ICS-2003 INTERCOM STATION

INSTRUCTION MANUAL

ICS-2003 Intercom Station Instruction Manual

Part Number 810303 Rev. A

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CONTENTS

IMPORTANT SAFETY INSTRUCTIONS

Please read and follow these instructions before operating an ICS-2003 intercom station.

For your safety, it is important to read and follow these instructions before operating an ICS-2003 intercom station:

(1) **WARNING:** To reduce the risk of fire or electric shock, do not expose an ICS-2003 intercom station to rain or moisture. Do not operate an ICS-2003 intercom station near water, or place objects containing liquid on it. Do not expose an ICS-2003 intercom station to splashing or dripping water.

(2) For proper ventilation, make sure ventilation openings are not blocked. Install the ICS-2003 according to the directions in the Installation Chapter of this manual.

(3) Do not install an ICS-2003 intercom station near a heat source such as a radiator, heat register, stove, or other apparatus (including amplifiers) that produces heat. Do not place naked flame sources such as candles on or near an i-station.

(4) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades, with one blade wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

(5) Protect the power plug from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the i-station's chassis.

(6) Only use attachments/accessories specified by Clear-Com Communication Systems.

(7) Unplug the ICS-2003 station during lightning storms or when unused for long periods of time.

(8) Refer all servicing to qualified service personnel. Servicing is required when:

- The ICS-2003 station has been damaged in any way, such as when a power-supply cord or plug is damaged.
- Liquid has been spilled or objects have fallen into the ICS-2003 station's chassis.
- The ICS-2003 station has been exposed to rain or moisture.
- The ICS-2003 station does not operate normally.
- The ICS-2003 station has been dropped.

Please familiarize yourself with the safety symbols in Figure 1. When you see these symbols on an ICS-2003 intercom station, they warn you of the potential danger of electric shock if the station is used improperly. They also refer you to important operating and maintenance instructions in the manual.

This symbol alerts you to the presence of uninsulated dangerous voltage within the product's enclosure that might be of sufficient magnitude to constitute a risk of electric shock. Do not open the product's case.

This symbol informs you that important operating and maintenance instructions are included in the literature accompanying this product.

Figure 1: Safety Symbols

OPERATION

INTRODUCTION

This chapter describes how to operate an ICS-2003 display intercom station and its digital equivalent, the ICS-2003T. Station operators can use this manual after the Eclipse System has been correctly installed and configured.

DESCRIPTION

This chapter describes how to operate an ICS-2003 display intercom station, and how to operate its digital equivalent, the ICS-2003T.

ICS-2003/ICS-2003T DISPLAY STATION

The ICS-2003/2003T intercom station is assembled in a small, 2-RU high (2.5 in. or 6.35 cm) chassis with 12 selectors. The station has the following features:

- Individually adjustable listen levels
- A 60 x 480 pixel EL display
- Local station configuration menus and functions
- Visible, assignable answer-back stack
- Swap window (provides additional 12 selector assignments)
- Built-in speaker and optional plug-in panel microphone
- Front-panel headset connector
- Call signaling ability
- “Answer Back” facility
- Local program input and volume control
- Programmable relay
- Mute relay
- Two logic inputs for external control of selected station functions
- Page override support

STATION OPTIONS

The ICS-2003/2003T can be equipped with the following options:

- OPT-100 Auxiliary Audio Output
- XP-12/22 or XPL-12/22 Expansion Panels

FRONT-PANEL CONTROLS AND INDICATORS

This section describes the front-panel controls and indicators. These include:

- The display screen
- Intercom and program controls
- Talk/listen selectors and indicators
- "Answer Back" facility
- Keypad buttons

Figure 2 illustrates the ICS-2003/ICS-2003T front-panel controls and indicators.

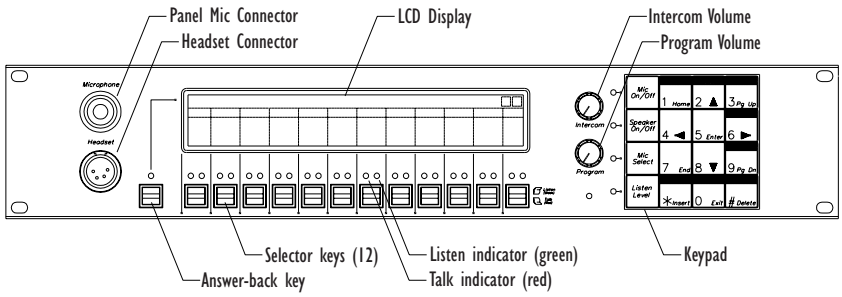

Figure 2: ICS-2003 Front-Panel Controls and Indicators

Display Screen

The display screen is divided into five areas, or windows. These include the talk, listen, answer-back, message, and symbol areas/windows.

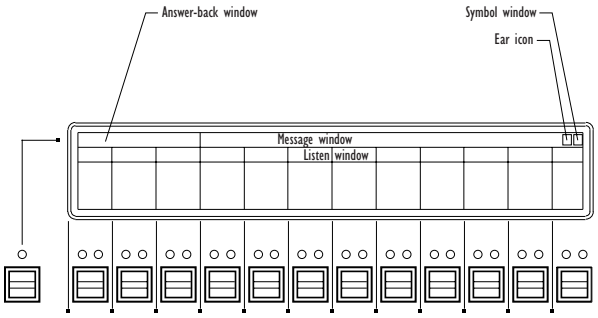

Figure 3: ICS- 2003 Display Screen

Talk Window

The talk window is located directly above the selectors, and shows the currently assigned labels. Assigned labels are accessed when the selector is pushed or latched in the "talk" position (down). Each selector can be assigned as many as four labels. Each label can represent a talk path to a station, interface, fixed group, or party line, or can activate a programmable control function.

Listen Window

The listen window is located directly above the talk window. It contains one listen label per selector. Labels refer to the listen paths that are established when the selector is pushed up.

Answer-Back Window

The answer-back window is located above the "Answer Back" selector. It displays a list of as many as five incoming calls. The first caller's label is closest to the "Answer Back" selector and is highlighted. Subsequent calls are placed to the right of the first in the window. This list is called the answer-back stack.

Message Window

The message window displays station status and error messages.

Symbol Window

The symbol window displays two graphic symbols. The functions of the two symbols are as follows:

- Ear symbol—indicates when someone is listening to (monitoring) the station.
- Window-indication symbol—displays a W (for window) and a Roman numeral I or II to indicate which talk/listen window is active, as toggled by the "Swap" button (See "Swap Button (9)" on page 1-12.).

Communication-Error Indicator

If the station should lose data communication with the matrix frame:

- It will display the message "WAITING FOR ECLIPSE CONNECTION."
- All of the red LEDs will flash slowly.

When data communication is restored, the station will automatically return to normal operation.

Speaker/Headset Level Controls

To adjust the speaker or headset volume, use the "Intercom" and "Program" volume controls. The speaker volume can also be affected by three software-controlled functions: Page Override, Mute Level, and Listen Level Adjustment.

Intercom Volume

The "Intercom" volume control sets the overall level of all signals coming from the matrix frame.

Program Volume

The "Program" volume control adjusts the volume of the signal coming into the station through the auxiliary input of the "Miscellaneous" rear-panel connector.

Page Override

Page override is a special function in the station in which the intercom volume defaults to a preset to a value when commanded to by the central matrix. Any fixed group can be assigned the page-override function through the configuration program.

The configuration program determines preset value for each station. If the preset value is lower than the setting of the front-panel volume control, the volume will be controlled by the front-panel control.

Mute Level

This turns down the speaker level when any talk is active at the station. The amount of muting (measured in dB) is set by the configuration program for each station. This function helps prevent possible feedback. The maximum amount of muting is 15 dB below full volume. If the front panel control is set below that level, then muting will have no effect.

Listen Level Adjustment

The level of any active listen path can be adjusted individually. Refer to "Listen-Level Mode" on page 1-8.

Headset Connector

The headset connector provides a front-panel connection for a headset. Plugging in a headset will initially cause the station to switch to headset-microphone operation and will turn the speaker off. Unplugging the headset will cause the station to switch to panel-microphone operation and will turn the speaker on.

Talk/Listen Selectors and Indicators

The following section describes the operation of the talk/listen selectors and their associated indicators.

Selector Operation

The selectors operate as both talk and listen selectors; they also work as volume controls when the station is in listen-level mode (see "Listen-Level Mode" on page 1-8). Pressing a selector down accesses a talk label; pushing it up accesses a listen label. Pushing the talk selector down and quickly releasing it will "latch" the selector and the talk path will stay active until it is pressed again. Pressing and holding a talk selector causes the talk path to stay active only for as long as it is held down. Listen selectors operate in the same manner.

To prevent the selector on the station from latching in the talk position (local latch disable), or to prevent any station from latching a talk to the station (global latch disable) use the configuration program.

Talk and Listen Indicators

When a talk path is active, the selector's red LED lights continuously. When a listen path is active, the selector's green LED lights continuously.

Monitoring/Eavesdropping Indicators

If any other station begins monitoring a station a beep (the monitoring-alert tone) will sound at the station.

To inhibit the monitoring-alert tone, use the configuration program.

Call-Waiting Indicator

If a station calls another station with a selector programmed with the caller's label, the red LED will flash rapidly. This flashing is a call-waiting tally. To answer the incoming call, push the indicated talk selector. The call-waiting tally will be cleared when the call is answered or after the call is terminated and the answer-back, auto-clear time out lapses.

Regardless of whether a selection is programmed with a caller's label, the label will be placed in the answer-back stack (see "Removing Labels from the Answer-Back Stack" on page 1-7).

In-Use Tally Indicator

If a selector is assigned to a label and another station is currently using that label, the LED will double-flash once per second to indicate the label is in use. This tally must be enabled from the configuration software.

Telephone Off-Hook Tally Indicator

When a telephone interface is assigned to a talk selector, the talk LED will flash once per second if that telephone is off the hook. This tally must be enabled from the configuration program.

Radio Receiver Active Tally Indicator

When a two-way radio interface port is assigned to a talk selector, the LED will flash once per second when that radio's receiver is active. This tally must be enabled from the configuration program.

Station Connected Tally Indicator

This tally is used when a station is connected to the frame by a high-speed data line (such as an ISDN or T1 line) that might be inactive periodically. The red LED of any talk selector associated with that station will flash once per second when the station is on-line. This tally must be enabled from the configuration program.

Audio Presence Tally Indicator

When a label is assigned to a listen selector, the LED will flash once per second to indicate someone is talking on that channel. This tally must be enabled from the configuration program.

Answer-Back Facility

The primary function of answer-back facility is to answer or call other stations or interfaces not assigned to a station's selectors. Stations and interfaces that are assigned to a station's selectors also can be answered or called with the answer-back facility.

The following sections describe the use of the answer-back facility.

Answer-Back Window

The answer-back window is located above the "Answer Back" selector. It displays a list of as many as five incoming calls. The first caller's label is closest to the "Answer Back" selector and is highlighted. Subsequent calls are placed to the right of the first in the window. This list is called the answer-back stack.

Answer-Back Selector

The "Answer Back" selector answers calls from stations and interfaces that are both assigned and unassigned to the station.

When a call arrives from a station or interface:

- The calling station's label will be placed in the answer-back stack and be highlighted in the answer-back window.
- The red LED will flash.

These two conditions will continue until the call is answered, or until the answer-back time-out period lapses and the caller's label is automatically removed. To answer the call, push the "Answer Back" selector. The LED will stay on steady, indicating an active talk path to the caller. The talk path is active for as long as the selector is held.

Note: *The "Answer Back" selector cannot be latched; it is a momentary-only function.*

Calls from stations or interfaces assigned to station selectors will also be indicated by their associated LEDs.

Answer-Back Label Selection

If another call or calls comes in while using the answer-back selector:

- The user will hear the caller's voice
- The label will be placed in the answer-back stack.

To answer the next caller:

1. Push up on the "Answer Back" selector to highlight the desired label in the answer-back stack.
2. Once the desired label is highlighted, press the selector down to talk.

Removing Labels from the Answer-Back Stack

Any label will be automatically removed from the stack if it is not answered within a certain time interval, which is set by the answer-back auto-clear time in the configuration program.

To manually remove the current caller's label from the answer-back stack, push up on the "Answer Back" selector.

Calling an Unassigned Station

To call a destination in the answer-back stack:

1. Push up on the "Answer Back" selector to highlight the desired label in the answer-back stack.
2. Once the desired label is highlighted, press the selector down to talk.

Keypad: Single-Function Buttons

The first column of buttons on the keypad consists of:

- "Mic On/Off"
- "Speaker On/Off"
- "Mic Select"
- "Listen Level"

Mic On/Off Button

This button activates the panel or headset microphone, whichever has been selected. The LED indicates when the microphone is on. If a talk is activated while the microphone is off, it will turn on for the duration of the call.

Speaker On/Off Button

This button functions only when a headset is plugged into the station. To toggle the speaker on and off, push the "Speaker On/Off" button. The LED indicates when the speaker is on.

Mic Select Button

This button selects the panel or headset microphone. If a headset is plugged in, the station will automatically switch to headset microphone operation. If the headset is unplugged, the station will automatically switch back to panel microphone operation. The LED to will be on when the panel microphone is active.

Listen Level Button

The Listen Level button has four functions:

- Activating the listen-level mode
- Resetting the listen-level settings
- Sending call signals
- Releasing auto-answered telephone lines

Listen-Level Mode

To use the listen-level adjust mode:

1. Push (for less than 1 second) and quickly release the "Listen Level" button.
2. "Listen Level Adjust Mode" will appear in the message window to indicate the function is on and the LEDs of all active listen selectors will begin to flash.

***Note:** Only active selectors can be adjusted in listen-level mode.*

3. Use the selector associated with the intended label to increase (up) or decrease (down) the volume.
4. To exit, push the "Listen Level" button or wait for the 3 second time-out.

Listen Level Reset

To reset the Listen Level to default settings:

1. Press (for less than 1 second) and quickly release the "Listen Level" button.
2. Press and hold the "Listen Level" button for 3 seconds.
3. Release the "Listen Level" button.

Call Signals

To activate a call signal push and hold (for at least 1 second) the "Listen Level" button until the station indicates it is in "Call Signal" mode.

The call signal will be sent each time the selector with that label assignment is pushed down and will remain so until the call-signal mode times out (about 5 seconds).

Call signals can be issued to any talk label assigned to a station's talk/listen selectors. If more than one label is assigned to a selector, all labels will receive the signal. If a label is a fixed group, the entire group will receive the call signal. If the label is a party line, then every station listening on the party line will receive the call signal.

Remote Telephone Line Release

This function is available only if specifically enabled in the configuration program. To hang up a telephone interface left off the hook:

1. Push and hold the "Listen Level" button for at least 1 second to activate the call-signal mode.
2. While holding the "Listen Level" button, press the talk selector of the desired telephone's label.
3. Release the "Listen Level" button.

***Note:** In addition to hanging up the telephone interface, this will deactivate any talk/listen selector set to the interface from anywhere in the system.*

Keypad: Administrative Buttons

The upper portions of 5 of the 12 buttons are labeled with the function active during normal station operation; these functions are:

- (3) “Menu”
- (5) “Display Listen” Labels
- (9) “Swap” window
- (*) “Dial” phone
- (#) “SA” (studio/stage announce)

Menu Button (3)

The “Menu” (3) button on the keypad accesses the Information, Local Configuration, System Configuration, and Maintenance menus. Pressing the “Menu” (3) button also displays the station’s port number, label, firmware version, internal level adjustment, and display brightness level.

To access the menus:

1. Push the “Menu” (3) button.
2. Use the selectors and keypad as indicated to select the appropriate menu.

This function can be inhibited through the configuration program.

If another station calls while in a menu, that station’s label will be added to the answer-back stack and the operator’s voice will be heard. To respond, push the “Answer Back” selector.

Information Menu

The Information menu allows viewing, but not modifying, the following items:

- “View Party Line Members”
- “View Fixed Group Members”
- “View Monitoring List”
- “View Forced Listens”
- “View Nearby Stations”

View Party Line Members

This function displays interfaces preset to a party line. Use the cursor buttons or selectors to select the desired party line.

View Fixed Group Members

This function displays stations and interfaces in each fixed group. Use the cursor buttons or selectors to select the desired fixed group.

View Monitoring List

This function displays all stations monitoring the station. An ear symbol in the symbol window indicates monitoring of the station.

View Forced Listens

This function displays destinations or sources of forced listens. Use the selectors to select “Destinations” or “Sources.”

Viewing destinations displays all stations or interfaces always connected to the station’s out-going audio. Viewing sources displays all stations or interfaces always connected to the station’s incoming audio.

View Nearby Stations

This function displays all the labels set for nearby stations. This means that two stations are within hearing distance of each other and that an audio path between the stations can result in an audio feedback loop. Audio paths to stations designated as nearby stations cannot be established.

Local Configuration Menu

Selecting the “Local Configuration” menu allows modifying the following items:

- “Answer Back Time-Out”
- “Internal Level Adjust”
- “Station Restrictions”
- “Display Brightness”

Answerback Time-out

This menu increases, decreases, or disables the time period a caller’s label will remain in the answer-back window. The time period is adjustable from 10 to 60 seconds in 10 second increments; the default period is 10 seconds. Use the cursor buttons or selectors to change the time-out period.

Internal Level Adjust

This menu changes the panel microphone, the headset microphone, and the headset sidetone gain. Use the selectors to raise or lower the gain.

Station Restrictions

This function inhibits or enables the following station features:

- “Monitoring” alert tone
- “Select” station mode
- “Swap” window
- “Assign” selectors mode
- “Dial” phone mode

Use the selectors to select the desired function.

Display Brightness

This menu adjusts the brightness of the station’s display. Use the cursor buttons or selectors to adjust the brightness.

Warning: *All station key reassignments take place immediately upon exiting this function. Active talk and listen paths will be disconnected when their labels are removed.*

System Configuration Menu

The System Configuration menu changes some of the Eclipse System configuration parameters typically only available through the configuration program. These are:

- "Assign Party Line Members"
- "Assign Fixed Group Members"
- "Assign Station Keys"
- "Assign Forced Listens"
- "Change Input Level Gains"

Assign Party Line Members

To add or remove an interface from a party line:

1. Choose the appropriate interface label category.
2. Choose an interface label.
3. A list of available party lines will be displayed. If the label is currently part of any displayed party line, that party line(s) will be outlined. Add or delete the label from a displayed party line by selecting it and pressing "Enter."

Assign Fixed Group Assignments

To add or remove stations or interfaces from fixed groups:

1. Choose the appropriate interface label category.
2. Choose an interface label.
3. A list of available fixed groups will be displayed. If the label is currently part of any displayed fixed group, that fixed group(s) will be outlined. Add or delete the label from a displayed fixed group by selecting it and pressing "Enter."

Assign Station Keys

To change the talk and listen selector labels on any station in the system, including the selectors on accessory panels:

1. Choose a station.
2. Choose the selector to be assigned.

Note: *It may be necessary to select a talk/listen window if the selector to be assigned isn't visible. Use the Pg Up and Pg Dn buttons for this.*

3. Press the "Enter" button to display all labels available for assignment.
4. Select the desired label.

Note: *If the desired label does not appear on this list, it may be because the station's access to that label has been inhibited (blocked) from the configuration program.*

5. Exit to save changes or abort to abandon the changes.

Warning: *All station selector reassignments take place immediately upon exiting this function. Active talk and listen paths will be disconnected when their labels are removed.*

Assign Forced Listens

To add or remove forced listens:

1. Select "select source -> assign destinations" to choose a single source and assign it to multiple destinations. Select "select destination -> assign sources" to choose a single destination and assign multiple sources to it.
2. Choose a station or interface label.
3. A list of destination or source labels will be displayed depending upon the assignment method selected. If the label(s) is already assigned to the selected label, that label will be outlined. To change a label's assignment status, select the label and press "Enter."

Change Input Level Gain

This menu adjusts the level of the audio signal sent to the frame. Use the selectors to raise or lower the gain

Maintenance Menu

The Maintenance menu provides functions for technical personnel. For information on the use of these functions, see the *Maintenance* chapter.

Listens Button (5)

Although not marked for the listen function, the center button (5) displays listen labels on any display expansion panel (XPL-12 or XPL-22) connected to the station. Momentarily pressing and quickly releasing the (5) button will cause all XPL panels to display the listen labels assigned to the selectors. If the listen and talk labels are the same, then there will be no change. The function will time-out after 10 seconds.

Swap Button (9)

The station can support two sets of talk and listen label assignments for its selectors. The Swap window (9) button alternates between the two sets; the talk/listen windows display the labels for each. This effectively doubles the selectors.

If talk/listen paths are latched on when windows are swapped, the paths will be disconnected temporarily. When the windows are swapped back, the previously latched paths will be re-established. Should the label appear in both windows (not necessarily in the same position) the path will remain latched through the swap.

Additionally, the station can be programmed to allow talks and listens to be active in both windows simultaneously.

This function can be inhibited from the configuration program.

Dial Button (*)

The "Dial" phone button turns the station keypad into a touch-tone phone keypad, allowing DTMF tones (Touch Tones) to be generated for telephone dialing. To place a telephone call:

1. Push a talk selector assigned to a telephone interface.
2. After the dial tone is heard, push the "Dial" phone button on the keypad.
3. Enter the phone number using the keypad buttons. The station will automatically exit dial-tone mode after 5 seconds of keypad inactivity.
4. While the call is in progress, it is possible to enter dial-phone mode and send DTMF tones to the destination.

This function can be inhibited from the configuration program.

SA (Studio/Stage Announce) Button (#)

This button functions only if the station is equipped with the OPT-100 Auxiliary Audio Input/Output option. Pressing and holding the "SA" button sends the microphone output to the studio announce output on the Auxiliary Audio I/O connector. All other talk paths from the station to the matrix frame are turned off.

REAR-PANEL CONNECTORS

This section describes only those rear-panel functions directly affecting normal station operation. These include the functions available through the "Miscellaneous" connector and those added by the use of the "OPT-100 Auxiliary Audio" connector. The actual functions these inputs and outputs perform depend on the installation of the individual station. This section only describes the general use of these functions.

Miscellaneous Connector

The Miscellaneous connector includes the following functions:

- Logic input #1
- Logic input #2
- Programmable relay
- Mute relay

Logic Input #1 and #2

Each input can control one of several functions, determined through the configuration program. Typically, these inputs are connected to an external foot switch, a panel-mounted switch, or the logic output of another device.

The following functions are available:

- Mic On/Off—toggles the station's microphone on and off.
- Mute Mic Output To Frame—turns off the audio from the station to the frame. It does not turn off the Hot Mic output (described in "OPT-100 Auxiliary Audio Option" on page 1-15).

- Mic Off —momentarily turns off the station's microphone.
- Answer Back Talk/Clear—functions the same as the station's "Answer Back" selector. Holding down the switch activates a talk to a label in the answer-back stack. To clear the label, quickly press and release the switch.
- Studio Announce—sends the output of the station's selected microphone (panel or headset) to the station's Studio Announce (SA) audio output, and activates the SA relay. The microphone output is not sent to the frame. The SA output and relay are only present if the station has the OPT-100 Auxiliary Audio I/O Option installed. (The SA options are described in "OPT-100 Auxiliary Audio Option" on page 1-15).
- Speaker OFF—turns off the station speaker, disabling all audible output from the station.
- PTT: Activate All Talk Keys—implements a push-to-talk function for all talk selectors. When the logic input is active, the station operates normally. When the logic input is deactivated, all active talk selectors are disabled. Any controls (relays, etc.) assigned to the labels are activated or deactivated along with their assigned labels. The LED indicators associated with the active talk selectors operate normally regardless of the PTT status. This input only controls latched talks.
- Activate Talk Switch #1— equivalent to pressing the station's first (leftmost) talk selector; a momentary and latching activation.
- Activate Talk Switch #2—equivalent to pressing the station's second talk selector; a momentary and latching activation.
- Activate Listen Labels Button—equivalent to pressing the "Listen Labels" button to display listen labels on any display expansion panel (XPL-12 or XPL-22) connected to the station.
- PTT: Activate Two-Way Radio Keys—implements a push-to-talk function for all two-way radio talk selectors. When the logic input is active, the station operates normally. When the logic input is deactivated, all active two-way radio talk selectors are disabled. Any controls (relays, etc.) assigned to the labels are activated or deactivated along with their assigned labels. The LED indicators associated with the active two-way radio talk selectors operate normally regardless of the PTT status. This input only controls latched talks.

Programmable Relay

Each ICS-2003 station includes a relay controlled by the system program and independent of the local station function. This relay can be assigned to any label(s) in the system, which will activate whenever a talk or listen is set to that label(s). If activating the relay is the only action desired, assign the relay to a Control label. See the *Eclipse Configuration System Manual* for more details.

The relay can activate an external device, such as an applause light in a studio, a cue light, or a security door lock. Any programmable relay in the system can be activated from any station in the system, including a direct-inward-access caller.

Mute Relay

The mute relay is activated whenever any talk selector is activated at the station. The mute relay is commonly wired such that whenever it is activated, the volume of the monitor speaker in that room is decreased (muted).

OPT-100 Auxiliary Audio Option

The OPT-100 Auxiliary Audio option provides the following features:

- Hot Mic output
- SA audio and relay outputs
- Auxiliary audio line level output

Hot Mic Output

The Hot Mic output is a balanced, line-level, transformer-isolated feed of the signal from the currently selected microphone (panel or headset). The Hot Mic output is active regardless of whether the station has talk paths set and regardless of the front-panel's control settings.

Studio/Stage Announce Audio and Relay Outputs

The SA output is a balanced, line-level, transformer-isolated feed with the same signal sent to the Hot Mic output, except it is only active when the SA button on the station's front panel is pressed or when activated by Logic Input #1 or #2, which is configured for the Studio Announce Function.

Auxiliary Audio Line Level Output

The Auxiliary Audio Line Level output is a balanced, line-level, transformer-isolated feed of the input to the station's internal speaker. For example, this output could be used to feed an external amplifier connected to loudspeakers.

EXPANSION PANEL OPERATION

Optional expansion panels provide additional selectors that operate the same as a station's selectors, including talk, listen, tally, and error indication.

The XPL-12 expansion panel provides 10 additional keys, while the XPL-22 provides 20 additional keys. Each expansion panel offers illuminated 5-character labels for every key.

Only one rack unit (1RU) of a standard Electronics Industry Association equipment rack is required for each expansion panel. The panels' compact size makes them ideal for use in TV control rooms, edit suites, mobile OB vans, and any other location where many talk/listen keys are necessary but space it at a premium.

Although the center button (5) on the station's keypad is not marked for a function, it has the function of displaying "listen" labels on any display expansion panel (XPL-12 or XPL-22) connected to the station. Momentarily pressing and quickly releasing the "5" button will cause all XPL panels to display the listen

label assigned to the key. If the listen and talk labels are the same, then there will be no change. The function will time-out after 10 seconds.

2 INSTALLATION

INTRODUCTION

This chapter describes the installation of the ICS-2003/ICS-2003T display station, including:

- Station placement
- Wiring
- Mains AC power
- Adjustments
- Configuration
- Accessory panels

MOUNTING STATIONS

Leave at least 2 inches (51mm) of clearance behind the station for connecting cables.

Locate all intercom stations at comfortable heights for operation and leave at least 2 inches (51 mm) of clearance behind the rear of the station's chassis to allow for cable connectors.

Accessory panels, that are intended to expand or enhance station operation are usually mounted next to or near the station with which they are associated. Leave at least 2 inches (51 mm) of clearance behind the rear of the station to allow for cable connectors.

Accessory panels can be located as far as 25 ft. (7.6 m) away from the station. A 6-ft. (1.8 m) cable is supplied to connect them.

WIRING

This section provides detailed wiring diagrams for all stations' wiring systems.

Eclipse uses either a twisted, 4-pair transmission, a single-pair twisted, or a coax scheme between the station and the frame using the industry standard RJ-45 connector. Refer to *Installing an Eclipse Matrix System: An Overview* for RJ-45 connector installation and use, and the type of cable needed for connection between stations and frames.

Most stations have a DB-15M and an RJ-45 connector to connect them to the frame. Stations with only a DB-15M connector include a kit containing one DB-15F/RJ-45 adapter. The adapter allows the use of RJ-45 connectors on both ends of the connection between the frame and the station.

Connections to external devices via the Miscellaneous connector, use the included DB-15M connector to construct one or more cables to connect external devices to the station.

The following sections describe connecting the station to the matrix frame, and all the connections between the station and local devices. Each of the following sections describes cable and station connector wiring:

- Analog matrix frame to station wiring
- Digital matrix frame to station wiring
- Matrix station Miscellaneous connector wiring
- OPT-100 Auxiliary Audio I/O option
- Binaural headset wiring

ANALOG MATRIX FRAME TO STATION WIRING

The analog audio RS-422 data communications module (COM-10) uses a 4-pair wiring scheme between the frame and stations. This module requires an MVX-A16 card in the frame.

Although some Matrix Stations have a DB-15M (male) connector for connection to the Matrix frame, most have a built-in RJ-45 connector. For those stations with a DB-15 male connector, Vitec Group Communications provides a properly wired DB-15F (female) to RJ-45 adapter for direct connection with RJ-45 terminated cables. Additionally, stations configured for digital communication are equipped with a BNC.

Four-pair analog wiring is typically wired with shielded CAT5 RJ-45 cable.

- Pair 1 transmits analog audio from the matrix port to the station.
- Pair 2 transmits RS-422 data from the station back to the matrix card port.
- Pair 3 transmits analog audio from the station to the matrix card port.
- Pair 4 transmits RS-422 data from the matrix port back to the station.

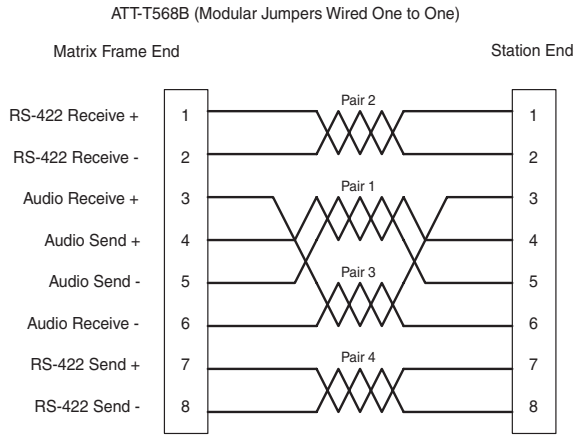

Figure 4: Matrix Frame to Station Wiring

DIGITAL MATRIX FRAME TO STATION WIRING

The ICS-2003T differs from the ICS-2003 because it contains an internal digital audio/data communications module (COM-20) that works in conjunction with the DIG-2 digital interface module to connect digital stations to the matrix.

The DIG-2 digital interface module offers two options for wiring the frame to intercom stations. One option is a single pair of double shielded (braid and foil) 24 AWG conductor CAT-6 Enhanced STP cable with RJ-45 connectors.

The second option, available because only one pair is required, is 75-ohm (RG59) braid shielded coax cable. For this option, a BNC-16 adaptor is required.

In addition, each station may require other connector wiring, depending on what options and accessories are installed.

***Note**: For more information on the DIG-2 digital interface and the DIF-102 frame which houses it, refer to the DIF-102/DIG-2 manual in the Eclipse set of manuals.*

Single-Pair Digital

Single-pair digital wiring requires double-shielded 24 AWG conductor CAT-6E enhanced STP cable with RJ-45 connectors. Pair 1 transmits and receives multiplexed audio or data between the matrix port and the station.

***Note:** Ensure that the Select switch on the station's rear panel is in the correct position for the intended use.*

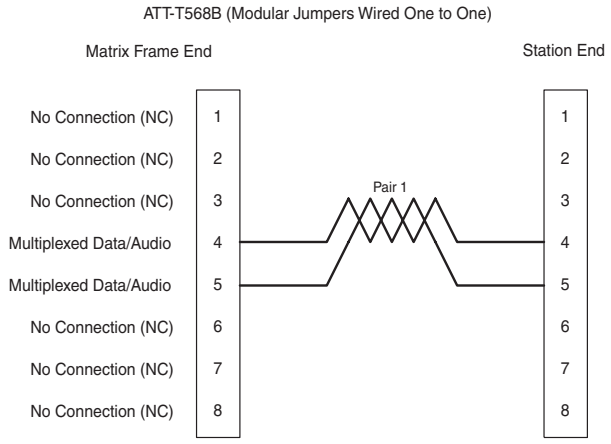

Figure 5: Matrix Frame to Digital Station Wiring Using RJ-45

Coax Digital

Coax digital wiring requires double-shielded 24 AWG conductor CAT-6 Enhanced STP cable connected to a 75-ohm (RG59) braid- shielded coax cable with a BNC-16 adaptor.

Pair 1 transmits and receives multiplexed digital and analog between the matrix port and the station.

Note: *Ensure that the Select switch on the station's rear panel is in the correct position for the intended use.*

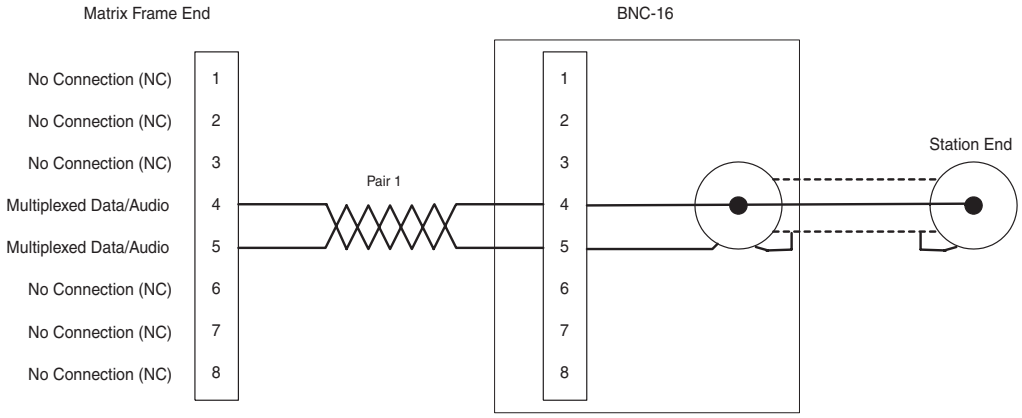

Figure 6: Matrix Frame to Digital Station Wiring Using BNC-16 and Coax

MATRIX STATION MISCELLANEOUS CONNECTOR WIRING

Most local devices connect with the station via the Miscellaneous connector.

The following sections discuss how to wire the various functions available on the "Miscellaneous" connector.

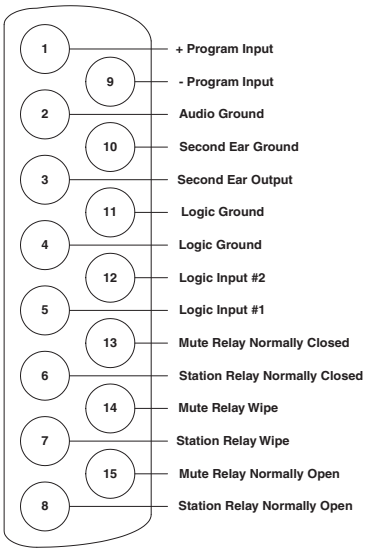

Figure 7: Miscellaneous Connector Pinout

External Program Feed Input

The external program feed input allows the station operator to simultaneously monitor audio from an external source and intercom audio.

The input is designed to accept a balanced, line-level audio feed at a nominal level of 0 dB. The program feed input passes through the station's "Program" volume control before being mixed with the audio at the station. The program

feed (program audio) can be heard on the station's speaker and headset; it cannot be heard by other stations in the Matrix system.

To connect an external program feed to the station:

1. Connect the balanced audio pair to pins 1 and 9.
2. Connect a shield or ground connection if available to the connector's pin 2 (see Figure 7 on page 1-4).

Logic Input #1 and #2

Each input can control one of several functions, determined through the configuration program. Typically, these inputs are connected to an external foot switch, a panel-mounted switch, or the logic output of another device.

The following functions are available:

- Mic On/Off—toggles the station's microphone on and off.
- Mute Mic Output To Frame—turns off the audio from the station to the frame. It does not turn off the Hot Mic output (described in "OPT-100 Auxiliary Audio I/O Option" on page 2-7). For an example of how to use this option, see "External Program Feed Input" on page 2-4.
- Mic Off —momentarily turns off the station's microphone.
- Answer Back Talk/Clear—the same functions as the station's "Answer Back" key. Holding down the switch activates a talk to a label in the answer-back stack. To clear the label, quickly press and release the switch.
- Studio Announce—sends the output of the station's selected microphone (panel or headset) to the station's Studio Announce (SA) audio output, and activates the SA relay. The microphone output is not sent to the frame. The SA output and relay are only present if the station has the OPT-100 Auxiliary Audio I/O Option installed. (The SA options are described in "OPT-100 Auxiliary Audio I/O Option" on page 2-7).
- Speaker OFF—turns off the station speaker, disabling all audible output from the station.
- PTT: Activate All Talk Keys (Push To Talk)—when enabled from the configuration program and the logic input is active, the station behaves normally. When this function (logic level) is deactivated, it disables activation of all talk labels, implementing a push-to-talk function for the station. Any controls (relays, etc.) assigned to the labels are activated or deactivated along with their assigned labels. The LED indicators associated with the active labels behave normally regardless of this input's activity. This input controls momentary and latched talks.
- Activate Talk Switch #1—equivalent to pressing the station's first (leftmost) talk selector; a momentary and latching activation.
- Activate Talk Switch #2—equivalent to pressing the station's second talk selector; a momentary and latching activation.
- Activate Listen Labels Button—equivalent to pressing the "Listens" button on the keypad; all modes of the "Listens" button are supported.

- PTT: Activate Two-Way Radio Keys—implements a push-to-talk function for all two-way radio talk selectors. When the logic input is active, the station operates normally. When the logic input is deactivated, all active two-way radio talk selectors are disabled. Any controls (relays, etc.) assigned to the labels are activated or deactivated along with their assigned labels. The LED indicators associated with the active two-way radio talk selectors operate normally regardless of the PTT status. This input only controls latched talks.

Use normally open type switches to activate the logic inputs. Connect the switches as follows (Figure 7 on page 1-4):

- Logic input #1—pins 4 to 5 (pin 4 = ground)
- Logic input #2—Pins 11 to 12 (pin 11 = ground)

Note: *Do not apply external voltage to the logic inputs.*

Mute Relay Contacts

The mute relay is activated whenever any talk selector is activated at the station. The mute relay is commonly wired such that whenever it is activated, the volume of the monitor speaker in that room is decreased (muted). See Figure 7 on page 1-4.

Both normally open and normally closed contacts are provided. They are rated at 1 Amp at 24 VDC. This relay is not designed for switching mains AC line voltage. To switch an external device running on mains AC line voltage, use an external relay (or other switching mechanism) activated by this relay.

Programmable Relay Contacts

Each station includes a relay controlled by the system program and independent of the local station function. This relay can be assigned to any label(s) in the system, which will activate whenever a talk or listen is set to that label(s). If activating the relay is the only action desired, assign the relay to a Control label. See the *Eclipse Configuration System Manual* for more details.

The relay can activate an external device, such as an applause light in a studio, a cue light, or a security door lock. Any programmable relay in the system can be activated from any station in the system, including a direct-inward-access caller. Figure 7 on page 1-4 shows the wiring of the relay contacts to the Miscellaneous connector.

Both normally open and normally closed contacts are provided. They are rated at 1 Amp at 24 V DC. This relay is not designed for switching mains AC line voltage. To switch an external device running on mains AC line voltage, use an external relay (or other switching mechanism) activated by this relay.

OPT-100 AUXILIARY AUDIO I/O OPTION

The OPT-100 Auxiliary Audio option provides the following features:

- Hot Mic output
- SA audio and relay outputs
- Auxiliary audio line level output

Figure 7 shows the pinout for the intercom station's DB-15F Auxiliary Audio I/O connector. Following are descriptions and wiring information for the OPT-100 Auxiliary Audio I/O option.

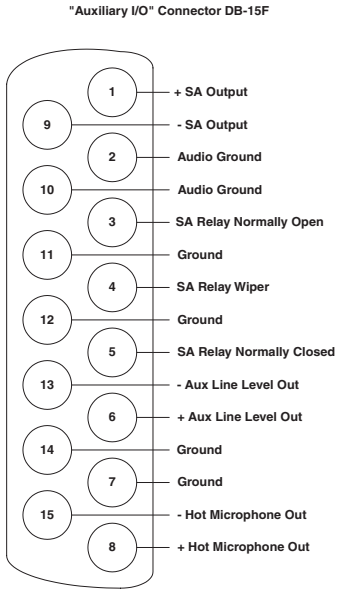

Figure 8: Auxiliary I/O Connector

Hot Mic Output

The Hot Mic output is a balanced, line-level, transformer-isolated feed of the signal from the currently selected microphone (panel or headset). The Hot Mic output is active regardless of whether the station has talk paths set and regardless of the front-panel's control settings.

Connect to pins 8 and 15 for a balanced output. Pin 7 is available as a shield or ground source (see Figure 7).

Studio/Stage Announce Audio and Relay Outputs

The SA output is a balanced, line-level, transformer-isolated feed with the same signal sent to the Hot Mic output, except it is only active when the SA button on the station's front panel is pressed or when activated by Logic Input #1 or #2, which is configured for the Studio Announce Function.

Connect to pins 1 and 9 for a balanced SA audio output. Pin 2 is available as a shield or ground source (see Figure 7).

Both normally open and normally closed contacts are provided. They are rated at 1 Amp at 24 VDC. This relay is not designed for switching mains AC line voltage. To switch an external device running on mains AC line voltage, use an external relay (or other switching mechanism) activated by this relay (see Figure 7). The following table shows the pins available for the SA relay.

Pin Description	Pin Number
N.O. (normally open)	3
WIPER (common)	4
N.C. (normally closed)	5

STUDIO ANNOUNCE PINS AVAILABILITY

Auxiliary Audio Line Level Output

The Auxiliary Audio Line Level output is a balanced, line-level, transformer-isolated feed of the input to the station's internal speaker. For example, this output could be used to feed an external amplifier connected to loudspeakers.

Connect to pins 6 and 13 for a balanced output. Pin 14 is available as a shield or ground source (see Figure 7).

BINAURAL HEADSET WIRING

Although the station has a second earphone output, it functions and is wired differently than some other ICS stations. The output is not available on the "Miscellaneous" connector, but on the station's main board on a separate header connector. This output would be available if a six-pin headset connector is installed on the front or rear of the station.

The default configuration of the station has both earphone outputs being fed with intercom and program audio. To separate the program input to the second ear only, use the configuration program.

Figure 8 shows the wiring of a six pin XLR connector for a binaural headset.

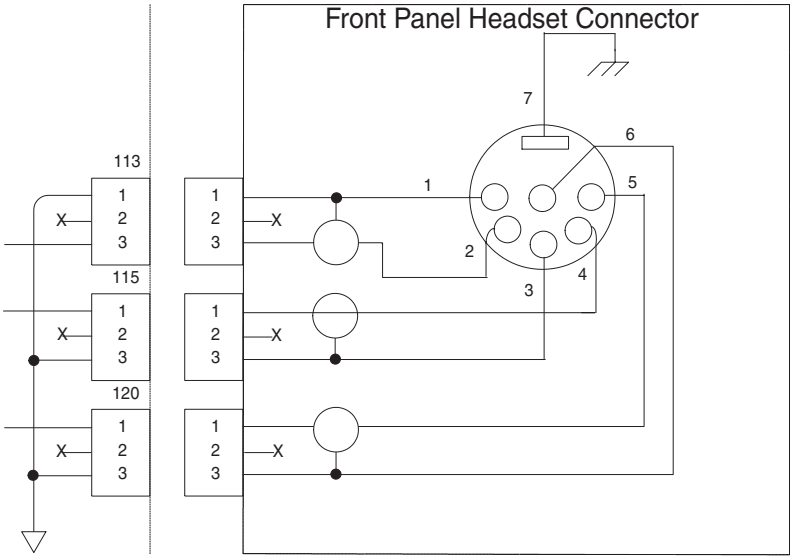

Figure 9: Binaural Headset Wiring

MAINS AC POWER

The station has a separate, external DC power supply with a removable AC power cord. The power supply is "universal," operating over a voltage range of 90 to 260 VAC and 45 to 65 Hz. The maximum dissipation is 30 W.

A bracket has been provided to mount this external supply if necessary.

ADJUSTMENTS

The following station parameters are adjustable internally on the station's main PCB by selecting options in the configuration program:

- Headset Sidetone
- Panel Microphone Gain
- Speaker Mute
- Page Volume Level
- Station-to-Matrix card Baud Rate

All these parameters are set to factory defaults. Most stations should operate at these default settings; however, some applications may require readjustment.

HEADSET SIDETONE

Sidetone is the sound of the user's voice in his headset.

Refer to the *Eclipse Configuration System Instruction Manual* for instructions on adjusting sidetone.

PANEL MICROPHONE GAIN

The preamplifier gain of the panel microphone can be adjusted over a range of 0 to 10 dB; the maximum is the panel microphone gain's default setting. However, if two stations are talking to each other at the same time with the panel microphone gain set to maximum, feedback may occur even if the speaker mute (see "Speaker Mute") is set to maximum. In this case, it will be necessary to turn the panel microphone gain down. Similarly, in some noisy environments it may be necessary to turn the panel microphone gain down and have the operator talk more closely into the microphone.

Refer to the *Eclipse Configuration System Instruction Manual* for instructions on adjusting panel microphone gain.

SPEAKER MUTE

When a panel microphone and a speaker are used together, feedback is possible. To reduce this possibility, the station software will mute (turn down) the speaker level by some predetermined amount when both the microphone and speaker are enabled. The speaker mute can be adjusted from 0 to 15 dB; its default setting is 6 dB.

Refer to the *Eclipse Configuration System Instruction Manual* for instructions on muting the speaker.

PAGE VOLUME LEVEL

When Page Override is assigned to a label, the audio level at the destination station(s) is predetermined. This function allows talking to someone even if his station's volume control is off. Two things will happen when a station activates such a label:

- If the destination speaker was off, it will turn on.
- The station(s)'s speaker output will be at the predetermined level regardless of the "Intercom" volume control setting, unless this control is set higher than the predetermined level.

The page volume level can be adjusted within a range of 0 to 10, equivalent to the front-panel control settings of 0 equals off and 10 equals full pot. The page volume level's default setting is 5.

Refer to the *Eclipse Configuration System Instruction Manual* for instructions on using Page Override.

STATION-TO-MATRIX CARD BAUD RATE

The RS-422 serial data communication between a station and other devices can operate at standard (19.2 k baud, the default) and long-line (9600 baud) baud rates. Use long-line only if encountering problems with the standard baud rate.

The baud rate is set from the configuration program and the station automatically adapts.

CONFIGURATION

Assign each station's name and other parameters by using the Eclipse Configuration System Program (see *Eclipse Configuration System Manual* for more information). Also refer to the Operation chapter for details regarding the configuration options available from the ICS-2003's menus.

ACCESSORY PANELS

The following sections describes how to install the following optional, accessory key panels:

- The XPL-12 Display Expansion Panel adds 10 talk/listen selectors to a station.
- The XPL-22 Display Expansion Panel adds 20 talk/listen selectors to a station.

The installation procedure is identical for these two panels.

XPL TYPE EXPANSION PANELS

The XPL series provides selectors labeled with electronic displays that are automatically updated whenever changes are made.

Only one rack unit (1RU) of a standard Electronics Industry Association equipment rack is required for each expansion panel. The panels' compact size makes them ideal for use in TV control rooms, edit suites, mobile OB vans, and any other location where many talk/listen keys are necessary but space it at a premium.

Model XPL-12 provides 10 additional selectors with displays and model XPL-22 provides 20 additional selectors with displays. Each station can accept a maximum of 60 additional selectors.

MOUNTING

All accessory panels are mounted in a standard 19-inch wide (48.3 cm) standard Electronics Industry Association rack, requiring one unit of rack space each. Leave at least 2 in. (51 mm) of clearance behind the rear of the chassis to allow for cable connectors.

POWER

Each XPL panel is powered by an external AC transformer (included). Confirm that the transformer is correct for the line voltage being used. To connect the AC power transformer to an XPL panel, route the transformer's secondary lead to the "AC Power Input" connector on the back of the panel. This is a 2.1 mm coax connector. When routing the lead, use the lead stress relief on the back of the panel. The panel can be powered by any 12- to 16-V RMS AC source rated for 750 mA.

STATION CONNECTION

A cable is supplied with each panel to connect it to a station or to additional panels. The cable is 6-ft. long (1.8 m) and has a DB-9F connector on one end and a DB-9M connector on the other end. If custom length cables are to be made, they should be made with 9 conductor control cable with 22 to 24 AWG wire. The pins should be wired one-to-one between the male and female connectors. The maximum distance between the station and the last expansion panel should be 25 ft. (7.6 m).

To connect an accessory panel to an intercom station:

1. Plug the DB-9M end of the cable supplied into the "Accessory Panel" connector on the back of the station.
2. Plug the DB-9F end into the "From Intercom Station" connector on the rear panel of the accessory panel.

To connect an additional accessory panel:

1. Plug the DB-9M end of the additional key panel's cable into the "To Next Expansion Panel" connector on the back of the preceding key panel.
2. Plug the DB-9F end of that cable into the "From Intercom Station" connector on the back of the additional key panel.

More panels can be added by using this "daisy-chaining" method.

The numbering of expansion selectors will be in the order of the daisy chaining. The first panel will be selectors 1 to 20, the second will be selectors 21 to 40, and so forth.

CONFIGURATION

After physically placing the key panels and connecting them to a station, the number of accessory keys installed in the station must be programmed into the configuration program. Refer to the *Eclipse Configuration System Instruction Manual* for more information.

3 MAINTENANCE

INTRODUCTION

This chapter provides station microprocessor resetting instructions, maintenance menu use, troubleshooting guidelines, schematics, assembly drawings, and component lists.

STATION RESET

The station's microprocessor has a reset button located in an unmarked hole just below the program volume knob on the right side of the unit's front panel. If the station is acting erratically, try resetting it by performing one of the following:

- Insert a small screwdriver or a stiff piece of wire (such as a bent paper clip) into the hole and pushing the reset button.
- Unplug the station from AC power and reconnect.

TROUBLESHOOTING

When experiencing the symptoms listed below, attempt the following solutions in the order outlined. The solutions are listed in order of difficulty with the first being the most simple and easy.

- **The station's display and all front-panel indicators fail to light.**

1. Check mains AC power into the station.
2. Ensure the external power supply is properly connected to the station.
3. Replace the station.

- **The display shows unexpected characters.**

1. Power the station off and turn it back on.
2. Reset the station's matrix card in the matrix frame.
3. Replace the station.

- **The LED indicator above a selector does not light when the selector is pressed.**

1. Ensure the selector has a label assigned to it (the LED indicator will not light without an assigned label).
2. Reset the station.
3. Replace the station.

- **Keypad button functions do not operate, or the station beeps when a button is pressed (affected buttons could include "Assign," "Station," "Dial," "Menu," and "Swap").**

1. Ensure the function has not been inhibited from the configuration program of the station's local Configuration menu.
2. Reset the station.
3. Replace the station.

- **The station appears to activate talk paths, but other stations can't hear the station operator.**

1. Check "Mic On/Off" and "Panel Mic" buttons to ensure the intended microphone is selected and on.
2. If the correct microphone is turned on, ensure the station audio has not been muted externally through the logic inputs.
3. Make sure the station has not been defined as a nearby station.
4. Activate the Matrix Loopback mode from the station's Maintenance menu to check the audio paths to the matrix.
5. Enable eavesdropping on the station.
6. Test the integrity of the station's audio path by temporarily setting a forced listen to it.
7. Reset the station.
8. Replace the station.

- **The station is inoperative and all red LEDs flash slowly.**

1. Wait 60 seconds. If the matrix frame has just been powered up, it is possible it is still downloading the configuration to the Matrix cards.
2. Ensure the cable connecting the station to the matrix is plugged in at both ends.
3. Check the integrity of the data paths, especially the polarity for stations using a COM-10 communication module.
4. Check the configuration program to ensure the station has been assigned the correct port type.
5. Confirm the matrix card type matches the station. Stations with COM-10 communication modules should have an MVX-A16.
6. Reset the station's matrix card in the Matrix frame.
7. Replace the station's matrix card in the Matrix frame.
8. Reset the station.
9. Replace the station.

- **No audio from the station's speaker.**

1. Ensure the 'Intercom" knob on the station's front panel is turned up.
2. Ensure the "Speaker On/Off" button is on.
3. Check whether audio can be heard in a headphone.
4. Check the configuration program and the station's logic inputs to ensure the speaker has not been software disabled.

5. Test the integrity of the station's audio path by temporarily setting a forced listen to it.
6. Reset the station's Matrix card in the Matrix frame.
7. Replace the station's Matrix card in the Matrix frame.
8. Reset the station.
9. Replace the station.

- **The operator cannot hear another station's page or call signal tones.**

1. Adjust the "Page Volume" control of the station using the configuration program (refer to the *Eclipse Configuration System Manual*).
2. Check the station's configuration to see if page override is enabled.

- **Announce tones (eavesdropping indication, change tones, etc.) aren't heard at the station.**

Check the configuration program to see if the monitoring tones and change tones are enabled.

- **No speaker audio from the external program feed.**

1. Check the "Program" knob on the station's front panel.
2. Check the program source.
3. Reset the station.
4. Replace the station.

- **The headphone isn't receiving audio from the external program feed.**

1. If the external program feed is audible in the speaker, check the station's configuration program to ensure the program was not disabled for the second earphone feed.
2. Replace the station.

- **Accessory panels do not function.**

1. Check the accessory panel's connection on the station's rear panel.
2. Ensure the external AC power transformers are correctly connected to the accessory panels.
3. Check the configuration program to ensure the correct number of selectors are configured.

BILL OF MATERIALS

MISCELLANEOUS

Device	Description	Part #	Designator
CABLE	26 Pin 3 in Ribbon	730078	
CABLE	34 Pin Ribbon	730181	
CABLE	20 Pin Ribbon, 2mm connectors	730208	
DISPLAY	60 x 480 Pixel EL Display	390056	
SPEAKER	2 1/2 in. 8 OHM 3.5W	500103	
CORD	Power	610022	
POWER SUPPLY	+5, +12, & -12 V	760050	

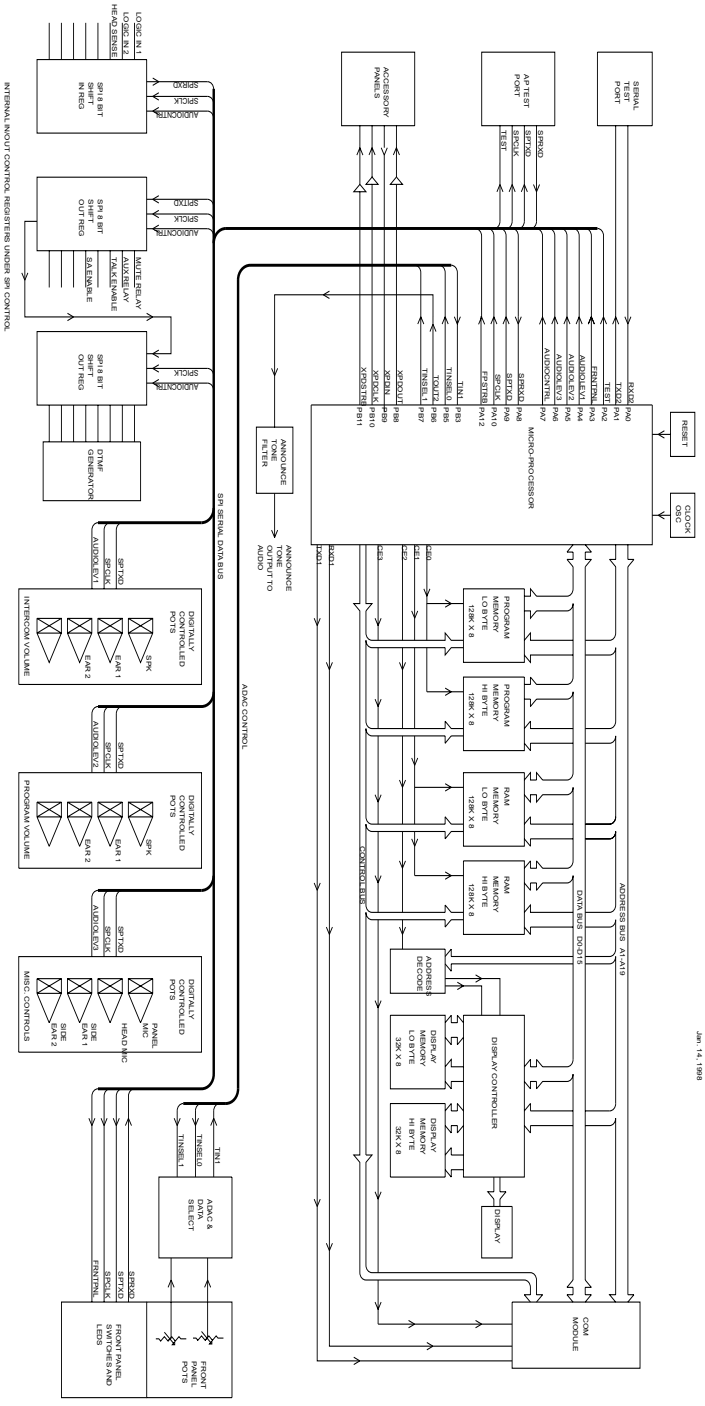

Figure 10: Digital Block Diagram—ICS-2003 Main PCB

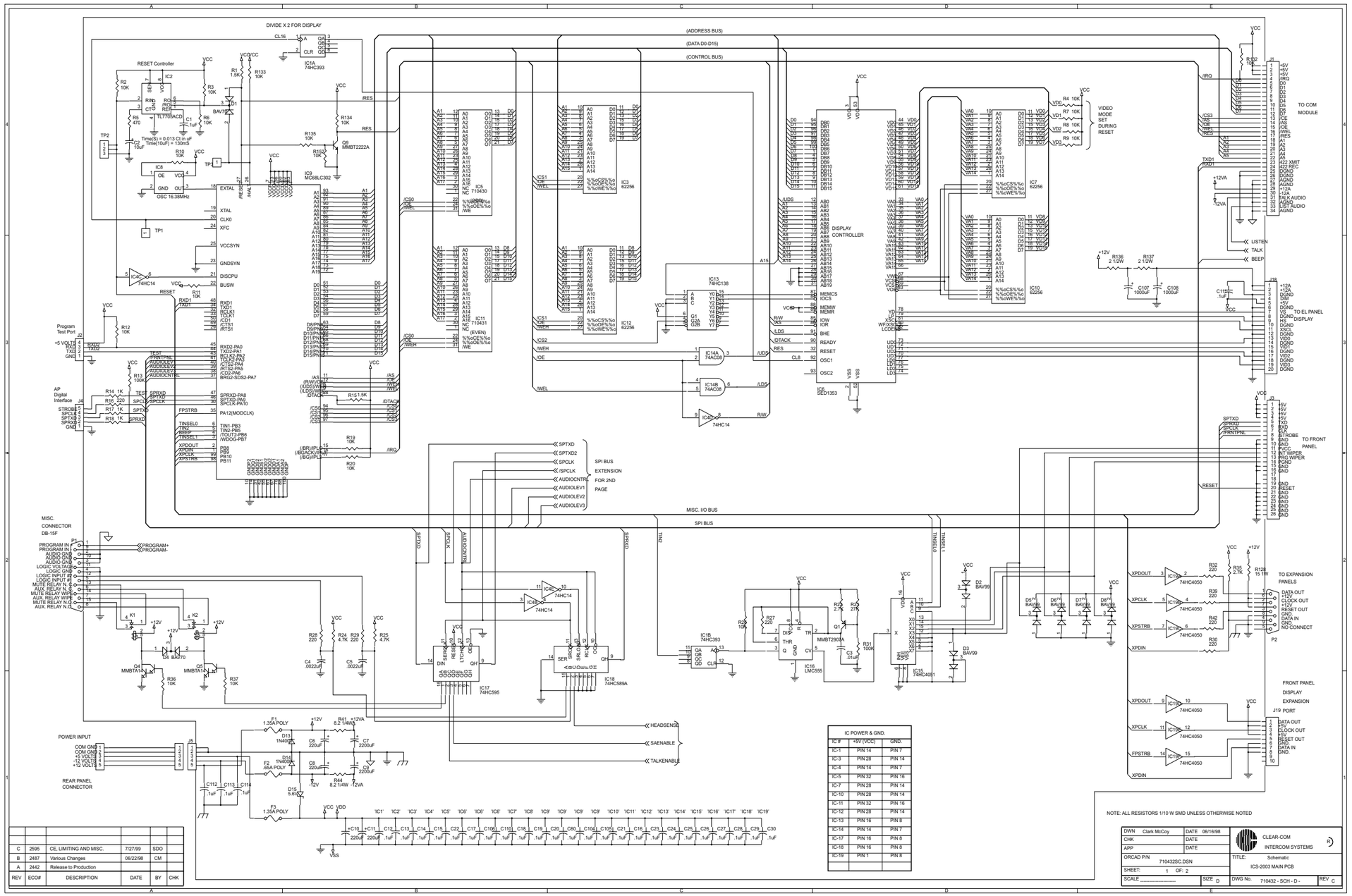

Figure 11: ICS-2003 Main PCB Sheet 1 of 2 Rev. C

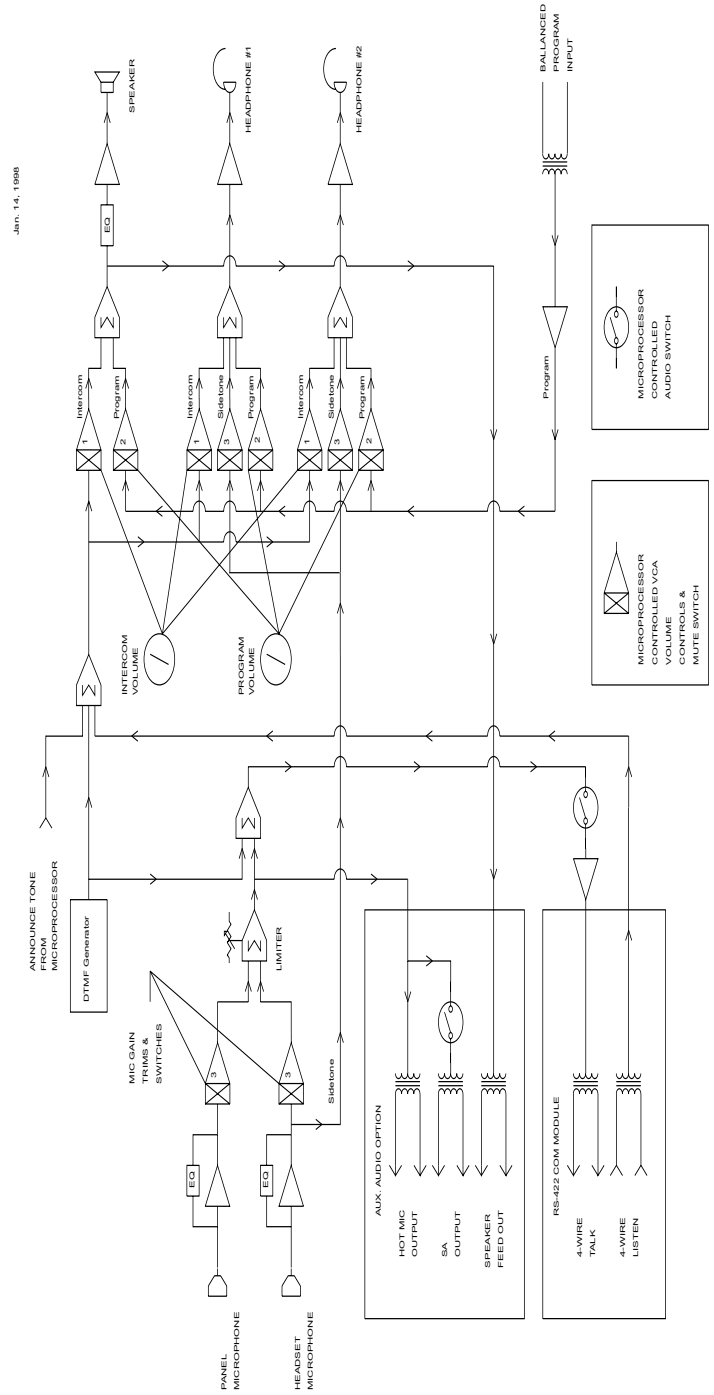

Figure 12: Analog Block diagram—ICS-2003 Main PCB

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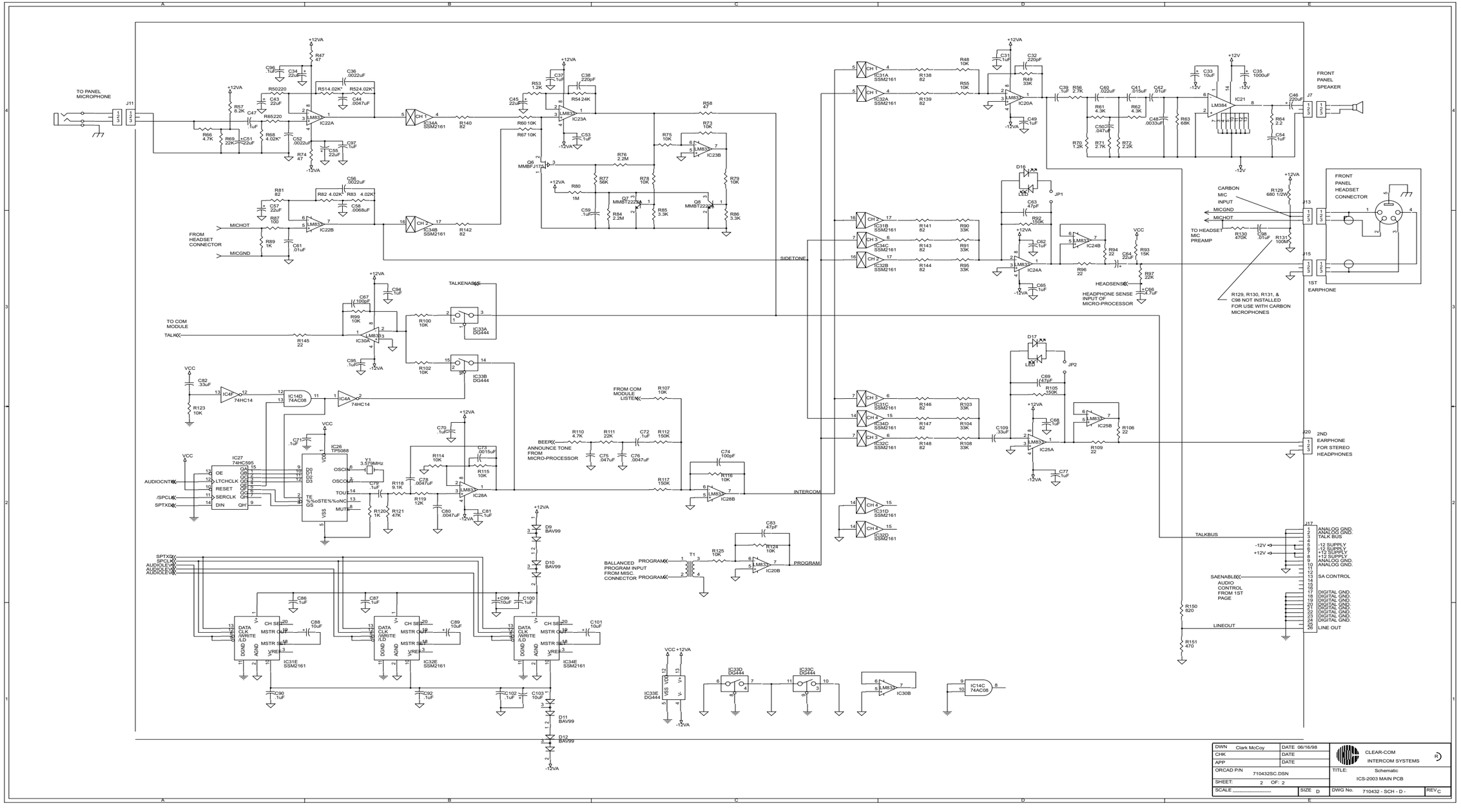

Figure 13: ICS-2003 Main PCB Sheet 2 of 2

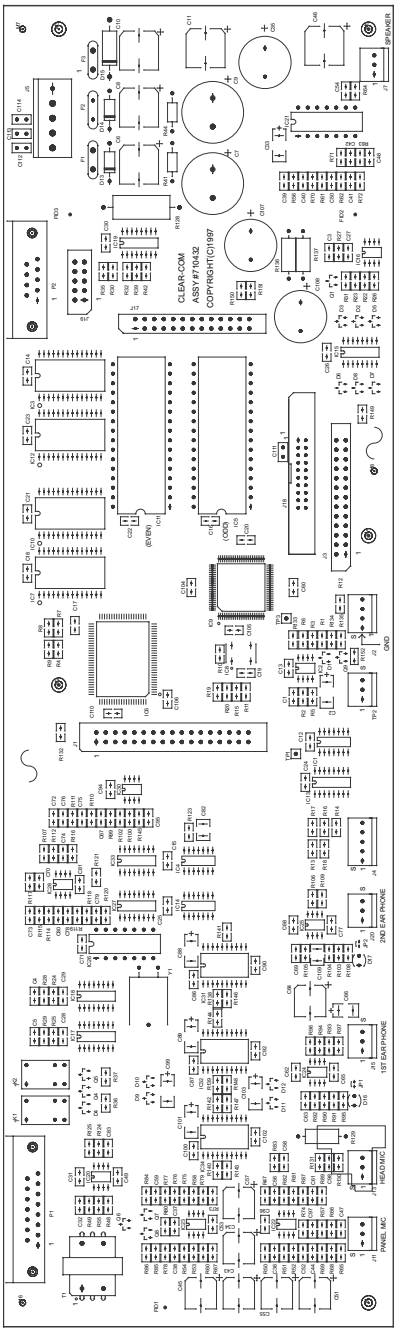

Figure 14: Assembly Drawing—ICS-2003 Main PCB

BILL OF MATERIALS FOR THE ICS-2003/2003T MAIN PCB

Capacitors

Value	Type	Volts	Tol.	Part # Designator
47 pF	Ceramic Disc SMD50	5%	151120	C63 C69 C83
100 pF	Ceramic Disc SMD50	5%	151124	C67 C74
220 pF	Ceramic Disc SMD50	5%	151128	C32 C38
.0015 uF	Ceramic Disc SMD50	5%	151138	C73
.0022 uF	Ceramic Disc SMD50	10%	151152	C4 C5 C36 C52 C56
.0033 uF	Ceramic Disc SMD50	10%	151154	C48
.0047 uF	Ceramic Disc SMD50	10%	151156	C44 C76 C78 C80
.0068 uF	Ceramic Disc SMD50	10%	151158	C58
.01 uF	Ceramic Disc SMD50	10%	151160	C3 C42 C61 C98
.015 uF	Ceramic Disc SMD50	10%	151162	C41
.022 uF	Ceramic Disc SMD50	10%	151164	C40
.047 uF	Ceramic Disc SMD50	10%	151168	C75 C50
.1 uF	Ceramic Disc SMD50	10%	151172	C1 C12 C13 C14 C15
				C16 C17 C18 C19
				C20 C21 C22 C23
				C24 C25 C26 C27
				C28 C29 C30 C31
				C37 C39 C47 C49
				C53 C54 C59 C60
				C62 C65 C68 C70
				C71 C72 C77 C79
				C81 C86 C87 C90
				C92 C94 C95 C96
				C97 C100 C102 C104
				C105 C106 C110
.33 uF	Ceramic Disc SMD25	10%	151178	C82 C109
4.7 uF	Tantalum SMD 16	10%	151189	C66

10 uF	Tantalum SMD	25	10%	151192	C2 C33 C88 C89 C
22 uF	Aluminum SMD	50	20%	151200	C101 C103 C34 C43 C45 C51
220 uF	Aluminum SMD	25	10%	151204	C55 C57 C64 C6 C8 C10 C11 C46
1000 uF	Aluminum	35		150092	C35 C107 C108
2200 uF	Aluminum	25		150120	C7 C9

Resistors & Resistor Packs

Value	Power	Type	Tol.	Part #	Designator
2 OHM	1/2	Carbon Film	5%	410173	R136 R137
2.2 OHM	1/10	SMD	5%	411181	R64
8.2 OHM	1/4	Carbon Film	5%	410166	R41 R44
15 OHM	1	Carbon Film	5%	410214	R128
22.1 OHM	1/10	SMD	1%	411230	R94 R96 R106 R109 R145
47.5 OHM	1/10	SMD	1%	411262	R47 R58 R74
82.5 OHM	1/10	SMD	1%	411285	R81 R138 R139 R140 R141 R142 R143 R144 R146 R147 R148
100 OHM	1/10	SMD	1%	411293	R87
221 OHM	1/10	SMD	1%	411326	R16 R27 R28 R29 R30 R32 R39 R42 R50 R65
475 OHM	1/10	SMD	1%	411358	R5 R151
680 OHM	1/2	Carbon Film	5%	410165	R129
825 OHM	1/10	SMD	1%	411381	R150
1.00K OHM	1/10	SMD	1%	411389	R14 R17 R18 R89 R120
1.21K OHM	1/10	SMD	1%	41139	R53 R70
1.50K OHM	1/10	SMD	1%	411406	R15
2.21K OHM	1/10	SMD	1%	411422	R72
2.74K OHM	1/10	SMD	1%	411431	R22 R35 R56 R71
3.32K OHM	1/10	SMD	1%	411439	R85 R86

4.02K	OHM	1/10	SMD	1%	411447	R51 R52 R68 R82 R83
4.32K	OHM	1/10	SMD	1%	411450	R61 R62
4.75K	OHM	1/10	SMD	1%	411454	R24 R25 R66 R110
8.25K	OHM	1/10	SMD	1%	411477	R57
9.09K	OHM	1/10	SMD	1%	411481	R118
10.0K	OHM	1/10	SMD	1%	411485	R1 R2 R3 R4 R6 R7 R8 R9 R10 R11 R12 R19 R20 R26 R36 R37 R48 R55 R60 R67 R73 R75 R78 R79 R99 R100 R102 R107 R114 R115 R116 R123 R124 R125 R132 R133 R134 R135
12.1K	OHM	1/10	SMD	1%	411493	R119
15.0K	OHM	1/10	SMD	1%	411502	R93
22.1K	OHM	1/10	SMD	1%	411518	R69 R97 R111
23.7K	OHM	1/10	SMD	1%	411521	R54
27.4K	OHM	1/10	SMD	1%	411527	R23
33.2K	OHM	1/10	SMD	1%	411535	R49 R90 R91 R95 R103 R104 R108
47.5K	OHM	1/10	SMD	1%	411550	R121
56.2K	OHM	1/10	SMD	1%	411557	R77
68.1K	OHM	1/10	SMD	1%	411565	R63
100K	OHM	1/10	SMD	1%	411581	R13 R31
150K	OHM	1/10	SMD	1%	411598	R92 R105 R112 R117 R130
1.0M	OHM	1/10	SMD	5%	411677	R84
1.2M	OHM	1/10	SMD	5%	411685	R80
2.2M	OHM	1/10	SMD	5%	411710	R76

Diodes and Transistors

Device Designator	Description		Part #
Diode	BAV70 Dual Diode Com Cath	481019	D1 D4
Diode	BAV99 Dual Diode Series SMD	481033	D2 D3 D5 D6 D7 D8 D9 D10 D11 D12
Transistor	2222A NPN 40V 600ma SMD	481026	Q7 Q8 Q9
Transistor	2907A PNP 60V 600ma SMD	481027	Q1
Transistor	J175 P-Ch JFET SMD	481056	Q6
Transistor	MPSA14 NPN 30V 300ma SMD	481038	Q4 Q5

Integrated Circuits

Device Designator	Description	Part #
Analog IC	555 CMOS TIMER SMD	481051 IC16
Analog IC	LM384 POWER 4W OP AMP	480012 IC21
Analog IC	LM833 Dual Opamp SMD	481023 IC20 IC22 IC23 IC24 IC25 IC28 IC30
Analog IC	SSM2161 4-Ch Volume Ctn. SMD	481055 IC31 IC32 IC34
Analog SW	DG444 Quad SPST Analog SW	481050 IC33
DTMF Gen.	TP 5088 DTMF GEN.	480196 IC26
Logic IC	74AC08 Quad 2-IN AND Gate	481053 IC14
Logic IC	74HC14 Hex Schmitt Trig Invert	481052 IC4
Logic IC	74HC138 CMOS 3-8 Decoder	481059 IC13
Logic IC	74HC393 Dual 4 Bit Bin Cnt	481058 IC1
Logic IC	74HC589 Par IN/SER Out SMD	481054 IC18
Logic IC	74HC595 SerIN/PAROut SMD	481036 IC17 IC27
Logic IC	74HC4050 Hex Buf SMD	481057 IC19
Logic IC	74HC4051 8-CH Mux SMD	481001 IC15

Micro. P IC9	68LC302 Micro Cont SMD	481049
ROM Mem. IC5	EPROM ASSY, ODD, ICS-2003	710430
ROM Mem. IC11	EPROM ASSY, EVEN, ICS-2003	710431
Regulator IC2	7705 Supply Supervisor SMD	481018
RAM Mem. IC3 IC7 IC10 IC12	62256 CMOS SRAM 32K X 8	481047
Video Cont. IC6	SED1353 LCD Graphics Control	481060

Miscellaneous

Device Designator	Description	Part #
Clock Osc. IC8	16.384MHZ OSC. SMD	231002
Connector P2	DB-9F RT ANG PC MTG	210186
Connector P1	DB-15F RT ANG PC MTG	210187
Connector IC5 IC11	32 PIN IC DIP SOCKET .600	210324
Connector J18	2 X 10 2MM HEADER	210356
Crystal Y1	3.579545MHZ PARALLEL	230001
Fuse F2	0.65A POLYFUSE	520043
Fuse F1 F3	1.35A POLYFUSE	520044
Relay K1 K2	SPDT 12V MINI PC	450006
Transformer T1	10K-10K Audio Xformer	560020

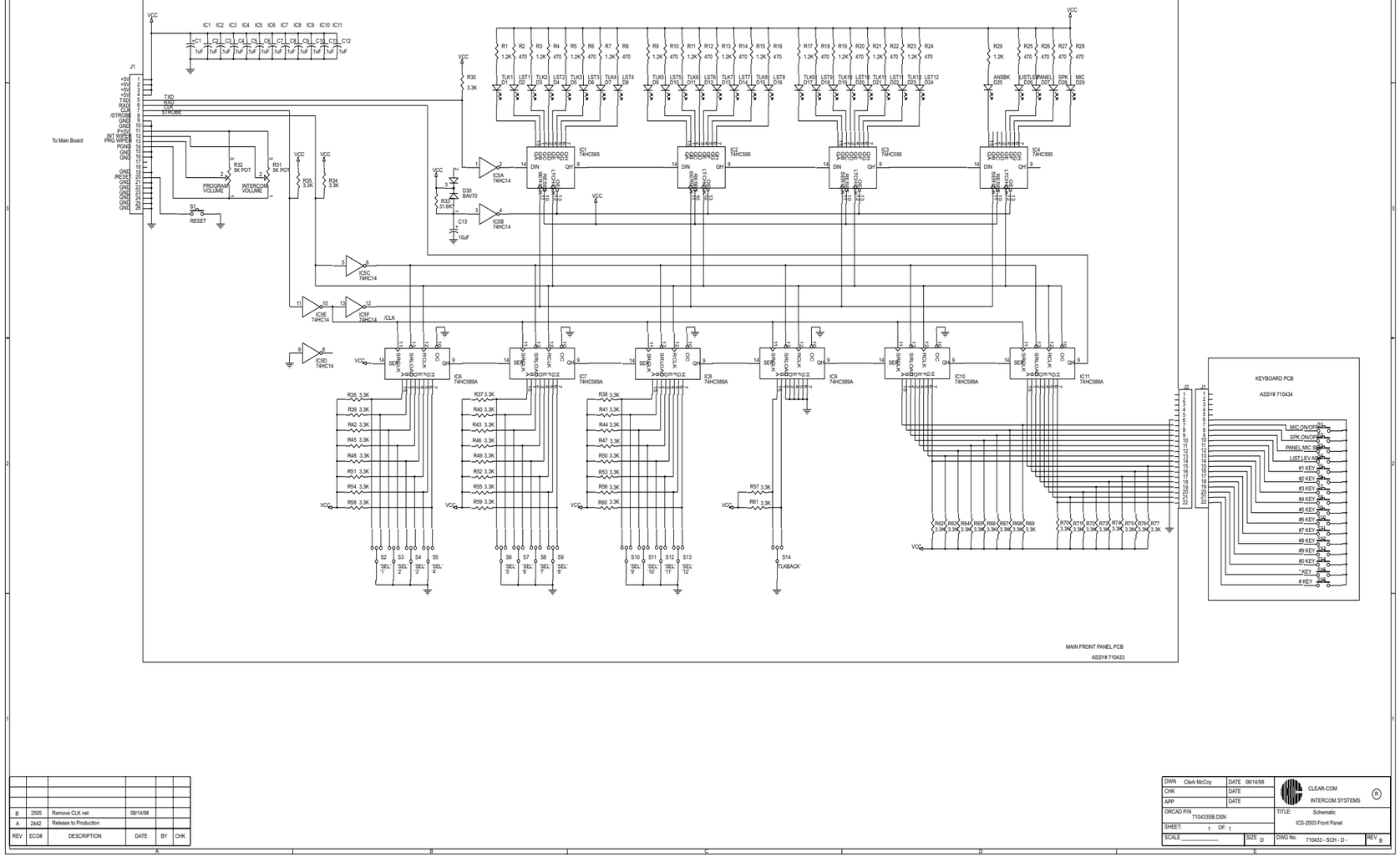

Figure 15: Schematic—ICS-2003 Front Panel PCB Rev. B

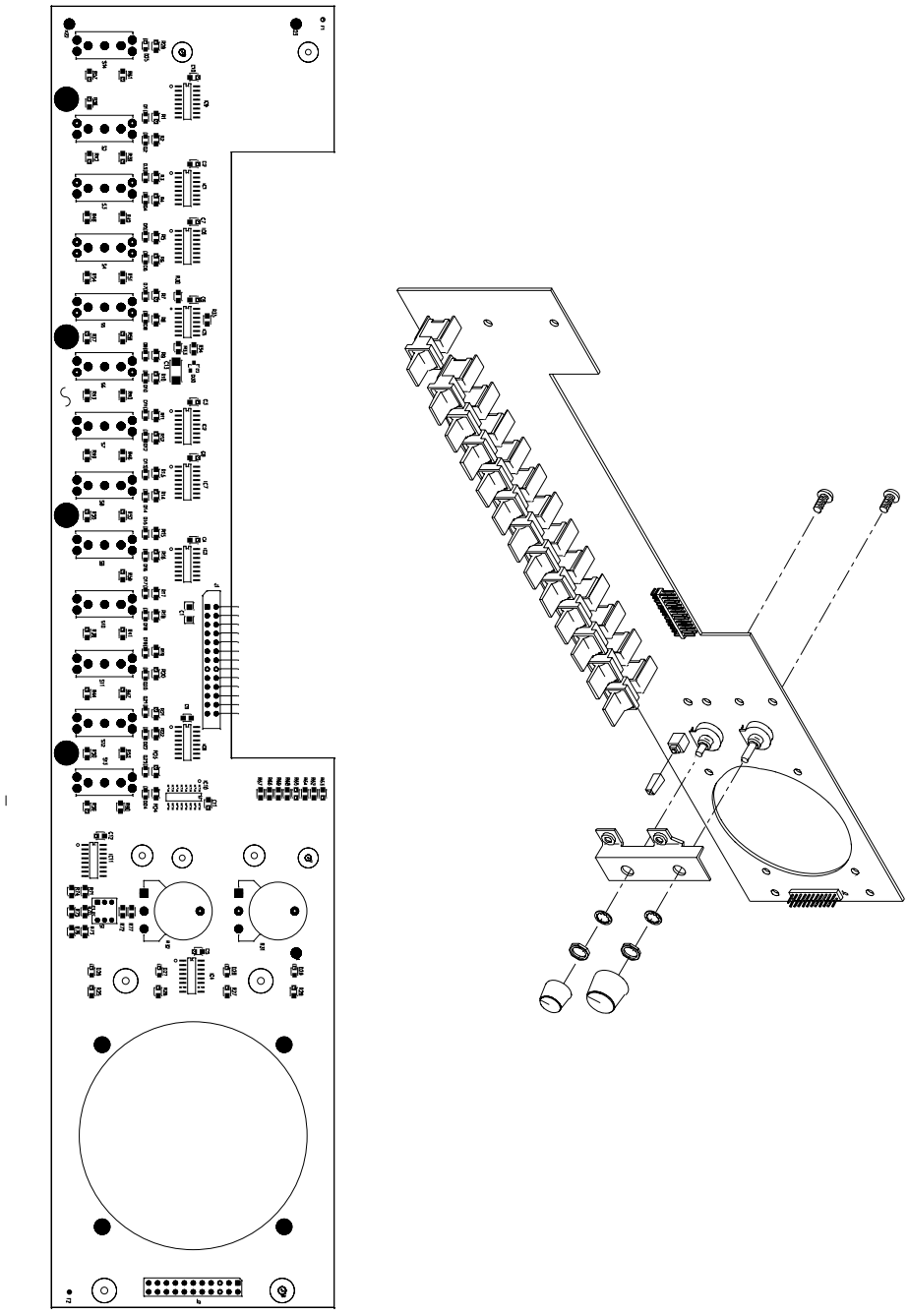

Figure 16: Assembly Drawing—ICS-2003 Front Panel PCB Rev. B

BILL OF MATERIALS FOR THE ICS-2003/2003T FRONT PANEL PCB

CAPACITORS

Value		Type	Volts	Tol.	Part #	Designator
.1	uF	Ceramic Disc SMD	50	10%	151172	C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12
1	uF	Tantalum SMD	16	10%	151185	C1
10	uF	Tantalum SMD	25	10%	151192	C13

Resistors & Resistor Packs

Value		Power	Type	Tol.	Part #	Designator
475	OHM	1/10	SMD	1%	411358	R2 R4 R6 R8 R10 R12 R14 R16 R18 R20 R22 R24 R25 R26 R27 R28 1.21KOHM 1/10SMD1% 411397R1 R3 R5 R7 R9 R11 R13 R15 R17 R19 R21 R23 R29
3.24K	OHM	1/10	SMD	1%	411438	R30 R34 R35 R36 R37 R38 R39 R40 R41 R42 R43 R44 R45 R46 R47 R48 R49 R50 R51 R52 R53 R54 R55 R56 R57 R58 R59 R60 R61 R62 R63 R64 R65 R66 R67 R68 R69 R70 R71 R72 R73 R74 R75 R76 R77
31.6K	OHM	1/10	SMD	1%	411533	R33

DIODES AND TRANSISTORS

Device	Description	Part #	Designator
Diode	BAV70 Dual, Com. Cath. SOT23	481019	D30
LED	Red 5ma LED SMD 0805	391001	D1 D3 D5 D7 D9 D11 D13 D15 D17 D19 D21 D23 D25
LED	Green 5ma SMD 0805	391002	D2 D4 D6 D8 D10 D12 D14 D16 D18 D20 D22 D24 D26 D27 D28 D29

INTEGRATED CIRCUITS

Device	Description	Part #	Designator
Logic IC	74HC14 Hex Schmitt Trig S0IC16	481052	IC5
Logic IC	74HC589 Par IN/SER Out SMD	481054	IC6 IC7 IC8 IC9 IC10 C11
Logic IC	74HC595 SerIN/PAROut SMD	481036	IC1 IC2 IC3 IC4

MISCELLANEOUS

Device	Description	Part #	Designator
Knob	Grey Insert .61 Dia.	240076	R32
Knob	Grey Insert .45 Dia.	240077	R31
Pot	5K	470081	R32
Pot	5K	470082	R31
Switch	SP3T MOM-OFF-MOM PC Mtg	510080	S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14
Switch	DPDT Mom. Push-button Switch	510102	S1

MISCELLANEOUS KEYBOARD PARTS

Device	Description	Part #	Designator
Connector	11 Pos Dual Row Socket	210362	J1
Keycap	SET OF 12, Keyboard	240071	
Keycap	SET OF 4, Keyboard	240072	
Switch	Push-button, Keyboard	510082	S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S15 S16

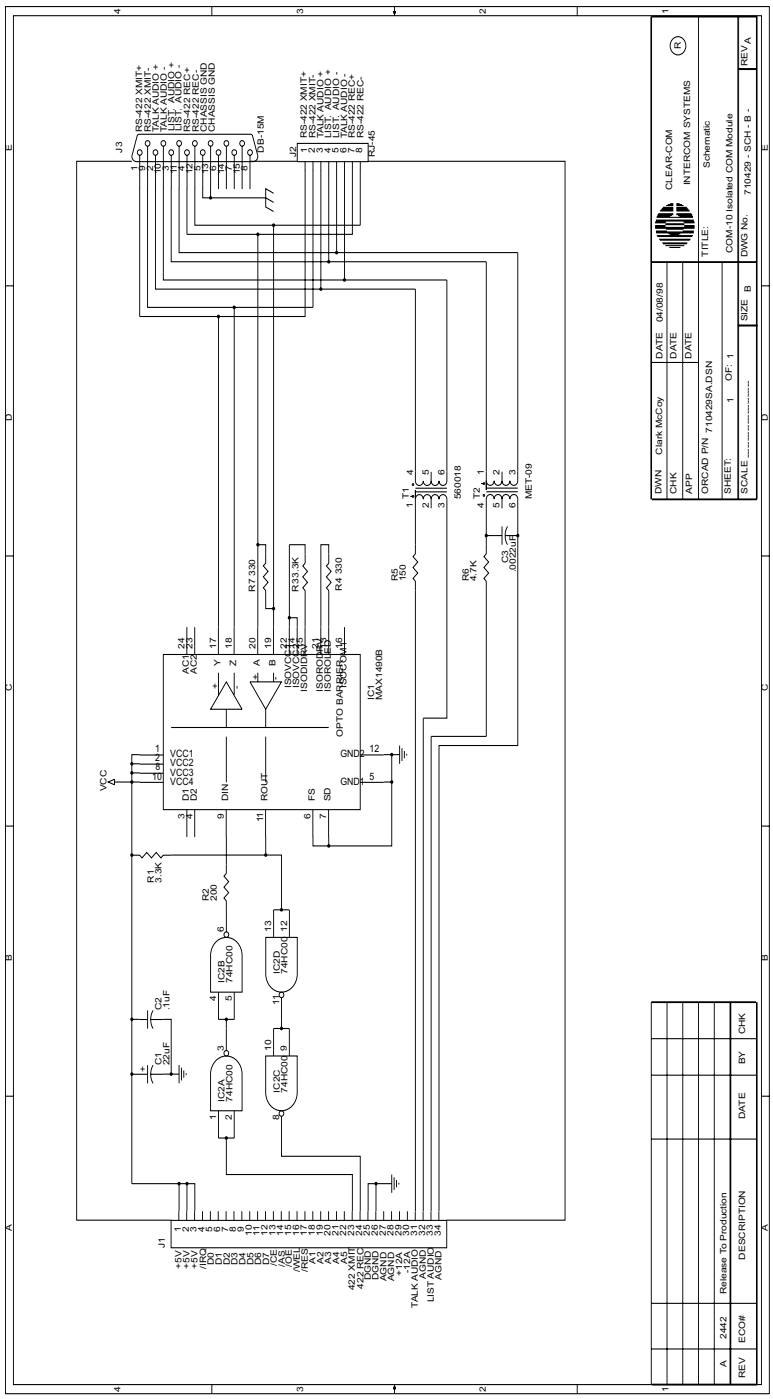

Figure 17: COM-10 Communications Module Schematic Rev. A

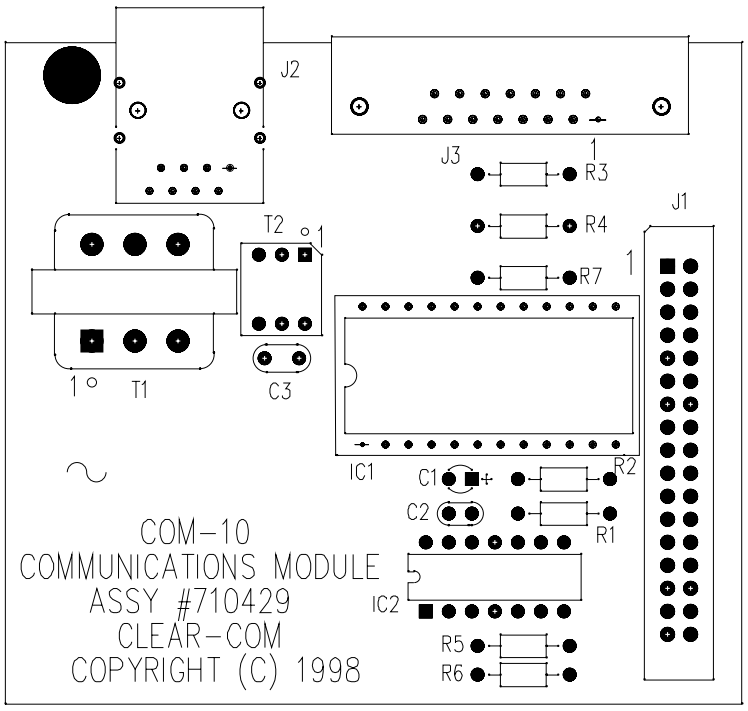

Figure 18: Assembly Drawing - COM-10 Communications Module Rev. A

BILL OF MATERIALS FOR THE ICS-2003/ICS-2003T COM-10 PCB

CAPACITORS

Value	Type	Volts	Tol.	Part #	Designator
22 uF	Tantalum	16		150032	C1
.1 uF	Monolithic	50	10%	150035	C2
.0022 uF	Mylar	100	5%	150045	C3

RESISTORS & RESISTOR PACKS

Value	Power	Type	Tol.	Part #	Designator
150 OHM	1/4	Carbon Film	5%	410006	R5
200 OHM	1/4	Carbon Film	5%	410072	R2
330 OHM	1/4	Carbon Film	5%	410061	R4
4.7K OHM	1/4	Carbon Film	5%	410013	R6
3.3K OHM	1/4	Carbon Film	5%	410015	R3 R1

INTEGRATED CIRCUITS

Device	Description	Part #	Designator
Interface IC	1490B Isolated RS422 Interface	480242	IC1
Logic IC	74HC00 Quad NAND	480157	IC2

MISCELLANEOUS

Device	Description	Part #	Designator
Connector	DB-15M Rt Ang PC Mtg	210188	J3
Connector	RJ-45 Rt Ang	210335	J2
Transformer	600CT/600CT	560018	T1
Transformer	10K:10K	560034	T2

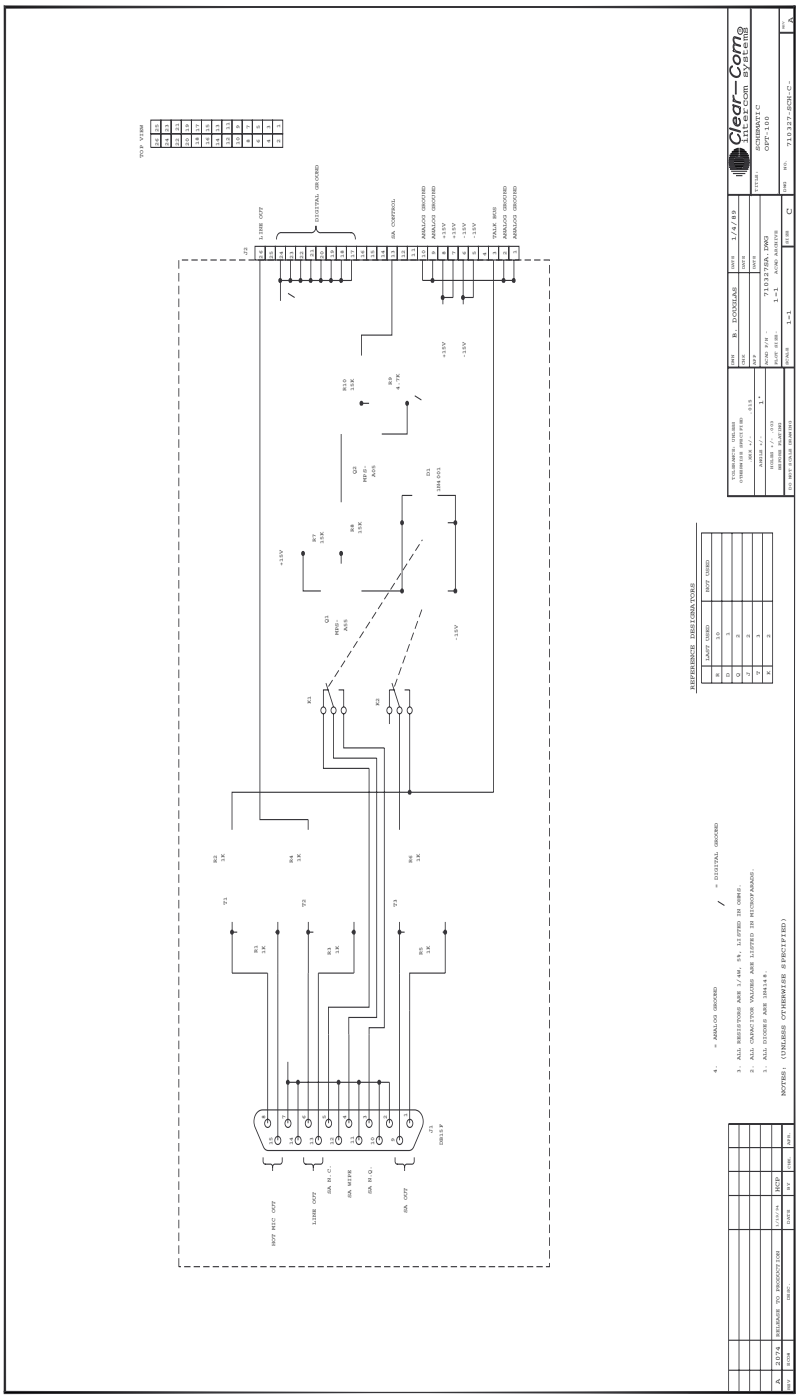

Figure 19: Schematic—OPT-100 (Aux Audio Option) Rev. A

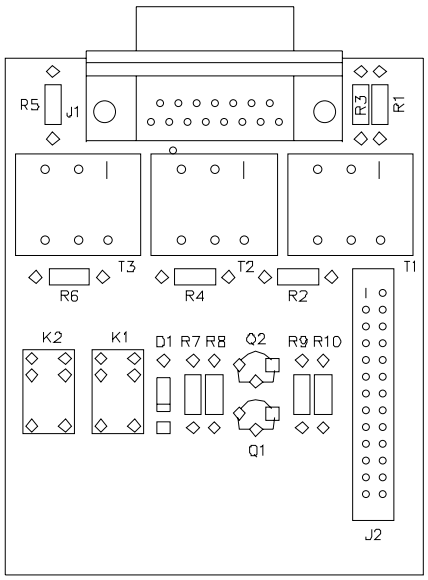

Figure 20: Assembly Drawing—OPT-100 Module Rev. A

BILL OF MATERIALS FOR THE OPT-100 PCB

Resistors & Resistor Packs

Value	Power	Type	Tol.	Part #	Designator
1K OHM	1/4	Carbon Film	5%	410010	R1 R2 R3 R4 R5 R6
4.7K OHM	1/4	Carbon Film	5%	410013	R9
15K OHM	1/4	Carbon Film	5%	410017	R7 R8 R10

Diodes and Transistors

Device	Description	Part #	Designator
Diode	1N4001 RECT 1A 50PIV	480001	D1
Transistor	MPS-A05 NPN 60V	480052	Q2
Transistor	MPS-A55 PNP 60V	480050	Q1

Miscellaneous

Device	Description	Part #	Designator
Connector	db-15fRT ANG PC MTG	210187	J1
Relay	SPDT 24V MINI PC RELAY	450004	K1 K2
Transformer	AUDIO, 600CT/600CT	560018	

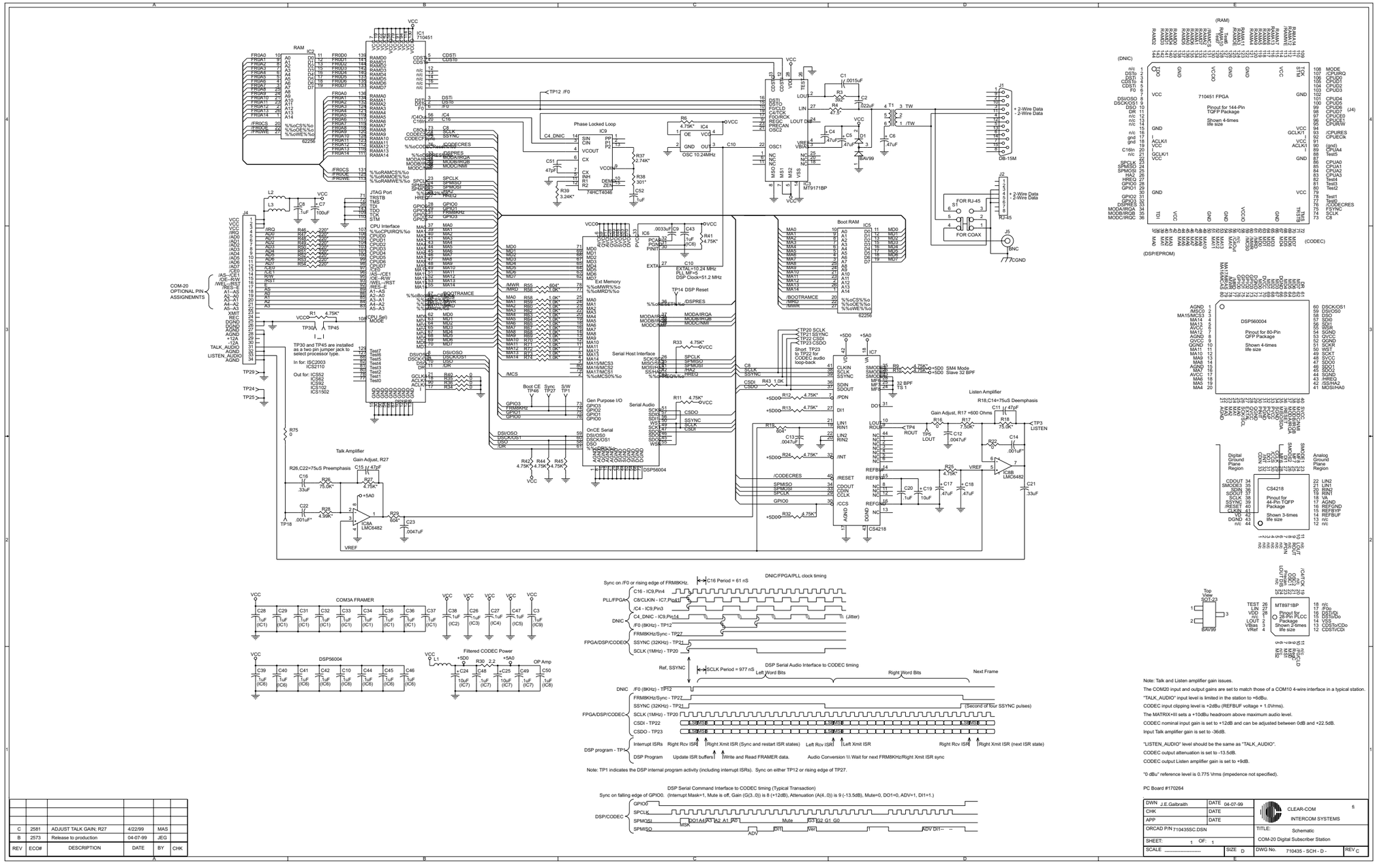

Figure 21: Schematic—COM-20 Communication PCB Rev. C

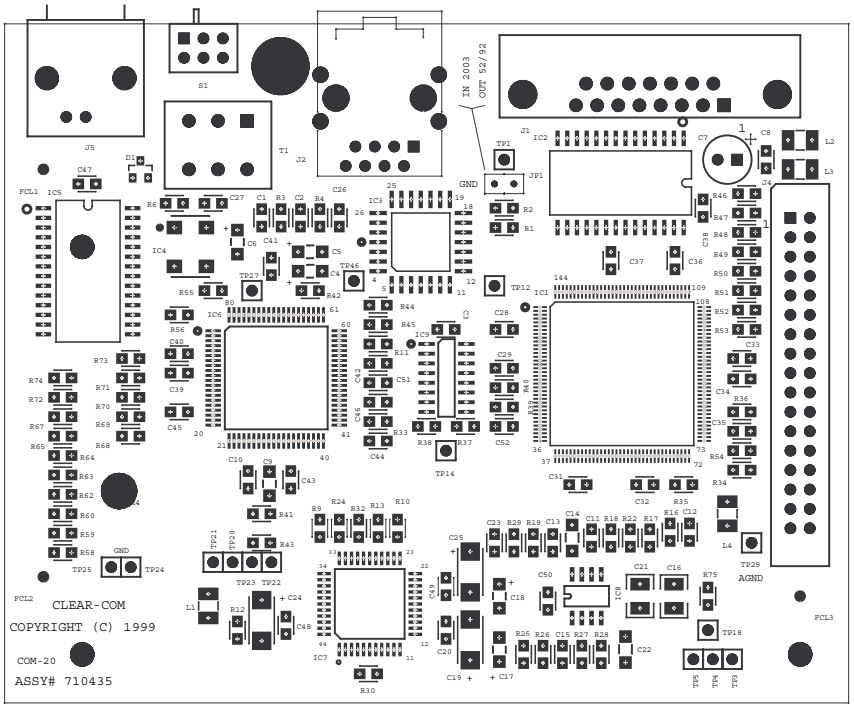

Figure 22: Assembly Drawing—COM-20 Communication PCB Rev. C

BILL OF MATERIALS FOR COM-20 COMMUNICATION PCB

CAPACITORS

Value	Type	Volts	Tol.	Part #	Designator
.001 uF	Ceramic Disc	SMD50V	1%	151001	C14 C22
.00 33	Ceramic Disc	SMD50V	5%	151002	C9
47 pF	Ceramic Disc	SMD50V	5%	151120	C11 C15 C51
.0015 uF	Ceramic Disc	SMD50V	5%	151138	C1
.0047 uF	Ceramic Disc	SMD50V	10%	151156	C12 C13 C23
.022 uF	Ceramic Disc	SMD50V	10%	151164	C2
.1 uF	Ceramic Disc	SMD50V	10%	151172	C3 C8 C10 C20 C26
					C27 C28 C29
					C31 C32
					C33 C34 C35
					C36 C37
					C38 C39 C40
					C41 C42
					C43 C44 C45
					C46 C47
					C48 C49 C50
					C52
.33 uF	Ceramic Disc	SMD25V	10%	151178	C16 C21
.47 uF	Tantalum SMD	35V	10%	151184	C4 C5 C6 C17 C18

10	uF	Tantalum SMD	25V	10%	151192	C19 C24 C25
100	uF	Aluminum	16V	20%	150155	C7

RESISTORS

Value		Power	Type	Tol.	Part #	Designator
0	OHM	1/10	SMD		411100	R16 R22 R34 R35 R36 R40 R75
2.2	OHM	1/10	SMD	5%	411181	R30
47.5	OHM	1/10	SMD	1%	411262	R4
221	OHM	1/10	SMD	1%	411326	R46 R47 R48 R49 R50 R51 R52 R53 R54
301	OHM	1/10	SMD	1%	411339	R38
392	OHM	1/10	SMD	1%	411350	R3
604	OHM	1/10	SMD	1%	411368	R29 R19 R55
1.00K	OHM	1/10	SMD	1%	411389	R43 56 R58 R59 R60 R62 R63R64 R65 R67 R68 R70 R71 R72R73 R74 R69
2.74K	OHM	1/10	SMD	1%	411431	R37
3.24K	OHM	1/10	SMD	1%	411438	R39
4.75K	OHM	1/10	SMD	1%	411454	R1 R6 R9 R10 R11 R12 R13 R24 R25 R32
4.75K	OHM	1/10	SMD	1%	411454	R33 R41 R42 R44 R45 R27
4.99K	OHM	1/10	SMD	1%	411456	R28
7.50K	OHM	1/IO	SMD	1%	411473	R17
75.0K	OHM	1/10	SMD	1%	411569	R26 R18

DIODES AND TRANSISTORS

Device	Description	Part #	Designator
Diode	BAV99 DUAL DIODE... SMD	481033	D1

INTEGRATED CIRCUITS

Device	Description	Part #	Designator
62256	CMOS SRAM 32K X 8	481047	IC2 IC5
6482	DUAL CMOS OPAMP RAIL/RAIL	481022	IC8
0.24MHZ	CRYSTAL CLOCK OSCILLATOR	231004	IC4
4218	16-BIT 2 CHANNEL CODEC	481041	IC7
74HCT4046A	CMOS PHASE LOCK LOOP...SOIC16	481045	IC9
MT9171AP	DIGITAL NETWORK INT.	481046	IC3
56004	24-BIT DSP 40MHZ	481071	IC6
IFPGA	DNIC FRAMER, COM 20	710451	IC1

Miscellaneous

Device	Description	Part #	Designator
Connector	JUMP JAX	210103	JP1
Connector	HEADER MULTI PIN HEADER((PER)PIN)	210112	JP1(2)
Connector	15 PIN (M) RT ANG PC MTG D TYPE CON	210188	J1
Connector	DUAL ROW HEADER 17 POS. .230IN	210279	J4
Connector	RJ-45 RT ANG MOD CON 1-PORT SHIELDED	210335	J2
Connector	BNC RT ANGLE PC MNT W/THREAD BUSH	210354	J5
Inductor	FERRITE EMI SUPPRESSOR 400MA	181001	L1 L2 L3
Switch	DPDT MICRO-SUBMINIATURE SWITCH	510124	S1
Transformer	2745B 2:1 PULSE TRANSFORMER	560023	T1

4 SPECIFICATIONS

***Note:** 0 dBv is referenced to 0.775 V RMS*

FRONT-PANEL CONTROLS AND CONNECTORS

Talk/Listen Switches:	12
Function Buttons	16
Answer Back Switch	1
Volume Controls	2
Headset Connector	1 D4M XLR
Panel Mic Connector	1 1/4 in. Phone Jack

REAR-PANEL CONNECTORS

Miscellaneous	DB-15F
To Matrix	RJ-45 & DB-15M
Audio IO (OPT-100)	DB-15F
Accessory	DB-9F
DC Power	5 Pin

PANEL MICROPHONE INPUT

Type:	Electret
Input Level	40 dBv
Gain Adjustment Range	+/-5dB
Impedance	200 Ohms

HEADSET MICROPHONE INPUT

Type	Dynamic
Input Level	-55dBv
Gain Adjustment Range	+/- 5dB
Impedance	200 Ohms

LOCAL PROGRAM INPUT

Type	Transformer Isolated
Impedance	8k Ohms Bridging
Level	0 dBv will produce full output of speaker when volume control is fully clockwise

HEADPHONE OUTPUTS

Impedance	50 to 600 Ohms
Power	1/2 W into 50 Ohms

SPEAKER AMPLIFIER OUTPUT

Impedance	8 Ohms
Power	2 W

LINE INPUT (2-PAIR LISTEN FROM MATRIX)

Type	Transformer Balanced
Impedance	8k Ohms Bridging
Level	0 dBv nominal
Freq. Resp.	100 Hz to 15 kHz +/- 2 dB

LINE OUTPUT (2-PAIR TALK TO MATRIX)

Type	Transformer Balanced
Impedance	150 Ohms (when talk active)
Level	0 dBv nominal
Freq. Resp.	100 Hz to 15 kHz, +/- 2 dB

LOGIC INPUT #1

Type	5 V logic with pull-up resistor
Logic	True = Short to Ground

LOGIC INPUT #2

Type	5 V logic with pull-up resistor
Logic	True = Short to Ground

MUTE RELAY

Contact Type	1 pair SPDT (single form C)
Contact Voltage Rating	24 VDC
Contact Current Rating	1 Amp continuous, 2 Amps peak at 24 VDC

STATION RELAY

Contact Type	1 pair SPDT (single form C)
Contact Voltage Rating	24 VDC
Contact Current Rating	1 Amp continuous, 2 Amps peak at 24 VDC

AC MAINS POWER

Voltage	117 VAC nominal (105 to 130 VAC)
Or	220 VAC nominal (200 to 240 VAC)
AC Current	0.2 Amp at 117 VAC 0.1 Amp at 220 VAC
Frequency	45 to 65 Hz

TEMPERATURE

Operating	between 0 and 50 C (32 to 125 F)
Storage	between 0 and 70 C (32 to 150 F)

HUMIDITY

Operation and Storage	Between 20% and 90%, Non-Condensing

PACKAGE DIMENSIONS

Height	3.5 in. (8.89 cm), (2 RU, EIA rack)
Width	19.0 in. (48.26 cm)
Depth	6.75 in. (17.15 cm)
Weight	7.5 lbs. (4.0 kg)

OPT-100 AUXILIARY AUDIO I/O OPTION

AUDIO

Output Signal Levels	0.0 dBv nominal
Impedance	600 Ohms, transformer balanced
Frequency Response	100 Hz to 10 kHz, +/- 2 dB of microphone preamp or external program input
Distortion	Less than 0.5% THD

SA RELAY

Contact Type	1 pair SPDT (single form C)
Contact Voltage Rating	24 VDC
Contact Current Rating	1 Amp continuous, 2 Amps peak at 24 VDC

Notice About Specifications

While Vitec Group Communications makes every attempt to maintain the accuracy of the information contained in its product manuals, that information is subject to change without notice. Performance specifications included in this manual are design-center specifications and are included for customer guidance and to facilitate system installation. Actual operating performance may vary.

5 VITEC GROUP COMMUNICATIONS WARRANTY

Vitec Group Communications (VGC) guarantees this product to be free of manufacturing defects in material and workmanship under normal use for a period of two years from the date of purchase.

Clear-Com offers 24/7 customer support.

Return authorization numbers are required for all returns.

Both warranty and non-warranty repairs are available.

TECHNICAL SUPPORT

To ensure complete and timely support to its customers, VGC maintains Technical Service Centers (TSC) staffed by qualified technical personnel. A Technical Service Center is staffed to respond to all technical inquiries and to troubleshoot technical problems regarding all products supplied by VGC. A TSC is fully available to VGC's customers *during the full course of their warranty period*.

Instructions for reaching our Technical Service Centers are given below.

For technical support from Europe, the Middle East, and Africa

Call: +49 40 66 88 40 40 Monday through Friday 09:00 – 17:00 (GMT)

+49 40 66 88 40 41 24hrs, any day (But you must have your PIN number ready.)

Web site: www.clearcom.com (Click the 24 X 7 User Support symbol on the Web site.)

For technical support from the Americas and Asia

Call: +1 510 496 6666

Web site: www.clearcom.com (Click the 24 X 7 User Support symbol on the Web site.)

Email: support@clearcom.com

FAX: +1 510 496 6610

EXCEPTIONS

This warranty does not include damage to a product resulting from cause other than part defect and malfunction. The VGC warranty does not cover any defect, malfunction, or failure caused beyond the control of VGC, including unreasonable or negligent operation, abuse, accident, failure to follow instructions in the manual, defective or improperly associated equipment, attempts at modification and repair not approved by VGC, and shipping damage. Products with their serial numbers removed or defaced are not covered by this warranty.

WARRANTY REPAIRS

While VGC will ensure complete system integrity by providing whatever support is necessary to resolve any failure covered under the terms of the warranty, the normal procedure will be to repair or replace any defective Line Replaceable Unit (LRU) that is returned to VGC during the warranty period.

A Line Replaceable Unit (LRU) is defined as: an assembly that can be safely removed from the system and readily replaced by plugging in a new unit. In the case of ancillary items such as power supplies, the entire power supply would be returned. Whereas, in the case of circuit cards, control panels, etc., only these assemblies would be returned for repair. All equipment provided by VGC is covered under the warranty.

This warranty does not include defects arising from installation (when not performed by VGC), lightning, power outages and fluctuations, air conditioning failure, improper integration with non-approved components, defects or failures of customer furnished components resulting in damage to VGC provided product.

NON-WARRANTY REPAIRS

Equipment that is not under warranty must be sent prepaid to VGC. If requested, an estimate of repair costs will be issued prior to service. Once repair is approved and completed, the equipment will be shipped freight collect from the TSC.

REPLACEMENT UNITS

Should VGC determine, in its reasonable discretion, that any part of a product is defective due to faulty materials or workmanship, VGC shall at its expense, repair or replace such part and return the repaired/replacement part to the customer. The provisions of this warranty shall apply to the repaired/replacement part for the unexpired portion, if any, of the warranty period.

EMERGENCY ON-SITE ASSISTANCE

VGC can provide emergency on-site technical assistance in support of warranty activities. The level of support effort required will be decided on a case-by-case basis. VGC has the qualified technical staff to support any and all emergency site activities should they occur.

LIABILITY

The foregoing warranty is VGC's sole and exclusive warranty. There are no other warranties (including without limitation warranties for consumables and other supplies), or guarantees, expressed or implied (including, without limitation, any warranties of merchantability or fitness for a particular purpose), of any nature whatsoever, whether arising in contract, tort, negligence of any degree, strict liability or otherwise, with respect to the products or any part thereof delivered

hereunder and/or with respect to any non-conformance or defect in any such product and/or part thereof delivered hereunder and/or with respect to any non-conformance or defect in any such product and/or part thereof delivered hereunder, or any other warranties or guarantees, including but not limited to any liability of VGC for any consequential and/or incidental damages and/or losses (including loss of use, revenue, and/or profits). In any event, the maximum extent of VGC's liability to customer hereunder shall not under any circumstances exceed the cost of repairing or replacing any part(s) fount to be defective within the warranty period as aforesaid.

RETURNING EQUIPMENT FOR REPAIR

All equipment returned for repair must be accompanied by:

- Documentation stating the return address, telephone number, date of purchase, and a description of the problem.
- A repair reference number.

To obtain a repair reference number, contact the appropriate Technical Service Center at the phone numbers or Web sites listed below. Our representatives will give you instructions and addresses for returning your equipment. By talking with our representatives, many problems can be resolved on the phone.

For returns from Europe, the Middle East, and Africa

Call: +49 40 66 88 40 40 Monday through Friday 09:00 – 17:00 (GMT)

+49 40 66 88 40 41 anytime, any day

(But you must have your PIN number ready)

Web site: www.clearcom.com (Click the 24 X 7 User Support symbol on the Web site.)

For returns from the Americas and Asia

Call: +1 510 496 6666

Web site: www.clearcom.com (Click the 24 X 7 User Support symbol on the Web site.)

Email: support@clearcom.com

FAX: +1 510 496 6610

WARRANTY VALIDATION

To validate your warranty, fill in the information below, and mail it to your local Technical Service Center.

Model No. _____ Serial No. _____
Date Purchased _____
Purchased from (dealer name) _____
Address _____
City _____ State _____
Country _____ ZIP/Postal Code _____