLE (Used in G2 and G4).		
19D903047P1	PLATE COVER		
19A 703332 P1	Bushing: sim to Hewlett-Packard No. 5082-4707.		
344A3338P1	KNOB CONT (Used in G2 and G4.)		
19A 702332 P1	Nut, slotted: M7 x .75. (Used in G2 and G4).		
19C8522061P1	DECAL (Used in G1).		
19C8522061P3	DECAL (Used in G2).		
19C8522061P2	DECAL (Used in G3).		
19C8522061P4	DECAL (Used in G4).		
N84P5008B6	SCR MACH (Used in G2 and G4)		
N402P33B6	WASH. PLN (Used in G2 and G4).		
19A700134P10	W SOL (Used in G2 and G4).		
N210P586	NUT MACH (Used in G2).		
N210 <b>P586</b>	NUT MACH (Uzed in G2).		

\* COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



\* COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

FRONT VIEW

# LBI-38635

# FRONT CAP ASSEMBLY (19D903159G1

(19D903159, Sh. 1, Rev. 0)



COMPLETED DESK TOP STATION (19D903168, Sh. 1, Rev 3)

# LBI-38635

(1)

NOTES:

1.

▲ PLUG P106 ONTO THE LEADS OF LED1 AS SHOWN (BLACK WIRE TO CATHODE) AND BEND LEADS OVER THE BODY OF P106 TO HOLD IN PLACE.

3. TEST PER QTI-170-180



EDACS ASM SAME AS PART 1 EXCEPT TEST PER QTI-170-179



### **RADIO INSTALLATION** Sheet 1 of 3 (19D903274, Sh. 1, Rev. 0)

23

# BOTTOM VIEW

18. AFTER PLUGGING IN MIC CABLE, SECURE TO FRONT CAP WITH M4 SCREW

17. WHEN EXTERNAL WIRES FOR OPTIONS ARE TO BE CONNECTED: REMOVE AND DISCARD PLUG BUTTON AND INSERT RUBBER GROMMET (5490407P10) AND PLACE STRAIN RELIEF (344A3480P1) AROUND WIRES AND SNAP INTO HOLE ADJACENT TO GROMMET.

14. CONNECT P1 OF DESK TOP POWER CABLE W3 TO J1 OF RADIO POWER CABLE W901

12, CONNECT ANTENNA CABLE P101 (VI) TO J101 ON RADIO

11. ADJUST THE RADIO BRACKET FOR PROPER ALIGNMENT AND APPEARANCE AND THEN TIGHTEN THE 2 M3.5 SCREWS.







FRONT VIEW OF BOARDS

THESE INSTRUCTIONS COVER THE INSTALLATION OF THE REMOTE OPTIONS FOR APPLICATION IN THE DESK TOP STATION

1. REMOVE AND DISCARD P104 FROM INTERCONNECT BOARD

3. INSTALL REMOTE INTERFACE BOARD AND THREE (3) RUBBER SPACERS BETWEEN INTERFACE BOARD & INTERCONNECT BOARD, LOCATE APPROX. AS SHOWN UNDER P204,P205 & J302

4. CONNECT W7 FROM REMOTE BOARD AS SHOWN TO J302 DN REMOTE INTERFACE BOARD, CABLE TO GO OVER THE TOP OF INTERCONNECT BOARD AND BRIENTATE CONNECTOR AS SHOWN, W7 /S 198801730 Pt.

5. CONNECT P301 (W6) FROM CONTROL PANEL TO J301 ON REMOTE INTERFACE BOARD, ORIENTATE CONNECTOR AS SHOWN

**RADIO INSTALLATION** Sheet 2 of 3

(19D903274, Sh. 2, Rev. 2)

# LBI-38635



2. REMOVE AND DISCARD CABLES INCLUDED WITH REMOTE BOARD, INSTALL REMOTE BOARD AS SHOWN.



J





FRONT VIEW OF BOARDS



### LBI-38635

(CONNECTOR PINS POINTED DOWN)

VIEW "A"

THESE INSTRUCTIONS COVER THE INSTALLATION OF THE KEYPAD OPTIONS FOR APPLICATION IN THE DESK TOP STATION

Install Keypad/Freq. Select Bd. and three (3) rubber spacers between Keypad Bd. & Interconnect Board. Locate spacers approx. as shown at J207, J208 & the center of

Preform W9 ribbon cable 198801752P1 per View "A".

Insert End of W9 marked "Keypad" through the chassis opening behind the Volume Control and slide on to Keypad Pins. Plug the other end on to J401 of Keypad Board. Observe Keyed Pins of W9.

When EDACS Tone Remote Board Is used Av} Connect W8 to P2 of Remote Board. The other end to J402 of Keypad Board. Orient plug @ J402 so pin with no wire is UP. W8 19 198235994 Pt.

B.) On Remote Interface Board Plug jumpers as follows: P303 on J303 pins 2 & 3, P304 on J304 pins 2 & 3, P305 on J305 pins 2 & 3, P306 on J306 pins 2 & 3, P307 on J307 pins 2 & 3.

> **RADIO INSTALLATION** Sheet 3 of 3

> > (19D903274, Sh. 3, Rev. 1)



Sheet 1 of 2

![](_page_27_Figure_2.jpeg)

#### **DESK TOP STATION** Sheet 2 of 2

(19D903086, Sh. 2, Rev. 2)

SCHEMATIC DIAGRAM

![](_page_28_Figure_2.jpeg)

# 19D902928G1

(19D902930, Rev. 0)

# LBI-38635

J200				
SCREW TERMINALS				
TO EXT OPTIONS				
J200.1	<del>a</del> -			
1200.2 O	DESK KIC KI			
JZ00.3	SH DESK MIC HI			
 J200.4	BESK NIC LO			
J200.5	A-			
J200.6	DESK MIC PTT			
J200.7 O	CG BISABLE (HOOKSNITCH			
J205.8 O	STATION SPKR LO			
1200.9 O	STATION SPKR HI			
J200.10 O	SH STATION SPKR HI			
J200. 11 	A+			
J200. 12	A-			
 J200. 13	SPARE			
 J260. 14 	SPARE			
J200. 15 O	SPARE			

R207 TO SNITCH DESK MIC AUDIO R208 TO SNITCH STATION SPEAKER AUDIO.

#### SCHEMATIC DIAGRAM

![](_page_29_Figure_2.jpeg)

#### LBI-38635

	7500	
	SCREW	TERMINALS
	T0 E)	(T OPTIONS
	J200.1	<b>a</b> -
	1200.2	DESK KIC KI
THIODE	1200.3	
2-) 100pF]	J200.4	
3   1990F	J200.5	BESK MIC LO
	-O	A-
1 1 100pF	0	DESK MIC PTT
5 11 100pF	0	CG BISABLE (MODKSWITCH)
	-0	STATION SPKR LO
	1200.9 O	STATION SPKR HI
	J200.10	SH STATION SPKR HI
≞ <u>  00p</u> F」 ●	J200.11	A+
9_ <u>  100¤F</u> ]	J200.12	
	J200.13	M*
	J200.14	SPARE
1 1 100pF	-O	SPARE
2 1 10005	<u>+</u> °	SPARE

R207 TO SHITCH DESK KIC AUDIO R208 TO SHITCH STATION SPEAKER AUDIO. REMOVE & OHN RESISTORS: R209 AND R210 FOR DATA OPTIONS.  $\mathbb{A}$  LINE NAMES IN ( ) FOR PST TONE REMOTE ONLY.

#### **INTERCONNECT BOARD A1** 19D902928G2

(19D903386, Rev. 0)

![](_page_30_Figure_2.jpeg)

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# LBI-38635

A JUMPERS P303 & P304: PINS 142 FOR MVS RADIOS, PINS 243 FOR TMX & MTU RADIOS. A JUMPER P305, P306, P307: PINS 142 FOR DC & 1 FRED TONE REMOTES. PINS 243 FOR PST TONE REMOTE.

![](_page_31_Figure_2.jpeg)

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LBI-38635
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# **REMOTE INTERFACE BOARD** Sheet 2 of 2

(19D902933, Sh. 2, Rev. 4)

![](_page_32_Figure_2.jpeg)

#### 344A3383P1

(19D903567, Rev. 0)

DEVICE	VEC PIN ND.	GND PIN ND.
U701	44	22
U782	52	10
0703	28	14
U784	28	12
U712	14	7
U713	14	7
U726	14	7

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