



MOTOROLA

RCH 3000 Desk Set L3029, L3030, L3031

With Installation/Operation Instructions for the RCH 3000 Junction Box

User Operation and Installation Manual



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- c. unauthorized alterations or repairs have been made, or unapproved parts used in the equipment.

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Scope of Manual

This manual offers descriptive data and service information for the L3029, L3030, and L3031 RCH 3000 Desk Sets. This manual is intended for use by experienced technicians familiar with similar types of equipment. It contains service information for the equipment described and is current as of the printing date. Changes that occur after the printing date are incorporated by manual addendums. These addendums are added to the manual as the engineering changes are incorporated into the equipment.

Nomenclature

This equipment is specifically identified by an overall model number on the rear panel. If additional options are ordered, the option will be indicated on the circuit board, if a hardware option.

Service

Motorola's National Service organization offers one of the finest nationwide installation and maintenance programs available to communication equipment users. This organization includes:

- Well over 900 authorized Motorola Service Subcontractors (MSSs) and Company Owned Service Centers (COCSs) nationwide.
- A staff of highly trained technicians who are thoroughly up to date on Motorola systems and products.
- Local Service Representatives who initiate, maintain and nurture customer service relationships.
- Local Service Management teams who promote service consistency throughout the national service network.

Should you wish to purchase a service agreement which ensures timely preventative maintenance, priority response to emergencies and has pre-established rates for parts and labor to simplify budgeting, contact your local Service Representative or write to:

National Service Manager
Motorola Communications and Electronics, Inc.
Schaumburg, Illinois 60196

Replacement Part Ordering

When ordering replacement parts, the complete identification number should be included. This applies to all components, kits, and chassis. If the component part number is not known, the order should include the number of the chassis or kit of which it is a part and sufficient description of the desired component to identify it.

Order parts from:

Parts Service Manager

Motorola Accessories and Aftermarket Division
1313 E. Algonquin Rd.
Schaumburg, IL 60196
800-422-4210

Depot Repair

GAI-Tronics Corporation
400 East Wyomissing Ave.
Mohnton, PA 19540
US: 800-442-4782
or
888-523-4303

FCC Interference Warning

The FCC requires that manuals pertaining to Class A and Class B computing devices must contain warnings about possible interference with local residential radio and TV reception. This warning reads as follows:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Safe Handling of CMOS Integrated Circuit Devices

Many of the integrated circuit devices used in communications equipment are of the Complementary Metal Oxide Semiconductor (CMOS) type. Because of their high open circuit impedance, CMOS integrated circuits are vulnerable to damage from static charges. Care must be taken handling, shipping, and servicing them and the assemblies in which they are used.

Even though protection devices are provided in CMOS integrated circuit inputs, the protection is effective only against overvoltage in the hundreds of volts range such as is encountered in an operating system. In a system, circuit elements distribute static charges and load the CMOS circuits, decreasing the chance of damage. However, CMOS circuits can be damaged by improper handling of the modules, even in a system.

To avoid damage to circuits, observe the following handling, shipping, and servicing precautions:

1. Prior to and while servicing a circuit module, particularly after moving within the service area, momentarily touch both hands to a bare metal, earth-grounded surface. This will discharge any static charge which may have accumulated on the person doing the servicing.
Note: Wearing Conductive Wrist Strap (Motorola No. RSX-4015A) will minimize static build-up during servicing.
2. Whenever possible, avoid touching any electrically conductive parts of the circuit module with your hands.
3. Power down the unit before installing or removing the circuit module.
4. When servicing a circuit module, avoid carpeted areas, dry environments, and certain types of clothing (silk, nylon, etc.) because they contribute to static build-up. Similarly, disconnect the test probe prior to removing the ground lead.
5. All electrically powered test equipment should be grounded. Apply the ground lead from the test equipment to the circuit module before connecting the test probe.
6. If a circuit module is removed from the system, it is desirable to lay it on a conductive surface (such as a sheet of aluminum foil) which is connected to ground through 100K of resistance.
7. When soldering, be sure the soldering iron is grounded.
8. Prior to connecting jumpers, replacing circuit components, or touching CMOS pins (if this becomes necessary in the replacement of an integrated circuit device), be sure to discharge any static build-up as described in procedure 1. Since voltage differences can exist across the human body, it is recommended that only one hand be used if it is necessary to touch pins on the CMOS device and associated board wiring.
9. When replacing a CMOS integrated circuit device, leave the device in its conductive rail container or conductive foam until it is to be inserted into the printed circuit module.
10. All low impedance test equipment (such as pulse generators, etc.) should be connected to CMOS device inputs after power is applied to the CMOS circuitry. Similarly, such low impedance equipment should be disconnected before power is turned off.
11. Replacement modules shipped separately from the factory will be packaged in a conductive material. Any modules being transported from one area to another should be wrapped in a similar material (aluminum foil may be used). Never use non-conductive material for packaging these modules.

Performance Specifications

General - Desk Set and Junction Box with Bus Translator

Operating Temperature Range	0 to +50° Celsius
Humidity	95% @ 50° Celsius (non-condensing)
Size	Desk Set: 8.0 W x 9.1 L x 5.1 H inches maximum Junction Box: 7.05 W x 5.2 D x 1.38 H inches
Weight.....	Deskset: Not to exceed 1.5 kg (3.3 lbs) Junction Box: 3.0 lbs
External Power Supply Input	95 to 130 V ac, 60 Hz (CDN6008) 95 to 240 V ac, 60-50 Hz (TDN9912)
Unit Input Voltage Range	10.5 to 16 V dc @0.5 A maximum, full audio
Junction Box Input Voltage Range	10.5 to 16 V dc @0.06 A maximum
Maximum number of desk sets in parallel.....	31 with use of multiple J-boxes

Audio, General

Audio Response.....	±3 dB, 300-3000 Hz @ 1000 Hz
Hum and Noise.....	50 dB below rated outputs
Distortion	Less than 5% @ 1000 Hz (full volume)

Receive Audio (Desk Set)

Input.....	0.78 V ac nominal, autoleveled, -10 dB to +6 dB nominal
Output to Speaker.....	1 W minimum into 16Ω, autoleveled, full output
Output to Handset.....	130 mV minimum into 160Ω, autoleveled, full output

Transmit Audio (Desk Set)

Internal Mic Input.....	4 mV ac, nominal, adjustable
Handset Mic Input	18 mV ac, nominal, adjustable
Output.....	Gated, 80 mV ac, or 0.78 V ac nominal, selectable into 600Ω

External Output with Optional Clock

Type	Form C Dry Contact Closure Current amp rating: 1 amp, 125 V ac; 2 amp, 30 V dc
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Maximum Distance Between Desk Set and Radio

With Junction Box Bus Translator	5,000 feet cable maximum
Without Junction Box Bus Translator	50 feet cable maximum

Safety

MET NRTL UL 1950, METc CSA950-95, File No. E112172 (Use with Listed Class 2 adapter 110 V ac;
UL E104603, CSA Cert. LR67888, or 100-240 V ac option: UL file E152235, CSA Cert. LR67888)
EU: EN60950

EMC

USA	FCC Part 15-B
Canada	ICES-003
EU Emissions	EN 55022
EU Immunity.....	EN 50082-1 (Jan. 92)
EN61000-4-2.....	ESD
EN61000-4-3.....	RF Radiated
EN61000-4-4.....	Electrical Fast Transient/Burst
EN61000-4-5.....	Surge Immunity
EN61000-4-6.....	Conducted disturbances
EN61000-4-8.....	Power Frequency Magnetic Field Immunity
EN61000-4-11.....	Voltage Dips, Short Interruptions

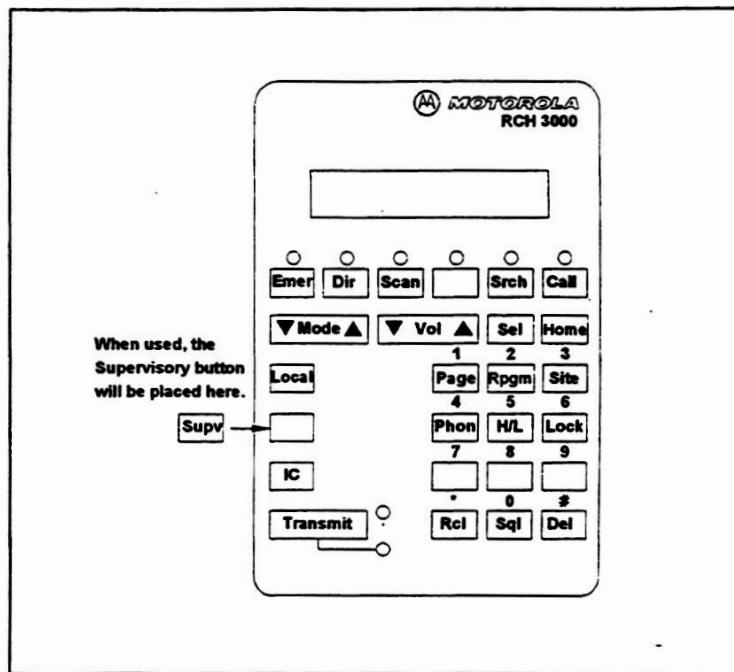
Description

Front Panel Button Description

The front panels for the RCH 3000 for the Astro, the iDEN, and the MCS 2000 are shown in the figures that follow. Please note the placement of the optional supervisory button on each.

RCH 3000 Front Panel for Astro

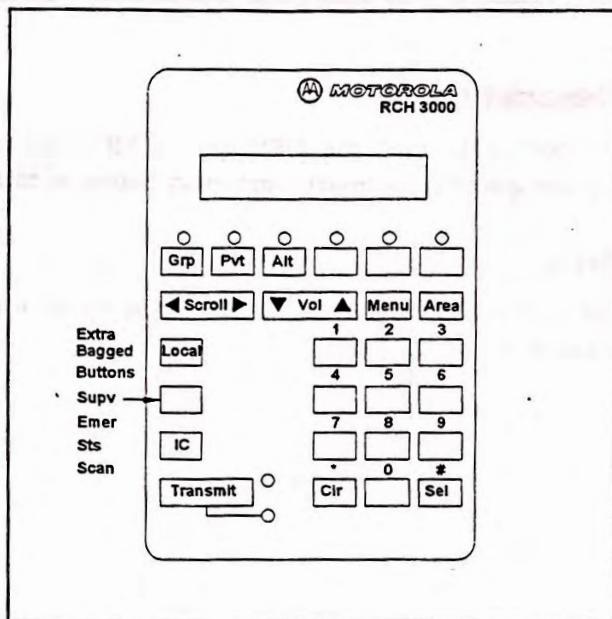
The front panel for the L3030 RCH 3000 Desk Set, which is intended for use with the Astro radio, is shown below. Note the position of the optional supervisory button.



L3030 RCH 3000 Desk Set Front Panel

RCH 3000 Front Panel for iDEN

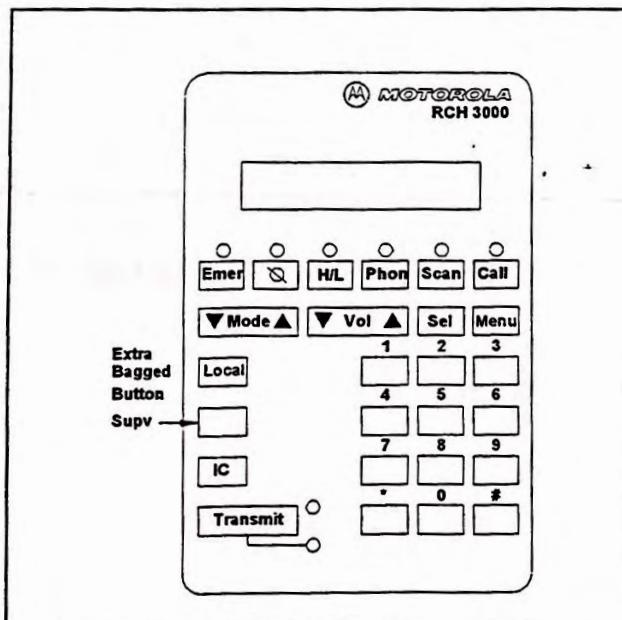
The front panel for the L3029 RCH 3000 Desk Set, which is intended for use with the iDEN radio, is shown below.



L3029 RCH 3000 Desk Set Front Panel

RCH 3000 Front Panel for MCS 2000

The front panel for the L3031 RCH 3000 Desk Set, which is intended for use with the MCS 2000 radio, is shown below.



L3031 RCH 3000 Desk Set Front Panel

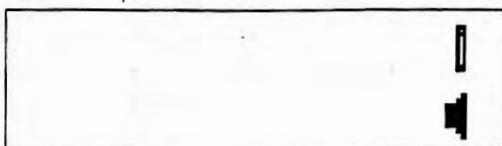
Accessories

Description	Part No.
RCH 3000 Desk Set for iDEN (m470)	L3029
RCH 3000 Desk Set for ASTRO Consolette	L3030
RCH 3000 Desk Set for MCS 2000	L3031
Options	
110/220 V ac 50/60 Hz Power Supply	Z353
110 V ac Power Supply	E275
12/24 Hour Clock w/ External Alarm Closure	Z827
Battery Revert	E04

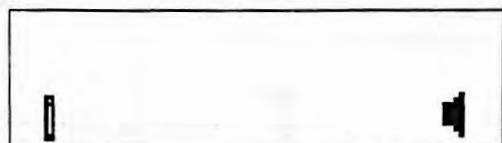
Field Installation Kits and Accessories

Description	Part No.
Fuse, 1A Fastblow 5x20mm (Bussman GMA-1 type)	4612-23500-01
RCH 3000 Junction Box, for ASTRO	CDN1337
RCH 3000 Junction Box, for iDEN	CDN6304
RCH 3000 Junction Box, for MCS 2000	CDN6683
Battery Revert Field Modification Kit	CDN1363
RCH 3000 Junction Box, 19-inch Rack Mount	CDN6010
Cable, RCH 3000 Radio to Junction Box (DB25 to DB25) for Astro - 10 feet	CDN1340
Cable, for MCS Radio - 10 feet	CDN1333
Cable, RCH 3000 Audio/Data - 10 feet	CDN6684
Cable, RCH 3000 Audio/Data - 25 feet	CDN1334
Cable, RCH 3000 Audio/Data - 50 feet	CDN1335
Adapter Module, RCH 3000 (DB25 to RJ45)	CDN1336 (Astro)
Adapter Module, RCH 3000 (DB25 to RJ45)	CDN6303 (MCS2000)
Power Supply, 110 V ac 60 Hz	CDN6008
Power Supply, 110/220 V ac 50/60 Hz	TDN9912
Manual, RCH 3000 Desk Set Installation/Operations	68-81129E92
Manual, RCH 3000 Modem Installation/Operations	68-81129E93

If the RCH 3000 has been programmed for the iDEN radio, the intercom icon is located in the upper right corner of the display screen. If the RCH 3000 has been programmed for the Astro radio, the intercom icon is located in the lower left corner of the display screen. Refer to the appropriate figure below. For radio selection programming, refer to the Radio Selection section.



Intercom Icon Screen for iDEN



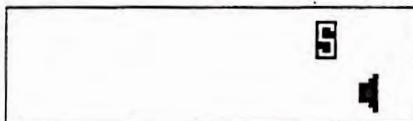
Intercom Icon Screen for Astro Radio

Supervisory Icon - Astro and iDEN only

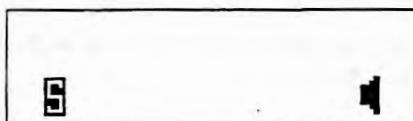


The supervisory icon is an inverse "S". It is steady when the desk set is originating the supervisory session (the SUPV button has been pressed from this desk set). The supervisory icon flashes when the desk set's keypad is locked because a parallel user pressed his SUPV button.

If the RCH 3000 has been programmed for the iDEN or MCS 2000, the supervisory icon is located in the upper right of the display screen. For radio selection programming, refer to the Radio Selection section. If the RCH 3000 has been programmed for the Astro radio, the supervisory icon is located in the lower left of the display screen. Refer to the appropriate figures below.



Supervisory Icon Screen for iDEN Radio



Supervisory Icon Screen for Astro Radio

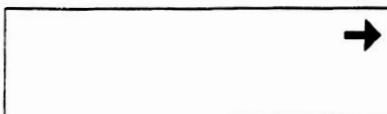
External Alarm Icon - Astro and iDEN only



The external alarm is a bell shape. The alarm icon flashes to signify the external alarm is active. Refer to Alarm Set Menu section.

Talkaround Icon - MCS 2000 only

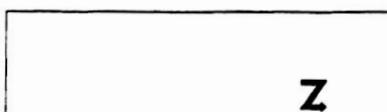
The talkaround icon indicates that the MCS 2000 is transmitting and receiving on the same conventional radio frequency - that is, that the radio is bypassing (or talking around) the repeater. It is located in the top right corner of the display. Refer to the radio manual for more detailed description of talkaround operation.



Talkaround Icon for MCS 2000 only

Scan Icon - MCS 2000 only

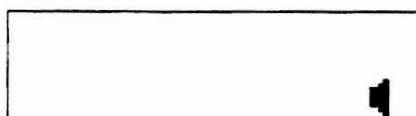
The scan icon indicates that the MCS 2000 is in a scan mode. It is located in the lower right corner of the display. Refer to the radio manual for details on the scan feature.



Scan Icon for MCS 2000 only

Monitor - MCS 2000 only

When the MCS 2000 is on a conventional channel, the monitor icon indicates that coded squelch detection has been disabled. Thus, any transmissions on the channel are audible at the desk set speaker. This icon is a speaker symbol and is located in the lower right corner of the display.

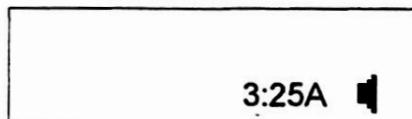


Audio Icon for the MCS 2000

Clock (if present)

Clock display can be set to either 12 or 24 hour mode. Refer to 12/24 Hour Clock Mode section. To set the clock, refer to Clock Set section.

The time will be displayed in the lower right corner of the screen and is only visible if the RCH 3000 has been programmed for the Astro radio. Refer to the figure below. For radio selection programming, refer to the Radio Selection section.

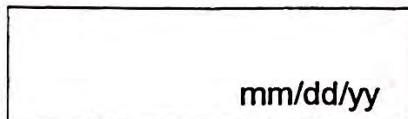


Clock Display

Calendar Set (if present)

When the clock option is present, the date can also be displayed by pressing the LOCAL Button and the number "9" button simultaneously. To set the calendar, refer to the Calendar Set Menu section.

The date will be displayed in the lower right corner of the screen and will be visible for approximately 3 seconds. Refer to the figure below.



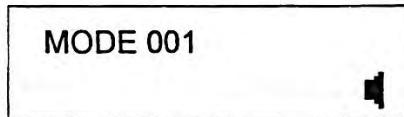
Calendar Display

Display Arrangement

The RCH 3000's normal display arrangement depends on the radio interface selected from the parameter menu.

Astro Display

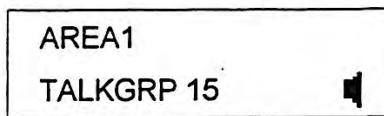
If the Astro interface has been selected, the top line of the screen will display radio messages, as shown in the figure below. For radio selection programming, refer to the Radio Selection section.



Astro Display

iDEN/MCS 2000 Display

If the iDEN or MCS 2000 interface has been selected, the first and second line of the screen will be used to display radio messages, as shown in the figure below. For radio selection programming, refer to the Radio Selection section.



iDEN or MCS 2000 Display

Local Menus

Introduction

Menu Access

The RCH 3000 Desk Set has several menus which allow adjustments during normal operations. Each menu is selected by pressing the LOCAL button and then the appropriate numeric button simultaneously during normal desk set operation. The LOCAL button and numeric key combinations necessary to access the various desk menus are shown below.

LOCAL	+	0	= System Configuration Screen
LOCAL	+	1	= Handset Mic Gain
LOCAL	+	2	= Local Mic Gain
LOCAL	+	3	= Viewing Angle
LOCAL	+	4	= Clock Set (if present)
LOCAL	+	5	= Calendar Set (if present)
LOCAL	+	6	= Clock Alarm Set (if present)

Menu Access Key Combinations

To exit a menu item press the # key. This will cause the screen to return to normal operation. If no key combination has been pressed for 5 seconds, the desk set will automatically return to normal operation.

Menu Item Descriptions

System Configuration

Pressing the LOCAL + 0 button combination will cause the desk set to display its current configuration for approximately 3 seconds.

The system will appear as either 'local' or 'remote' if the desk set is connected to a remote RCH 3000 Modem. If the desk set is remote, the baud rate of the RCH 3000 Modem will be displayed next to MODEM.

SYSTEM: LOCAL
MODEM: N/A

System Configuration Screen

Handset Mic Gain

This function adjusts the handset microphone (mouthpiece) level in five steps, from 1 through 5, with level 5 being the most sensitive. The handset mic gain affects the desk set user's voice level received at system mobiles, portables or other desk sets. The default value for this function is 3. It is advisable to change the value one step at a time, confirming the result with a mobile or portable.

Access the handset mic gain menu by pressing the LOCAL + 1 button combination. Adjust the gain value, in the upper right corner, by entering a new value from the keypad.

HANDSET GAIN	3
ENTER NEW VALUE	

Handset Mic Gain Screen

Note: High sensitivity values can result in unacceptable background noise and distortion, while low sensitivity values can result in low audio levels when the desk set is transmitting. This problem is imperceptible to the desk set operator. Therefore, any change to the default level for handset mic gain must be made by changing the value one step at a time, and the result must be confirmed with a mobile or portable user.

Local Mic Gain

This function adjusts the local microphone level in five steps, from 1 through 5, with level 5 being the most sensitive. The local mic gain affects the desk set user's voice level received at system mobiles, portables, or other desk sets. The default value for this function is 3. It is advisable to change the value one step at a time, confirming the result with a mobile or portable user.

Access the local mic gain menu by pressing the LOCAL + 2 button combination. Adjust the gain value, in the upper right corner, by entering a new value from the keypad.

LOCAL GAIN	3
ENTER NEW VALUE	

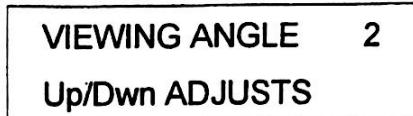
Local Mic Gain Screen

Note: High sensitivity values can result in unacceptable background noise and distortion, while low sensitivity values can result in low audio levels when the desk set is transmitting. This problem is imperceptible to the desk set operator. Therefore, any change to the default level for local mic gain must be made by changing the value one step at a time, and the result must be confirmed with a mobile or portable user.

Viewing Angle

Normally, the desk set will be viewed from a particular angle. The display should be adjusted so that it appears sharpest at this angle. The display viewing angle can be set from 1 to 8.

To edit the viewing angle, press the LOCAL + 3 button combination. The viewing angle screen will be displayed. Use the MODE ▲/▼ arrow keys to set the viewing angle. The default for this parameter is 1.



Viewing Angle Screen

Clock Set

When this menu is entered, the 1st digit of the time is flashing, indicating that it can be changed by entering a new value from the numeric keypad. Once a new value has been entered for a particular digit, the next digit will begin to flash. The digit being edited can be changed by pressing Mode ▲ to select the next digit, or Mode ▼ to select the previous digit.



Clock Set Screen

The TRANSMIT button is pressed to set the clock to the displayed time. The clock can be displayed in either 12 or 24 hour mode. Refer to the 12/24 Hour Clock Mode section to select the proper clock display.

Note: The RCH 3000 performs range checking on digits as they are entered in this menu. The user will not be allowed to set the time to an invalid value.

For example, to set the clock to 4:30 PM:

1. Press the LOCAL + 4 button combination. The clock set menu will be displayed and in the upper right corner of the display. The first digit of the clock will be flashing.
2. Enter "0" from the numeric key pad. The second digit will begin to flash automatically.
3. Enter "4" from the numeric key pad, then enter "3", then enter "0".
4. Press any of the numeric keys to change the flashing "A" (for AM), to "P" (for PM).
5. Press the TRANSMIT button to set the clock, then press the # key to return to normal screen view.

Calendar Set Menu

The calendar set menu works in the same manner as the clock set menu. When this menu is entered, the 1st digit of the date is flashing, indicating that it can be changed by entering a new value from the numeric keypad.

Once a new value has been entered for a particular digit, the next digit will begin to flash. The digit being edited can be changed by pressing the MODE ▲ to select the next digit, or MODE ▼ to select the previous digit.

DATE	01/00/00
ENTER NEW VALUE	

Calendar Set Screen

This menu functions identically to the clock set menu. However, range checking is not performed until the user presses TRANSMIT. The date will be saved only if it is valid. The TRANSMIT button is pressed to set the calendar to the displayed date.

For example, to set the calendar to March 28, 1997:

1. Press the LOCAL + 5 button combination. The calendar set menu will be displayed and in the upper right corner of the display the digit of the calendar will be flashing.
2. Enter the following number combination from the numeric pad: 0 3 2 8 9 7.
3. Press the TRANSMIT button to set the calendar.
4. Press the # key to return to the normal screen view. Press the LOCAL + 9 button combination to display the date. Refer to the Calendar section for more information.

Alarm Set Menu

The clock alarm is one of the methods used to trigger the external alarm control. Refer to the External Alarm Control section for more information.

The alarm set menu works in the same manner as the clock set menu with the following addition: pressing the * button toggles the clock alarm on and off.

When this menu is entered, the 1st digit of the time is flashing, indicating that it can be changed by entering a new value from the numeric keypad. Once a new value has been entered for a particular digit, the next digit will begin to flash. The digit being edited can be changed by pressing MODE ▲ to select the next digit, or MODE ▼ to select the previous digit.

ALARM SET	12:00A
ON	* CHANGES

Alarm Set Screen

Parameter Entry Mode

Parameter Entry Mode

The RCH 3000 Desk Set's parameter entry mode is used to edit the desk set's operational parameters. These parameters should only have to be set/edited once, at the desk set's initial power up. Parameters available for editing are:

- Radio Selection
- Desk set priority (master or slave)
- Control Point
- Parallel audio muting
- Speaker button feature
- Autolevel enable/disable
- Programmable button selection
- Mic output level (high or low)
- 12 or 24 hour clock mode (requires clock/alarm option)
- External alarm control (requires clock/alarm option)

The parameter entry mode is entered as follows:

1. The desk set **MUST** be disconnected from the radio system.
2. Cycle the power. The desk set's opening screen will appear, showing the product name and firmware version.
3. Press the LOCAL button, then the # button simultaneously while the opening screen is visible (approximately 8 seconds). The parameter mode cannot be entered once the opening screen disappears. If the desk set is not disconnected from the radio system, the opening screen will disappear too quickly for you to enter the parameter mode.
4. The parameter mode screen will appear. The top line of the screen will display the parameter name. The second line of the screen will display the current setting. Individual parameters are selected by scrolling them via the MODE ▲ and ▼ keys. Refer to the figure below.
5. The parameter entry mode is exited by pressing the # key. If no key is pressed for a duration of 5 minutes, the parameter mode will time-out.

RADIO SELECTED:
ASTRO * CHANGES

Typical Parameter Entry Mode Screen

Parameter Descriptions

Radio Selection

The desk set can be programmed to operate with any of the following radios: Astro, iDEN, or MCS 2000.

Desk Set Priority

This parameter is for special applications only. The desk set should normally be programmed as a slave.

Control Point

If the RCH 3000 is connected to a radio equipped with its own control head, it must be programmed for CONTROL POINT: NO. Otherwise, no more than one desk set per radio should be programmed for CONTROL POINT: YES.

Note: Only one desk set per radio should be programmed for CONTROL POINT: YES. If there is any doubt, program the desk set for CONTROL POINT: NO.

Default = CONTROL POINT: NO

Parallel Audio Muting

This parameter allows TX audio from parallel desk sets to be muted or unmuted. When desk sets are located in close proximity (within the same room), parallel audio should be muted to avoid audio feedback.

Default = Unmuted

Speaker Button Feature

When the speaker button feature is enabled, the local speaker is enabled/disabled via the LOCAL-Volume ▲/LOCAL Volume ▼ key press combinations. It is not controlled via the hookswitch. This feature is primarily used when it is desired that the local speaker remain active when the handset is off hook.

Default = Speaker Button Disabled

Autolevel Enable/Disable

This parameter provides for the disabling of autoleveling of receive and intercom audio. Disabling may be necessary if working in a noisy environment. In normal working environments, autoleveling should be enabled.

Default = Autolevel Enabled

Programmable Button

The button just below the LOCAL button is programmable. The available functions of this button are: unused or Supervisory.

The supervisory option gives a designated operator the ability to disable all functions from parallel desk sets, except intercom, for approximately one minute or until the supervisory button is pressed again. The designated "supervisor" is able to seize control of the radio, allowing only one person or site priority access. This function would be ideal in an emergency situation.

Pressing the TRANSMIT button or handset PTT bar will automatically extend this time for another minute. Normally, only one parallel-connected desk set would be programmed with a supervisory button.

Default = Unused

Mic Output Level

This parameter is set to low if the radio requires a mic output level of 80 mV ac (normal setting). This parameter would be set to high (.775 mV ac) if the desk set is connected to a junction box or if required by the radio used. Refer to your radio manual for additional information on the mic output level.

Default = Low

12/24 Hour Clock Mode

This parameter configures the optional clock to operate in either 12 or 24 hour mode.

Default = 12 Hour Mode

External Alarm Control

This parameter allows selecting one of the three different methods to control the external alarm:

1. manually;
2. via a radio message;
3. by the alarm feature of the clock

If the external alarm is controlled manually, pressing the LOCAL button plus the * button toggles the alarm state. If the external alarm is radio-controlled, it is configured to mimic the VIPI radio output.

If the external alarm is associated with the clock's alarm, the external alarm will be activated at the programmed clock alarm time. (The clock alarm can be set through the local menu ONLY if the external alarm is associated with it. Refer to Alarm Set Menu section for more information on setting the alarm.) In this case, the external alarm is disabled by pressing the LOCAL + * buttons.

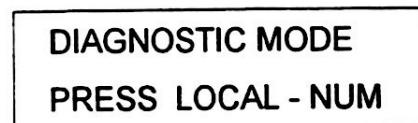
Default = Unused

Diagnostic Mode

Entering Diagnostic Mode

The RCH 3000 contains several internal diagnostics designed to assist in the installation and servicing of the desk set. The RCH 3000 Desk Set's diagnostic mode is entered as follows:

1. The desk set MUST be disconnected from the radio system.
2. Cycle the power. The desk set's opening screen will appear, showing the product name and firmware version.
3. Press the LOCAL button, then press the * button simultaneously while the opening screen is visible (approximately 8 seconds). The diagnostic mode cannot be entered once the opening screen disappears. (If the desk set is not disconnected from the radio system, the opening screen will disappear too quickly for you to enter the diagnostic mode.)
4. The diagnostic mode screen will appear as shown in the figure below. When the main diagnostic mode screen is entered, the front panel LEDs will begin to strobe. These LEDs will continue to strobe until one of the diagnostic tests is entered. Use the key combinations shown in step 5 to enter one of the six diagnostic tests.



Diagnostic Mode Main Screen

5. The diagnostic mode is exited by pressing the # key. To move from one diagnostic to another without exiting the diagnostic mode, enter one of the key combination shown below.

LOCAL	+	0	= Button Diagnostic
LOCAL	+	1	= Busy Diagnostic
LOCAL	+	2	= Data Diagnostic
LOCAL	+	3	= RX Audio Diagnostic
LOCAL	+	4	= RX IC (receive intercom) Diagnostic
LOCAL	+	5	= TX Audio Diagnostic

6. The diagnostic mode will time-out if no keys are pressed during any 15 minute period.

Diagnostic Mode Description

Button Diagnostic

The button diagnostic allows the testing of all front panel buttons. The button diagnostic is performed by pressing each button on the front panel. As each button is pressed, the right side of the second line of the screen will display the button name. The state of the LOCAL button is shown on the left side of the bottom display line. Refer to chart below for a list of button presses and the corresponding text that will be displayed.

Notes:

- It is not possible to move to another diagnostic once the button diagnostic has been accessed. It can only be exited by pressing the # key.
- Pressing the # button will not display the button name. When the # button is pressed the button diagnostic will be exited.

LOCAL	= LOCAL	1	= NUM 1	9	= NUM 9
SUPV	= PROG	2	= NUM 2	0	= NUM 0
IC	= INTERCOM	3	= NUM 3	*	= NUM *
TRANSMIT	= TRANSMIT	4	= NUM 4		
MODE ▲	= MODE UP	5	= NUM 5		
MODE ▼	= MODE DOWN	6	= NUM 6		
VOL ▲	= VOL UP	7	= NUM 7		
VOL ▼	= VOL DOWN	8	= NUM 8		

Busy Diagnostics

The busy diagnostic automatically tests the busy output/input circuitry. If all generated edges were correctly detected, the display says PASSED. Otherwise, the display will read FAILED.

Data Diagnostic

The data diagnostic automatically tests the data circuitry of the RCH 3000.

If the test is successful, the display will show PASSED. Otherwise, the display will show FAILED and display "B:xxN:xx", where B stands for "bad data" and N stands for "no data". The count of bad data bytes indicates the number of times an incorrect value was received back from the serial data port. The count of "no data" bytes indicates the number of times the serial data port failed to return a value following a transmit.

RX Audio Diagnostic

During the RX audio diagnostic, the audio path from the RX port to the speaker is opened. Autoleveling is enabled/disabled via the top left button; the top left LED indicates the state of the autoleveling (on or off). The local speaker is enabled/disabled via the top right button; the top right LED indicates the state of the local speaker (on or off).

RX IC (receive intercom) Diagnostic

The RX IC diagnostic is identical to the RX audio diagnostic with the exception that the enabled audio path is from the TX audio port to the speaker.

TX Audio Diagnostic

The TX audio diagnostic enables the mic audio path when the TRANSMIT or handset PPT bar is pressed. When either of these buttons is pressed, the PTT LED is lit. The applicable mic (handset or local) is determined by the hookswitch state.

The number in the bottom right corner of the display indicates the current mic gain. If the handset is off hook, the number represents handset mic gain; otherwise, the number represents local mic gain. The mic gain can be changed by pressing any of the numeric keys 1-5.

Note: Changing mic gains in this diagnostic has no effect on mic gains during normal operation. Permanent changes to the mic gains must be made through the local menu during normal operation.

If "H" appears immediately beside the mic gain, the desk set is configured for .775 mV ac reference audio level output to the radio. If "L" appears immediately beside the mic gain, the desk set is configured for 80 mV ac reference audio level output to the radio. Pressing Volume Up selects "H"; pressing Volume Down selects "L".

Notes:

- Permanent changes to the mic audio reference level must be via the parameter menu. Changes made to the reference level during this test are not saved.
- "Reference" audio level output to the radio occurs when a reference signal is input to the mic with the mic level at 3.

RCH 3000 Desk Sets L3029, L3030, L3031 Installation/Operation Manual

Notes:

Mechanical Receipt Inspection

Thoroughly inspect the desk set as soon as possible after delivery. In-transit damage should be immediately reported to the transportation company.

FCC Interference Warnings

The FCC requires that manuals pertaining to Class A and Class B computing devices contain warnings about possible interference with local and residential radio and TV reception. Please read these warnings and all safety information in the Foreword section of this manual.

Cable Installation Safety Considerations

Interconnecting, communications, and Class 2 dc power cables should be separated from electrical light or other Class I circuits by at least 2 inches. The exception is where Class I wiring or power circuits are run in a raceway, or are metal-sheathed or metal-clad, or are permanently separately from the conductors of the other circuitry by a continuous and firmly fixed nonconductor such as porcelain tubes or flexible tubing in addition to the insulation on the wire. Communications cables and in-building wiring should be listed and marked for the purpose according to NEC Article 800.

For maximum surge and lightning protection, building primary (over-voltage) protectors should be installed at the point where the telephone lines enter the radio equipment building. Primary protectors are usually required by local codes and should be provided by your leased line provider.

Desk Set Installation

Installation of a Single Desk Set with Direct Connection to the Astro Consolette Base Station

Note: The cable length between the radio and the desk set must be 50 feet or less.

In addition to the cable for this installation, you will need a 25-pin D-to-8 pin modular adapter.

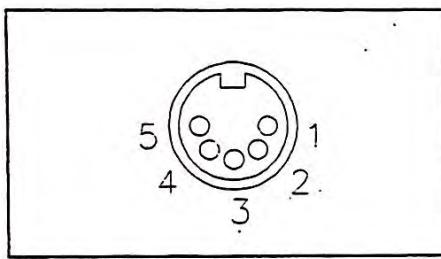
The desk set cable must be wired so that the modular connectors at both ends are connected in mirrored fashion. That is, the right-to-left progression of conductors is opposite at each end. This is the standard connection of off-the-shelf modular cables. If you are using a one-piece flat cable, the cable will be connected correctly if the connector locking tab is facing the same side of the cable on each end.

Connect the 25-pin D-to-8 pin modular adapter to the accessories connector on the rear of the station. Connect the modular cable from the desk set to the adapter. Ensure that the RCH 3000 Desk Set is programmed for the Astro radio type. Refer to Desk Set Operation, Radio Selection section).

Note: If the RCH 3000 Desk Set is used with a DGT 9000A system, ensure that switch 6 on the DGT 9000 adapter is in the UP position.

Installation of a Single Desk Set to the iDEN Advanced Feature M470**Notes:**

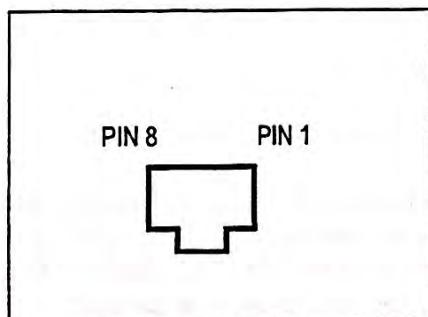
- The cable length between the radio set and the junction box must be 50 feet or less.
 - Desk set installation to the iDEN mobile requires the use of the RCH 3000 Junction Box for iDEN, CDN6304. Do not connect the radio directly to the desk set.
1. Connect the iDEN mobile to the radio port on the rear of the RCH 3000 Junction Box, using iDEN cable HKN6123.
 2. Connect the RCH 3000 Junction Box to an RCH 3000 Desk Set following the instructions shown in Junction Box Installation section.
 3. Ensure that the RCH 3000 Desk Set is programmed for the iDEN Protocol. Refer to Desk Set Operation, Radio Selection section.

RCH 3000 Desk Set J3 Connector, 5-Pin DIN

Pin Number	Connection
J3-1	Ground
J3-2	Battery (requires battery revert option)
J3-3	10.5-16 V dc In
J3-4	Ground
J3-5	10.5-16 V dc In

RCH 3000 Desk Set J2 Connector, 8-Pin Modular

(Figure looks into connector)



Pin Number	Connection
J2-1	Data Bus Busy
J2-2	Bus Data Minus
J2-3	RX Audio High
J2-4	Mic High
J2-5	Audio GND
J2-6	RX Audio Ground
J2-7	Bus Data Plus
J2-8	Ground

I/O Clock Board Contacts

Contact	State
E1	Common
E2	Normally Closed
E3	Normally Open

Astro Consolette to RCH 3000 Desk Set Pin-Out (CDN1336)

Desk Set Pin No.	Radio Accessory Connector Pin No.	Function
1	6	Data Bus Busy
2	19	Bus Data Minus
3	14	RX Audio High
4	3	Mic High
5	11	Audio GND
6	15	RX Audio Ground
7	7	Bus Data Plus
8	12	Ground

MCS 2000 to RCH 3000 Desk Set Pin-out (CDN6303)

Desk Set Pin No.	Radio Accessory Connector Pin No.	Function
1	5	Data Bus Busy
2	18	Bus Data Minus
3	11	RX Audio High
4	13	Mic High
5	10	Audio GND
6	10	RX Audio Ground
7	6	Bus Data Plus
8	4	Ground

Junction Box Installation

Installation RCH 3000 Desk Set(s) Using the Junction Box with Integral Data Bus Translator

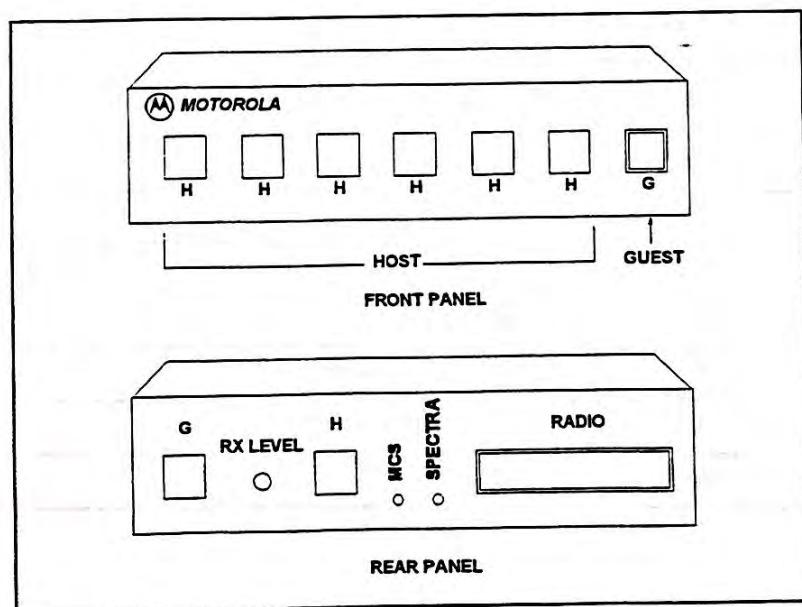
The total desk set cable run must be 5,000 feet or less of twisted pair construction (category 3 or higher). Refer to the table below for connections that are to be paired together. The 8-pin modular connectors used in this system are pinned out in two formats: Host and Guest. These are mirrored to each other in regard to the right-to-left progression of functions.

Modular Connector Pairs

Host Pin No.	Host Function	Guest Pin No.	Guest Function
1	Ground	8	1/2 Pair a
2	Bus Data Plus	7	1/2 Pair b
3	RX Audio Ground	6	1/2 Pair c
4	Audio Ground	5	1/2 Pair d
5	Mic High	4	2/2 Pair d
6	RX Audio High	3	2/2 Pair c
7	Bus Data Minus	2	2/2 Pair b
8	Bus Data Busy	1	2/2 Pair a

The system components must be connected host-to-guest when using mirrored cables. DDJ Schematic Sheet 3 illustrates the connections for all the connectors on the junction box/bus translator. The large-system block diagram gives an overview of how various RCH 3000 Desk Set system components are connected and the system wiring conventions are illustrated on the Connection Scenarios Diagram.

The RCH 3000 Junction Box incorporates seven 8-pin modular jacks, J21 - J27, on the front of the chassis. There are six host and one guest. Refer to the figure below.



RCH 3000 Junction Box

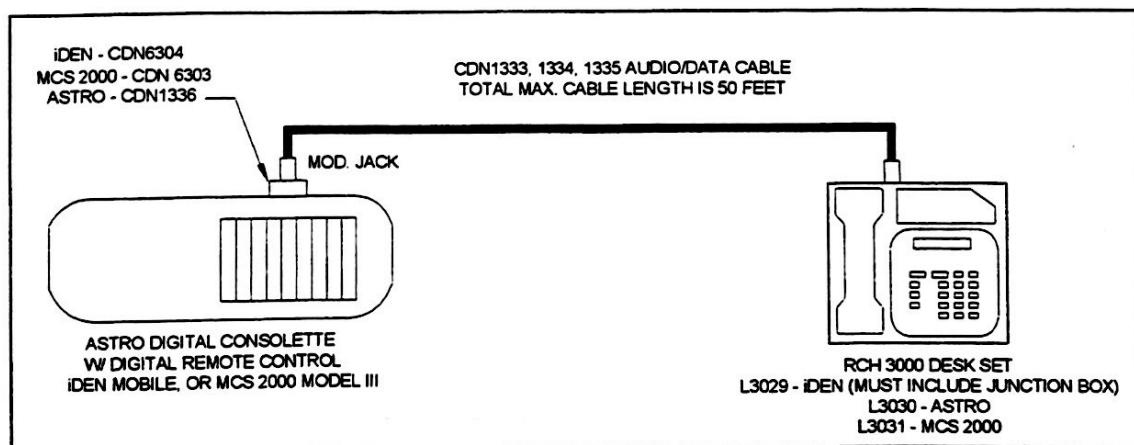
Junction Box Jumper Table

Jumper	Position	Function
JU2	In	MCS 2000 and Astro radios
	Out	iDEN radio
JU3	In	If desk set is programmed for a LO mic level. (80 mV ac); used for special applications only.
	Out	For MCS 2000 radio, or if the deskset is programmed for HI mic level. (0 dBm) default
JU4	In	For MCS 2000 radio
	Out	For Astro and iDEN radios
JU5	A position	For Astro and iDEN radios
	B position	For MCS 2000 radio
JU13	In	For MCS 2000 radio or if the desk set is programmed for HI mic level. (0 dBm) (default)
	Out	If desk set is programmed for LO mic level. (80 mV ac); used for special applications only.
JP4	In	Default
	Out	Used when connecting an RCH 3000 modem to rear of junction box.
JP	JP1-JP2	For MCS 2000 and iDEN radios
	JP2-JP3	For Astro radio

Note: The above jumpers are defaulted accordingly based on the junction box model number. For iDEN and MCS 2000 radios, desk set must be programmed for HI level TX and RX audio.

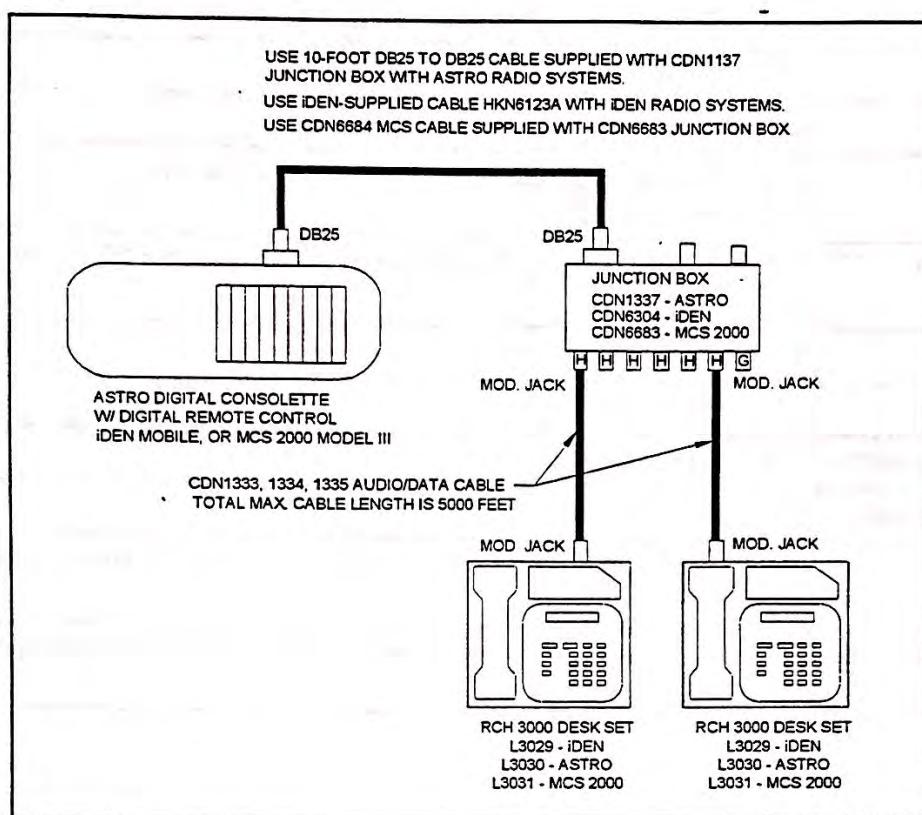
Planning the Installation

For an extended local control installation with a single desk set unit, refer to the figure below.



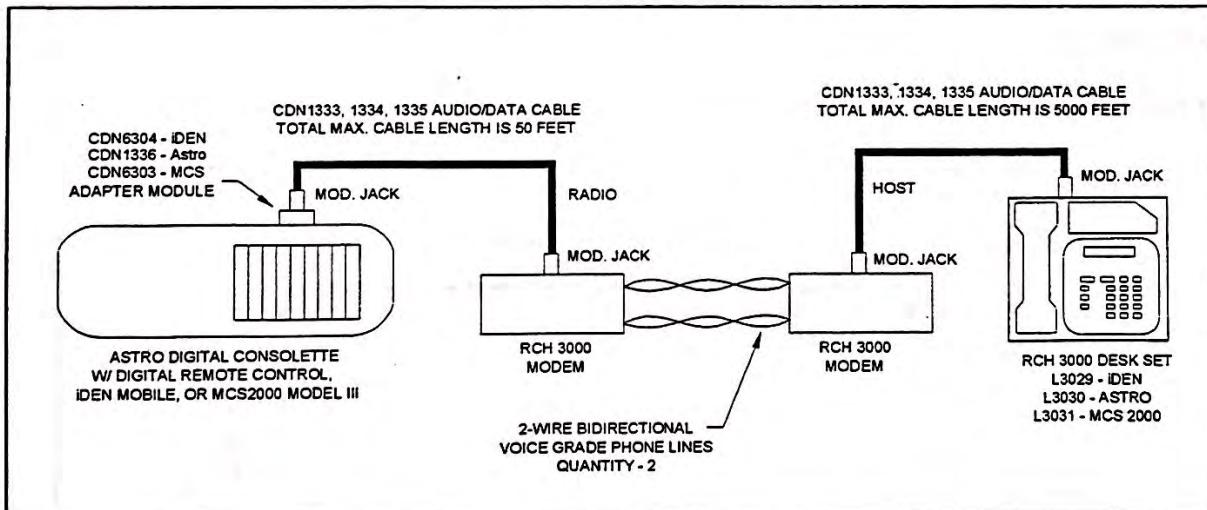
Extended Local Control Installation with a Single Desk Set Unit

For an extended local control installation with multiple desk set units, see the figure below. Ensure that JP4 in the junction box is installed.



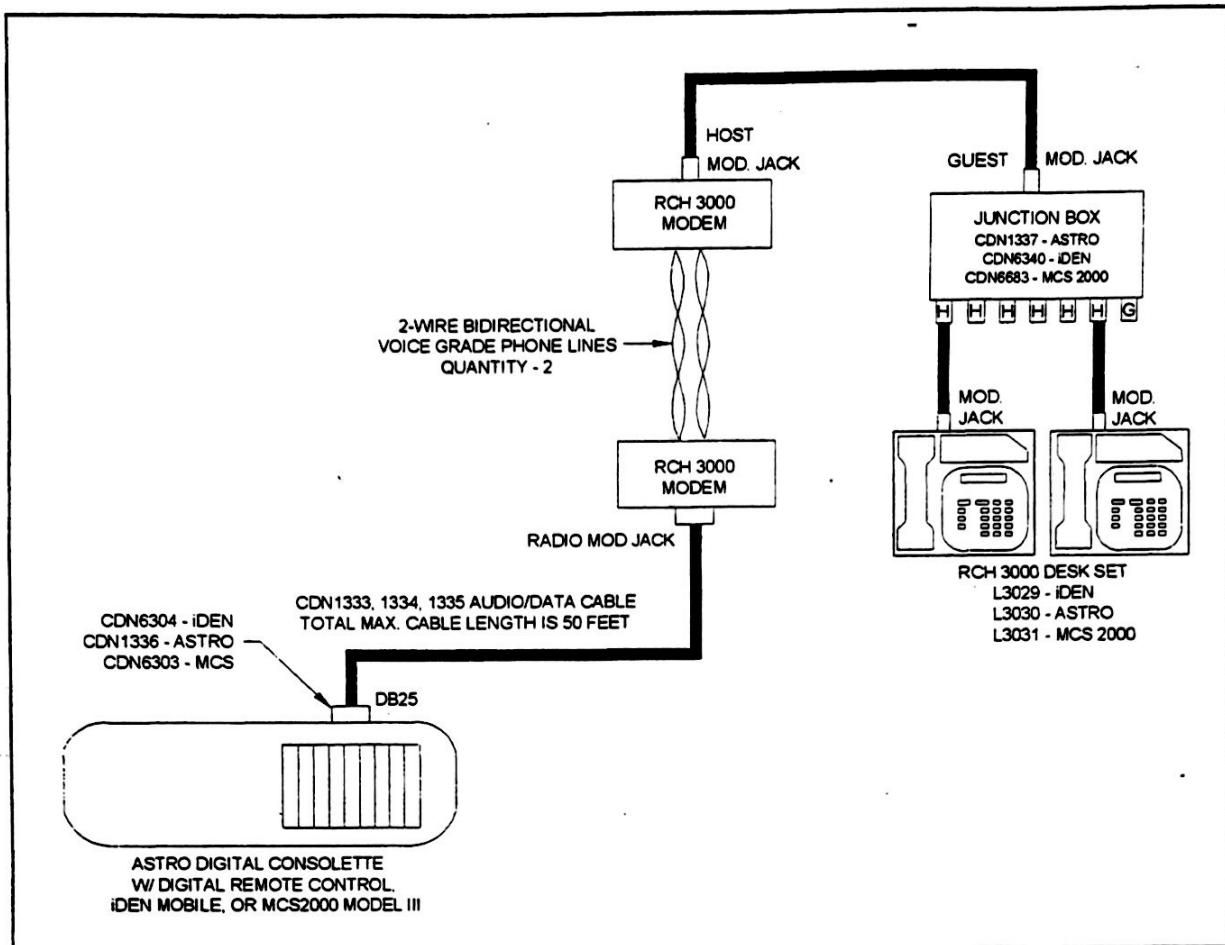
Extended Local Control Installation with Multiple Desk Set Units

For a remote control installation with a single desk set unit, refer to the diagram below.



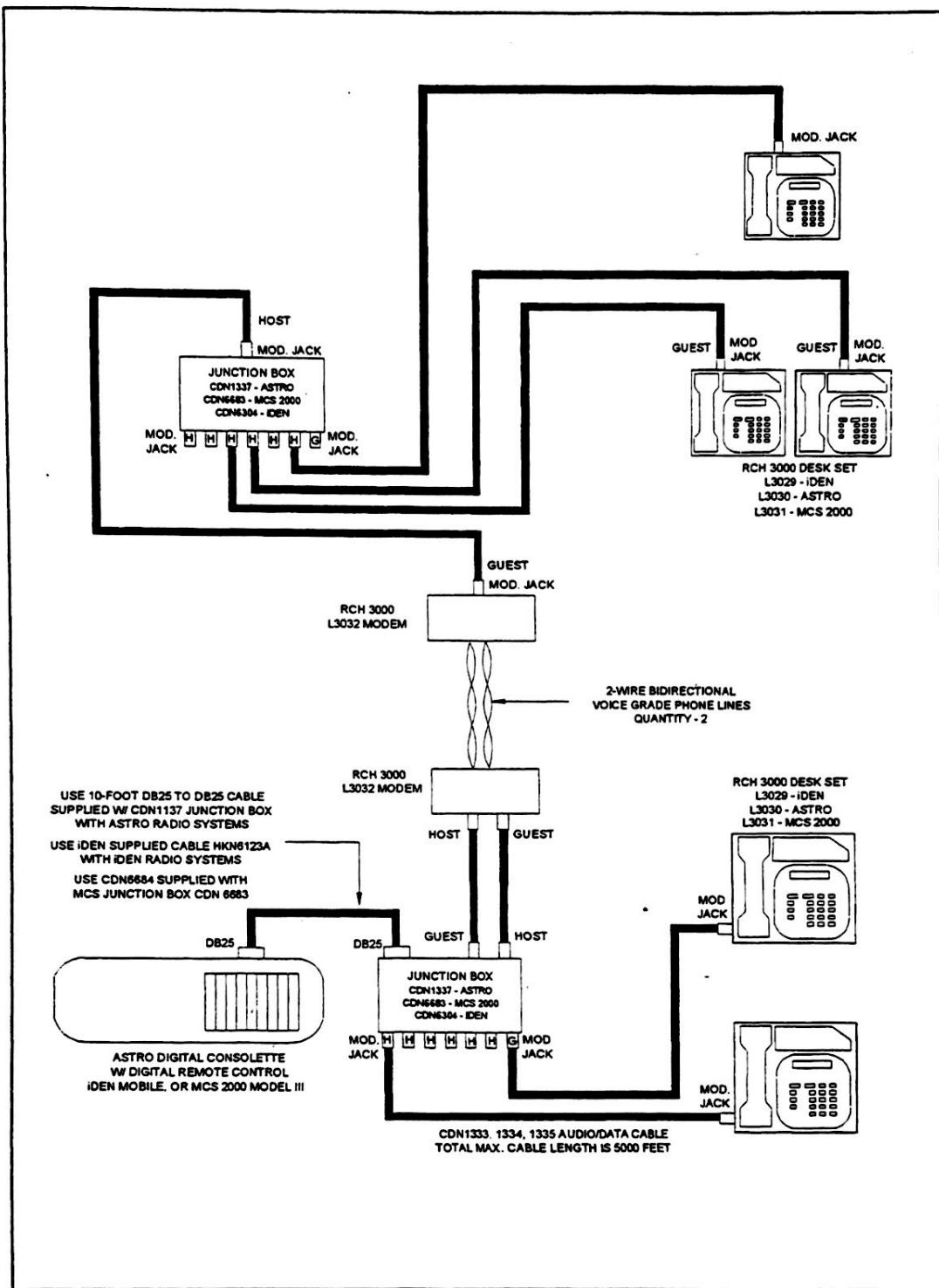
Remote Control Installation with Single Desk Set Unit

For a remote control installation with multiple desk set units, refer to the drawing below.



Remote Control Installation with Multiple Desk Set Units

For Remote/Local Combination Setup with a modem, refer to the figure below, making guest and host connections as indicated.



Remote/ Local Combination Setup

Parts Lists

DDL Circuit Board Parts List

DDL Circuit Board: Reference No.	Motorola Part No.	GAI-Tronics Part No.	Description
Integrated circuits			
U30		4601-50036-00	Speaker amplifier
U27, U26		9201-50035-00	Digital pot
U7		9201-50016-00	Shift register
U21, U22	51-82276R68	9201-10214-00	Quad op-amp
U25	51-82276R68	9201-10214-00	Quad op-amp
U24		9201-10225-00	Dual op-amp
U5, U6, U8		9201-10170-00	Shift register
U4, U10	51-02022A01	9201-10112-00	Hex inverter
U2		4601-10264-01	EEPROM
U40	51-80364E36	9201-10217-00	Pulse width modulator
U29		9201-10243-00	Audio amplifier
U31		9201-49100-00	RS485 transceiver
U1		9201-10268-00	Microprocessor
U3		9201-50008-00	Decoder
U28		9201-10021-00	Analog multiplexer
Resistors, fixed: ±5%			
R180, R183, R180A, R180B, R180C	06-11077A02	9203-00001-12	1
R64, R65, R70, R71, R164, R199	06-60076A01	9203-00100-12	10
R305	06-60076A17	9203-00470-12	47
R30, R85, R124, R167, R181, R182, R190	06-60076A25	9203-01000-12	100
R350	06-60076A33	9203-02200-12	220
R306, R307		9203-02700-12	270
R49, R249, R351	06-60076A43	9203-05600-12	560
R4, R48, R121, R129, R130, R157	06-11077A02	9203-01001-10	1K
R156		9203-01501-10	1.5K
R42, R43, R44, R45, R46, R47, R120, R143, R163, R199A	06-11077A10	9203-02201-10	2.2K

DDL Circuit Board: Reference No.	Motorola Part No.	GAI-Tronics Part No.	Description
R116, R117	06-11077A14	9203-03301-10	3.3K
R2, R3, R5, R7, R9, R40, R84, R87, R88, R131, R161, R162, R174, R191	06-11077A18	9203-04701-10	4.7K
R61, R352	06-11077A20	9203-05601-10	5.6K
R8, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R62, R63, R86, R90, R128, R165, R175, R176	06-11077A24	9203-08201-10	8.2K
R36, R37, R38, R39, R142, R160, R166	06-11077A34	9203-02202-10	22K
R122, R125	06-11077A38	9203-03302-10	33K
R83, R127, R132	06-11077A42	9203-04702-10	47K
R140, R177		9203-01004-10	1M
R1		9203-01005-10	10M
Resistors, fixed: ±1%			
R89, R171, R178, R201, R202, R203, R204, R205, R206	06-11077A74	9204-01001-12	1.00K
R105, R106, R112, R113, R114, R115, R150, R152, R153, R154, R155, R158, R159, R168, R169, R353	06-11076E73	9204-01002-10	10.0K
R119		9204-01502-10	15.0K
R123A, R126A	06-11076E97	9204-05622-10	56.2K
R51, R52, R53, R54, R55, R56, R57, R103, R104, R107, R108, R110, R111, R118, R123, R126, R133, R134, R135, R136 R137, R138, R139, R172, R207, R208, R209, R210, R211, R212	06-11076F01	9204-01003-10	100K
R151	06-80376E09	9204-04753-10	475K
RA1, RA2, RA3, RA4		9203-92200-12	Resistor array
Capacitors			
C4, C5, C42, C46, C50, C52, C58, C65, C66	21-12740A37	9206-00220-00	22pF
C47, C53, C19	21-13740A55	9206-01000-00	100pF
C104, C105		9206-04700-00	470pF
C10, C11, C12, C13, C14, C15, C16, C17, C18, C91, C97, C106, C107, C109	21-05158A02	9206-01001-00	.001uF
C108	21-05158A41	9206-26110-00	.0047uF
C36, C37, C38, C39, C40, C41, C44, C45, C57, C185	21-05185A08	9206-01002-00	.01uF

DDL Circuit Board: Reference No.	Motorola Part No.	GAI-Tronics Part No.	Description
CU1, CU2, CU21, CU22, CU24, C49, C51, C54, C55, C56, C59, C90, C99, C111, C112, C181, C182, C189, C190, C301, C350, CU3, CU4, CU5, CU6, CU7, CU8, CU10	21-80376E18	9206-01003-12	.1uF
C183		4606-00474-00	.47uF
C48		9206-09025-00	1uF
C2, C7		9206-10500-00	1uF
C98, C102, C103	23-80090M20	9206-41204-00	2.2uF
C94, C113, C184	23-80376E23	9206-00010-35	10uF
C187, C188		9206-22616-00	22uF
C182		4606-00330-50	33uF
C92, C93, C101, C186		9206-10010-00	100uF
C180		4606-54706-25	470uF
CA1, CA2, CA3, CA4		9206-31411-99	Capacitor array
Diodes			
D17, D18, D19, D20, D22, D23, D24, D25, D26, D27, D28, D29, D31, D352	48-80376E15	9202-20008-00	Signal diode
D21		9202-20014-00	4.3 volt zener
D1, D30, D38, D302, D303, D304, D305, D306, D307, D353	48-80376E25	9202-20010-00	6.8 volt zener
D301	48-80376E26	3302-20005-00	18 volt zener
Miscellaneous items			
F301		4612-23500-01	1 amp fuse: Bussman type GMA-1 or Little Fuse 325001
J1		62-302103	4pos rcpt
J2		4611-52025-14	8-pin modular plug
J3		4611-40005-10	5 pos. DIN connector
J4		21926-001	16-pin connector
LED1, 2, 3, 4		4606-03350-00	red LEDs
LED5, 6		4606-03350-00	red LEDs
LED7		4606-03450-00	yellow LEDs
LED8		3306-04000-00	red/green LED
L1, L2, L301, L302		18007-001	Bead
L3		9207-53606-00	Choke
L4, L5		9207-02147-00	Bead

DDL Circuit Board: Reference No.	Motorola Part No.	GAI-Tronics Part No.	Description
M1		4612-00034-00	Condenser mic
Y1		4612-98304-00	Crystal, 9.8304 MHz
Q1	48-13824A22	9209-44030-00	2N4403 PNP transistor
Q2, Q3, Q8	48-80376E14	9209-44010-00	2N4401 NPN
Q9, Q10	48-80376E14	9209-44010-00	Transistor
Q11, Q22	48-80376E14	9209-44010-00	
P6, P7		4611-01409-30	14 pos. connector

Parts for Battery Revert Option	Motorola Part No.	GAI-Tronics Part No.	Description
D351		4602-20042-00	20 amp diode
K350		4610-00200-00	Relay
U350		4601-10256-00	Comparator
D350		3302-20005-00	18 volt zener
Q350		3309-44030-00	2N4403 PNP transistor

DCK Circuit Board Parts List

DCK Circuit Board Reference No.	Motorola Part No.	GAI-Tronics Part No.	Description
C36		4606-00473-00	0.04uf
C304, C305	21-13740A37	9206-00220-00	22pF
C310	21-13740A55	9206-01000-00	100pF
C301, C302		9206-09025-00	1.0uF
D301, D310	48-80376E15	9202-20008-00	signal diode
J6		4611-20003-00	3-pos. header
J7		4611-22142-07	7-pos. header
K310		4610-00200-00	12 volt relay
R301	06-11077A02	9203-01001-10	1K
R304, R305		9203-01005-10	10M
R303		9203-02203-10	220K
R310, R311	06-11077A18	9203-04701-10	4.7K
R302	06-11077A42	9203-04702-10	47K
R306	06-11077A26	9204-01002-10	10K
Q310	48-80376E14	9209-44010-00	NPN transistor
U301		9201-50023-00	Real time clock
Y301		4612-00265-00 crystal	32.768 kHz crystal
3 each		4616-44003-16 screw	#4-40x3/16 screw
3 each		4616-83462-00 conn tab	#4-40

Unless otherwise specified, resistors are 5%, 1/8W

DDJ Circuit Board Parts List

DDJ Circuit Board Reference No.	Motorola Part No.	GAI-Tronics Part No.	Description
Integrated circuits			
U1		9201-50039-00	microcontroller
U3		9201-49100-00	RS485 transceiver
U4		9201-50025-00	Comparator
U5		9201-10214-00	Quad op-amp
U6, U8		9201-10243-00	Audio amplifier
Resistors, fixed: ±5%			
R1, R2, R4, R20, R21, R22, R23, R24, R25, R26, R27, R49, R60, R61, R64, R65, R120, R121, R122, R123, R124, R125, R126, R127, RU1	06-60076A01	9203-00100-12	10
R50, R51, R52, R53, R58, R71, R78	06-60076A17	9203-00470-12	47
R32, R33, R48, R57, R57A, R57B, R57C, R68, R81	06-60076A25	9203-01000-12	100
R5, R6, R46, R47, R47A, R89, R90	06-60076A43	9203-05600-12	560
R101, R102		9203-06200-10	620
R3, R7, R17, R30, R31	06-11077A02	9203-01001-10	1K
R79, R85	06-11077A10	9203-02201-10	2.2K
R59, R70, R73, R74, R77, R83, R105	06-11077A18	9203-04701-10	4.7K
R9		9203-06801-10	6.8K
R37, R54, R55, R76, R94, R97, R98	06-11077A24	9203-08201-10	8.2K
R16, R31, R33, R34, R36, R82, R103, R104	06-11077A34	9203-02202-10	22K
R42, R45		9203-03902-10	39K
R30, R56, R69, R72, R75, R93,	06-11077A42	9203-04702-10	47K
R34		9203-06802-10	68K
R15, R115, R116		9203-02203-10	220K
R80		9203-01004-10	1M
Resistors, fixed: ±1%			
R91, R92		9204-01001-12	1.0K
R14, R32, R40, R41, R43, R44	06-11076E73	9204-01002-10	10K
R114		9204-01502-10	15K
R35		9204-05622-10	56.2K
R10, R11, R12, R13	06-11076F01	9204-01003-10	100K

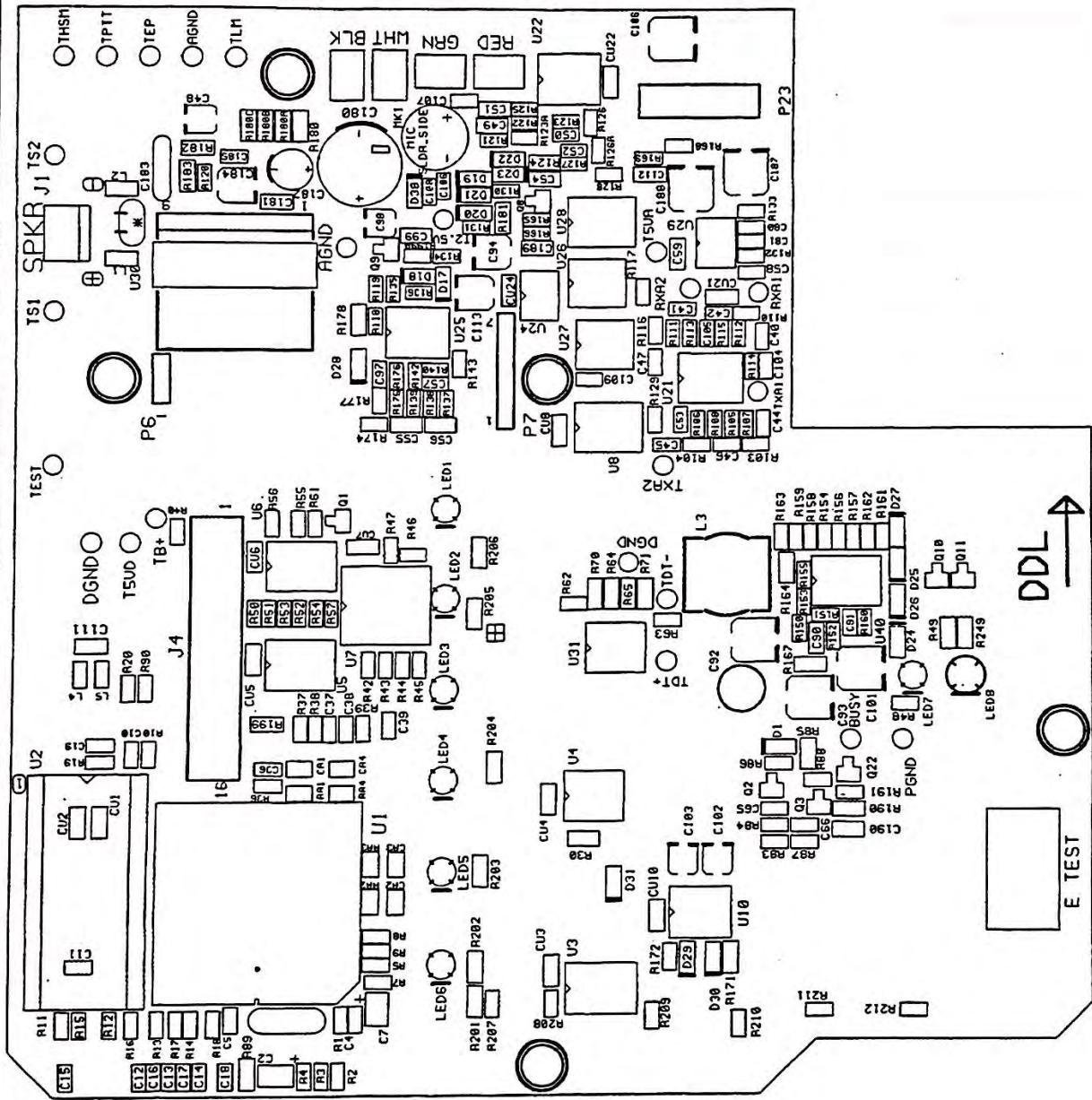
DDJ Circuit Board Reference No.	Motorola Part No.	GAI-Tronics Part No.	Description
Miscellaneous			
T1, T2		3308-08238-00	Transformer
JU2, JU3, JU4, JU13, JP21, JU21A, JU21B, JU22A, JU22B, JU23A, JU23B, JU24A, JU25B, JU26A, JU26B		4611-10002-10	2-pin plug
JU5		62302-303	3-pin plug
J2, J3, J21, J22, J23, J24, J25, J26, J27		4611-52025-14	8-pin mod jack
JP1, JP2, JP3		4611-10012-00	12-pin header
JP4		62305-116	16-pos header
D1, D3		9202-20014-00	4.3 volt zener
D10, D11, D12, D13, D14, D15, D17		9202-20010-00	6.8 volt zener
D2, D6, D7, D8, D9, D40		9202-20040-00	15 volt zener
D4, D5, D16, D18		9202-20008-00	signal diode
C12, C13, C70, C71, C80, C81		9206-00220-00	22pf
C16, C17, C18, C40, C42, C45, C116, C117, C118		9206-01000-00	100pf
C56, C57, C58, C59, C60, C61		9206-04700-00	470pf
C1, C31, C50, C51, C52, C53, C54, C55, C85, C86, C87		9206-01001-00	.001uf
C10, C11		9206-01002-00	.01uf
CU1, C33		9206-01003-12	.1uf
C82		9206-00010-35	10uf
C2, C3, C6		9206-10010-00	100uf
F1		4612-10500-20	.5 amp fuse
Q1, Q2, Q3, Q4, Q5, Q8		9209-44010-00	NPN transistor
LED1, LED2		24874-003	Red LED
LED3, LED4		3306-00750-00	Red LED
Y1		4612-80000-01	8 MHz crystal
P1		4611-74549-67	25-pin male 'D' connector
POT 1		3305-01002-10	10K pot
U7		9201-10021-00	Analog multiplexer
3 each		4611-69145-21	shorting clips
20 each		62504-001	shorting clips

Notes:

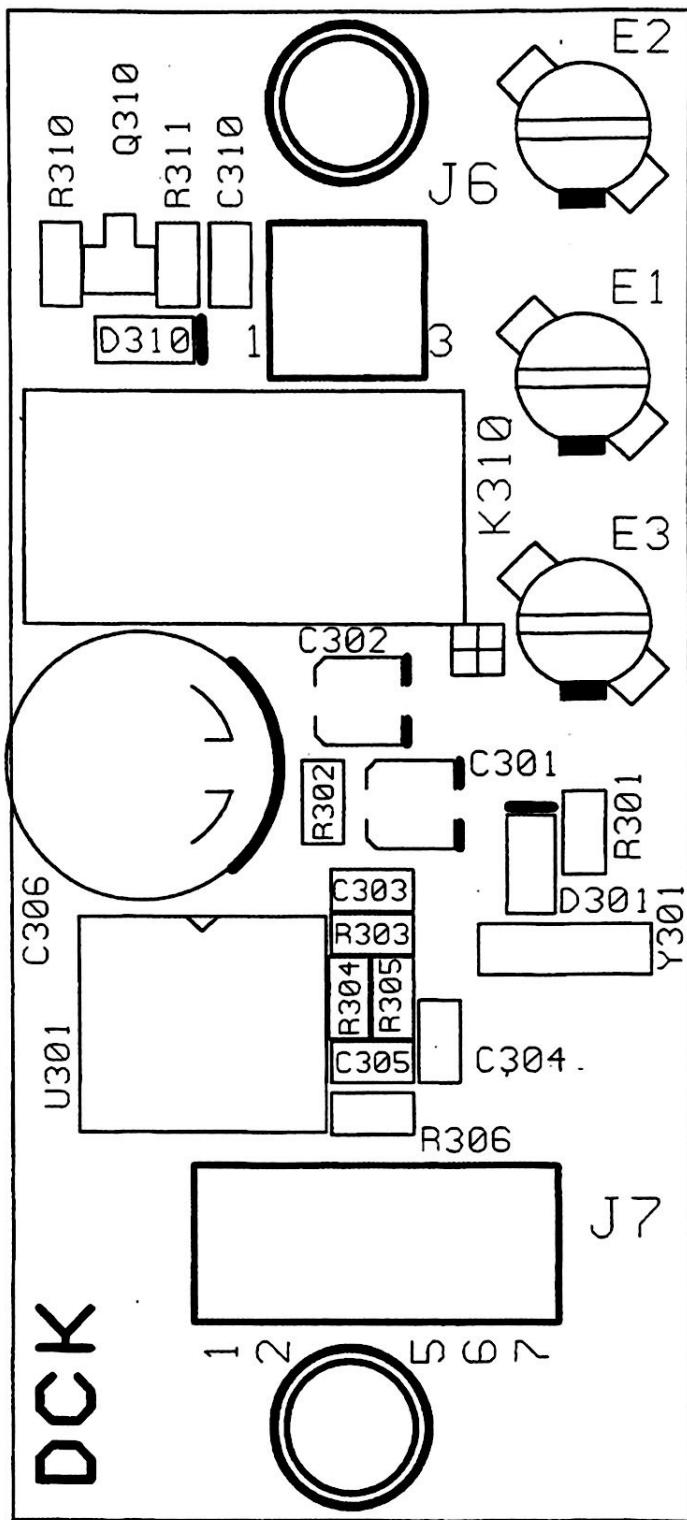
Main Circuit Board

Circuit Boards

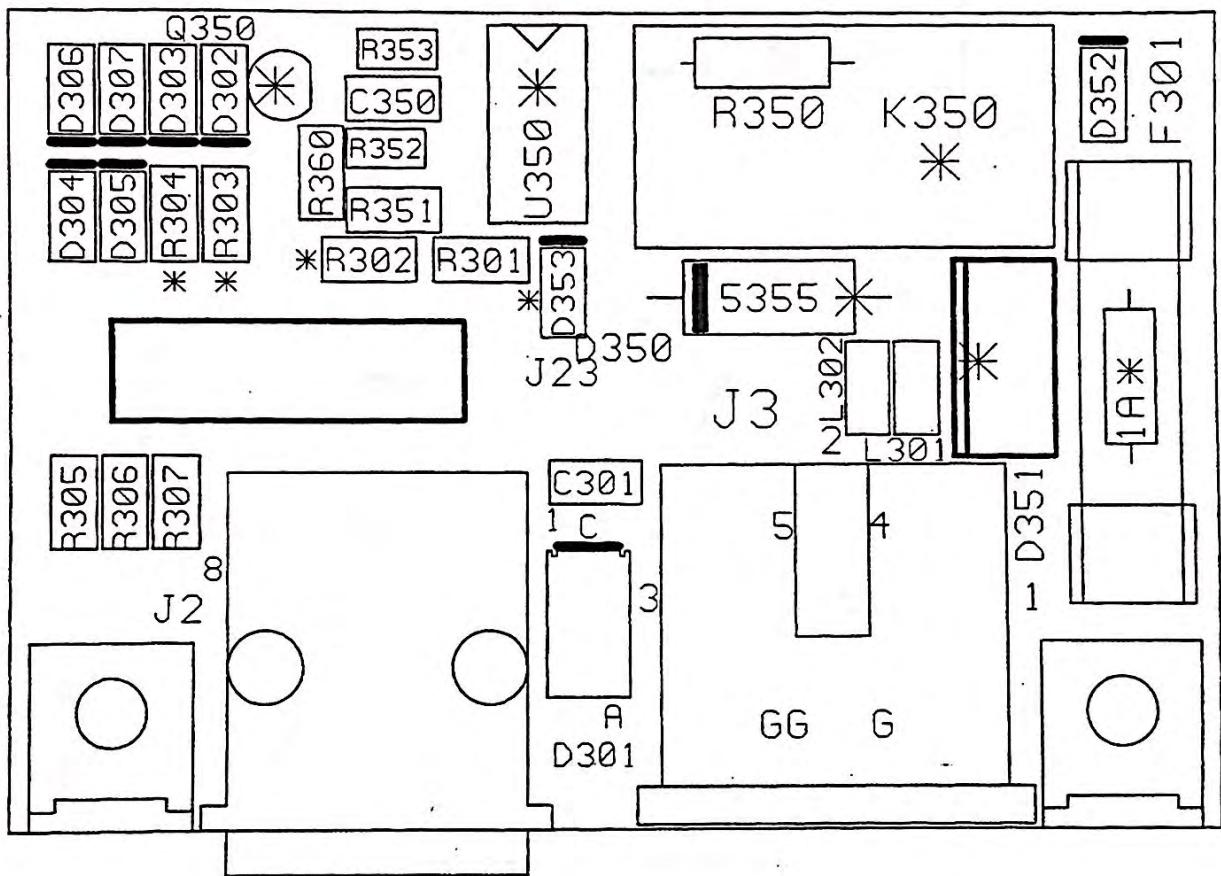
RCH 3000 Desk Sets L3029, L3030, L3031 Installation/Operation Manual



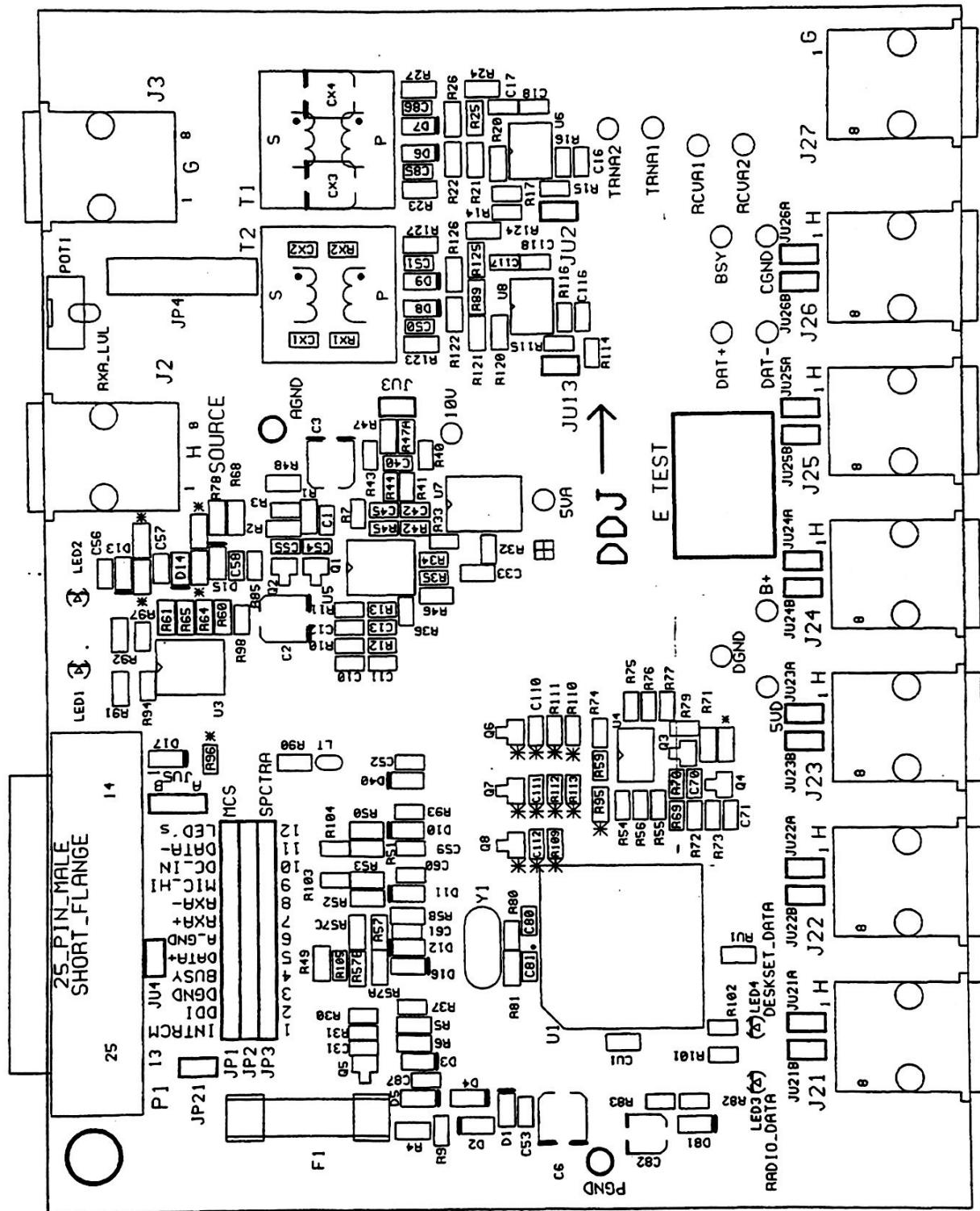
DDL Circuit Board



DCK Circuit Board



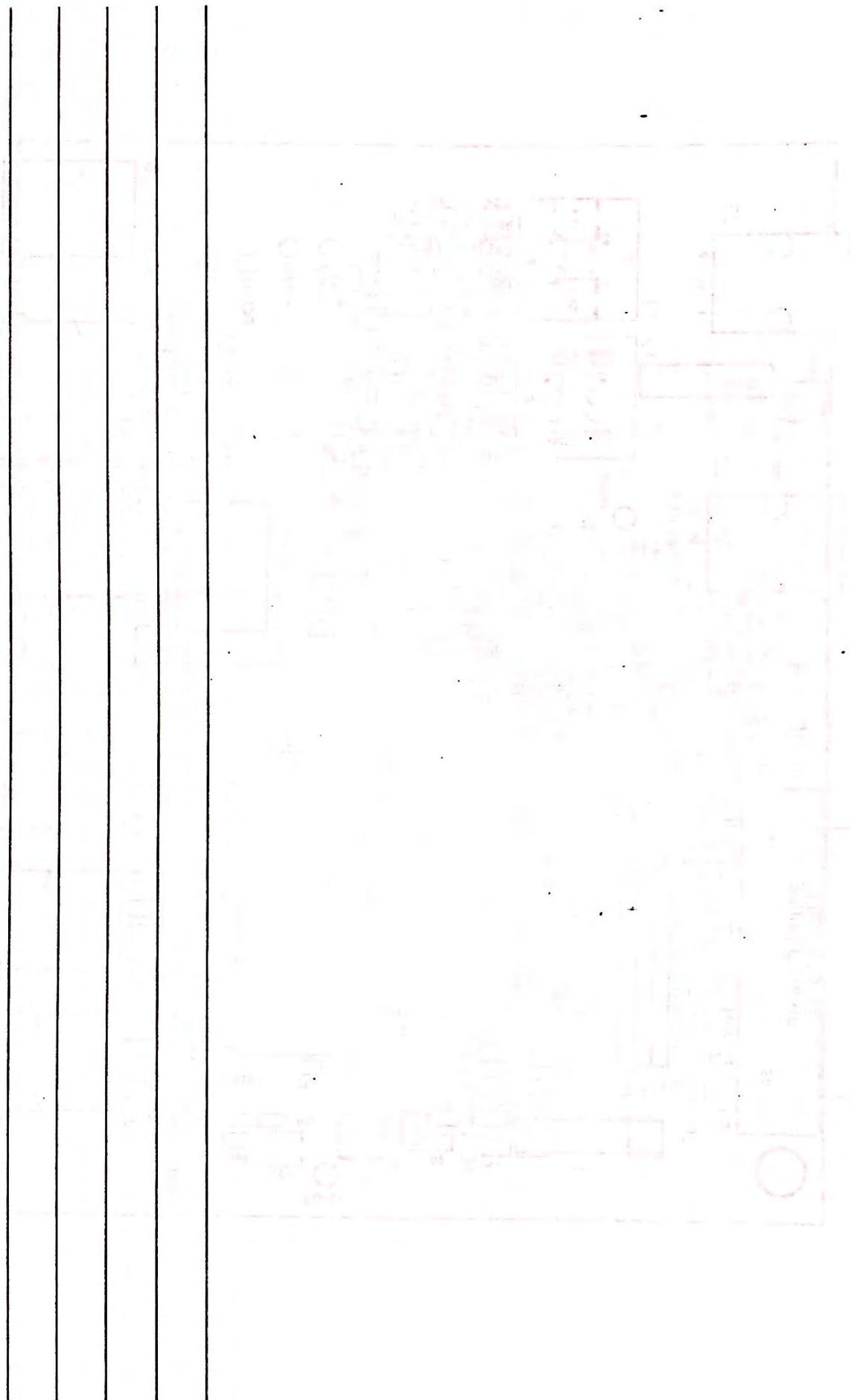
PSI Circuit Board



Circuit Boards

RCH 3000 Desk Sets L3029, L3030, L3031 Installation/Operation Manual

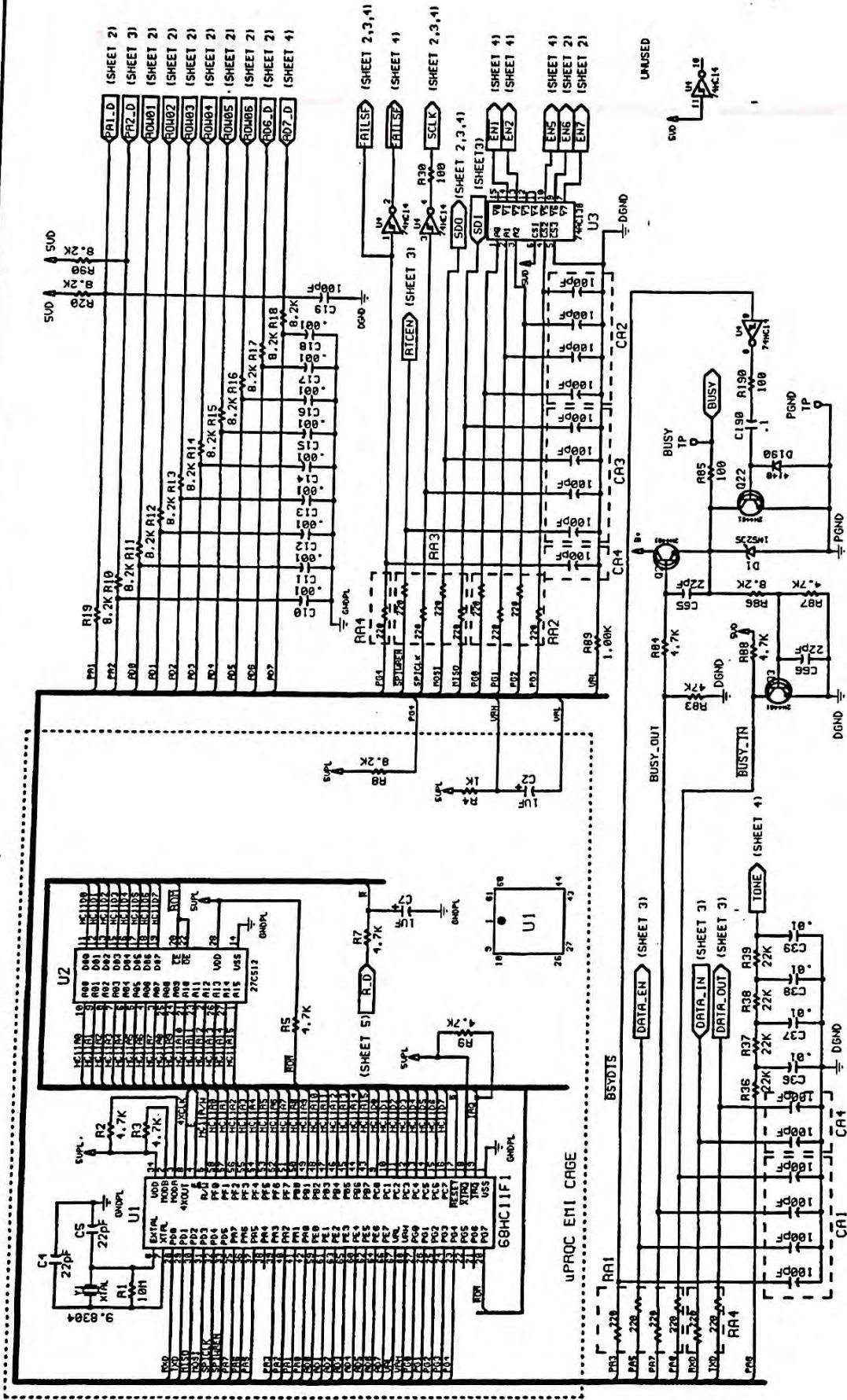
Notes:



Schematics

Schematics

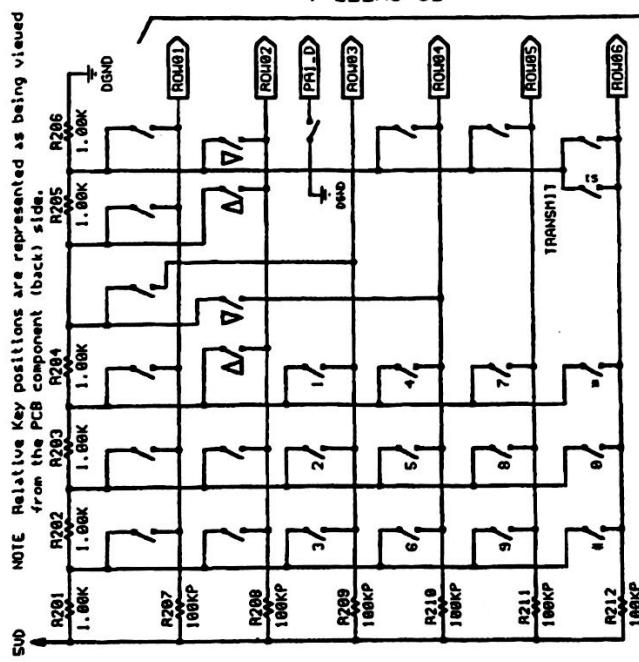
RCH 3000 Desk Sets L3029, L3030, L3031 Installation/Operation Manual



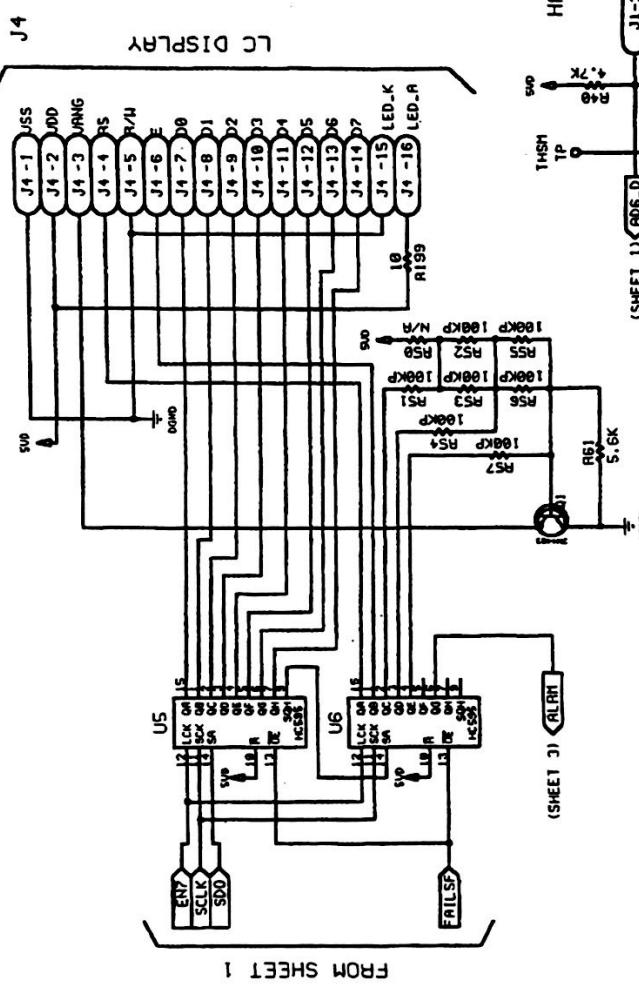
RCH 3000 Desk Set - Sheet 1 of 5

RCH 3000 Desk Sets L3029, L3030, L3031 Installation/Operation Manual

Schematics

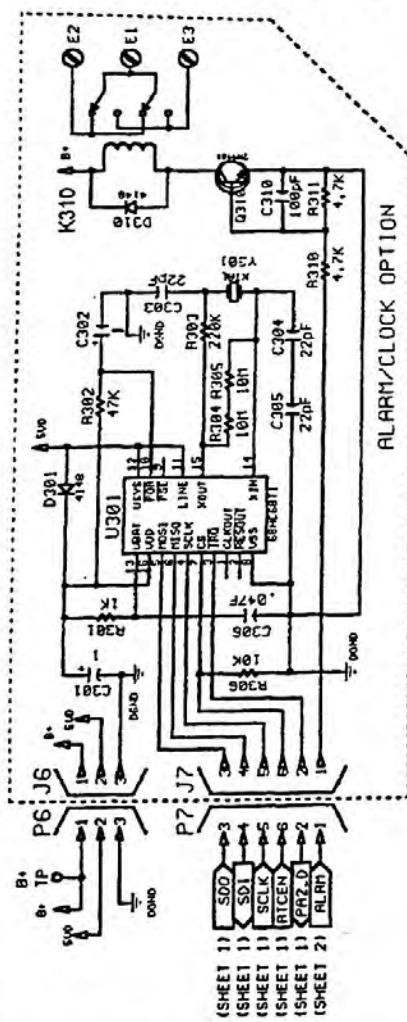


TO SHEET 1

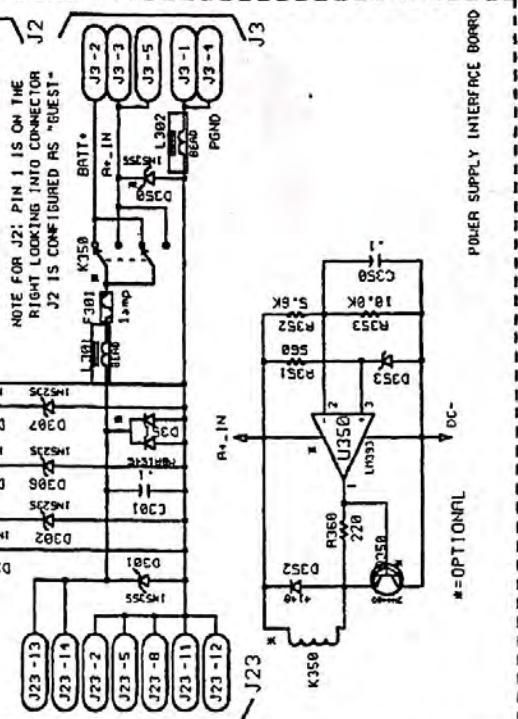
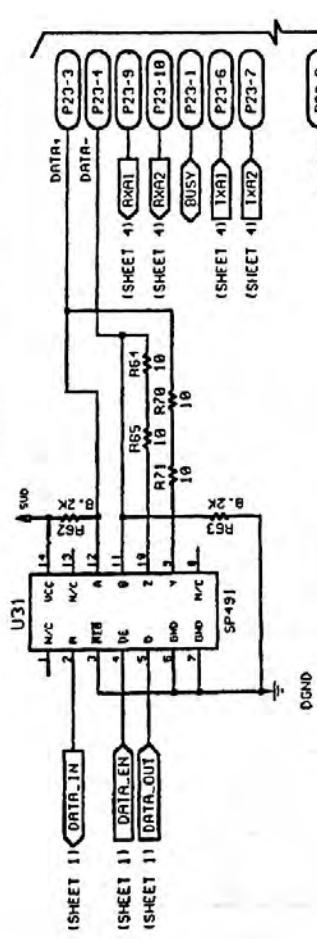


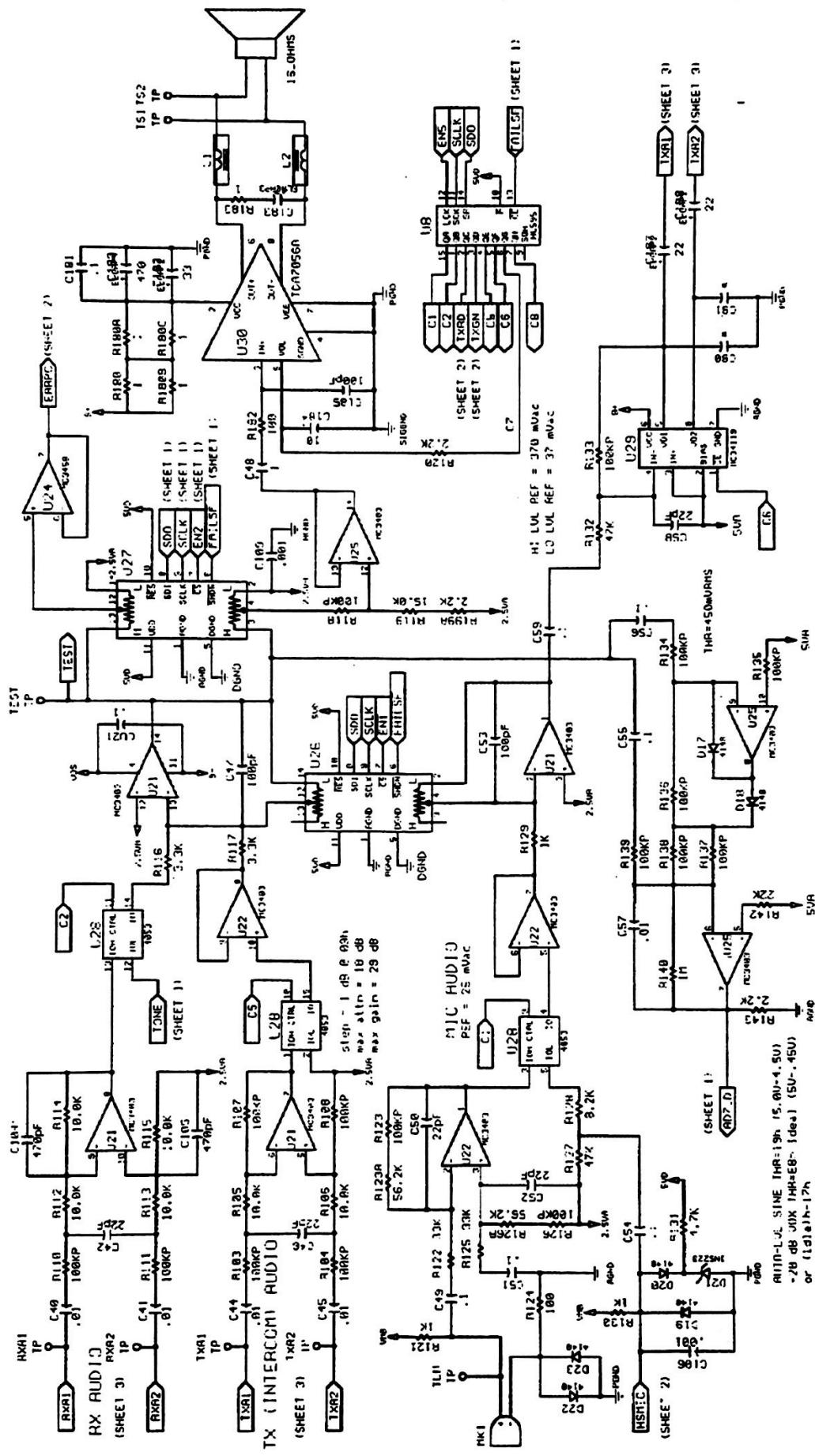
Schematics

RCH 3000 Desk Sets L3029, L3030, L3031 Installation/Operation Manual

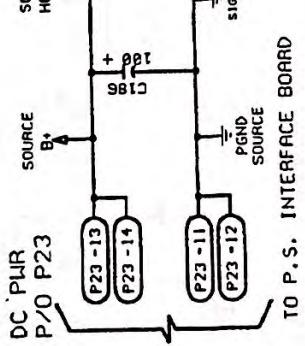
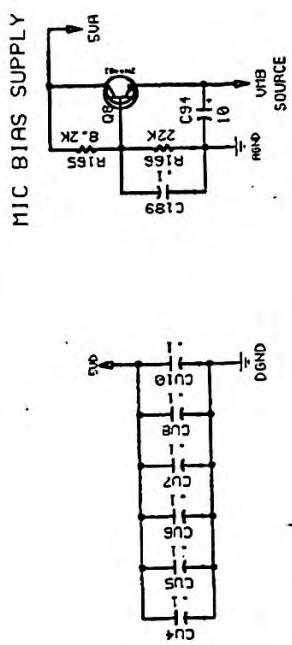
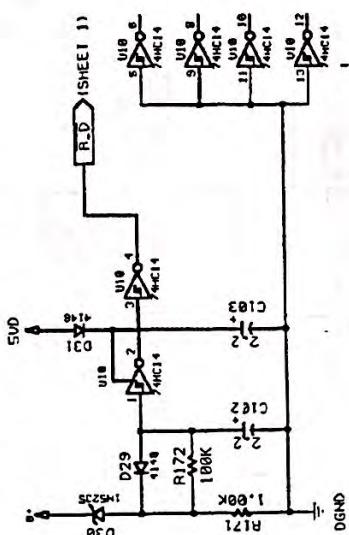
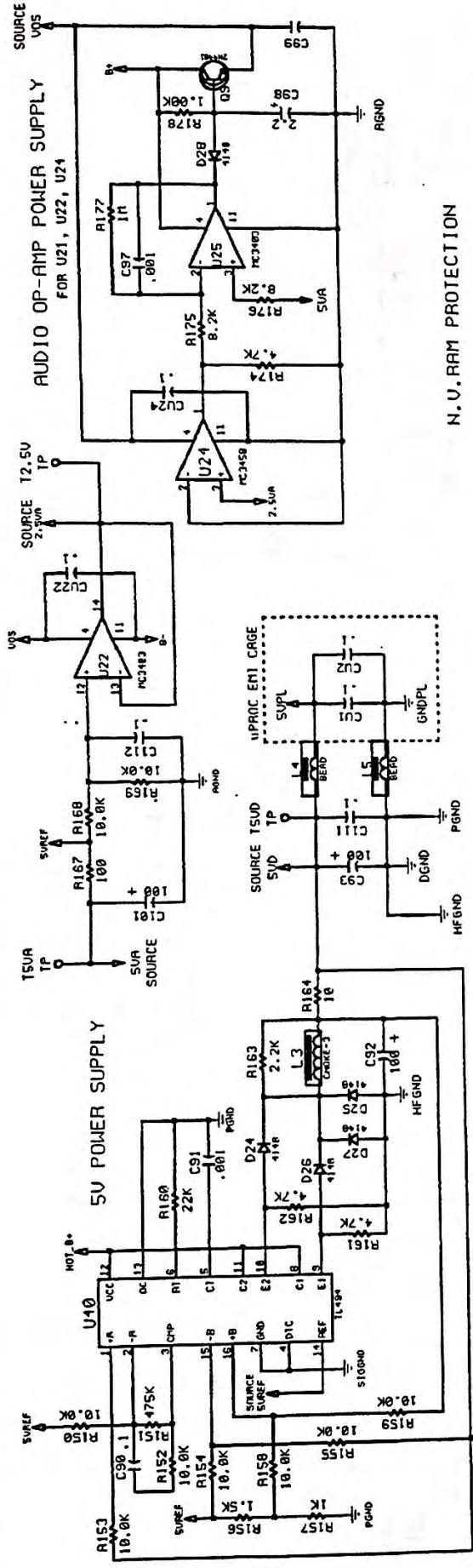


ALARM/CLOCK OPTION





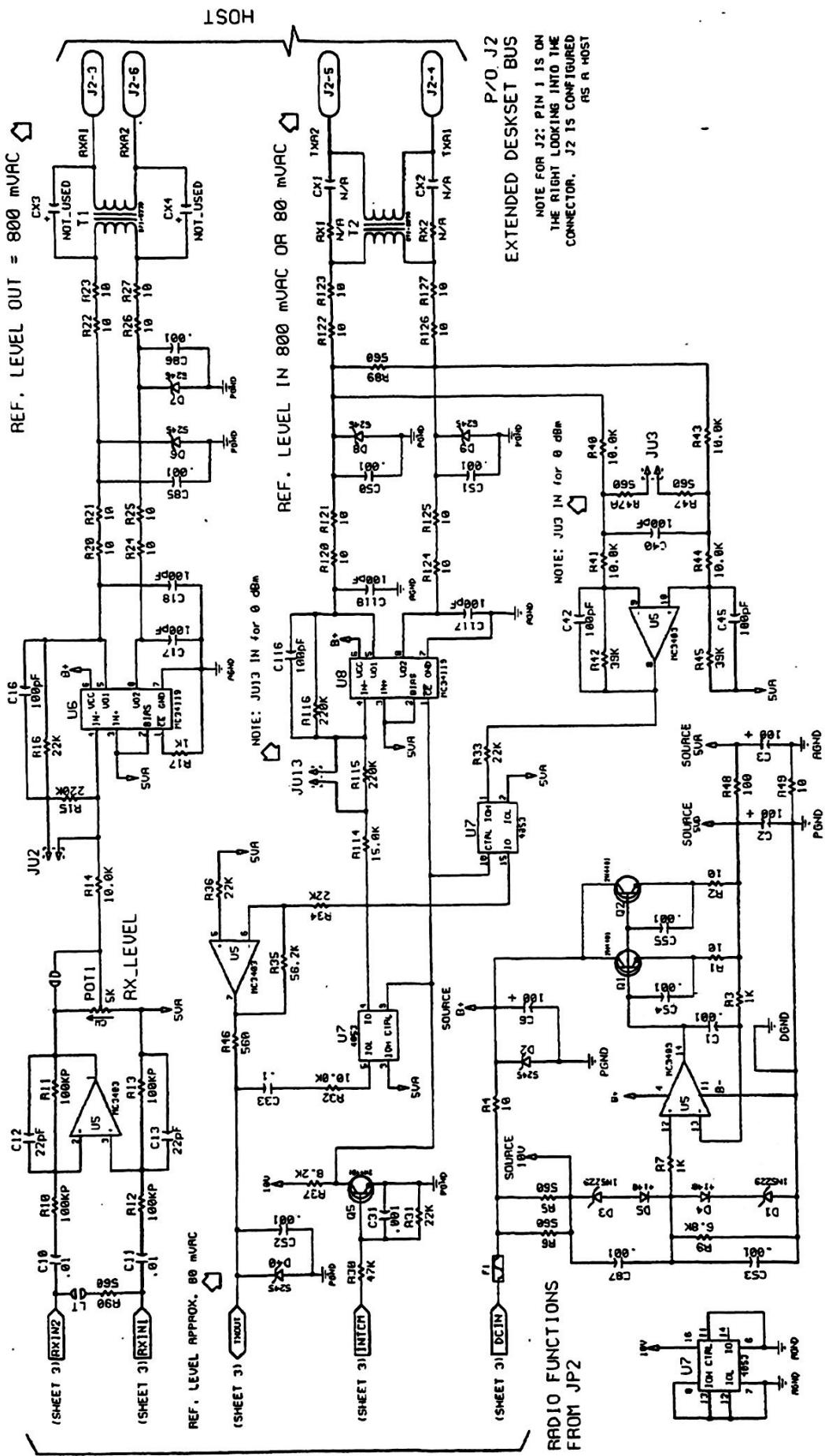
RCH 3000 Desk Set - Sheet 4 of 5



RCH 3000 Desk Set - Sheet 5 of 5

RCH 3000 Desk Sets L3029, L3030, L3031 Installation/Operation Manual

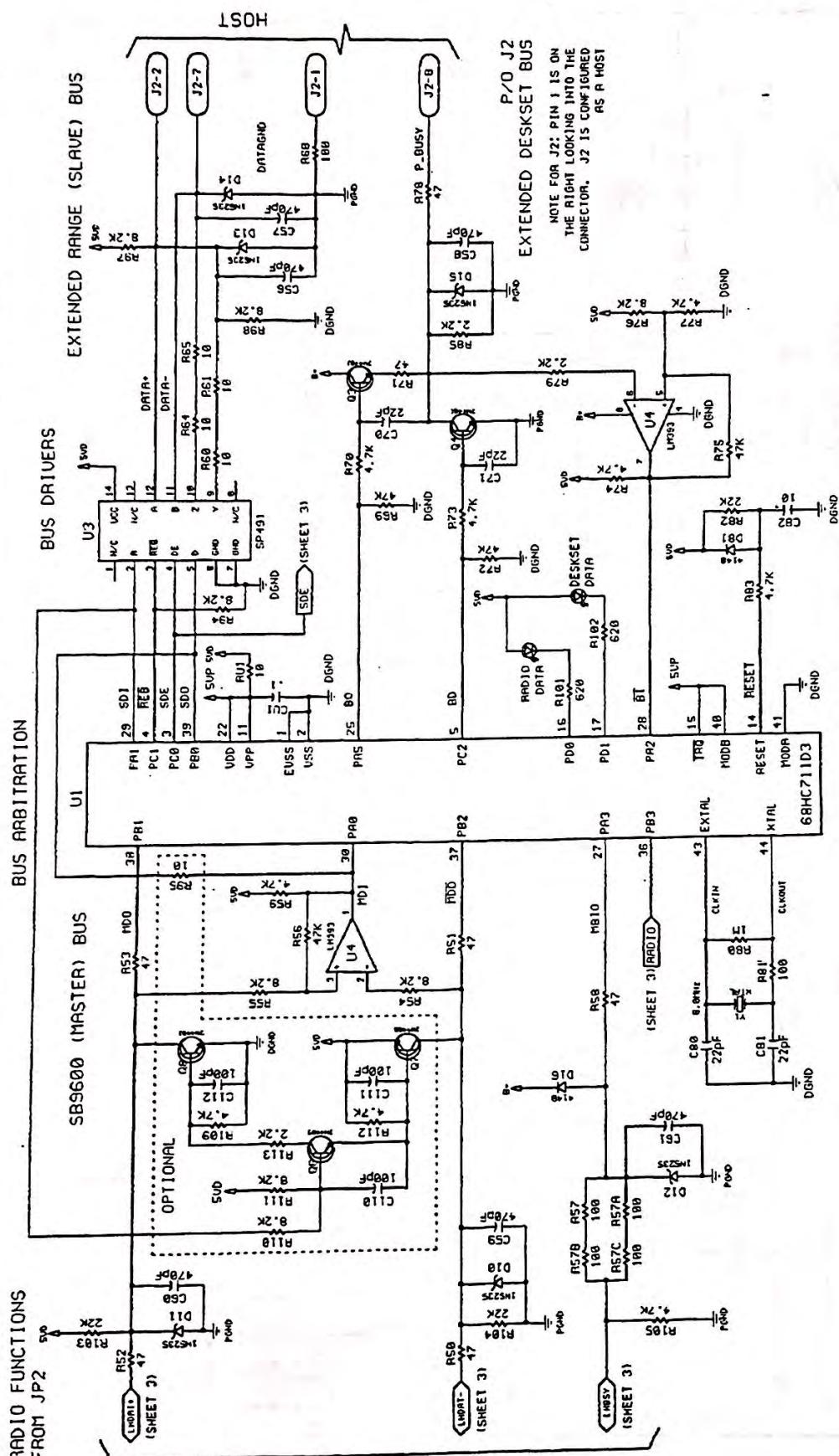
Schematics



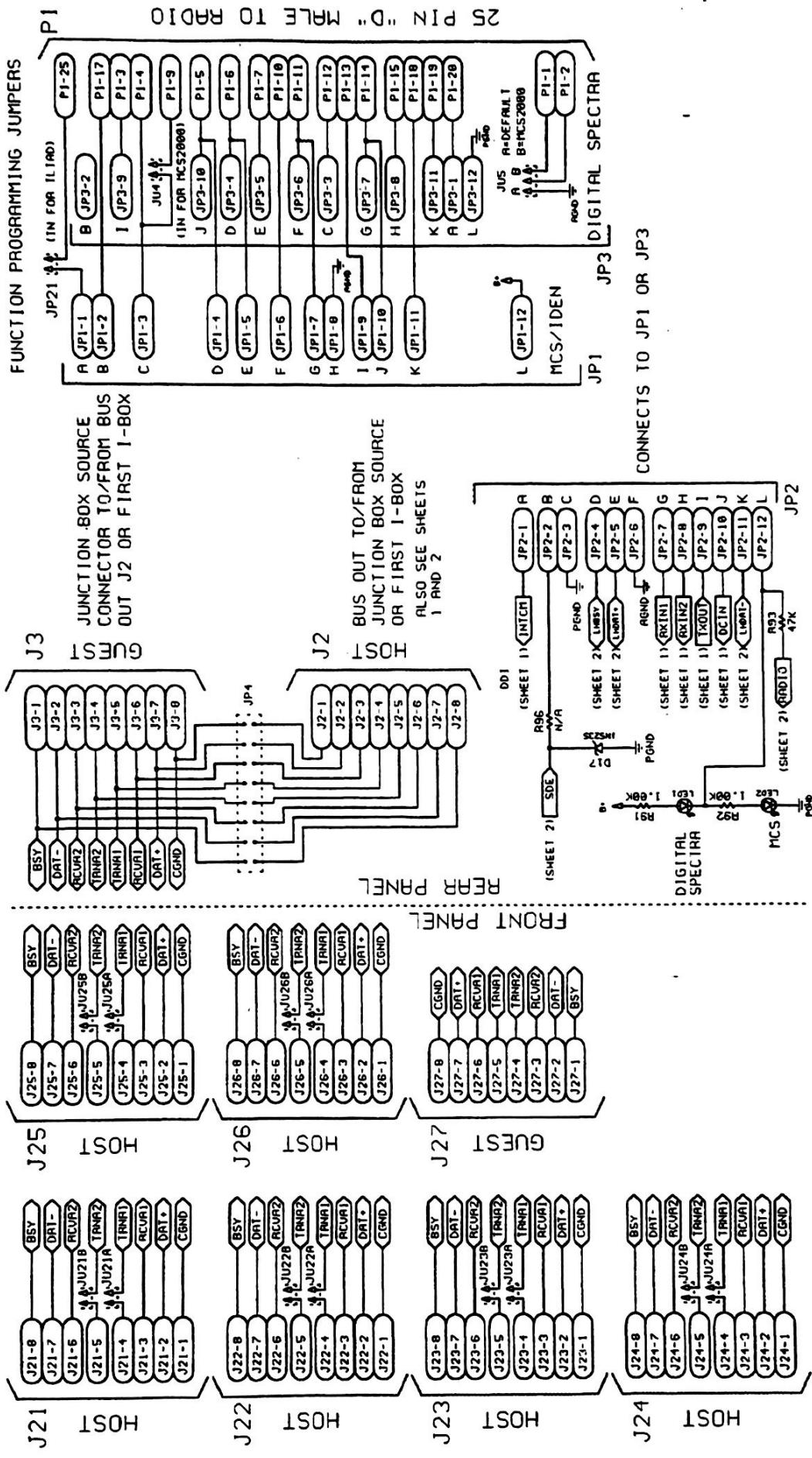
RCH 3000 Junction Box - Sheet 1 of 3

Schematics

RCH 3000 Desk Sets L3029, L3030, L3031 Installation/Operation Manual

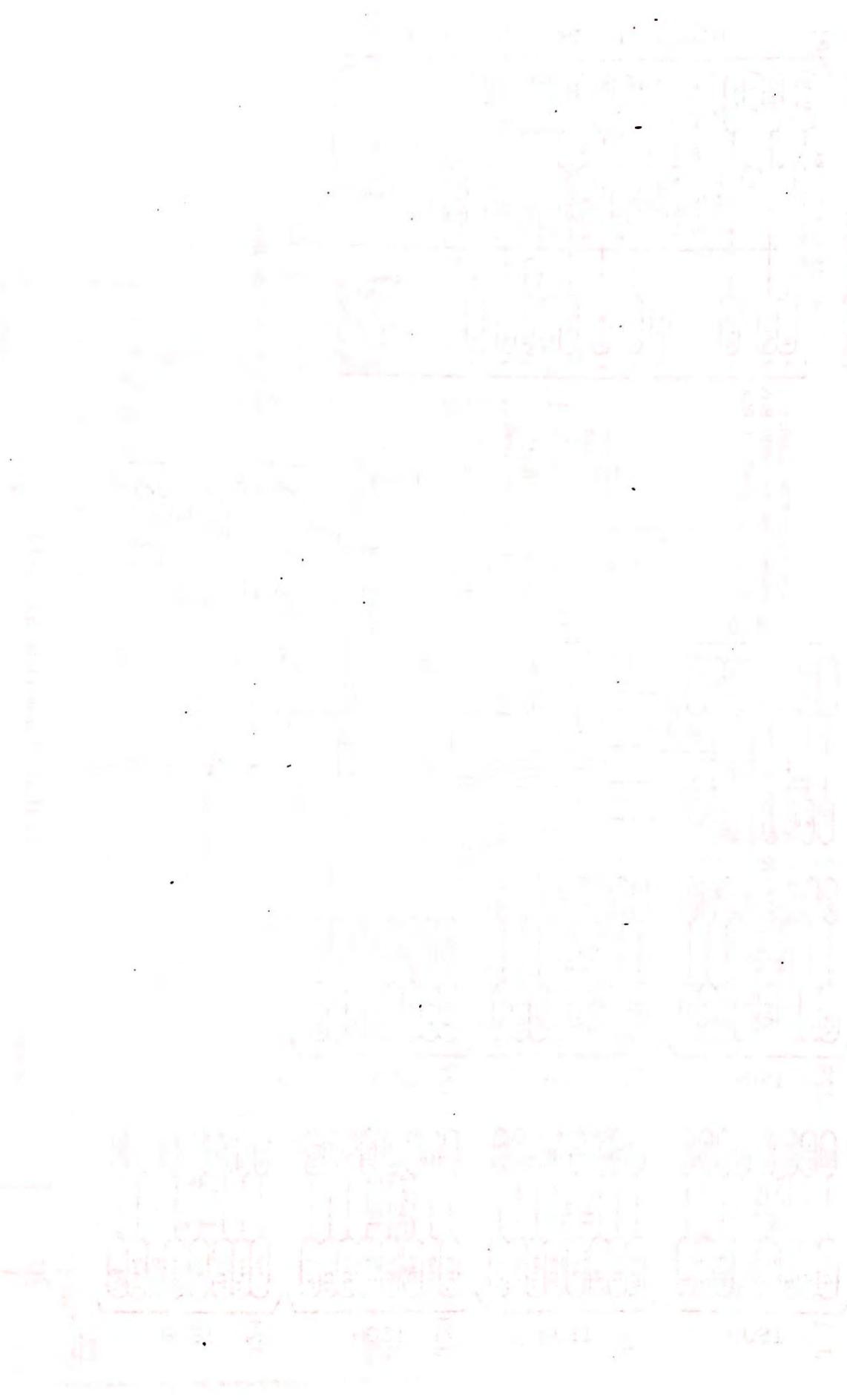


RCH 3000 Junction Box - Sheet 2 of 3.



RCH 3000 Junction Box - Sheet 3 of 3

Notes:



Notes

RCH 3000 Desk Sets L3029, L3030, L3031 Installation/Operation Manual

