

## REMOTE INTERFACE BOARD 19D902931G1

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**NOTICE!**

Repairs to this equipment should be made only by an authorized service technician or facility designated by the supplier. Any repairs, alterations, or substitution of recommended parts made by the user to this equipment not approved by the manufacturer could void the user's authority to operate the equipment in addition to the manufacturer's warranty.

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# 1 SPECIFICATIONS

This information is intended primarily for service technician use. Refer to the appropriate Specification Sheet for complete specifications.

Power Input	13.8 Vdc $\pm$ 10%
Current	
No PA Load	100 mA
3 Watts @ 4 Ohms	560 mA (typical)
Output Voltage	9.9 Vdc (typical)
Audio Output (4 Ohm Load)	3.46 Vrms (3 watts) 4.0 Vrms (4 watts)
Audio Distortion (3 watts)	5% (maximum)

## **2 DESCRIPTION**

Remote Interface Board 19D902931G1 is used to interface a mobile radio unit (MVST<sup>™</sup>, TMX<sup>™</sup>, MTD<sup>™</sup>, Orion<sup>™</sup> or JAGUAR<sup>™</sup>) with:

- DC Remote Control Board 19A704686P3
- Tone Remote Control Board 19A704686P4
- EDACS<sup>®</sup> Tone Remote Control Board 19A704686P8

The DC or Tone Remote Control Board allows for use of a Remote Control Console with the Desktop Station.

There is a choice of 2-wire or 4-wire interface to the consoles for transmit, receive and intercom audio.

## 3 CIRCUIT ANALYSIS

The Remote Interface Board (19D902931G1) provides the electrical interface between the mobile radio unit and the DC or Tone Remote Control Board.

SW DESK MIC HI (mic audio) is routed through bilateral switches for control to the Remote Control Board and MIC HI in the mobile radio unit. VOL/SQ HI audio or SW SPKR HI audio is selectable by jumpers on the Remote Interface Board. The Remote Interface Board routes mic audio from the Remote Control Board to MIC HI and SW SPKR HI.

Conversely, remote console mic audio from the phone line is buffered by the Remote Interface Board and sent to the Remote Control Board, which then gates the audio to the radio transmitter or to the station speaker.

### 3.1 AUDIO PATH FROM DESK MIC TO REMOTE INTERFACE BOARD

Audio from the desk mic enters the Remote Interface Board at P204-1 as SW DESK MIC HI, and at intercom mic (mic) level potentiometer R323 (Schematic Diagram 19D902933, Sh. 1). Potentiometer R323 adjusts the level of the intercom mic signal going to bilateral switch U304-1.

Bilateral switch U304-1 controls the connection of the SW DESK MIC HI to pre-emphasis amplifier U302-1. The logic on the Interface Board applies 0Vdc to control U304-1, Pin 13 to keep the mic-to-line normally muted, but switches this control voltage to +10Vdc to unmute the mic-to-line for the following conditions:

- Desktop mic PTT keyed and REMOTE switch ON
- INTERCOM switch ON, desktop mic PTT keyed and REMOTE switch OFF
- INTERCOM switch ON, desktop mic PTT keyed and receiver muted

When the SW DESK MIC HI signal is gated through switch U304-1, it goes through amplifier U302-1 and output through J302-9 as RX AUD (audio) where connection is made to the Remote Control Board. Since the audio circuitry on the Remote Control Board has built in de-emphasis, amplifier U302-1 includes audio pre-emphasis. The switching logic for controlling bilateral switch U304-1 at Pin 13 and the mute status of this audio path is shown in Figure 1.

### 3.2 AUDIO PATH FROM THE DESK TOP MIC TO THE RADIO TRANSMITTER

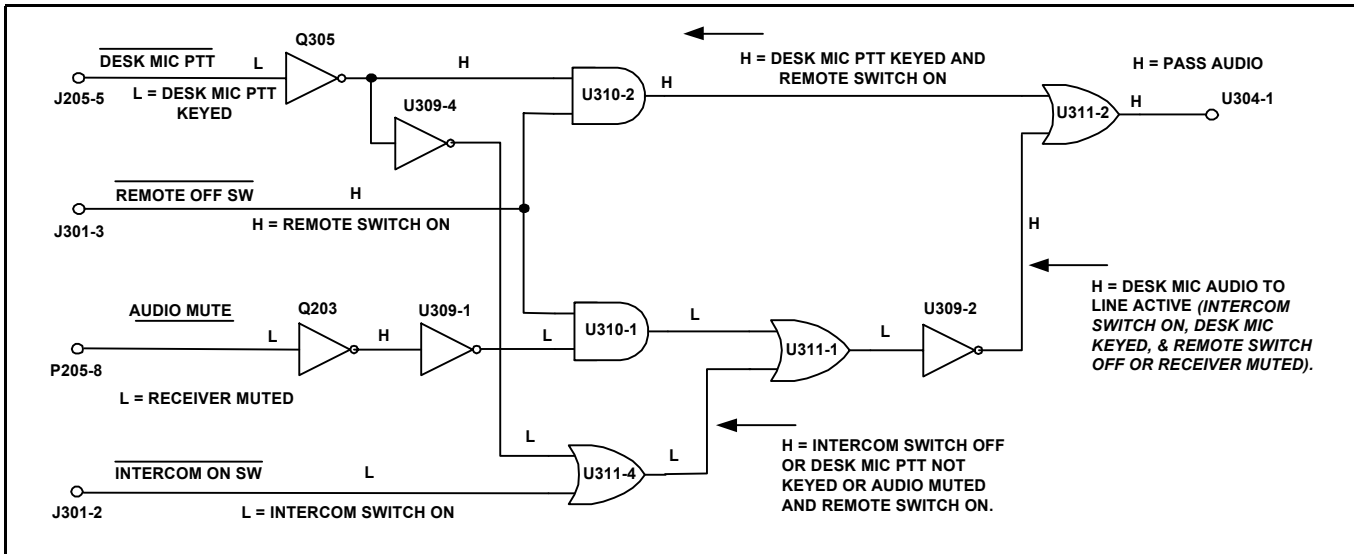
Audio from the desktop mic enters the Remote Interface Board at P204-1 as SW DESK MIC HI. Bilateral switch U304-2 controls the passage of the SW DESK MIC HI line from the Interconnect Board to MIC HI at P204-2. Normally, the logic on the Interface Board grounds U304-2, Pin 5 to keep the switch open, preventing desktop mic audio from passing. It also switches to +10Vdc, closing the switch and passing the audio when the desktop mic is keyed and the INTERCOM switch is OFF.

Combining amplifier U305-2 amplifies the audio and passes it as MIC HI to the Interconnect Board through P204-2.

The mic audio from the telephone line is controlled by the volume control on the Desktop Station and summed by audio PA U303. For mobile receive audio, plug J303 jumper P303 across Pins 2 and 3. This routes the signal to combining amplifier U305-1, where it is amplified and sent through J301-4 VOLUME HI to VOLUME potentiometer R1 on the desktop control panel. This potentiometer provides level control for both the remote console mic audio and audio from the radio PA. The signal

is then returned to the Remote Interface Board at J301-5 VOLUME WIPER and amplified by Desktop Station 3-Watt Audio PA U303.

The output of audio amplifier U303-4 exits the Interface Board through P204-8 as STATION SPKR HI. There is no switching control logic for this path.



**Figure 1: Logic for Controlling the Desktop Mic to Remote Speaker Path**

### 3.3 MOBILE RECEIVE AUDIO PATH FROM THE RADIO PA TO THE REMOTE INTERFACE BOARD

The audio signal from the radio PA enters the Remote Interface Board at P204-7. For the mobile receive audio path, jumper P303 is connected across J303, Pins 2 and 3. This routes the receive audio signal to Field Effect Transistor (FET) switch Q302. The gate is controlled by logic on the Remote Interface Board. FET Q302 is normally OFF with 0Vdc applied, but is switched ON by +5Vdc to pass the receive audio when the receiver is active and the REMOTE switch on the control panel is ON.

The receive audio is switched through Q302 is to amplifier U302-1. The amplified output of U302-1 is output to J302-9 as RX AUDIO to the Remote Board. Since the audio circuitry in the Remote Board has built-in de-emphasis, amplifier U302-1 includes audio pre-emphasis.

The audio path from the radio to the remote console speaker is set up with the REMOTE switch ON and is completed only when the radio is unscelched.

The desktop mic PTT controls audio gating for radio transmission, unless the INTERCOM switch is ON. In intercom mode, the transmitter is not keyed. The switching control logic for controlling this path is shown in Figure 2.

### 3.4 AUDIO PATH FROM THE REMOTE INTERFACE BOARD TO THE RADIO TRANSMITTER

The remote console mic audio signal from the telephone line comes through the Remote Control Board to J302-1, MIC AUDIO on the Remote Interface Board. The audio is gated by bilateral switch U304-3, which is controlled by logic on the Interface Board. The control signal is applied to U304-3, Pin 6. This gate is normally muted (the switch is open) with 0Vdc. The control voltage is switched to +10Vdc to unmute (the switch is closed) the gate when the remote mic PTT is keyed, the desktop mic PTT is unkeyed and REMOTE switch is ON.

The output of the switch is applied to combining amplifier U305-2. The amplified output of U305-2 is passed as MIC HI to the Interconnect Board through P204-2. The REMOTE switch controls gating for MIC HI. The REMOTE switch must be ON. The desktop mic has priority over the remote console mic for radio transmission. The switching control logic for controlling this path is shown in Figure 3.

### 3.5 AUDIO PATH FROM THE REMOTE INTERFACE BOARD TO THE STATION SPEAKER

The remote console mic audio from the telephone line enters the Remote Interface Board through J302-1 as MIC AUDIO. The INTERCOM LEVEL FROM REMOTE potentiometer R325 independently adjusts the signal level.

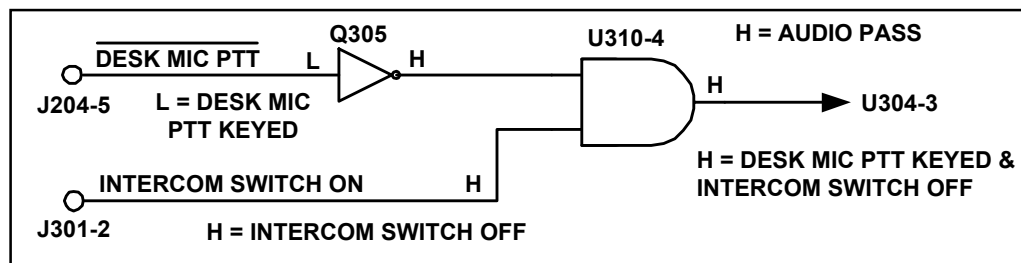


Figure 2: Logic for Controlling the Audio Path of Audio From the Radio to the Remote Control Board

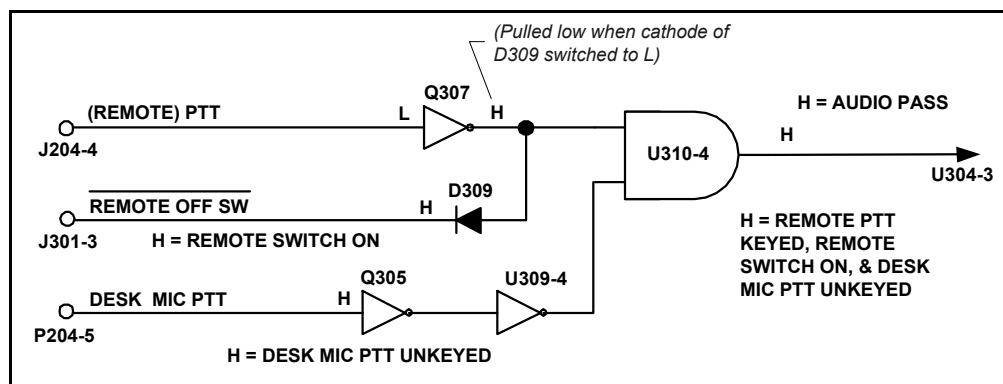


Figure 3: Logic for Controlling the Desktop Mic to Remote Speaker Audio Path

Audio is gated by bilateral switch U304-4 and controlled by logic on the Interface Board. The gate is normally ON (the gate is open, the switch is closed, audio is passing) with +10Vdc applied. Control is through U304-4, Pin 12. This control voltage is switched to 0Vdc to mute (the gate is closed, the switch is open, audio is not passing) the gate when:

- the receiver is active
- or**
- the desktop mic audio to remote line is active

The second condition is a restatement of the gating conditions for the desktop mic to remote speaker path previously listed.

The audio signal is amplified by combining amplifier U305-1 and passed through J301-4, VOLUME HI to VOLUME potentiometer R1 on the desktop control panel. Potentiometer R1 controls the level for both the remote mic audio and audio from the radio PA when jumper P304 is connected for mobile receive audio. Audio returns to the Remote Interface Board at J301-5, VOLUME WIPER and is amplified by Desktop Station 3-Watt audio PA U303. STATION SPKR HI audio from U303 leaves the Interface Board through P204-8.

The audio is normally unmuted when connecting the remote console mic 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 desktop mic and speaker is possible. The switching control logic for this path is shown in Figure 4.

### **3.6 PATH FOR NON-PROCESSED AUDIO FROM THE RADIO VOL SQ HI LINE TO REMOTE INTERFACE BOARD FOR VOL SQ HI**

Unprocessed audio from the radio is received by the Remote Interface Board as VOL SQ HI at P205-9. The VOL SQ HI signal is then passed to FET switch Q301. The gate of Q301 is controlled by logic on the Remote Interface Board. This gate is normally OFF (*the FET is not conducting, the gate is closed, the switch is open, audio is not passing, the line is muted*) with 0Vdc applied. The gate (Q301) is switched ON when the receiver is active and the REMOTE switch is ON. This condition applies an RX AUDIO MUTE (barred)<sup>1</sup> signal from U310-1, Pin 3 (Schematic Diagram 19D902933, Sh. 2) to the gate input of Q301. The gate of Q301 goes high.

The VOL SQ HI audio signal is applied to amplifier U301-1 where it is processed with de-emphasis in the U301-1 amplifier stage and 300 Hz high-pass filtering Channel Guard filter U301-2. For unprocessed "mobile receive audio" jumper P303 is connected across 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 conditions for switching. It controls the "Radio PA to Station Speaker Path."

When the audio signal is passed through FET switch Q302, it is applied to amplifier U320-1 and output as RX AUDIO at J302-9. Connector J302-9 provides a connection to the Remote Control Board and to the remote console speaker. Since the audio circuitry on the Remote Interface Board contains de-emphasis, amplifier U302-1 includes audio pre-emphasis. The path from the radio to the remote speaker is set up with the REMOTE switch ON and is completed only when the radio receiver is unswitched. The switching control logic for this path is shown in Figure 5.

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<sup>1</sup> A barred condition means the condition must be in a low state (0) to be true. In this case, the audio is normally muted.



### 3.7 PROCESSED AUDIO FROM THE RADIO AUDIO TO THE STATION SPEAKER

The audio signal from the radio enters the Remote Interface Board at P204-7 as SW SPKR HI. For VOL SQ HI radios, jumper P304 is connected across Pins 1 and 2 of J304. This routes the receiver audio-to-audio PA U303. The radio volume control buttons adjust the receiver volume. The switching logic for this path is shown in Figure 6.

### 3.8 RUS PATH

The Receiver UnSquelch (RUS) signal is generated on the Remote Interface Board, and output to the Remote Control Board through J302-12 as HI (logical 1). A RUS signal is passed to the Remote Board when either the "Rx Audio to Line" path or the "Station Mic to Line" path is active. The conditions are met for:

- REMOTE switch ON
- **or**
- INTERCOM switch ON

RUS is generated by transistor Q308 when a low from either the radio VOL SQ HI line or the radio audio PA line is applied to the base. This turns Q308 off, causing a HI to be routed to the Remote Control Board through J302-12 to the remote console speaker. The logic is shown in Figure 7.

### 3.9 CHANNEL GUARD DISABLE PATH

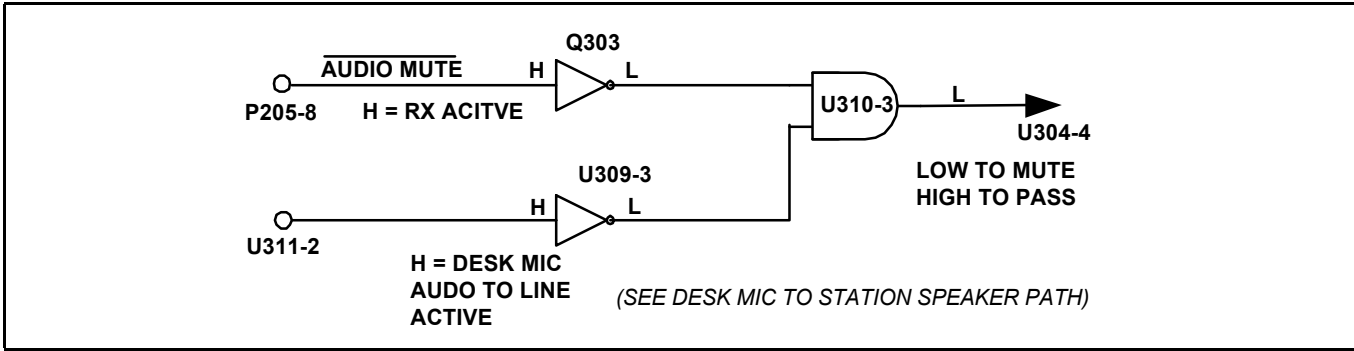
The Channel Guard Disable (CGD) signal enters the Remote Interface Board at J302-11 as a logical low. When Channel Guard is disabled in the radio, all audio transmissions on the receive frequency are heard.

Jumpers P305 must be connected across J305, Pins 1 and 2 when the CGD signal is used. In EDACS tone remote applications, the CGD signal is not used. Reposition jumper P305 across J305, Pins 2 and 3.

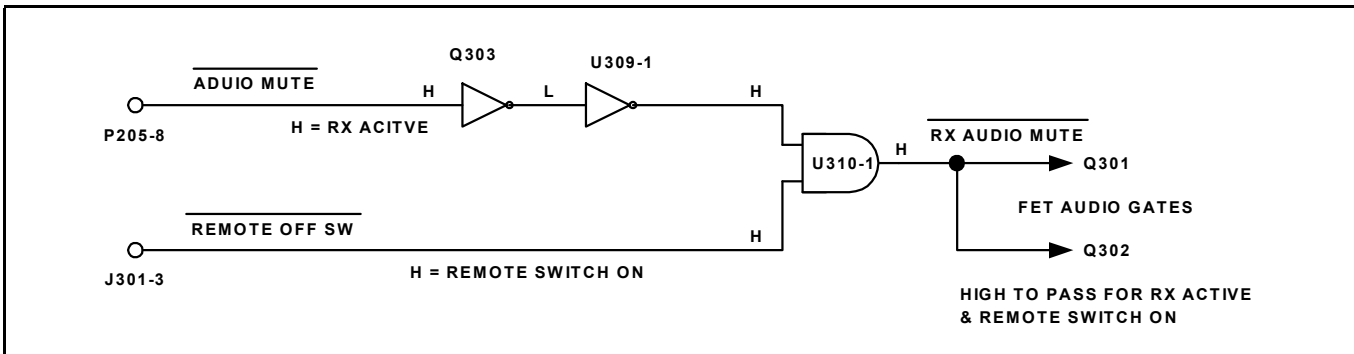
The low CGD signal received at J302-11 is inverted by transistor Q309. This signal is now under control of the REMOTE switch, allowing it to be overridden. With the REMOTE switch OFF, diode D308 pulls the signal low at the base of inverter transistor Q304. Transistor Q304 provides a HI signal to P205-10, enabling Channel Guard. Depending on the input to Q304, Q304 enables or disables the CGD signal.

### 3.10 PTT PATH

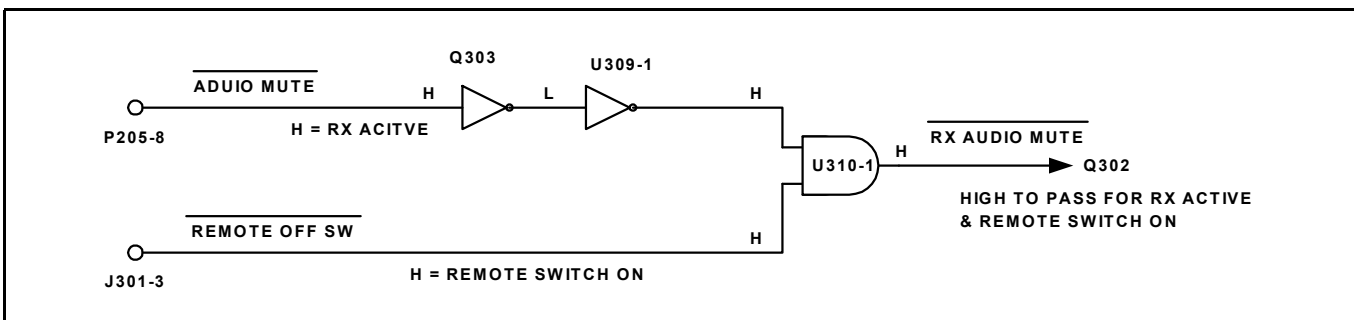
The PTT signal enters the Remote Interface Board at J302-4 as a low to key the radio transmitter. After two inversions through transistors Q307 and Q306, the PTT signal is output to the Remote Interconnect Board through P204-6, as a logical low to key the radio.



**Figure 4: Logic for Controlling the Remote Console Mic to Station Speaker Path**



**Figure 5: Logic for Controlling Radio VOL SQ HI to Remote Speaker Path**



**Figure 6: Logic for Controlling the Radio PA to Remote Speaker Path**

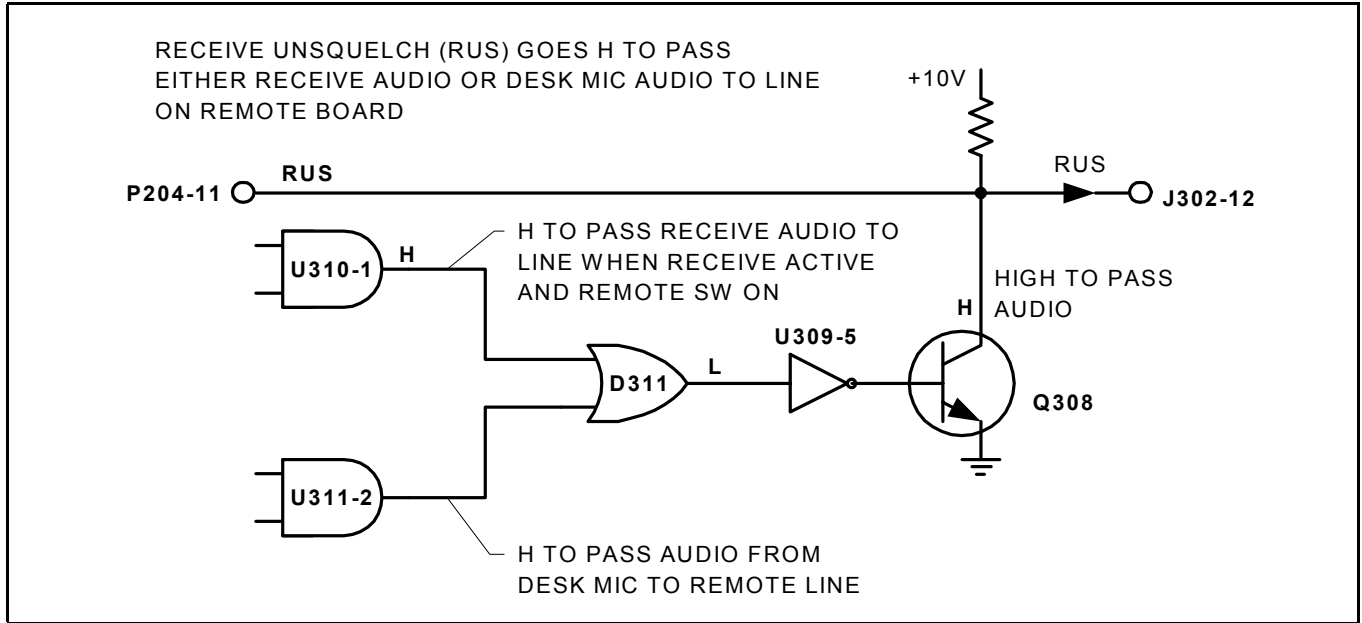


Figure 7: Logic for Controlling the Generation of the RUS Signal

## 4 JUMPER SETTINGS

The “Rev D” Remote Interface Board (19D902931) is fully compatible with earlier revisions when J308 and J309 are appropriately jumpered. The jumpering is shown in the following tables. Earlier MTD and MVS radios should jumper J308 and J309 according to the MDX application.

### 4.1 MDX DC REMOTE CONTROL

JUMPER	FUNCTION	PLUG
J303	Rx Audio Source	2-3
J304	Volume Pot Choice	2-3
J305	Remote CG Dis Hardware	1-2
J306	Mic Audio Only On Remote PTT	2-3
J307	Remote PTT Hardware	1-2
J308	Radio Speaker Load	1-2
J309	Spkr Lo Choice	1-2

### 4.2 MDX DC/TONE REMOTE CONTROL

JUMPER	FUNCTION	PLUG
J303	Rx Audio Source	2-3
J304	Volume Pot Choice	2-3
J305	Remote CG Dis Hardware	1-2
J306	Mic Audio Only On Remote PTT	2-3
J307	Remote PTT Hardware	1-2
J308	Radio Speaker Load	1-2
J309	Spkr Lo Choice	1-2

### 4.3 MDX EDACS REMOTE CONTROL

JUMPER	FUNCTION	PLUG
J303	Rx Audio Source	2-3
J304	Volume Pot Choice	2-3
J305	Remote CG Dis Hardware	2-3
J306	Mic Audio Only On Remote PTT	2-3
J307	Remote PTT Hardware	1-2
J308	Radio Speaker Load	1-2
J309	Spkr Lo Choice	1-2

#### 4.4 JAGUAR/ORION DC REMOTE CONTROL

JUMPER	FUNCTION	PLUG
J303	Rx Audio Source	2-3
J304	Volume Pot Choice	3-3
J305	Remote CG Dis Hardware	1-2
J306	Mic Audio Only On Remote PTT	2-3
J307	Remote PTT Hardware	1-2
J308	Radio Speaker Load	2-3
J309	Spkr Lo Choice	2-3

#### 4.5 JAGUAR/ORION TONE REMOTE CONTROL

JUMPER	FUNCTION	PLUG
J303	Rx Audio Source	2-3
J304	Volume Pot Choice	2-3
J305	Remote CG Dis Hardware	1-2
J306	Mic Audio Only On Remote PTT	2-3
J307	Remote PTT Hardware	2-3
J308	Radio Speaker Load	2-3
J309	Spkr Lo Choice	2-3

#### 4.6 JAGUAR/ORION EDACS REMOTE CONTROL

JUMPER	FUNCTION	PLUG
J303	Rx Audio Source	2-3
J304	Volume Pot Choice	2-3
J305	Remote CG Dis Hardware	2-3
J306	Mic Audio Only On Remote PTT	2-3
J307	Remote PTT Hardware	2-3
J308	Radio Speaker Load	2-3
J309	Spkr Lo Choice	2-3

## 5 REPLACEABLE PARTS

Replaceable assemblies can be ordered through M/A-COM Service Parts. Component items listed in the following list and identified with M/A-COM part numbers are available through M/A-COM Service Parts. All other components are for reference only and are considered common parts. These items can usually be obtained from your local electronic parts distributor.

To order, call or fax our on-line ordering system:

North America:	800-368-3277
Fax:	434-385-2234
International:	434-385-2400
Fax:	434-385-2234

Symbols	Part No.	Description
<b>CAPACITORS</b>		
C301	19A704879P8	Electrolytic: 2.2 $\mu$ F $\pm$ 20%, 50 VDCW.
C302	19A702061P61	Ceramic: 100 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 50 PPM.
C303	19A702052P7	Ceramic: 2200 pF $\pm$ 10%, 50 VDCW.
C304	T644ACP368J	Polyester: .068 $\mu$ F $\pm$ 5%, 50 VDCW.
C305 and C306	T644ACP333J	Polyester: .033 $\mu$ F $\pm$ 5%, 50 VDCW.
C307	T644ACP368J	Polyester: .068 $\mu$ F $\pm$ 5%, 50 VDCW.
C309 and C310	T644ACP333J	Polyester: .033 $\mu$ F $\pm$ 5%, 50 VDCW.
C311	19A701534P4	Polyester: .033 $\mu$ F $\pm$ 20%, 35 VDCW.
C312	19A704879P8	Electrolytic: 2.2 $\mu$ F $\pm$ 20%, 50 VDCW.
C313	19A702052P14	Ceramic: 0.01 $\mu$ F $\pm$ 10%, 50 VDCW.
C314	19A702061P61	Ceramic: 100 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 50 PPM.
C315	19A702052P26	Ceramic: 0.1 $\mu$ F $\pm$ 10%, 50 VDCW.
C316	19A7001225P11	Electrolytic: 470 $\mu$ F -10% to +75%, 16 VDCW.
C317	19A702052P26	Ceramic: 0.1 $\mu$ F $\pm$ 10%, 50 VDCW.
C318	19A7001225P11	Electrolytic: 470 $\mu$ F -10% to +75%, 16 VDCW.
C319	19A701534P7	Tantalum: 10 $\mu$ F $\pm$ 20%, 16 VDCW.
C320	19A702052P26	Ceramic: 0.1 $\mu$ F $\pm$ 10%, 50 VDCW.
C321	19A702061P61	Ceramic: 100 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 50 PPM.
C322	19A702061P17	Ceramic: 12 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C323	19A702052P122	Ceramic: 0.047 $\pm$ 5%, 50 VDCW.

Symbols	Part No.	Description
C324	19A70879P8	Electrolytic: 2.2 $\mu$ F $\pm$ 20%, 50 VDCW.
C325 thru C327	19A702061P61	Ceramic: 100 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 50 PPM.
C328	19A701534P7	Tantalum: 10 $\mu$ F $\pm$ 20%, 16 VDCW.
C329	19A702061P61	Ceramic: 100 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 50 PPM.
C330	19A70879P8	Electrolytic: 2.2 $\mu$ F $\pm$ 20%, 50 VDCW.
C331 and C332	19A702061P61	Ceramic: 100 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 50 PPM.
C333	19A70879P8	Electrolytic: 2.2 $\mu$ F $\pm$ 20%, 50 VDCW.
C334 and C335	19A702061P61	Ceramic: 100 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 50 PPM.
C336	19A702052P14	Ceramic: 0.01 $\mu$ F $\pm$ 10%, 50 VDCW.
C350 thru C352	19A702052P26	Ceramic: 0.1 $\mu$ F $\pm$ 10%, 50 VDCW.
C353 and C354	19A702061P61	Ceramic: 100 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 50 PPM.
C355	19A703314P2	Tantalum: 220 $\mu$ F, -10 +5%, 10 VDCW.
C356	19A701534P4	Polyester: .033 $\mu$ F $\pm$ 20%, 35 VDCW.
<b>DIODES</b>		
D301 thru D307	19A700053P2	Silicon: 2 Diodes in Series; sim to BAV99.
D308 and D309	19A700053P3	Silicon: 2 Diodes in Series, Common Cathode; sim to M8AV70L.
D310	19A703561P2	Silicon: Fast Recovery (2 diodes in series).
D311	19A700053P3	Silicon: 2 Diodes in Series, Common Cathode; sim to M8AV70L.
<b>HEAT SINK</b>		
H8301	19A702917P7	Transistor: sim to Thermalloy Cat 6030B-TT.

Symbols	Part No.	Description
<b>JACKS</b>		
J301 thru J309	19A703248P11	Post: Gold Plated, 10 mm length.
<b>PLUGS</b>		
P204 and P205	19A704779P11	Connector: sim to Molex 22-17-2122.
P303 thru P309	19A702104P2	Connector: Shorting Jumper, Gold Plated ( <i>Housing Color: White</i> ).
<b>TRANSISTORS</b>		
Q301 and Q302	19A134137P7	N-type, Field effect.
Q303 thru Q310	19A700023P2	Silicon, NPN: sim to 2N3904.
<b>RESISTORS</b>		
R301 and R302	19B801251P473	Metal film: 47k Ohms $\pm 5\%$ , 1/10 watt.
R303	19B801251P334	Metal film: 330k Ohms $\pm 5\%$ , 1/10 watt.
R304	19A702931P289	Metal film: 8250 Ohms $\pm 1\%$ , 200 VDCW, 1/8 watt
R305	19A702931P333	Metal film: 21.5k Ohms $\pm 1\%$ , 200 VDCW, 1/8 watt
R306	19B801251P561	Metal film: 560 Ohms $\pm 5\%$ , 1/10 watt.
R307	19B801251P223	Metal film: 22k Ohms $\pm 5\%$ , 1/10 watt.
R308	19B801251P273	Metal film: 27k Ohms $\pm 5\%$ , 1/10 watt.
R309	REP608442/5	Chip: 15 Ohms, 1 watt.
R310 thru R314	19B800607P222	Metal film: 2.2 Ohms $\pm 5\%$ , 1/8 watt.
R315	19B801251P153	Metal film: 15k Ohms $\pm 5\%$ , 1/8 watt.
R316	19B800607P222	Metal film: 2.2 Ohms $\pm 5\%$ , 1/8 watt.
R317	19B801251P102	Metal film: 1k Ohms $\pm 5\%$ , 1/8 watt.
R318 and R319	19B800607P222	Metal film: 2.2 Ohms $\pm 5\%$ , 1/8 watt.
R320	19B800607P221	Metal film: 220 Ohms $\pm 5\%$ , 1/8 watt.
R321	19B800607P100	Metal film: 10 Ohms $\pm 5\%$ , 1/8 watt.
R322	19B801251P103	Metal film: 10k Ohms $\pm 5\%$ , 1/10 watt.
R323 thru R325	19B800779P10	Variable: 10k 25%, 100 VDCW, .3 watt.
R326	19B801251P823	Metal film: 8.2k Ohms $\pm 5\%$ , 1/10 watt.
R327	19B801251P562	Metal film: 5.6k Ohms $\pm 5\%$ , 1/10 watt.
R328	19B801251P223	Metal film: 22k Ohms $\pm 5\%$ , 1/10 watt.
R329	19B801251P563	Metal film: 56k Ohms $\pm 5\%$ , 1/10 watt.
R330	19B801251P331	Metal film: 330 Ohms $\pm 5\%$ , 1/10 watt.
R331	19B801251P332	Metal film: 3.3k Ohms $\pm 5\%$ , 1/10 watt.

Symbols	Part No.	Description
R332	19B801251P155	Metal film: 15k Ohms $\pm 5\%$ , 1/10 watt.
R333	19B801251P682	Metal film: 6.8k Ohms $\pm 5\%$ , 1/10 watt.
R334	19B801251P333	Metal film: 33k Ohms $\pm 5\%$ , 1/10 watt.
R335	19B801251P561	Metal film: 560 Ohms $\pm 5\%$ , 1/10 watt.
R336	19B801251P562	Metal film: 5.6k Ohms $\pm 5\%$ , 1/10 watt.
R337	19B801251P154	Metal film: 150k Ohms $\pm 5\%$ , 1/10 watt.
R338	19B801251P104	Metal film: 100k Ohms $\pm 5\%$ , 1/10 watt.
R339	19B801251P470	Metal film: 47 Ohms $\pm 5\%$ , 1/10 watt.
R340	19B801251P104	Metal film: 100k Ohms $\pm 5\%$ , 1/10 watt.
R341	19B801251P102	Metal film: 1k Ohms $\pm 5\%$ , 1/8 watt.
R342	19B801251P470	Metal film: 47 Ohms $\pm 5\%$ , 1/10 watt.
R343 and R344	19B801251P224	Metal film: 220k Ohms $\pm 5\%$ , 1/10 watt.
R345	19B801251P223	Metal film: 22k Ohms $\pm 5\%$ , 1/10 watt.
R346	19B801251P103	Metal film: 10k Ohms $\pm 5\%$ , 1/10 watt.
R350	19B801251P137	Metal film: 237 Ohms $\pm 1\%$ , 200 VDCW, 1/8 watt.
R351	19B801251P221	Metal film: 1620 Ohms $\pm 1\%$ , 200 VDCW, 1/8 watt.
R352	19B801251P137	Metal film: 237 Ohms $\pm 1\%$ , 200 VDCW, 1/8 watt.
R353	19B801251P185	Metal film: 750 Ohms $\pm 1\%$ , 200 VDCW, 1/8 watt.
R354	19B801251P103	Metal film: 10k Ohms $\pm 5\%$ , 1/10 watt.
R355 and R356	19B801251P104	Metal film: 100k Ohms $\pm 5\%$ , 1/10 watt.
R357 thru R359	19B801251P473	Metal film: 47k Ohms $\pm 5\%$ , 1/10 watt.
R360 and R361	19B801251P103	Metal film: 10k Ohms $\pm 5\%$ , 1/10 watt.
R362 and R363	19B801251P104	Metal film: 100k Ohms $\pm 5\%$ , 1/10 watt.
R364	19B801251P473	Metal film: 47k Ohms $\pm 5\%$ , 1/10 watt.
R365 and R366	19B801251P103	Metal film: 10k Ohms $\pm 5\%$ , 1/10 watt.
R367	19B801251P473	Metal film: 47k Ohms $\pm 5\%$ , 1/10 watt.
R368 and R369	19B801251P104	Metal film: 100k Ohms $\pm 5\%$ , 1/10 watt.
R370	19B801251P103	Metal film: 10k Ohms $\pm 5\%$ , 1/10 watt.
R371 and R372	19B801251P473	Metal film: 47k Ohms $\pm 5\%$ , 1/10 watt.
R373 and R374	19B801251P104	Metal film: 100k Ohms $\pm 5\%$ , 1/10 watt.

## REPLACEABLE PARTS

Symbols	Part No.	Description
R375 thru R377	19B801251P103	Metal film: 10k Ohms $\pm 5\%$ , 1/10 watt.
R378 and R379	19B801251P102	Metal film: 1k Ohms $\pm 5\%$ , 1/8 watt.
R380 and R381	19B801251P391	Metal film: 390 Ohms $\pm 5\%$ , 1/8 watt.
R382 thru R384	19B801251P473	Metal film: 47k Ohms $\pm 5\%$ , 1/10 watt.
<b>RESISTOR NETWORK</b>		
RN301	19A704885P8	Custom: 9 pins, 0.125 watt.
<b>INTEGRATED CIRCUITS</b>		
U301 and U302	19A700086P4	Linear: Dual Operational Amplifiers; sim to 458
U303	19A701830P1	Linear: Audio Amplifier; sim to TDA 2003.
U304	19A700029P44	Digital: Bilateral Switch; sim to 4066B.
U305	19A700086P4	Linear: Dual Operational Amplifier; sim to 4558.
U307	19A701999P1	Linear: Voltage Regulator; sim to LM317T.

Symbols	Part No.	Description
U308	19A701999P4	Linear Positive Voltage Regulator; sim to LM317LZ.
U309	19A700176P2	Digital: Hex Buffer; sim to 4069UB.
U310	19A700029P47	Digital: Quad 2-Input and Gate; sim to 4081B.
U311	19A700029P46	Digital: Quad, -Input OR Gate.
<b>VARISTOR</b>		
VR301	REYUA20310/1	Chip: Metal Oxide Varistor (Transient voltage suppressor).
<b>MISCELLANEOUS</b>		
	19A702364P306	Machine screw, TORZ Drive; No. M3-0.5 x 8.
	19A701312P4	Flatwasher: 3.2 ID.
	19A700034P4	Nut, hex: No. M3 x 0.5 MM.
	19A00033P5	Lockwasher, external tooth: No. 3.

### 5.1 Production Changes

Changes in the equipment to improve or to simplify circuits are identified by a **"Revision Letter,"** which is stamped on the unit after the unit number. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

**REV. A:** To change volume control range, add time delay and jumpers to accommodate the keypad option.

Added capacitor C311.  
 Added Jacks J306 and J307.  
 Added plugs P306 and P307.  
 Added transistor Q310  
 Added resistors R324 and R342 through R345.

**REV. B:** To equalize transmit audio between disk top mic mike and the remote unit.

Changed resistor R333. Resistor R333 was 19B801251P473, 47k Ohms.

**REV. C:** To replace parts no longer available.

Changed transistors Q301 and Q302. Transistor Q301 and Q302 were 19A700060P4.

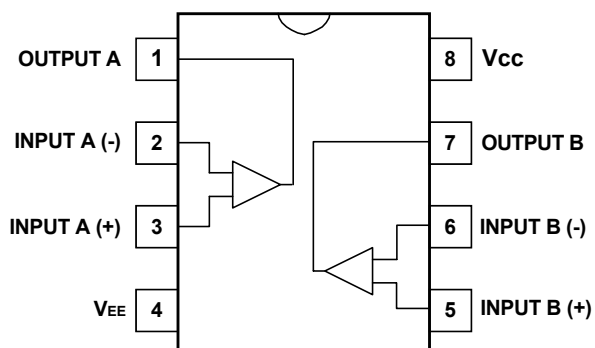
**REV. D:** To make Remote Interface Board 19D902931G1 compatible with Orion Mobile Radios.

Added J308 and J309.  
 Added P308 and P309.  
 Added capacitor C356.  
 Added voltage regulator VR301.  
 Added resistor R346.  
 Changed resistor R309. Resistor R309 was 19B800607P2R2, 2.2 Ohms, 1/8 w.  
 Deleted resistors R310 thru R314.  
 Resistors R310 thru R314 were 19B800607P2R2, 2.2 Ohms, 1/8 w.

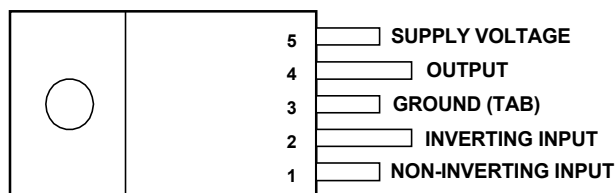


## 6 IC DATA

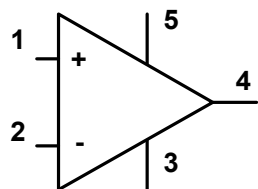
U301, U302 and U305  
 DUAL OPERATIONAL AMPLIFIER  
 19A700086P4 (4558)



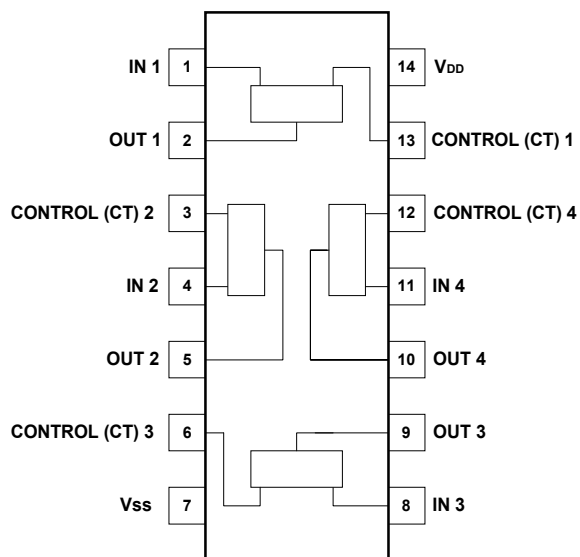
U303  
 AUDIO AMPLIFIER  
 19A701830P1 (TDA2003)



PIN IDENTIFICATION

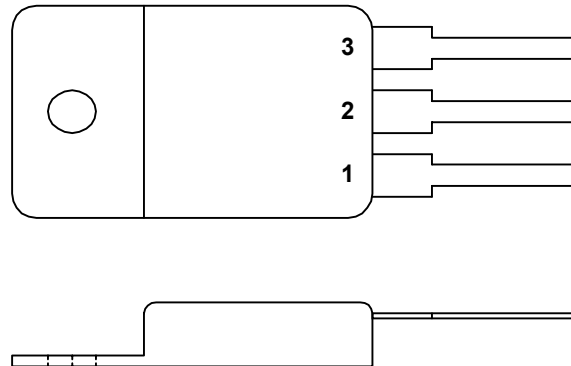


U304

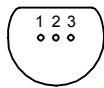
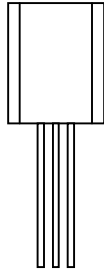


BILATERAL SWITCH  
 19A700029P44 (4066B)

U307  
 VOLTAGE REGULATOR  
 19A701999P1 (LM317T)



**U308**  
**VOLTAGE REGULATOR**  
 19A701999P4 (LM317LZ)

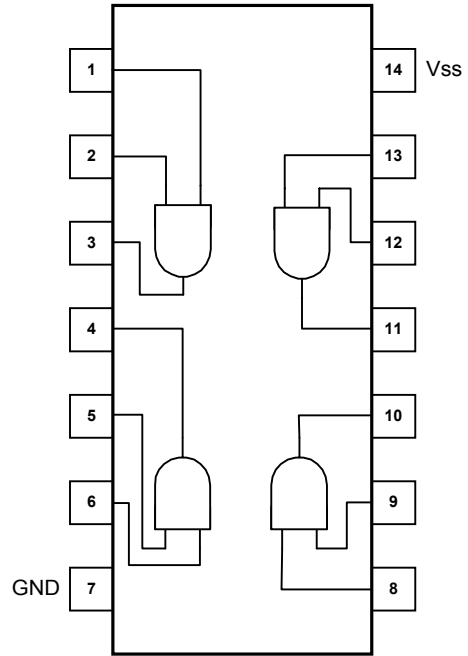


**BOTTOM VIEW**

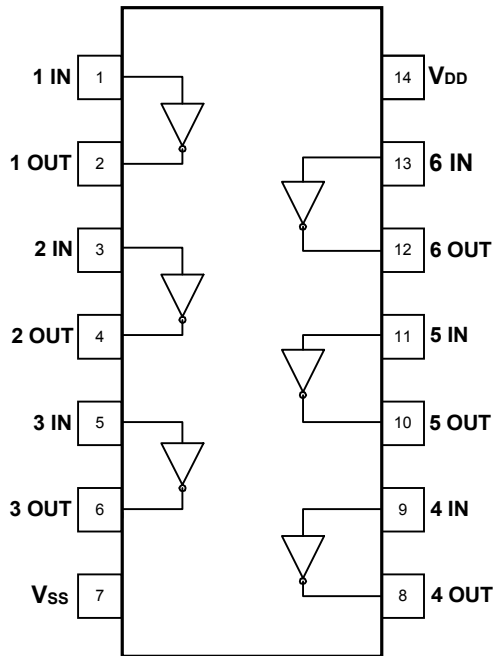
Pin Identification

- Pin 1 Adjust
- Pin 2 Output
- Pin 3 Input

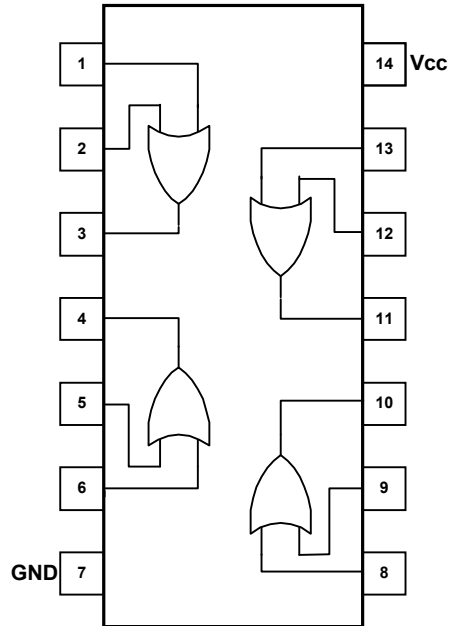
**U310**  
**QUAD 2-INPUT AND GATE**  
 19A700029P47 (4081B)

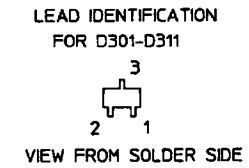
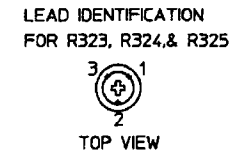
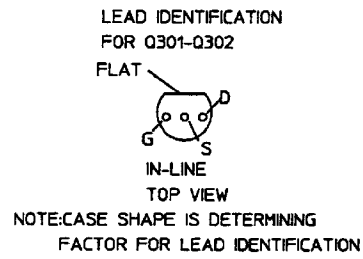
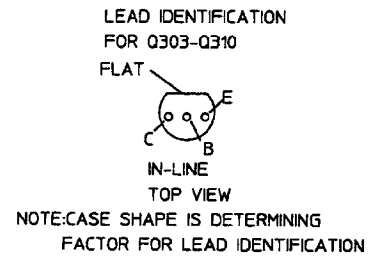
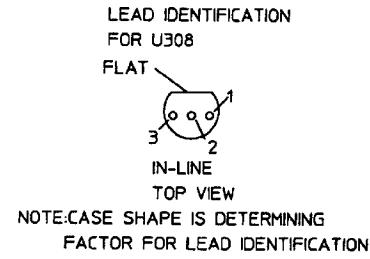


**U309**  
**HEX BUFFER**  
 19A700176P2 (4069UB)

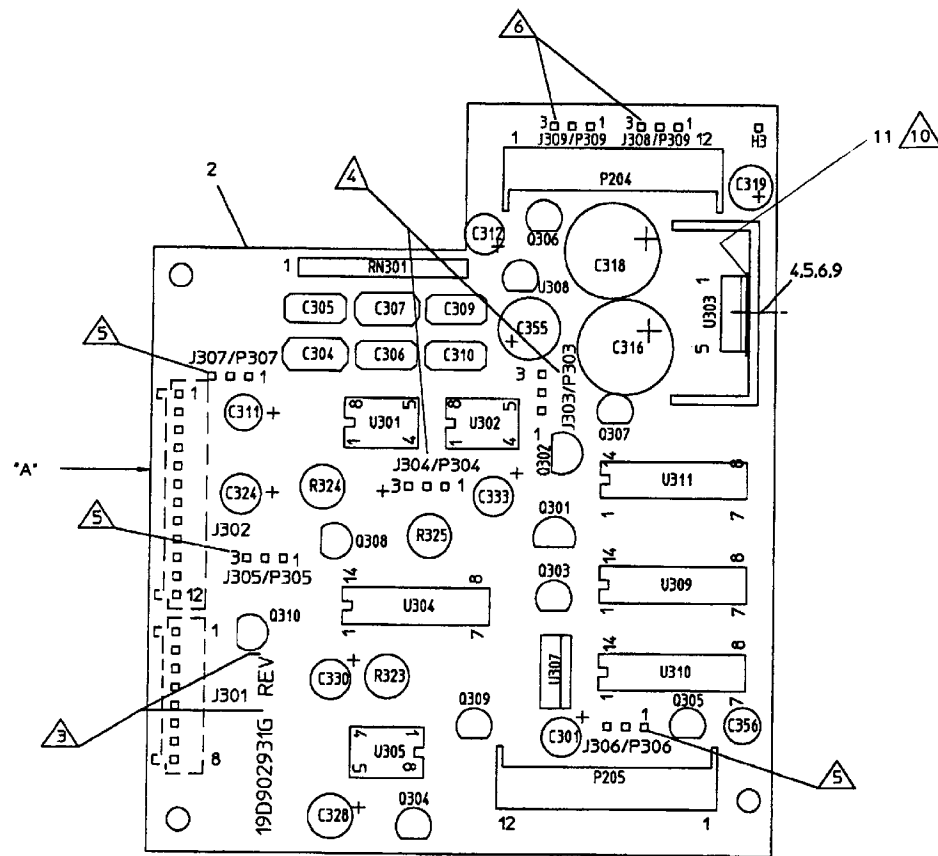


**U311**  
**QUAD 2-INPUT OR GATE**  
 19A700029P46

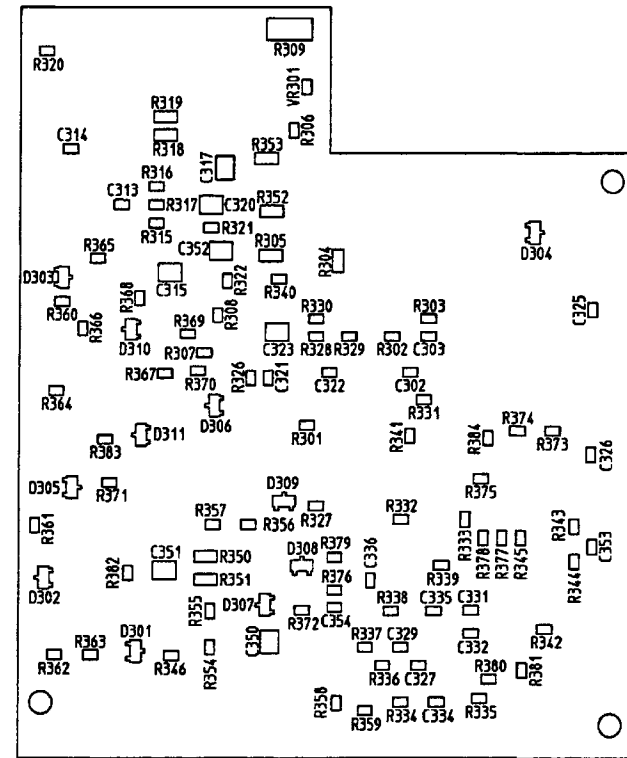




J301-1 THRU J301-8  
J302-1 THRU J302-12  
J308-1 THRU J308-3  
J309-1 THRU J309-3



FRONT SIDE VIEW



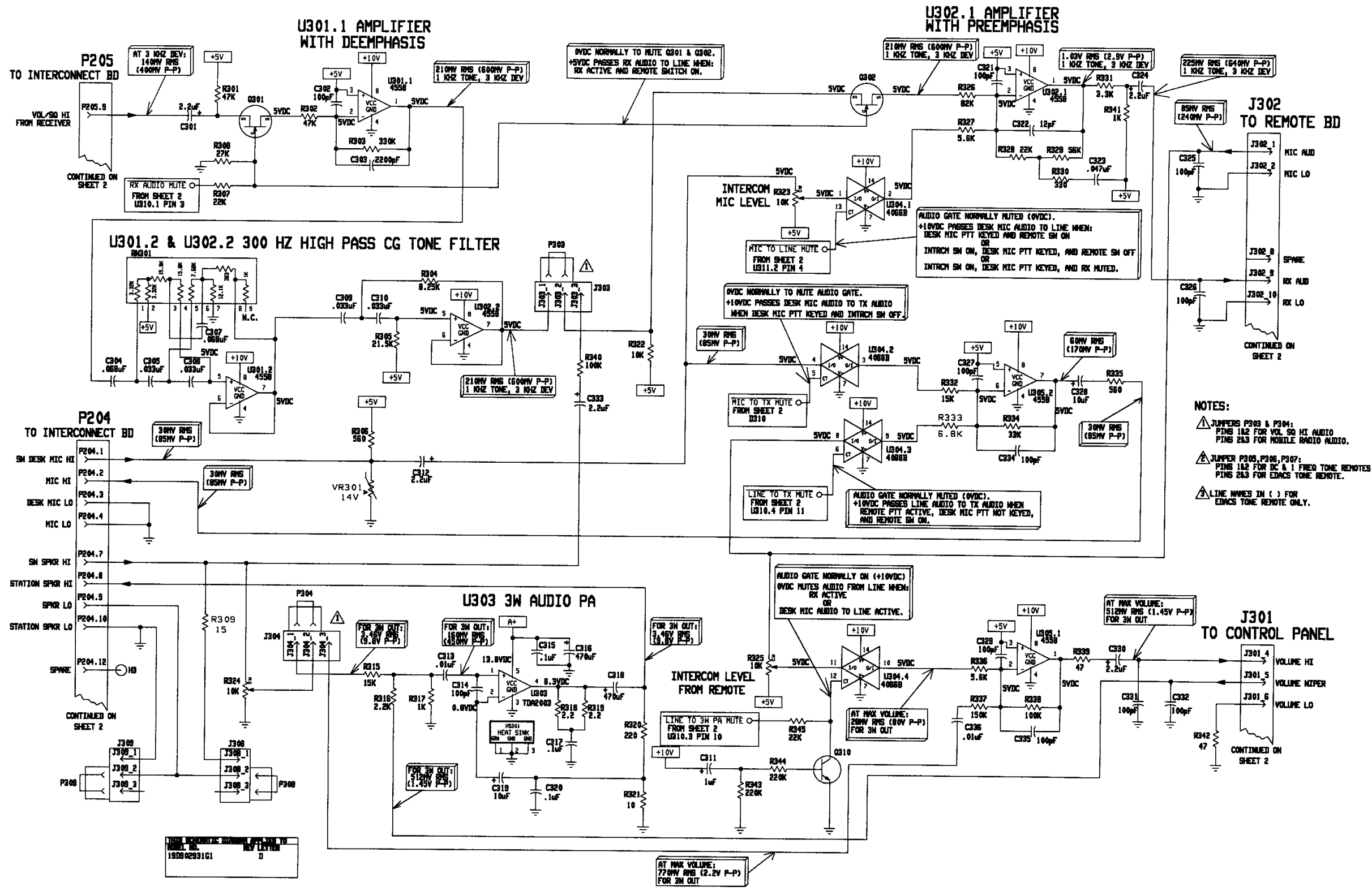
BACKSIDE VIEW

- 1 NOTES
1. SOLDER ALL ELECTRICAL CONNECTIONS.
  2. COMPONENT LEADS TO PROTRUDE 2 MAX BELOW SOLDER SIDE OF BOARD.
  3. MARK APPLICABLE GROUP AND REVISION PER 19A700154P1 .1.6 HIGH .COLOR BLACK FOR LATEST REVISION SEE REVISION LETTER INDEX 19C852060
  4. FOR INITIAL TESTS JUMPERS ARE TO BE ON P303-1 & 2 AND P304-2 & 3. FOR MVS INSTALL JUMPERS ON P303 AND P304 PINS-1 & 2 FOR TMX AND MTD INSTALL JUMPERS ON P303 AND P304 PINS-2 & 3
  5. INSTALL P305, P306, AND P307 JUMPERS ON J305, J306, AND J307 PINS 1 AND 2. MOVE JUMPER TO PINS 2 AND 3 FOR PST TONE REMOTE APPLICATION.
  6. INSTALL P307 AND P308 JUMPERS ON J307 AND J308 PINS 2 AND 3.
  7. INDICATES FRONT OF COMPONENT AUTO-INSERTION MACHINES.
  8. PIN 1 OF RN301 IDENTIFIED BY DOT, COLOR STRIPE, VENDORS LOGO, OR NOTCH.
  9. THE FOLLOWING DEVICES ARE ELECTROSTATIC SENSITIVE DEVICES REQUIRING SPECIAL CARE PER 19A701294: U304, U309, U310, AND U311.
  10. ITEM 11 TO BE BETWEEN U303 AND HEATSINK

REMOTE INTERFACE BOARD  
19D902931G1

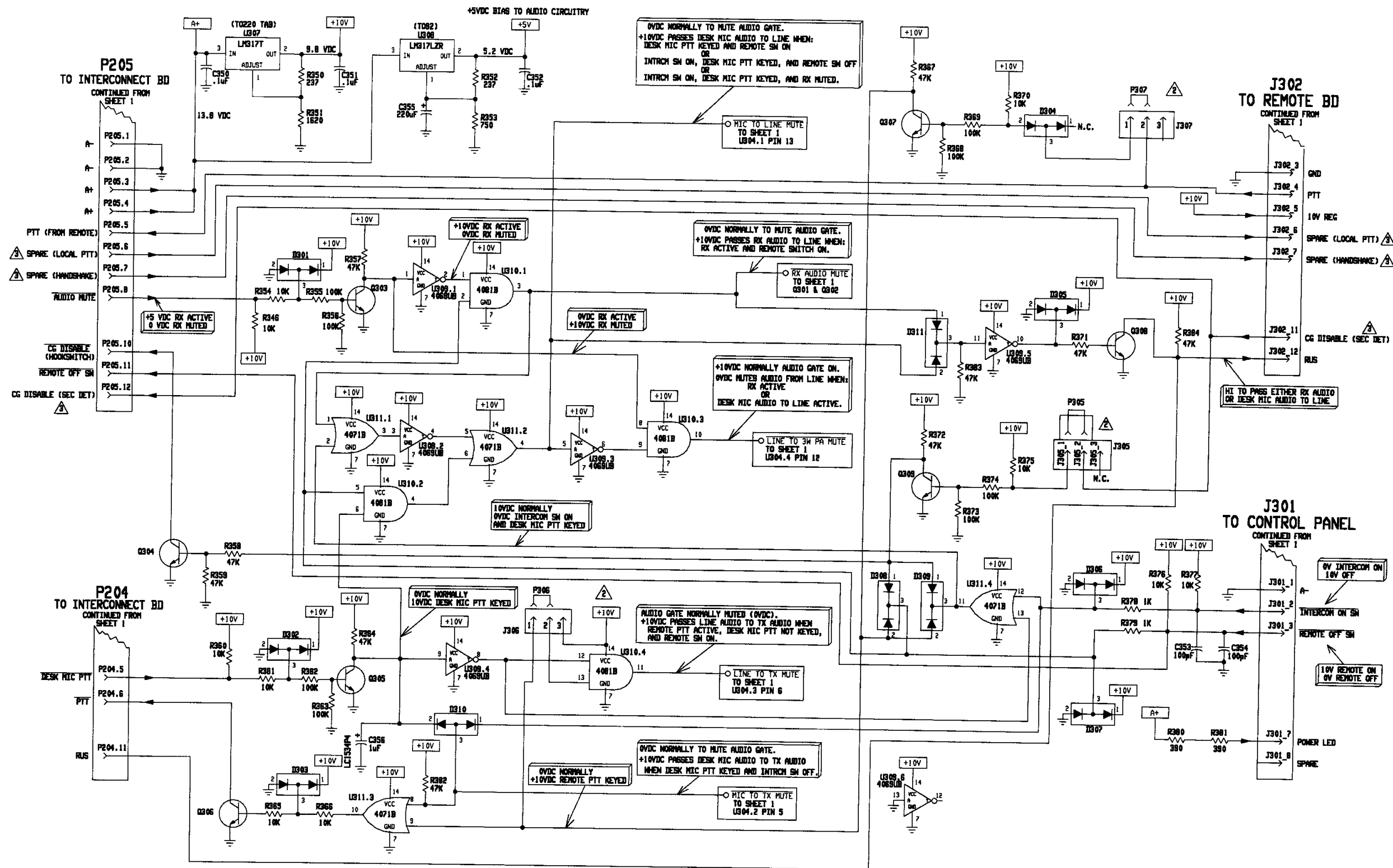
(19D902931, Rev. 7)

**SCHEMATIC DIAGRAM**



**REMOTE INTERFACE BOARD  
19D902931G1**

(19D902933, Sh. 1, Rev. 10)



**REMOTE INTERFACE BOARD  
19D902931G1**

(19D902933, Sh. 2, Rev. 10)

