

\$5

DLC SERIES
MS/IS-808

**INSTRUCTION
and
SERVICE MANUAL**



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CLEAR-COM
DOCUMENTATION ADDENDUM "C"
MS-808: 6-PIN CONNECTORS
DATE: JULY 1, 1987

* MS-808: 6-PIN IFB/ISO/ACCESSORY CONNECTORS.

1. All MS-808 Main Stations built after July 1, 1987, with serial numbers higher than #330407, are equipped with three 6-pin male XL type connectors that are not mentioned in the manual. These connectors are located on the left hand side of the rear panel, between the Program Input connector and the Channel 1-4 Intercom Line connectors. They are designated, from left to right, "J3", "J4", & "J5", respectively.
2. These connectors have standard functions, but are also occasionally used for special purpose and custom modification connections. The standard functions are:
 - 2.1 J3: "IFB 1-4". (J3 accesses the operating module that is connected to J105 on the I/O board.)
 - 2.2 J4: "IFB 5-8". (J4 accesses the operating module that is connected to J106 on the I/O board.)
 - 2.3 J5: "ISO". (J5 connects directly to a ISO-4 ISO Control Module (when installed). Only a single connector is required regardless of the number of ISO-4 modules.)
3. For additional, detailed information concerning MS-808 IFB and/or ISO connection and operation, refer to the PIC-4000B or ISO-4000 Operation Manuals.
4. Any non-standard functions or connections of J3, J4, & J5 are indicated on the individual "MS-808 Configuration label" that is affixed to the right hand side of the MS-808 rear panel, and on the "MS-808 Configuration Sheet" that is shipped with each unit.

ADDENDUM
November 17, 1987

* MS-808: MIC TO LINE GAIN LEVEL INCREASE.

In effecting a 4dB Mic to Line increase in gain level, the following changes have been made:

<u>Change:</u>	<u>At:</u>	<u>To:</u>
2.7K OHM	R37	3.9K OHM
10K OHM	R40	15K OHM

* IFB-4 MIC TO LINE GAIN LEVEL INCREASE

In effecting a 4dB Mic to Line increase in gain level, the following changes have been made:

<u>Change:</u>	<u>At:</u>	<u>To:</u>
4.7K OHM	R29, 31 33, 35	6.8K OHM

* CH-4 MIC TO LINE GAIN LEVEL INCREASE

In effecting a 4dB Mic to Line increase in gain level, the following changes have been made:

<u>Change:</u>	<u>At:</u>	<u>To:</u>
10K OHM	R37, 38, 39, 40	15K OHM

SPECIAL NOTE:

ON PAGE 13 OF THE MS-808 INSTRUCTION AND SERVICE MANUAL (PART NUMBER 810003) UNDER THE SECTION "DLC SYSTEM INTERCONNECT", DELETE THE THIRD SENTENCE WHICH READS:

With each DLC station, we supply two 30-pin female connectors (these attach to each end of the interconnect cable)."

CLEAR-COM NO LONGER PROVIDES THESE CONNECTORS AT NO CHARGE. THEY MUST BE ORDERED AND PURCHASED SEPARATELY. THE PART NUMBER IS: DLC/820018.

THE DLC SERIES
OPERATION MANUAL

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I. INTRODUCTION

This manual is a reference document that helps the intercom user and the service technician understand, set up, operate, and maintain the **Clear-Com DLC Series Production Intercom System**.

This manual does not contain information about electrical adjustments that require test procedures and equipment. Please call the factory should your system need adjustment.

The DLC Series contains the "MS-808" and "IS-808" Station mainframes; the CH-4 and IFB-4 Control Modules; the SP-4 Speaker Module; and related accessories including a Four-Wire Interface Unit (Model IF4-4) and a fully-integrated Program Interrupt System (Model PIC-4 IFB Controller and IFB Talent Receivers TR-50/TR-62).

The DLC Series is a high-performance intercom system designed for teleproduction and broadcast studios, although its features, versatility, and reliability make it ideal for commercial or industrial use. Its innovative solid-state circuitry and digital logic control enable programmable two-way communications in a "Party-Line" or a Point-to-Point intercom system. With the addition of Clear-Com's interface units, the System can link with many 2, 3, and 4-wire communications devices, including television cameras, telephone lines, and other intercom systems such as RTS or Roh.

DLC Station Features:

- 1) **FULL SYSTEM CAPABILITY**-- each DLC Station is self-powered. The IS Station contains a regulated power supply; the MS Station's regulated power supply is slightly larger, so it can support an intercom system containing standard remote headset or speaker stations. Each MS/IS mainframe provides "power on" and short-circuit indication, and is circuit-breaker-protected.
- 2) **BUILT-IN ASSIGNMENT MATRIX**--a 9 x 10 slide-switch matrix inside the MS/IS Station assigns each set of channel controls (A through H) to the inputs connected to the rear panel. The Matrix also assigns your dedicated line to the desired destination, or lets you "park" it in an "OFF" (disabled) position.
- 3) **VERSATILE MONITORING SYSTEM**-- With the CH-4 Control Module, the DLC Station operator can access any channel with one of the two switches assigned to it. The Listen control is a locking pushbutton that illuminates dimly when activated, and the Talk control is a 3-position toggle switch with lock-on, momentary-on, and off settings.
- 4) **HANDS-FREE DEDICATED LINE**--allows the MS/IS operator to maintain permanent, point-to-point communications with another Station operator. A point-to-point system can be configured to contain up to nine stations.
- 5) **PROGRAM MONITORING**--the MS/IS Station has a balanced auxiliary input for monitoring an external program; the operator hears the program in the speaker or in a headset, and may send the program to any channels so Remote Stations can monitor it also. A front panel Program volume control adjusts the level, and the CH-4 Control Module contains trimpots for adjusting program level on each channel.
- 6) **STAGE ANNOUNCE FUNCTION**--the MS/IS Station operator can add the Station's amplified mic output to an external connector. The output is line-level

balanced, and works in conjunction with a "speaker mute" function provided on the rear panel.

- 7) **VISUAL CALL SIGNALLING**--attracts the attention of other Station operators; also used to activate remote control of KB-112 Stations.
- 8) **ULTRA-STABLE SIDETONE CONTROL**--suppresses feedback when using a mic and speaker simultaneously
- 9) **MIC LIMITER**-- part of the Station's mic preamplifier, the mic limiter prevents overload and maintains constant signal levels
- 10) **GOOSENECK MIC**--a noise-cancelling electret mic on an field-adjustable flexible extension is permanently attached to the MS/IS mainframe.
- 11) **EXTERNAL SPEAKER**--the MS/IS Station provides a jack on the rear panel for connecting the Station to an external speaker

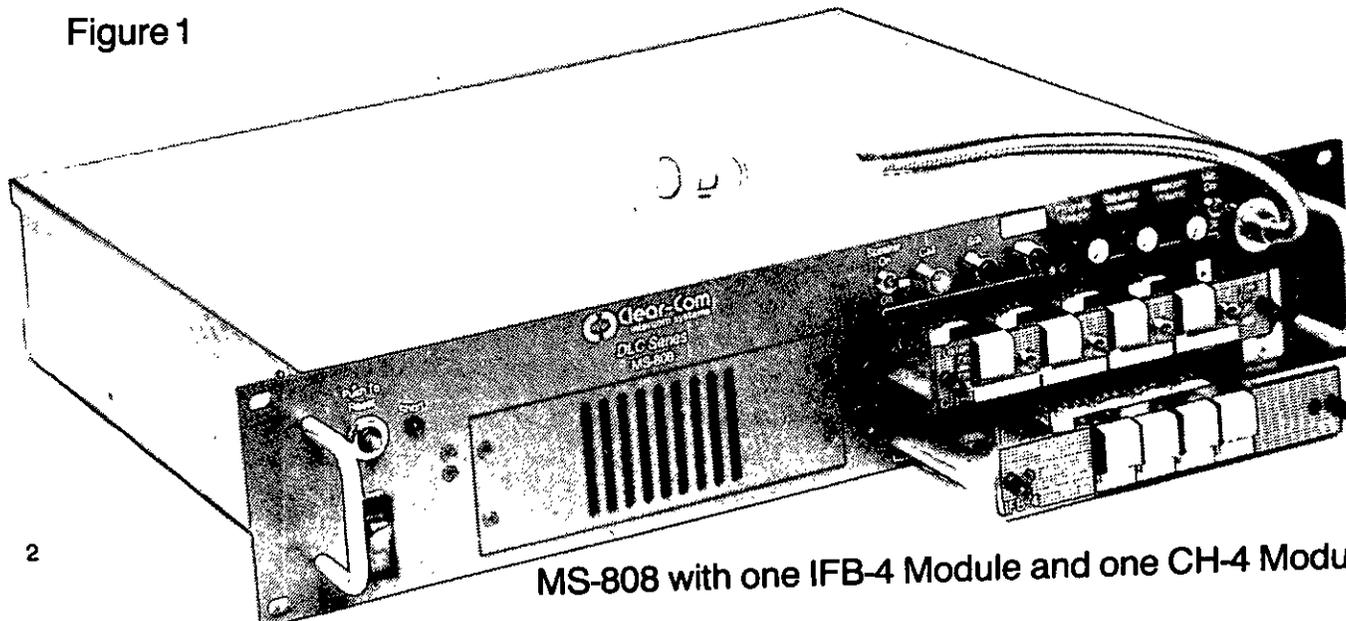
Special DLC System Features:

- 1) **CHANNEL ISO**-- allows the Station operator to hold a private conversation with any channel(s) without having to turn off the "talk" monitor switches for all other channels.
- 2) **OPTIONAL PROGRAM INTERRUPT (IFB) PACKAGE**--includes the IFB-4 Control Module, the PIC-4 Program Interrupt Controller, and one or more Talent Receivers, for a fully-integrated IFB System with four channels of intercom and four channels of IFB. Other combinations are possible. The DLC System is available with up to eight intercom channels and eight IFB channels.
- 3) **CAMERA INTERFACE**--the IF4-4 Four-Wire Interface allows TV camerapeople (operating three-wire or four-wire systems) to communicate with Clear-Com System operators

Interconnect Cable Required:

DLC Stations interconnect with 12-pair cable; the rear panel of each unit has one or two 30-pin male connectors for output/input. This manual provides detailed diagrams to help the user construct the DLC interconnect cable, putting a FEMALE 30-pin ("Tuchel" type) connector at each end.

Figure 1



I.A. MS-808 CIRCUIT FLOW DESCRIPTION

The MS/IS-808 Station circuitry contains three major components: the input/output ("I/O") board, the four-channel intercom modules, and the power supply.

The I/O board contains the microphone preamplifier, the power amplifier, bias supply circuits, and the dedicated line monitoring circuit.

The four-channel intercom board (Model CH-4) contains four identical channel monitoring circuits, each of which consists of switches and logic that control, for each channel:

- the monitoring of the talk/listen circuits
- the DC "call" signalling
- the termination
- the program distribution

There are two mic inputs to the intercom station: one is the mic on the headset, which is connected to pins 1 and 2 on the station's front panel headset connector; it is input to the mic preamp (IC-1B) via header J109. The second input is to the built-in electret gooseneck mic, which is, like the headset's mic, mixed into the summing input (pin 6) of IC-1B. The gooseneck mic input level is adjustable through trimpot P5. The electret mic is controlled by the mic on/off switch, which controls the power to the gooseneck mic. The signal input then goes through the mic preamp, where it is amplified approximately 54 dB. The signal is controlled by the limiter (Q1), which maintains the output near 0 dB level.

The mic preamp output then goes to the 4-channel boards, to the individual channel talk analog switches (IC-1, IC-3, IC-5, and IC-7). The signals then go through line driver amplifiers which feed the intercom lines through 1.5k resistors, and

then out to the intercom line. The impedance is raised approximately 15k ohms by the receive buffer (IC8), which feeds its associated circuitry, composed of 1% precision resistors (R172, R36, and R156).

Sidetone

Sidetone null balance is achieved by taking a portion of the signal from the output of the line driver (IC8) and adjusting its level and phase with the sidetone control (P8) until it balances out the signal in the line driver; the resultant output at pin 1 is fed to the listen analog switch (IC7). It is then mixed together with the signals from the other channels through resistor R35 to a summing amplifier (IC7). The summing amp's output is fed through headset volume control (P3) into the 4-watt power amplifier (IC8). The signal is then applied to the station's speaker and through a separate op amp to the headset connector (pins 3 and 4).

Signalling

Signalling is achieved by applying a DC voltage on the intercom line. This voltage is applied when the front panel "call" button is depressed, which turns on transistor Q12 (see channel D in schematic) which applies approximately 15 VDC to the intercom line of that channel. A receiving station sees the 15V on the intercom line; the voltage is sensed by amplifier IC14, which turns on an NPN transistor. This in turn causes the call lamp to shine brightly (I4).

Program

An external program is fed to the program connector (3-pin XLR female) on the rear panel; the input is a balanced one, -20 to 0 dBm. From there, the signal is amplified, passes the program master

I.A. MS-808 CIRCUIT FLOW DESCRIPTION, continued

gain control (P6), and then to another amplifier (IC5, section A on the I/O PCB schematic) which feeds the program buss and the program volume control on the station's front panel. The signal at that point gets mixed into the output of the summing amplifier where it is combined with the intercom signal. From there, the signal can go directly to the headset/speaker power amp, OR it can go into a separate program amplifier (IC11B) and then feed directly to one side of a split phone headset. The feed to the program buss from

IC5A goes to the 4-channel boards (CH-4 Control Modules) and program is sent with intercom to any or all of the channels depending on the setting(s) of the program level trimpot(s).

Stage Announce

When the Stage Announce button is pressed, the output of the mic preamp is also fed to a buffer amp which provides the rear panel 1/4" phone jack with a balanced line-level signal at 600 ohm impedance. The mic preamp continues to feed the intercom line as well.

I.B MS-808 SPECIFICATIONS

AMPLIFIER DESIGN

IC amplifiers including solid-state switching and signalling circuits. Current-limited and short-circuit protected.

MICROPHONE PRE-AMP:

Microphone Input: 200 ohm nominal dynamic type
Mic Input Level: -55 dB nominal
Frequency Response: 250-12k Hz with mic limiter to maintain level and to prevent overload
Limiter Range: 25 dB
Gain Adjust: ± 5 dB
(gooseneck mic only)

HEADPHONE AMPLIFIER

Output Impedance
Range: 50-2000 ohms
Output Level--
Speaker: 4 watts into 8 ohms
Headset: +20 dBm into 600 ohms
Distortion: <.25% THD @ 1kHz
Amplifier Gain: 35 dB
Frequency Response: 150-18kHz ± 2 dB

PROGRAM AMPLIFIER:

Switchable for 0-4 channels per CH-4 Control Module with individual level controls
Frequency Response: 150-18k Hz
Input: 50k ohms transformer-less, balanced
Input Level: -20 to 0 dBm
Common Mode Rejection: >50 dB

POWER SUPPLY:

Output Voltage: 30 volts regulated; circuit-breaker protected
Output Current: 2 amps maximum, MS-808
1 amp maximum, IS-808

VOLTAGE GAIN:

Mic-to-line: 37 dB nominal
Mic Gain Adjust: ± 5 dB
Line-to-output: 37 dB

CHANNEL SEPARATION: ≥ 50 dB

SIGNAL-TO-NOISE: >55 dB
SIDETONE: adjustable from >25 dB null to full on

OPERATING CONDITIONS:

Channel Monitoring

Programmable channels with illuminated locking monitor switches

Sending Call Signal

Follows position of "listen" monitor switches

Call Light Sensitivity: 4 VDC

Signalling Voltage: 11 VDC

Capacity (MS-808)

Will support up to 100 remote headset stations or 20 remote speaker stations

System Impedance

200 ohms or 15k ohms bridging, switchable

System Level

-15 dB nominal; 0 dB before clipping

CONNECTIONS:

Headset Inputs: (1) XLR male 4-pin
Line Outputs: (9) XLR male 3-pin
(1) 30-pin male
Program Input: (1) XLR female 3-pin
Stage Announce: 1/4" jack
Speaker Mute: 1/4" jack
External Speaker: 1/4" jack

AC POWER REQUIREMENTS:

105-130 VAC; 48-62 Hz; 80 watts maximum. May be modified for 210 to 260 VAC.

DIMENSIONS: 19" x 3.5" x 9"

AMBIENT TEMPERATURE TOLERANCE:

0-50 degrees C. 32-12 degrees F

I.C THE CLEAR-COM CONCEPT: TECHNICAL OVERVIEW

The DLC Series is a closed-circuit intercom system that provides highly-intelligible two-way communications in all environments. A basic system consists of:

- an MS-808 Main Station connected to a number of Clear-Com Remote Stations and/or various DLC System Accessories, or
- an interconnected group of IS-808 Intercom Stations.

System Interconnection

All units in the DLC Series (MS/IS-808, IF4-4, and PIC-4) interconnect with a single cable which carries up to seventeen audio "channels" (eight intercom, eight IFB, one point-to-point) plus DC power. Each intercom station location may be assigned to the point-to-point audio channel, which is referred to as a "dedicated line."

Most Remote Headset and/or Speaker Stations connect to the MS-808 with standard two-conductor shielded microphone cable. One wire carries DC power, the other wire carries the audio channel, and the shield acts as common ground.

Only one termination is needed throughout the system, and is accomplished at the MS- or IS-808.

Performance

The DLC Series is a distributed amplifier system; each intercom station houses its own mic preamplifier with limiter, power amplifier (for the headset or internal/external speaker), and visual signalling circuitry. Electrical isolation between the talk and listen circuits is achieved, prior to the switch matrix, by the individual amplifiers. The mic limiter prevents overload and maintains a steady transmit level from each station.

The "automatic headset detection"

circuit shuts off the station's mic preamp when the mic or headset is disconnected, so an unused, on-line mic does not add background noise. Low impedance mic input lines (200 ohms) make the audio channels virtually immune to RF and dimmer noise. Each bridging circuit is terminated with a low impedance to prevent crosstalk between station pairs that have been simultaneously selected for monitoring.

Clear-Com prevents audio feedback between the station's mic and speaker with individual anti-sidetone circuits on each intercom channel. Analog logic circuitry determines the direction of the intercom signal, regulating the gain circuitry for the highest performance.

Power Supplies

IS-808 Stations are self-powered and incorporate regulated DC power supplies (1 amp) for operation with 115-120 VAC, 50-60 Hz line power. MS-808 Stations have regulated power supplies (2 amps) and the connectors to support up to 100 standard remote headset stations or 20 remote speaker stations distributed along a mile of wire. Remote stations bridge the intercom line at a very high impedance and place a minimum load on the line. Audio level always remains constant, even when stations leave/join the line.

Both the MS-808 and the IS-808 are short-circuit-protected, providing an LED for "short" indication and a circuit breaker re-set button.

The 28-30 VDC provided by the MS-808 enables Remote Stations to operate with minimal current (headset stations, 10 milliamps; speaker stations, 20 milliamps) while generating loud listen levels (greater than 110 dB SPL). The higher voltage and low current keep voltage losses to an absolute minimum in long lines.

II. INTERCOM SYSTEM SET-UP

A. SYSTEM INTERCONNECTION

1) MS-808 & Standard Remote Stations

1.1 Station Capacity

The **MS-808** has a regulated power supply that delivers 30 volts at 2 amps. Therefore, it can support an intercom system that contains any combination of Clear-Com's 1-, 2-, or 4-channel Remote Stations. The number of Remote Stations that one MS-808 can support depends upon 4 factors:

- 1) the current requirements of each Remote Station
- 2) the length of the cable that interconnects the Stations
- 3) the gauge of the interconnect cable
- 4) the capacitance of the interconnect cable

If your MS-808 is to support remote headset stations only (MR-102A, RS-100A, RS-201, etc), the system can contain up to 100 units. If your MS-808 is going to support remote speaker stations only (KB-111A, RM-400, RM-120, etc), the system can hold up to 20 units.

Most intercom systems incorporate a variety of headset and speaker stations. To determine the maximum number that one MS-808 can support, see the graph in **Figure 2**. Match the number of speaker stations in your system to the number of headset stations. If the intersection falls within the graph's shaded section, one MS-808 can support all the stations in your system.

In systems where interconnect lines between stations are longer than 1000 feet, we recommend you add a second power source to act as a back-up supply; this doubles the system's capacity, allowing you to include more Remote Stations. Main Stations and Power Supplies can be paralleled in the intercom system. If your system includes two MS-808's or one MS-808 plus another power source (PS-452, MS-200, etc), the system termination occurs in only ONE of the power sources.

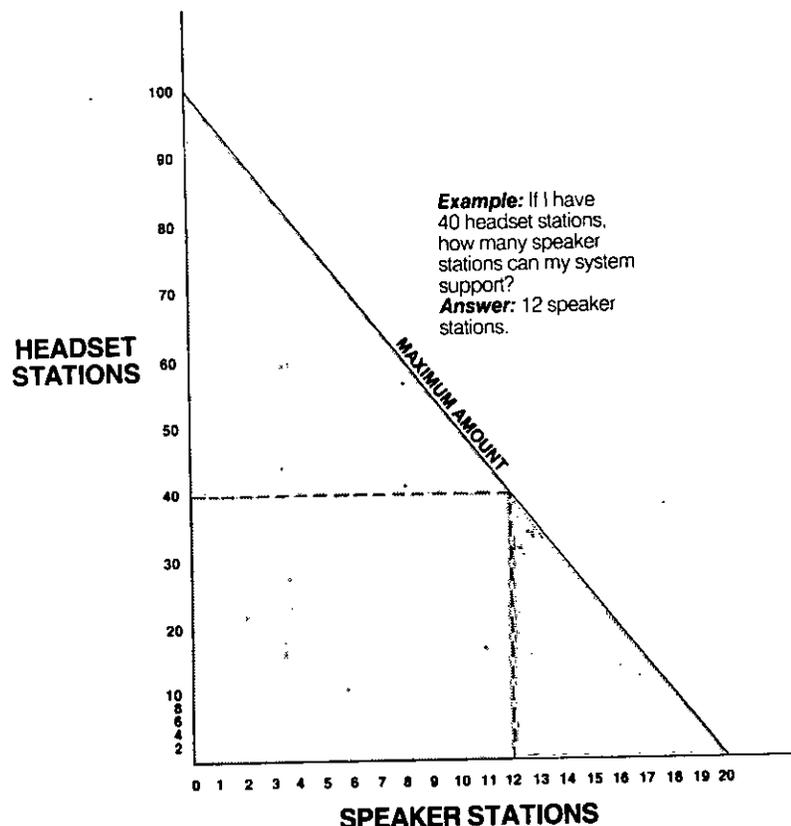


Figure 2 Maximum Amount of Remote Stations

II. Intercom System Set-Up, continued

1.2 INTERCONNECT CABLE

Each intercom channel is normally fed on standard two-conductor, shielded mic cable. This cable is routed from a 3-pin male connector on an MS-808 rear panel to a Remote Station's input connector. One wire in the cable carries DC power and the other wire carries the audio signal; the shield serves as circuit ground.

The pin assignments on ALL 3-pin, XLR intercom connectors (male and female):

- PIN 1-- COMMON
- PIN 2-- +30 VDC
- PIN 3-- INTERCOM AUDIO

The MS-808 provides 28-30 VDC to run the Remote Stations. Each one uses minimal current (headset stations, 10 milliamps quiescent; speaker stations, 20 mA quiescent) and generates loud listen levels (greater than 110 dB SPL). The higher voltage and low current keep voltage losses to an absolute minimum in long lines. If the voltage drops because you've added many extra Remote Stations or great lengths of cable, the stations in the system continue to operate normally even with less than 12 volts available.

CHOOSING CABLE

The MS-808 contains nine XLR, 3-pin male connectors, one for each of the eight channels and one for the dedicated line. Depending upon what stations are in your system, you will:

- 1) route each channel on a separate two-conductor cable that goes to single-channel Remote Stations, or
- 2) route two channels together on multi-pair cable to two-channel Remote Stations, or
- 3) route four channels together on multi-pair cable to the four-channel Remote Stations.

When choosing interconnect cable, keep in mind the following considerations:

- 1) DC resistance affects crosstalk. In permanent installations, do not use cable smaller than 20 gauge, stranded (except on runs shorter than 100 feet). Keep the total resistance under 100 ohms.
- 2) The capacitance of the interconnect cable affects the frequency response and sidetone stability of the Remote Stations. Total capacitance should be .25 microfarads or less (capacitance between the conductor and shield; equivalent to an intercom system with 5000 feet of 50 pF/foot of cable.
- 3) Standard Clear-Com Remote Stations operate with cable that has no more than 35 pF from conductor to conductor, and no more than 70 pF from conductor to shield.

Cable for Portable Installations:

Typical cable for connecting the MS-808 to portable single-channel Remote Stations is rubber-jacketed, two-conductor, shielded mic cable. We suggest you try BELDEN 8413 or the equivalent (24 gauge, stranded) for connections of 500 feet or less. For connections that run between 500 and 5000 feet, we suggest BELDEN 8412 or the equivalent (20 gauge, stranded).

Cable for Permanent Installations:

We recommend you use vinyl-insulated and jacketed cable for interconnecting all permanently installed Remote Stations (wall-mount or custom-mount units). This cable costs less and is easier to pull through conduit than the rubber-insulated type.

As explained before, low-capaci-

II. Intercom System Set-Up continued

tance cable must be used. We suggest BELDEN 8762 or the equivalent (20 gauge, stranded) for up to 500 feet, or BELDEN 8760 or the equivalent (18 gauge, stranded) for up to 5000 feet.

If you don't use Belden cable, use a similar type with the equivalent wire gauge and capacitance. Cable (especially in longer runs) should

have low DC resistance--less than 15 ohms per 1000 feet, with large diameter conductors. Cable should have low interconductor capacitance--less than or equal to 55 pF/foot of cable, capacitance between conductor and shield.

Consult the Belden wire specs in Figure 3 to ensure that the substitute cable is the equivalent.

Figure 3
Belden Shielded Cables

Trade #	# of Cond.	AWG & (Stranding)	Insulation Thickness (Inch)	Jacket Thickness (Inch)	Nom. O.D. (Inch)	% Shield Coverage	Suggested Working Voltage	Nom. Cap.* (pf/ft.)	Nom. Cap.** (pf/ft.)
8413	2	24 (45x40)	.019	.025	.190	100	300	30	55
8412	2	20 (26x34)	.020	.043	.268	84	600	30	55
8762	2	20 (7x28)	.014	.028	.196	100	350	27	49
8760	2	18 (16x30)	.018	.028	.222	100	450	24	44
8725	8	20 (7x28)	.015	.030	.360	100	400	27	49
8723	4	22 (7x30)	.008	.019	.165	100	400	35	62

*Capacitance between conductors.

**Capacitance between 1 conductor and other conductor connected to shield.

Cable for Multi-Channel Lines:

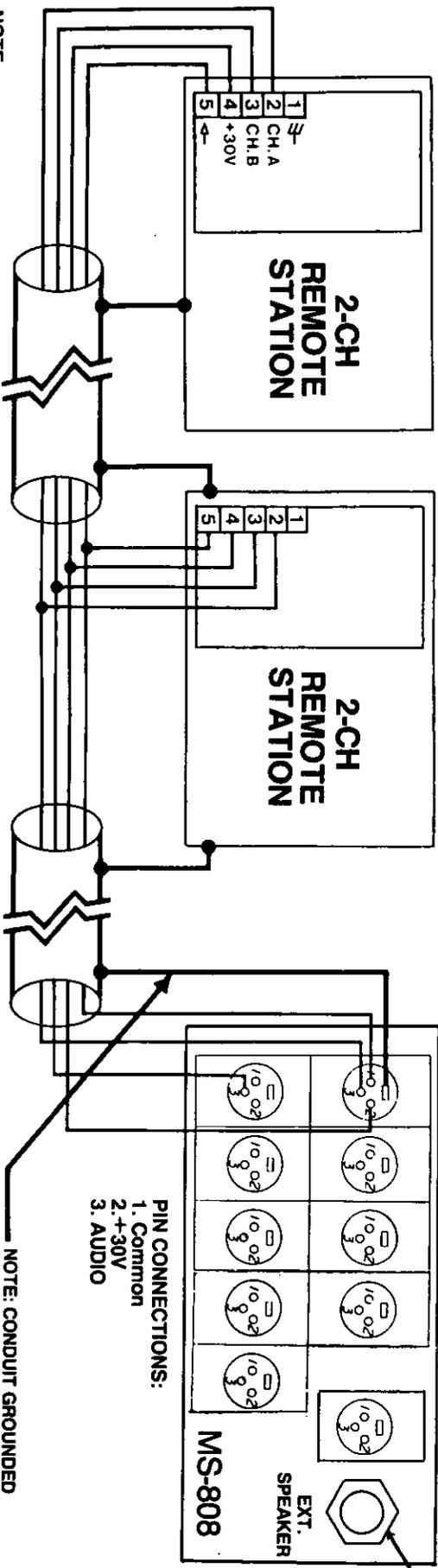
When installing a system that contains two- or four-channel Remote Stations, you can send each channel in its own two-conductor shielded mic cable, OR you can:

- 1) route 2 channels together in a two-pair, individually shielded cable (Belden 8723)
- 2) route 4 channels together in a four-pair, individually shielded cable (Belden 8725).

Whichever method you chose, make sure that the cable you select provides A SEPARATE SHIELD FOR EACH CHANNEL. See Figures 4 and 5, Two-Pair and Four-Pair Cable.

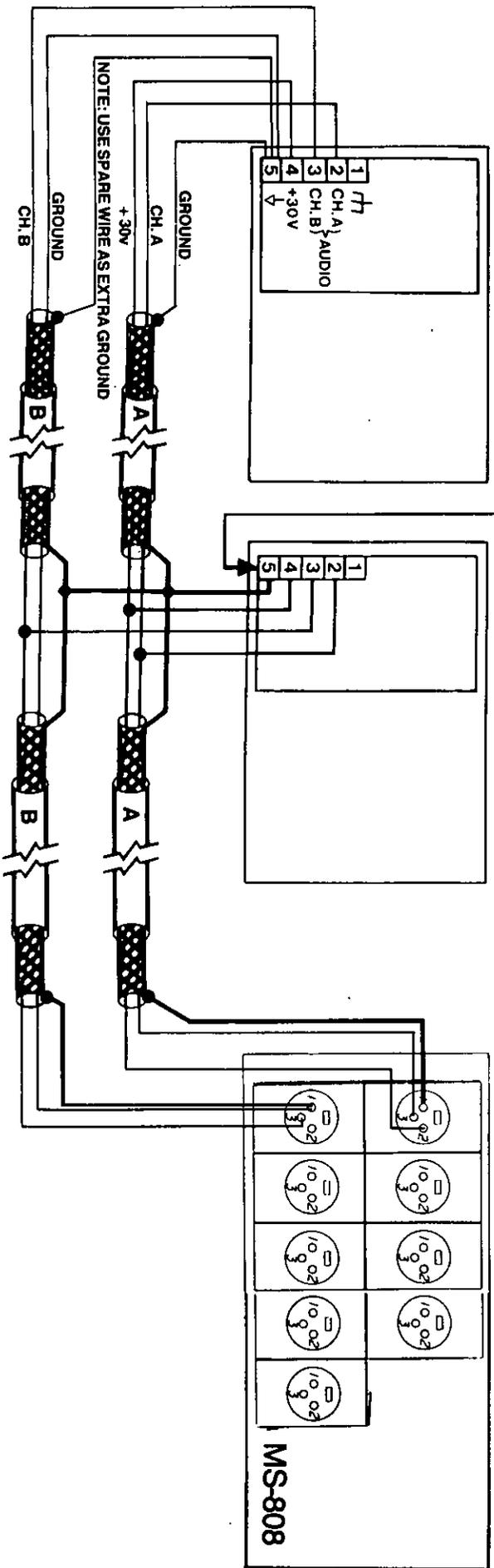
Figure 4 - FIXED INSTALLATION WIRING (TWO-CHANNEL)

METHOD I: 4 WIRES, UNSHIELDED IN CONDUIT



NOTE:
IF WIRES DO NOT FIT IN STATION CONNECTOR BLOCK, USE SEPARATE TERMINAL STRIP OR JUNCTION BLOCK TO CONNECT WIRES TOGETHER

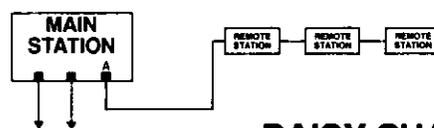
METHOD II: 2 2-COND., SHIELDED PAIR



II. Intercom System Set-Up, continued

1.3 INTERCONNECTION PROCEDURES

- 1) When routing cable from the MS-808 to the Remote Stations, allow at least three inches behind rack-mount units for cables to extend from the rear panels. Avoid sharp bends in the cabling.
- 2) Always route cables away from heavy AC power sources, such as lighting panels or electric motors.
- 3) Portable and rack-mount Remote Stations have female/male pairs of input/output XLR connectors; when installing a system with these units, it's easy to "daisy-chain" several stations along one interconnect path.



Alternately you might try Clear-Com's Quadropuss Splitter to feed lines to individual Stations (the Quadropuss is a line splitter with one input and three outputs, and is plugged directly into the MS-808 or installed along the line). Both these methods lessen the amount of cable you need, and also simplify installation.

- 4) Use of Conduit: Wall-mounted and custom-mounted Remote Stations connect to the intercom system via 5-pin terminal strips instead of XLR connectors. If you're using these in an installation site that has conduit, run interconnect cables through the conduit. If the conduit has existing wire, you can use that whether it's shielded or not.

Be sure to install cable in accordance with approved local building codes.

- 5) Not Using Conduit?: In installations where conduit is NOT used, and equipment doesn't share a common ground, it is good engineering practice to run an additional ground wire to tie all chasses together. This decreases susceptibility to electrical noise fields.
- 6) **IMPORTANT**: "Chassis ground" and "signal ground" (Pin 1 on intercom XLR connectors) are NOT the same point. DO NOT connect the chassis and Pin 1 together. The chassis is insulated from the signal ground with a capacitor (.01 microfarad, 1.4 kV). This eliminates the hum and potential shock hazards that might arise should the Stations be at different ground potentials.

Refer to the Permanent Installation Wiring Diagram (Fig. 4) when making connections.

- 7) Crosstalk: When routing two or more channels to one Remote Station, the amount of crosstalk is proportional to the amount of DC resistance in the ground return. Two ohms of resistance or less is ideal; two ohms will give 40 dB of isolation. Anything greater than two ohms will increase crosstalk. Be sure to route each channel in its own shield.

II. Intercom System Set-Up. continued

8) When using four-pair cable, you should connect all the shields and ground wires. This effectively lowers ground resistance and improves crosstalk. See the Interconnect Cable Detail diagram, Fig. 5. Also, tie any unused wires in the interconnect cable to Ground (Pin 1 on intercom XLR connectors), thereby further improving crosstalk.

4-PAIR CABLE Belden 8725 or equivalent

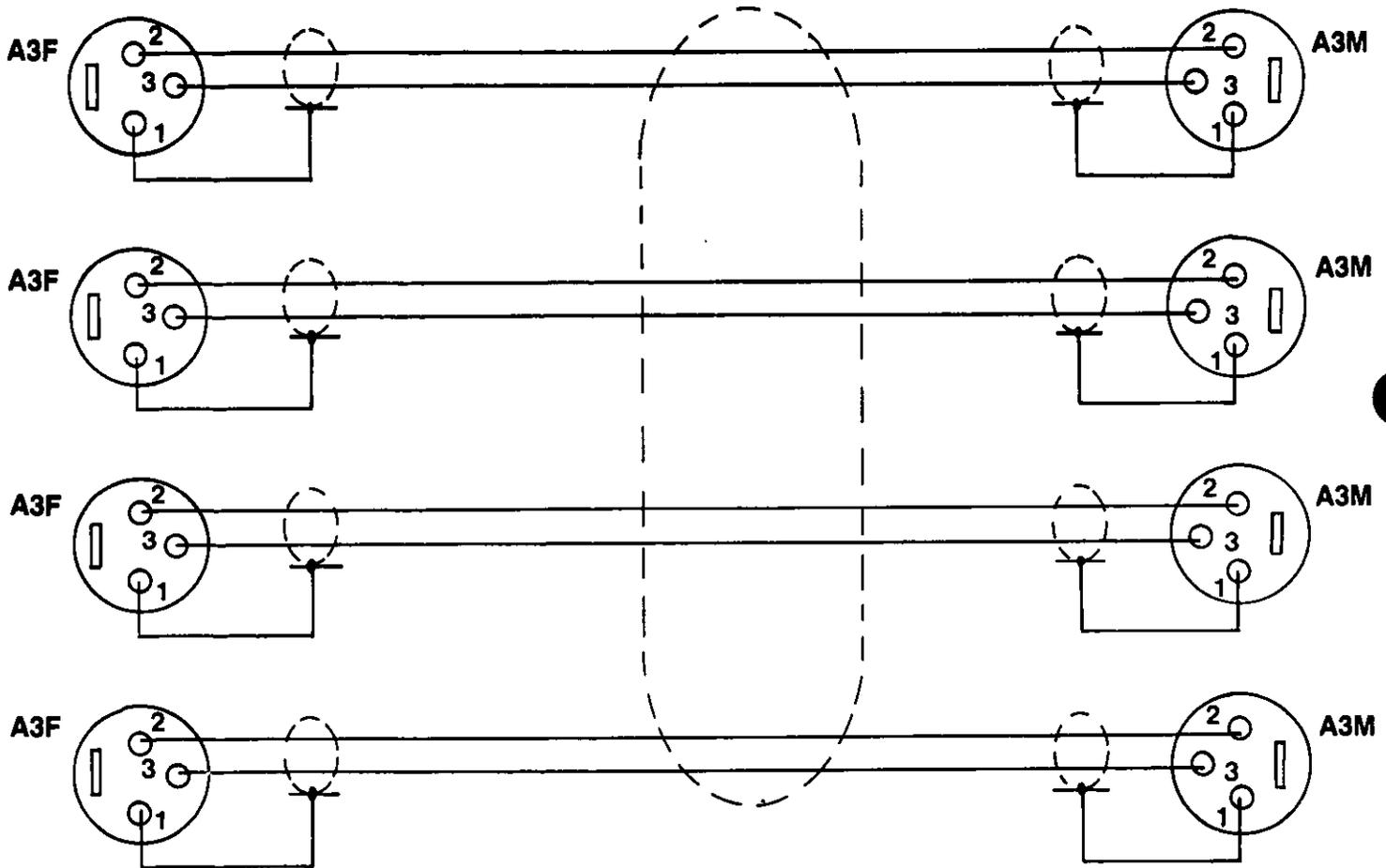


Figure 5 - INTERCONNECT CABLE DETAIL

II. Intercom System Set-Up, continued

2) DLC SYSTEM INTERCONNECTION

DLC Stations and the PIC-4 Program Controller connect to each other with 12-pair shielded cable. The cable is input to the 30-pin male connector on the Station's rear panel. With each DLC Station, we supply two 30-pin female connectors (these are attached to each end of the interconnect cable).

The following pages contain illustrations to help you construct the interconnect cable. We recommend you use **Belden 9768** or the equivalent (twelve-pair, individually-shielded, 22 gauge).

Cable, especially in longer runs, should have low DC resistance--less than 15 ohms per 1000 feet, with large diameter conductors. Cable should have low inter-conductor capacitance--less than or equal to 55 pF/foot of cable, capacitance between conductor and shield.

The MS-808 provides one 30-pin connector for output to DLC Series components.

The IS-808 Station provides two 30-pin connectors, one for "input" and one for "output," so you can daisy-chain the unit with other IS Stations. See the Daisy-Chain diagram in the previous section.

The PIC-4 Program Controller contains one 30-pin connector for DLC intercom/IFB input.

Since each MS-808 and IS-808 contains its own power supply, there is no limit to the amount of mainframes that can be interconnected within a system. (systems with IFB must contain at least one MS-808 to provide power for the Program Controller and Talent Receivers; see Section IV.)

Always route the interconnect cable away from heavy AC power sources, such as lighting panels or electric motors.

Avoid sharp bends in the cabling. Allow at least 3 inches behind each DLC Station for cable to extend from the rear panel.

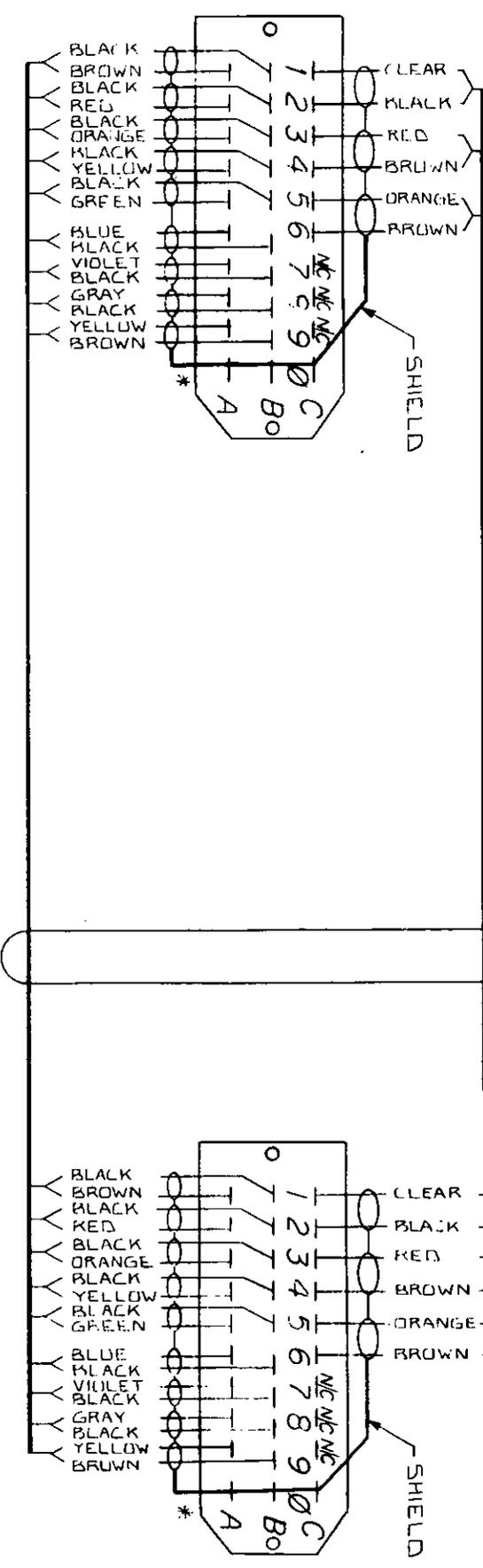
COLOR CODING FOR PAIRED CABLES

BELDEN

Pair Number	Color Combination
1	Black paired with Red
2	Black paired with White
3	Black paired with Green
4	Black paired with Blue
5	Black paired with Yellow
6	Black paired with Brown
7	Red paired with Orange
8	Red paired with White
9	Red paired with Green
10	Red paired with Blue
11	Red paired with Yellow
12	Red paired with Brown

MOGAMI

Pair Number	Color Combination
1	Brown paired with Black
2	Red paired with Black
3	Orange paired with Black
4	Yellow paired with Black
5	Green paired with Black
6	Blue paired with Black
7	Violet paired with Black
8	Gray paired with Black
9	Clear paired with Black
10	Red paired with Brown
11	Orange paired with Brown
12	Yellow paired with Brown



CABLE WIRING:

WITH
**30-PIN FEMALE
CONNECTORS**
(BOTTOM VIEW-WIRING SIDE)

*** NOTE:**
BUSS PINS C, B, & A OF ROW Ø
TOGETHER, AND CONNECT ALL
DRAIN SHIELDS TO THAT BUSS.

DLG SERIES: MS/IS-808
INTERCONNECT CABLE WIRING

SCALE: **B** (DRAWING NO. 810006-ICW-B-E)

DO NOT SCALE DRAWING SHEET 1 OF 1

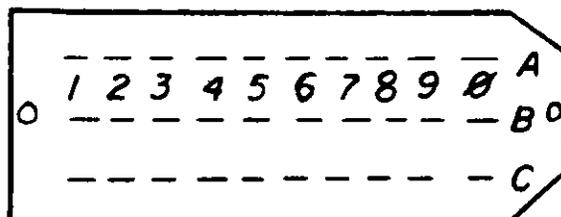
Figure 7

DLC Series: Rear Panel
Connector Pin Assignments

PIN ASSIGNMENT

A1	INTERCOM AUDIO 1
A2	INTERCOM AUDIO 2
A3	INTERCOM AUDIO 3
A4	INTERCOM AUDIO 4
A5	INTERCOM AUDIO 5
A6	INTERCOM AUDIO 6
A7	INTERCOM AUDIO 7
A8	INTERCOM AUDIO 8
A9	IFB-1A
A0	GROUND
B1	+ VOLTS
B2	+ VOLTS
B3	IFB-2A
B4	IFB-3A
B5	IFB-4A
B6	IFB-1B
B7	IFB-2B
B8	IFB-3B
B9	PRIORITY
B0	GROUND
C1	INTERCOM AUDIO 9
C2	IFB-4B
C3	PROGRAM 1
C4	PROGRAM 1
C5	PROGRAM 2
C6	PROGRAM 2
C7	N/C
C8	N/C
C9	N/C
C0	GROUND

↙ 30-PIN MALE



TUCHEL CONNECTOR
AS SEEN FROM
INSIDE CHASSIS
(Wiring side)

II. Intercom System Set-Up, continued

B. ASSIGNING CHANNEL I.D.'s

The MS/IS Station with two CH-4 Control Modules provides two-way communicating abilities on eight intercom channels and a dedicated line. The Modules let you pre-set the channel functions and control channel monitoring.

The dedicated line has no external controls for it; it remains permanently "on," allowing the DLC Station operator to maintain constant point-to-point communications with another Station operator.

When you interconnect DLC Stations, the lines in the cable are not hard-wire-assigned to the specific "channels" (A through H) which are controlled via the front panel. Assigning each set of channel controls on the CH-4 module to the audio lines in the cable (and the Stations connected to the lines) is done via the Station's **Assignment Matrix**.

The Matrix is located on the Input/Output Circuit Board inside the DLC Station. Remove the top cover of the Station, and you'll see the labelled Assignment Matrix. See Figure 8, Input/Output Board, for exact location.

On the Assignment Matrix, the horizontal rows labelled 1-9 correspond with the nine intercom lines run through the 30-pin connector on the Station's rear panel (MS or IS mainframe). Refer to the pin-out chart, Figure 7, to see which pins on the connector correspond to which intercom lines.

The vertical columns on the Matrix are labelled with alphabet letters A-H and "D/L." They correspond with the channels monitored via the CH-4 Modules.

The position marked "off" on the

Assignment Matrix disables one of the circuits within the unit, disconnecting it entirely from the system. It should be used as a place to "park" the dedicated line slideswitch in systems that do not use point-to-point communications.

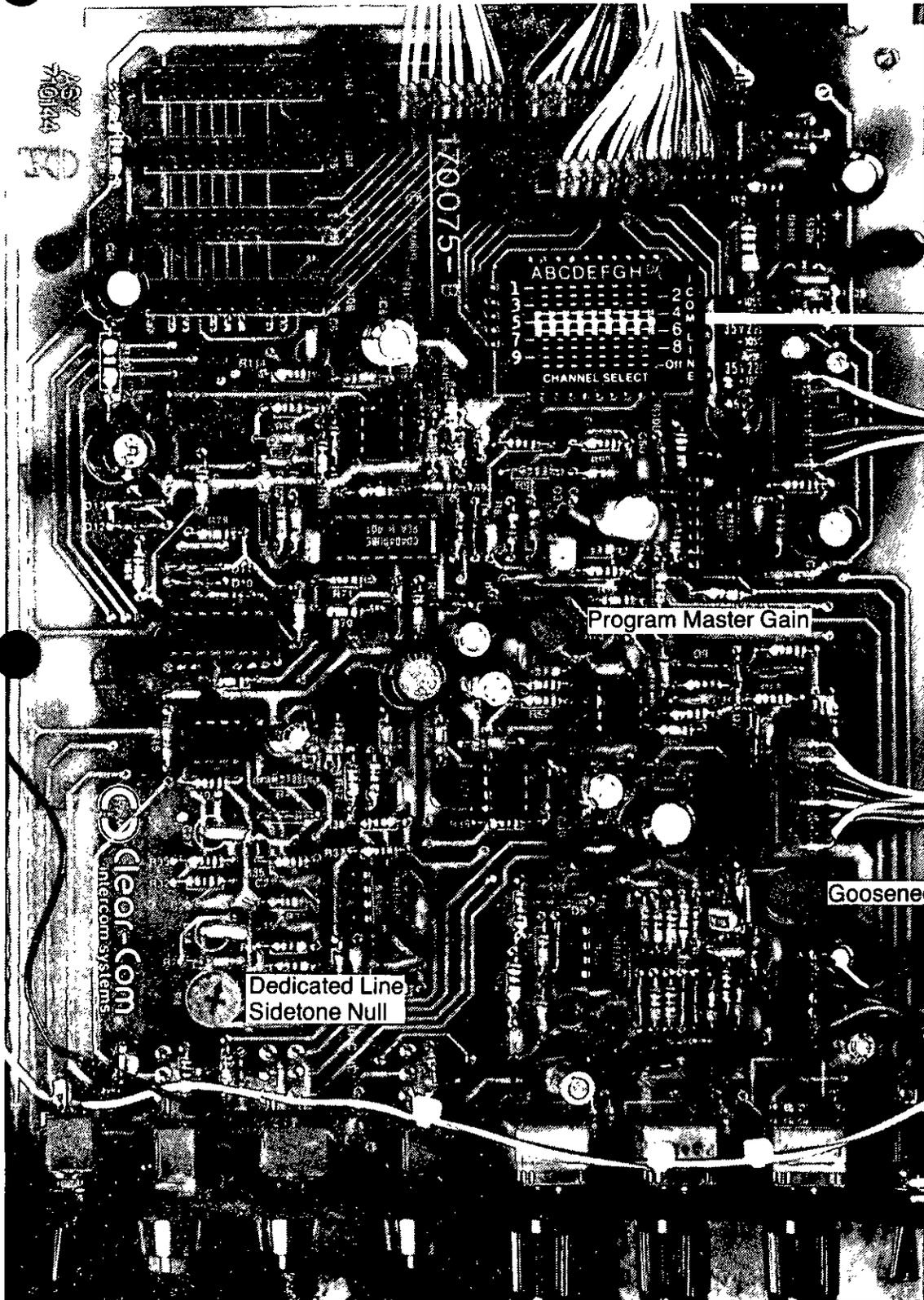
At the factory, we set up the Matrix so the intercom lines in the 30-pin connector are assigned to the channels in a straight-forward manner:

Intercom line 1 = Channel A
Intercom line 2 = Channel B
Intercom line 3 = Channel C
Intercom line 4 = Channel D
Intercom line 5 = Channel E
Intercom line 6 = Channel F
Intercom line 7 = Channel G
Intercom line 8 = Channel H
Intercom line 9 = Dedicated Line

If you have an MS-808 that connects to standard remote headset/speaker stations instead of DLC System components, there's no need for you to re-set the Assignment Matrix. The 3-pin, XLR connectors on the Station's rear panel directly correspond with the intercom lines; in other words, the line run through XLR connector #1 is monitored via the Channel A buttons, the line to XLR connector #2 is monitored via the Channel B buttons, the line to XLR connector #3 is monitored via the Channel C buttons, and so on. XLR connector #9 is for the dedicated line.

To change the channel/line assignments: use the point of a pencil (or end of a paper clip, etc.) to push each Matrix slide-switch up or down its column, thereby assigning a channel ID to each intercom line run through the 30-pin connector (it is possible to assign more than one line to the same channel; you can assign two sets of talk/listen controls to one XLR input).

Figure 8



Assignment Matrix

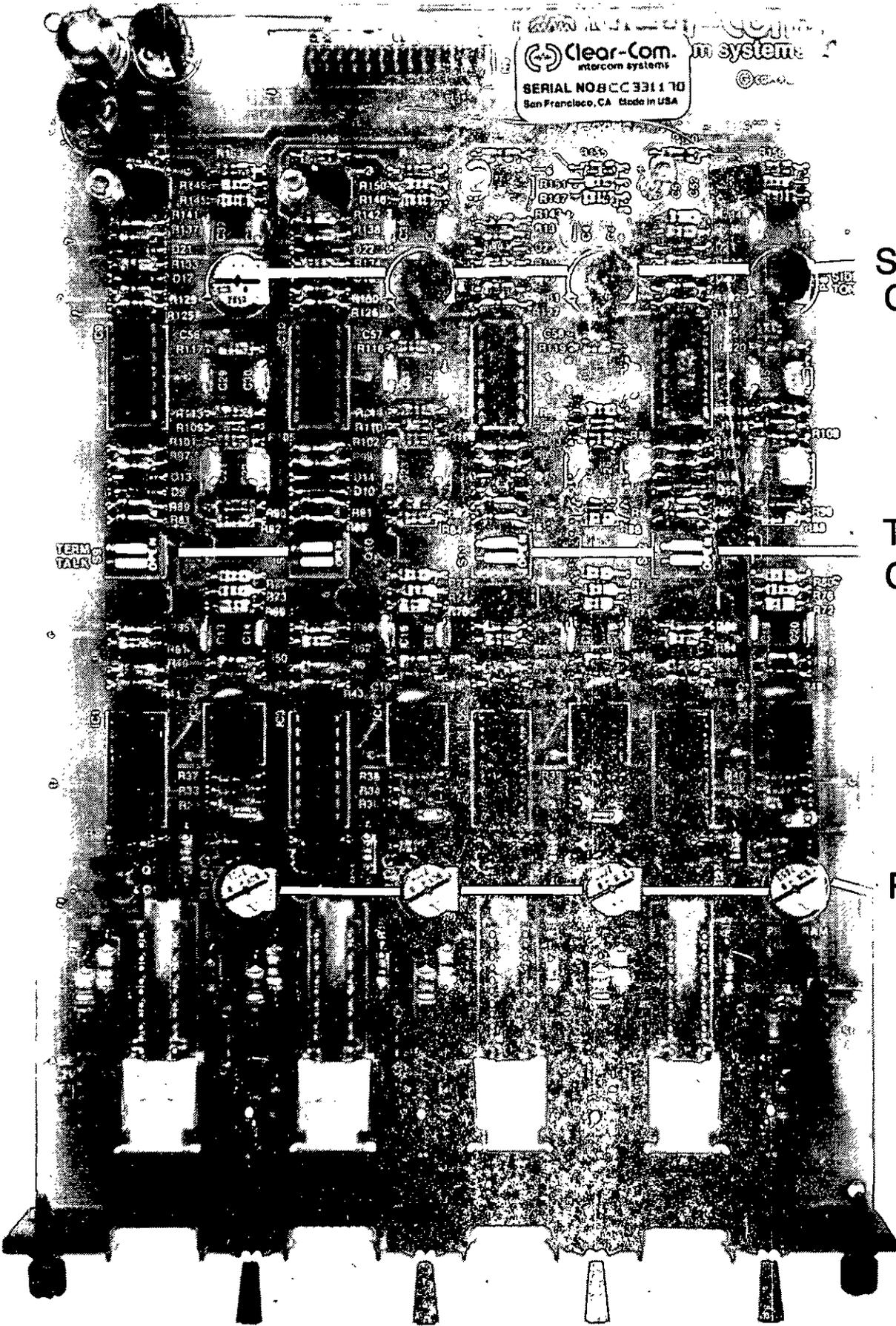
Program Master Gain

Gooseneck Mic Trim

Dedicated Line
Sidetone Null

Input/Output
P.C. Board

Figure 9



Clear-Com.
intercom systems
SERIAL NO 8CC 3311 70
San Francisco, CA Made in USA

Sidetone Null
Controls

Termination, Talk
Controls

Program Controls

(front panel)

CH-4 Control Module

II. Intercom System Set-Up, continued

C. TERMINATION

After completion of cable routing and system interconnection, you must make sure that the system is properly terminated once at a point in the system.

Only one termination per channel is needed. All channels should be terminated at any one of the MS or IS Stations or other Main Stations in the system, or at the MS-808 if it's the only power source.

Termination for each intercom channel is accomplished with a dip-switch which is located on the CH-4 Control Module's printed circuit board. Loosen the screws that hold the Control Module onto the DLC Station's front panel, and gently pull the Module out of the slot until you have access to the dip switches (grouped in sets of 4, there is one set for each channel). See Figure 9, CH-4 Circuit Board, for exact location of dip switches.

The circuit board is labelled on its far left side (next to the first set of dip switches) with the

D. PROGRAM SEND/RECEIVE

The rear panel of each MS/IS mainframe contains a 3-pin female XLR connector for a balanced, auxiliary program input. The Station operator hears the program in the headset and/or speaker.

In most cases, the headset connector on the DLC mainframe's front panel has the intercom and program signals combined onto one pin (pin 4), although the DLC mainframe is optionally available with a 6-pin headset connector that has separate program and intercom pins for use with binaural headsets.

The program input uses a differen-

switch functions. Dip switch #4 in each set is for that channel's termination. Each termination switch must be set to the "on" or "closed" (not "open") position.

Make sure a termination switch is "on" for all intercom channels in your system. Even if a channel is not in use, you should terminate it.

At all other DLC Stations in the system (also at all Main Stations, Switchboard Stations, or Power Supplies, if part of the system), the termination switches should be OFF ("open" position).

It is important to remember that each channel, whether in use or not, should be terminated ONCE at some point within the intercom system (note: that point need not be the same for each channel).

In DLC Systems using IFB-4 Control Modules, the IFB channels are terminated by the PIC-4 Program Controller.

tial amplifier to accept a balanced signal without using a transformer. A -25 dB signal will drive the line to full output. The input impedance of the program amplifier is approximately 50k ohms.

The speaker output always combines the intercom and program signals, although the relative levels of each are dependent upon the settings of both volume controls on the front panel (Intercom Volume, Program Volume).

The program level heard in the headset is affected only by the Program Volume control. However,

II. Intercom System Set-Up, continued

PROGRAM SEND/RECEIVE, continued

the program level heard in the speaker is affected by the setting of the Intercom Volume control.

If you're using a binaural headset with the DLC mainframe, the Intercom Volume has no effect whatsoever upon the program level, whether in the speaker or the headset.

The DLC mainframe operator can combine the the program with the intercom on any or all of the channels. If he decides to do so, the program and intercom signals are mixed at the Station and the ensuing signal is sent to the Remote Stations on the desired channel(s).

To send the program on any channel,

E. CHANNEL SIDETONE NULL

Sidetone control enables the Station operator to vary the level of his/her voice as heard in his headset or speaker.

The CH-4 Module provides a sidetone null trimpot for each channel. This light-blue trimpot looks like the Program trimpot, but is located towards the rear end of the Control

F. HEADSETS, SPEAKERS, & GOOSENECK MIC

An electret mic on a gooseneck extension is permanently attached to the front panel of the DLC Station. The length of the extension is adjustable; loosen the screws that hold the base to the front panel, and you can slide the gooseneck in or out. The gooseneck mic is controlled by a **Mic On/Off** toggle switch next to the gooseneck base.

slide out the appropriate CH-4 Control Module. The control to adjust is a light-blue trimpot, located close to the front panel (see Fig. 9, for exact location of all controls on CH-4 Module). Turn the trimpot fully clockwise, and the associated channel will receive the program signal at maximum level. Turn the trimpot fully counter-clockwise, and the associated channel will not hear the program.

Program can not be sent on the dedicated line.

Note: the Program Input XLR connector is wired in parallel with the "program 1" lines in the mainframe's 30-pin connector (see Fig. 7 for specific pins).

Module circuit board (see Figure 8 for exact location).

These trimpots adjust the sidetone level for the individual channels. Turn a sidetone null trimpot clockwise to decrease the sidetone heard on its associated channel. At the factory, we set all these trimpots for maximum null.

Beneath the gooseneck mic is a headset connector, for use with a dynamic headset. The headset connector's pin assignments are:

- Pin 1 - Mic Common
- Pin 2 - Mic Hot
- Pin 3 - Headphone Common
- Pin 4 - Headphone Hot

Do not use the mic or headset within two feet of an AC power trans-

II. Intercom System Set-Up, continued

HEADSETS, SPEAKER & GOOSENECK MIC, continued

former, or the mic(s) will pick up hum.

The Station's headset/speaker amplifier can drive a headset to levels greater than 110 dB SPL. When the headset jack is not used, the Station's amplifier gain is reduced from 50 dB to unity gain, eliminating pick-up from the unused input.

All dynamic headset connectors in Clear-Com Stations are 4-pin XLR male connectors. These are for use with monaural headsets, but can be adapted for use with stereo (binaural) headsets (see Section G).

To assure proper level and performance, the headsets (or handsets or mics) should have the following characteristics:

Microphone Type:	dynamic
Impedance:	150-250 ohms
Output Level:	-55 dB
Headphone Type:	dynamic
Output Impedance:	300-2000 ohms

Clear-Com can supply you with the Model YC-100 "Y" Cable, which allows you to plug two headsets into the one 4-pin connector on the Station's front panel. Alternatively, you can construct your own Y-cable; we recommend you use Belden 8416 or the equivalent (2-conductor, 25 gauge) or Belden 8734 or the equivalent (3-conductor, 22 gauge). See Figure 10, Y-Cable Construction.

You can also build an extension cord for the headset, using the same cable specified for the Y-cable. Limit the extension length to 15 feet or less; greater lengths lead to possible capacity coupling between the mic signal and the headset signal, which causes oscillation or a loss in frequency re-

sponse. See Figure 11, Headset Extension Cord Construction.

If you want to connect an external speaker to the MS/IS mainframe, use one with impedance of 8 ohms or more. Connect the two wires from the speaker to the tip and sleeve of a 1/4" phone plug, then plug it into the external speaker jack on the Station's rear panel. The external speaker always remains on, and does not affect operation or performance of the Station's built-in speaker (which is included when the MS/IS mainframe contains an SP-4 Speaker Module).

The mainframe is easily adapted for use with a stereo (binaural) headset. You will need:

- 6-pin insert (male, Switchcraft-type) for the connector
- one jumper
- one capacitor, 100 pF 1kV
- small-blade screwdriver
- small needle-nose pliers
- solder iron and wick

To switch from mono to binaural:

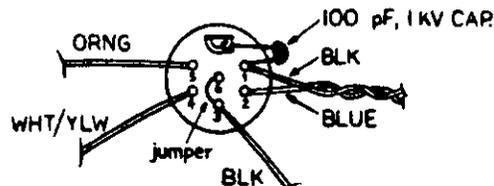
- 1) remove top cover from mainframe
 - 2) remove set screw from top of headset connector shell (inside front panel)
 - 3) remove 4-pin insert from connector shell by gently pulling its wires towards rear of mainframe
 - 4) carefully unsolder all 4 wires from the insert
 - 5) prepare the 6-pin insert by soldering the 100 pF capacitor between the insert's ground tab and Pin 1 (see diagram next page)
- (continued)

II. Intercom System Set-Up, continued

HEADSETS, SPEAKER & GOOSENECK MIC, continued

(adapting mainframe to stereo headset connector)

- 6) solder the headset connection wires to the 6-pin insert:
 - a-- black & blue twisted-wire pair to Pin 1 (black) and Pin 2 (blue);
 - b-- other black wire to Pin 3;
 - c-- spare white/yellow wire to Pin 4 (spare wire is tucked inside the mainframe, in the same bundle as the other wires);
 - d-- orange wire to Pin 5;
 - e-- jumper between Pins 3 and 6.
- 7) use pliers to move jumper JP2 from the MIX position to the SEPARATE position (located on I/O PC Board between the Sidetone and Intercom Volume controls)
- 8) Slide the 6-pin insert through headset connector shell; secure with set screw
- 9) replace top cover of mainframe.



HEADSET CONNECTOR
6-PIN INSERT:
WIRING SIDE

G. TRIMPOTS ON I/O (INPUT/OUTPUT) PC BOARD

There are three trimpoints on the I/O Board that are set at the factory for optimum operation (refer to Figure 14 for their location).

Dedicated Line Sidetone Null (reference designator, P4):

Adjusts the sidetone null on the dedicated line; should not require re-adjustment.

Gooseneck Mic Trim (P5):

Sets the level for the gooseneck mic sensitivity over a 10 dB range.

Master Program Gain (P6):

Adjusts the program gain from full off to full on, >60 dB.

Figure 10
HEADSET "Y" CABLE CONNECTIONS

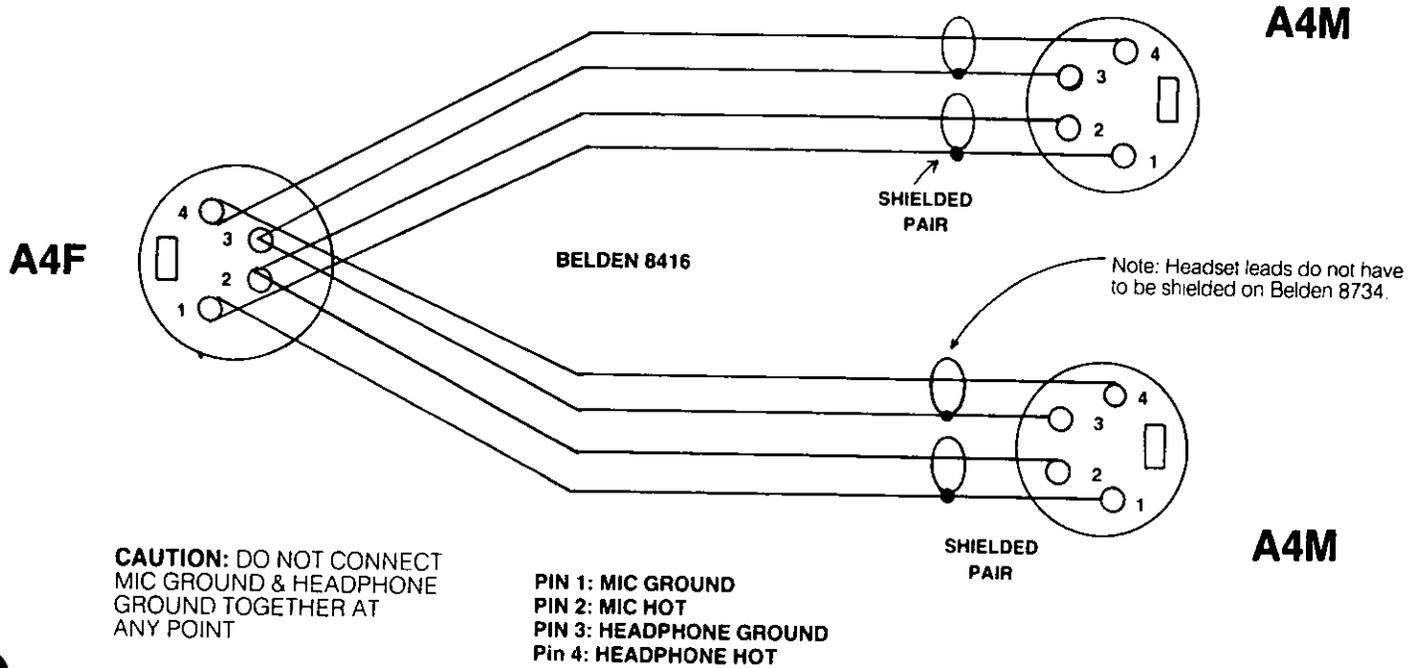
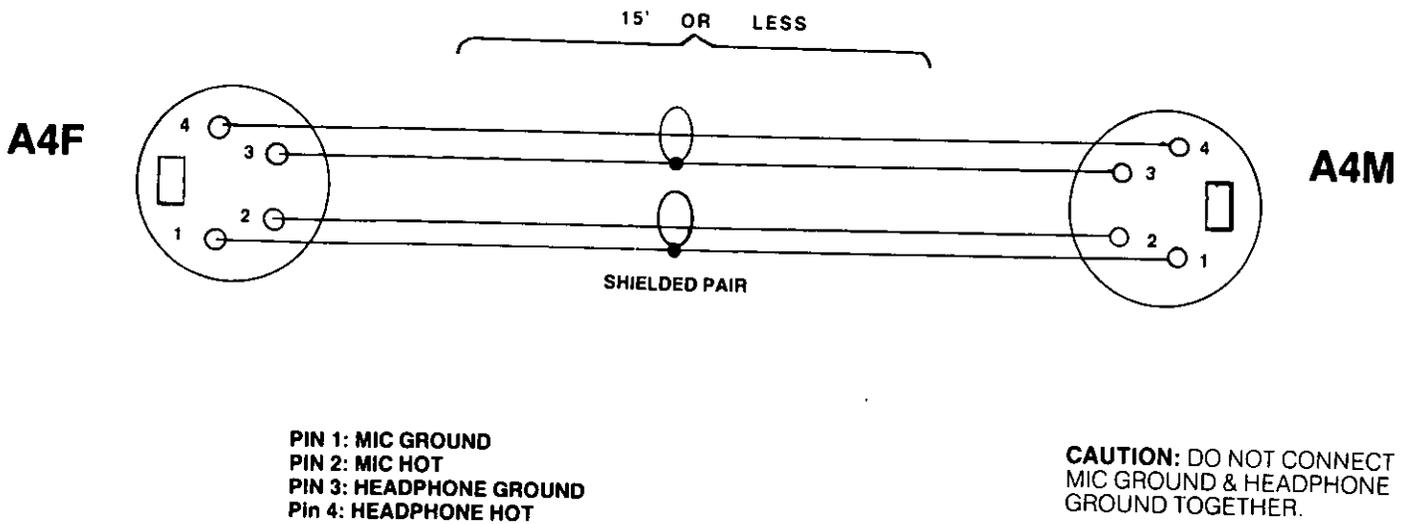


Figure 11
HEADSET EXTENSION CORD



III. MS-808/IS-808 OPERATING CONTROLS

The mainframe and CH-4 Module controls are described as they appear from left to right, viewing the front panel of the MS/IS-808.

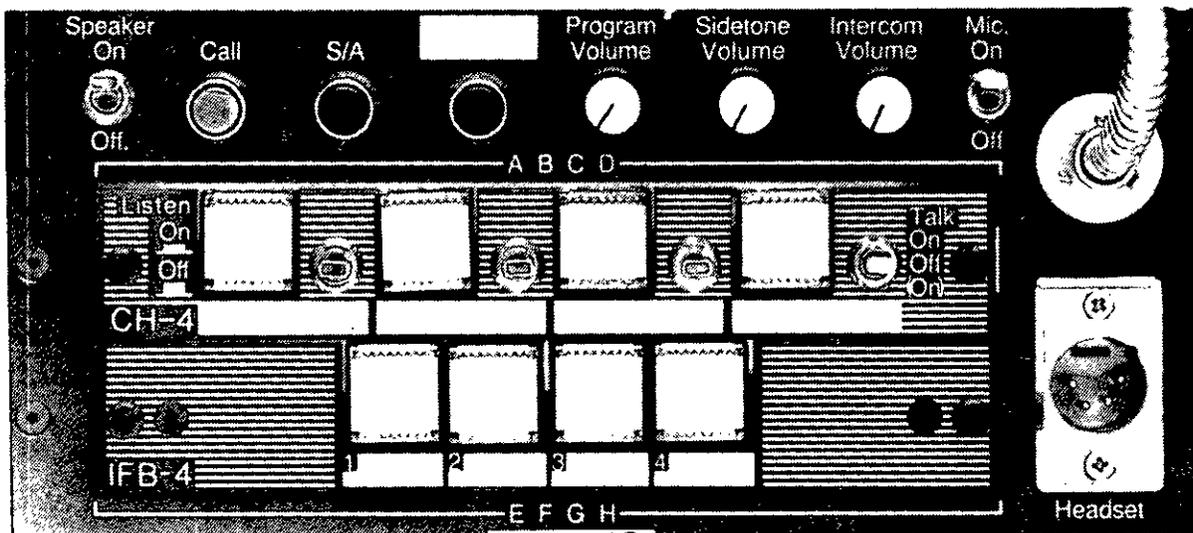


Figure 12

POWER SWITCH

PUSH-TO-RESET CIRCUIT BREAKER

LED SHORT INDICATOR

The MS/IS mainframe has a power cord that connects to a source of 105-125 VAC, 50-60 Hz. When the power switch is turned on, it illuminates, indicating the Station is ready to run.

The MS/IS mainframe provides a red LED that illuminates when the Station's circuit breaker pops, indicating a short circuit or phase reversal in the cabling. If the LED lights up, inspect the interconnect cable, remove the short circuit, and press the Circuit Breaker re-set to re-establish the system.

SPEAKER ON/OFF

This toggle switch controls the MS/IS mainframe's built-in speaker.

CALL

Pressing Call activates the Visual Signal Circuitry in the system, allowing the Station operator to attract the attention of other operators.

The Call button will signal the operators on channels that the calling Station operator has chosen with CH-4 locking "Listen" buttons. If the Listen buttons for Channels D and E are on, pressing Call will signal only those Stations on Channels D and E. If all Listen buttons are enabled, all connected Stations will receive the Call signal.

When a Remote Station sends a Call signal, the MS/IS Station's Listen button for that Remote Station's channel will illuminate brightly (whether it's on or off).

III. MS/IS-808 Operating Controls, continued

S/A-- STAGE ANNOUNCE

"Stage Announce" allows the MS/IS Station operator to add his words spoken into the mic to the intercom system to an external output. When the operator presses the S/A button, the mic preamp output is added to the rear panel Stage Announce connector (1/4" phone jack) as a balanced, line-level signal, with 600 ohms impedance. The S/A function has no sidetone.

The MS/IS mainframe rear panel also provides a 1/4" phone jack for "Speaker Mute." Speaker Mute provides a contact closure when the Stage Announce function is activated, allowing you to use a relay that will shut off or mute an external speaker located close to the MS/IS Station (so there's no feedback). The Speaker Mute phone jack should not be used to send a signal to a speaker.

UNLABELLED BUTTON

On the front panel of the MS/IS mainframe, there is an unlabelled button. Depending upon the specified configuration when your system was ordered, this button is any of the following:

- a) unwired
- b) "All Page" (talk to all channels at once)
- c) "All IFB" (dip program and cue all talent at once)

You might choose to wire up this button yourself; if so, call our Sales or Engineering Department (415-861-6666) for assistance.

PROGRAM VOLUME

This front panel knob adjusts the overall volume level of the auxiliary Program signal in the Station's speaker or headset.

SIDETONE VOLUME

This knob controls the overall volume level of the operator's voice as he hears it in the Station headset/speaker. Sidetone control also prevents feedback when the Station is used with an external speaker. The sidetone control does not affect the level of the operator's voice heard by other Stations or the level of incoming signals.

As you turn the knob clockwise overall sidetone level increases.

Sidetone can be varied from fully off to fully on, "no null" level. For maximum speaker output without feedback, turn the sidetone knob fully counter-clockwise (maximum null).

INTERCOM VOLUME

This knob adjust the overall volume of the channels monitored in the speaker/headset of the DLC Station.

III. MS/IS-808 Operating Controls, continued

CH-4 Control Module: TALK/LISTEN MONITOR CONTROLS

The front panel of the Control Module contains four pairs of intercom channel controls. For each channel, there is a "Listen" push-button and a "Talk" toggle switch.

When a square "Listen" button is activated, it dimly illuminates, locks into place, and allows the operator to listen to activity on the associated channel. The operator can listen to as many channels as needed.

NOTE: the positions of the Listen buttons determine which channels will receive a visual signal when the MS/IS operator presses Call; the Call signal travels only on channels whose Listen buttons are ON.

The "Talk" toggle switch has three positions: on, off, and momentary on. The Station operator can talk on as many channels at the same time as s/he wants.

Activating the "momentary Talk" function automatically dips the Station's speaker output approximately 6 dB so you don't get feedback.

ISO OPTION

The CH-4 Module contains a certain jumper within the electronics for each channel. When removed, the channel becomes an ISO line. To access an ISO channel, set that channel's "talk" toggle switch to the momentary on position. This lets you talk to the Stations on the ISO line only, and disables your "talk" and "listen" ability on all other channels, regardless of their "talk" and "listen" switch positions. You can still hear the external program (if input to the auxiliary input) while communicating with an ISOLated channel.

Please call the factory at the above number if you'd like to modify any of your channels for ISO operation.

In a system that contains an MS-808 Main Station and standard Remote Stations, set all dedicated lines (D/L) in DLC Stations to Matrix "OFF" position.

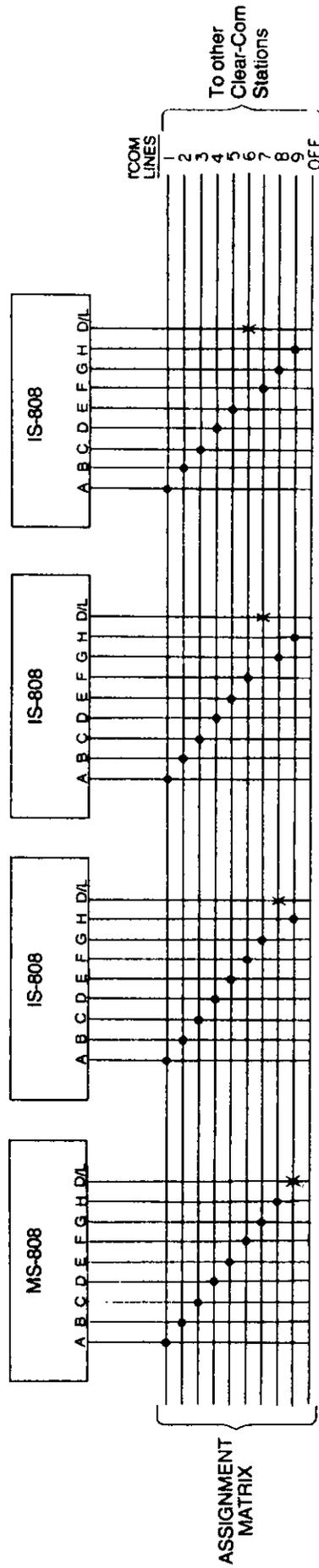


Figure 13: DLC Point-to-Point System Interconnection

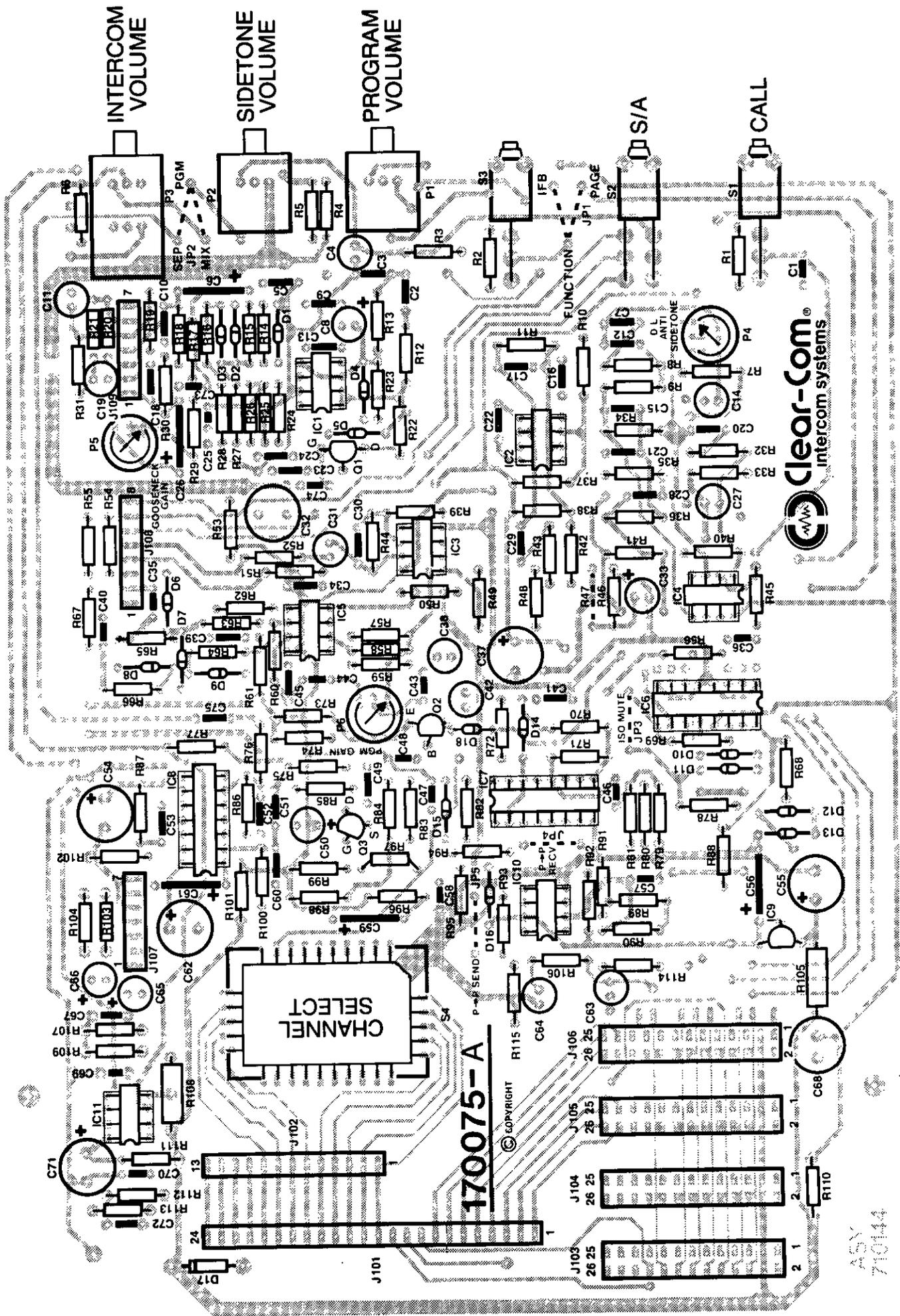


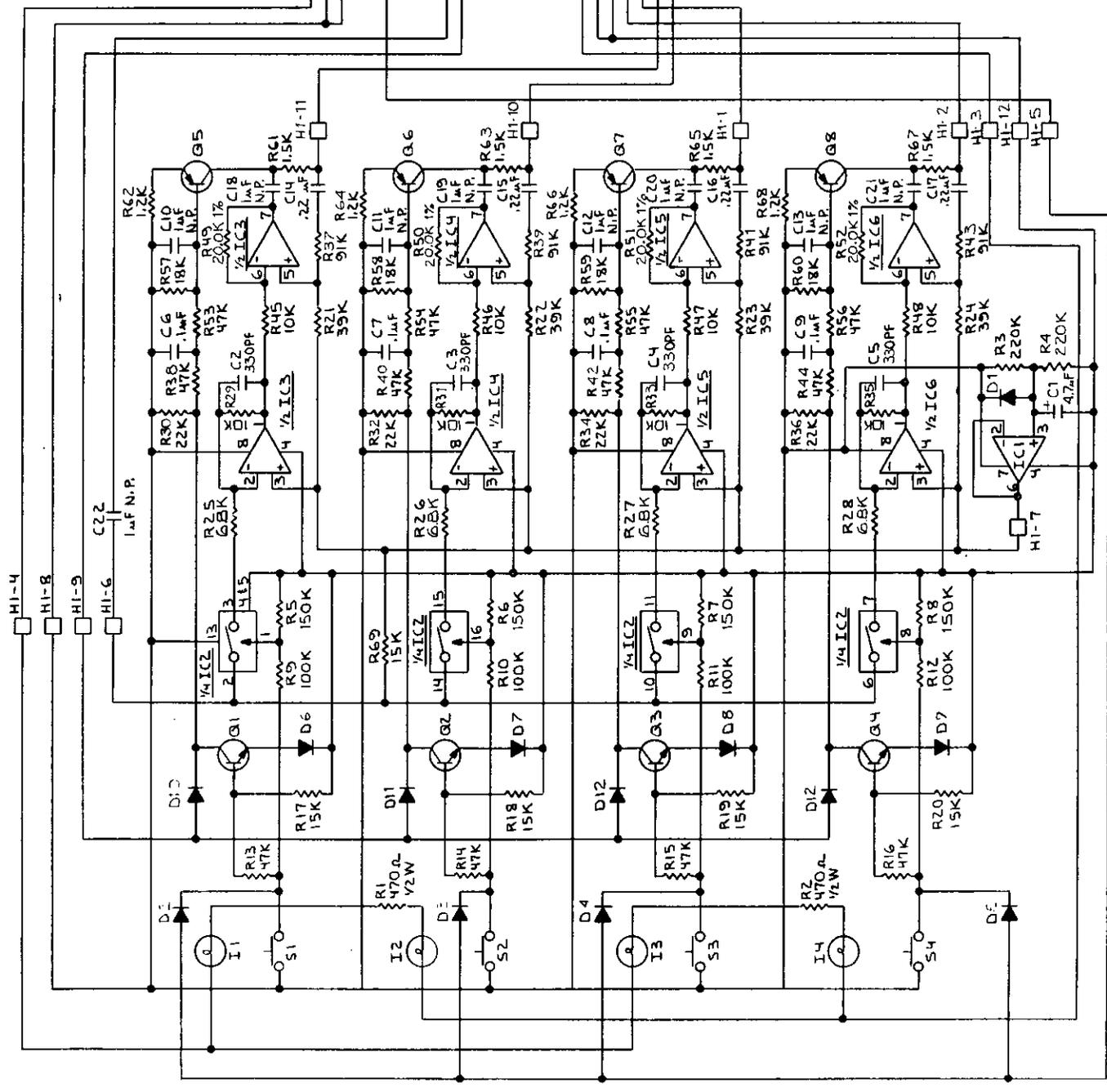
Figure 14: I/O Board Stuffing Diagram



1	H2	38.0 VDC UNREGULATED
2	V6	29.5 VDC
3	V1	29.5 VDC
4	V1	29.5 VDC
5		
6		
7		ALL IFB
8		
9		
10		
11		TALK
12		IFB
13		
14		
15		
16		
17		
18		
19		
20		LAMP GROUND
21		CIRCUIT COMMON
22		CIRCUIT COMMON
23		CHAN. D OR H AUDIO LINE
24		CHAN. C OR G AUDIO LINE
25		CHAN. A OR E AUDIO LINE
26		CHAN. B OR F AUDIO LINE

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIODES ARE IN4148.
2. ALL .22 μF CAPACITORS ARE RATED @ 100VDC.
3. G1,2,3 & 4 ARE 2N4401.
4. G5,6,7 & 8 ARE MPS-AG3.
5. IC1 IS A RC741N.
6. IC2 IS A DG308CJ.
7. IC3,4,5 & 6 ARE RC4559N.
8. ALL RESISTORS ARE 1/4W 5%.
9. HI-1 THRU HI-12 ARE TEST POINTS LOCATED AT FRONT OF P.C. BD.
10. LAST REFERENCE DESIGNATORS USED: R29, Q8, IC6, C22, D13, I4, S4 & H2



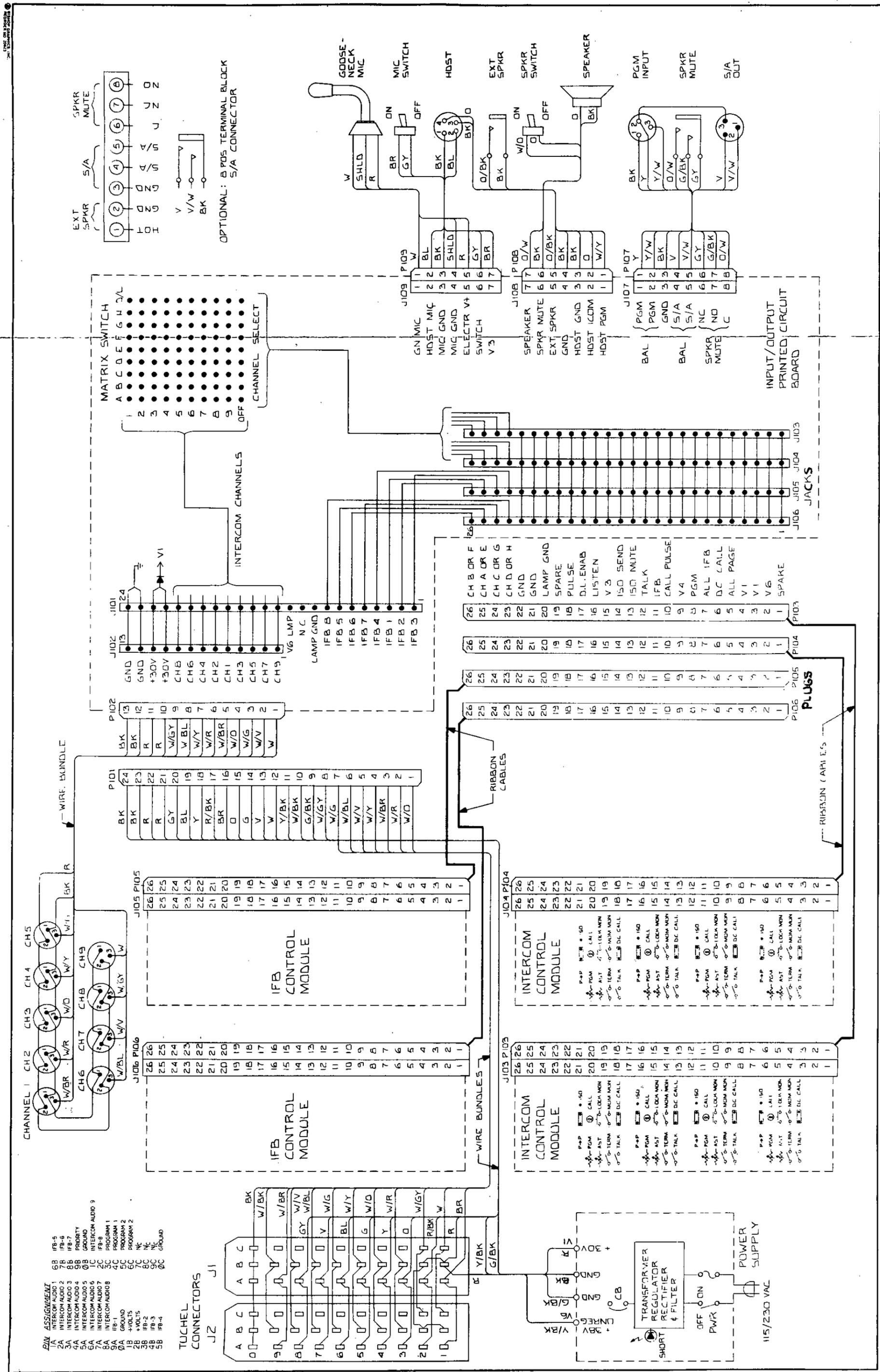
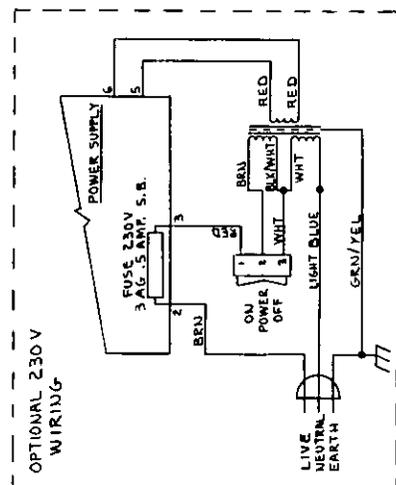
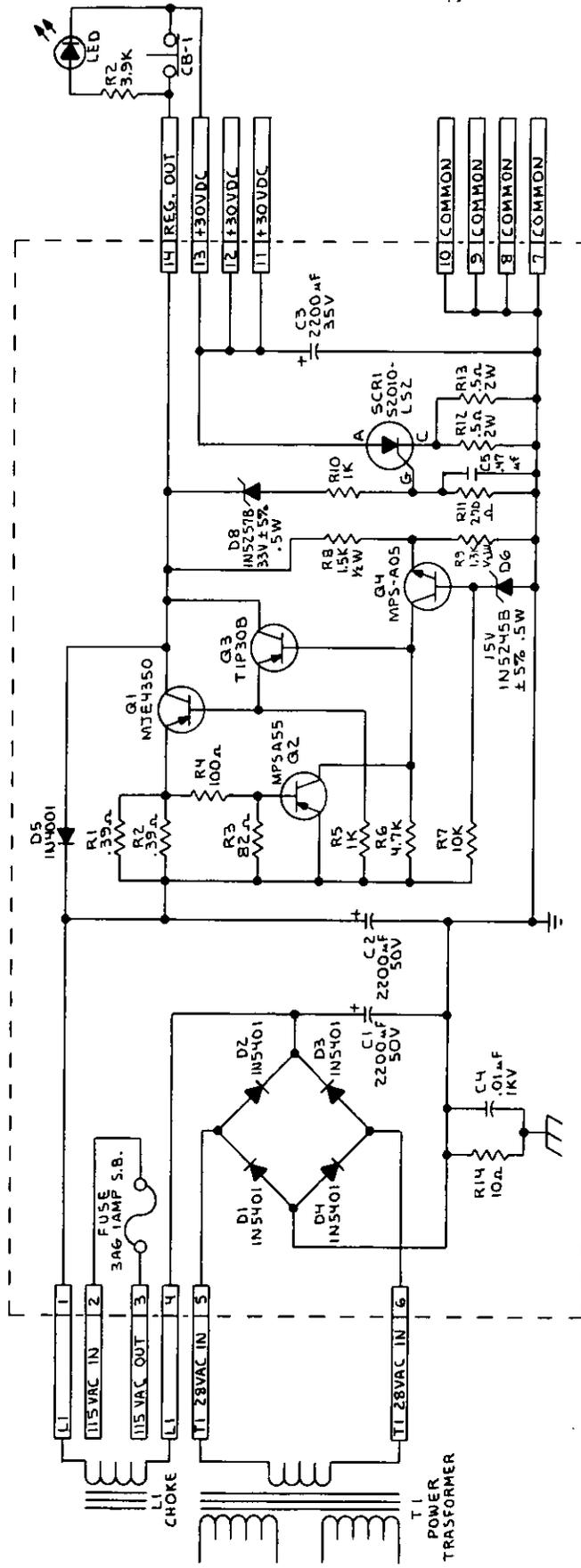
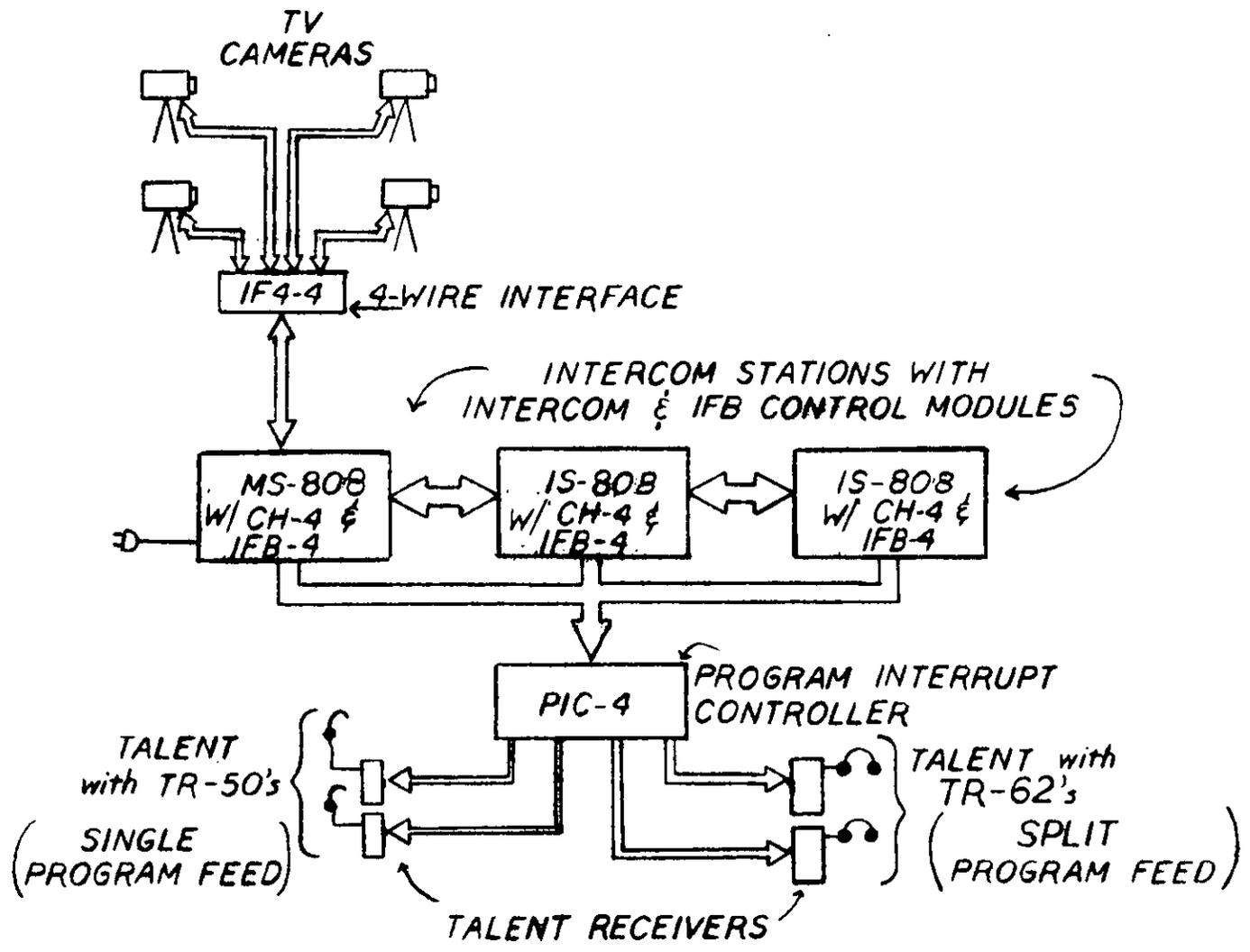


Figure 15: DLC Station, Internal Interconnections 31



NOTES:
 1. PARTS INSIDE DOTTED LINE ARE MOUNTED ON PCBD.
 2. FOR 230V OPERATION USE 1/2 AMP SLOW BLOW FUSE.

Clear-Com intercom systems	
SCHEMATIC	
1/2 REG. POWER SUPPLY	
SCALE	DRAWING NO
NONE	C
DO NOT SCALE DRAWING	7144-SCD-C-C
	SHEET 1 OF 1



MAJOR COMPONENTS OF A
 DLC PRODUCTION INTERCOM SYSTEM
 WITH 4 INTERCOM CHANNELS AND
 4 IFB CHANNELS

ALSO AVAILABLE WITH UP TO 8 INTERCOM
 CHANNELS AND 8 IFB CHANNELS

IV. DLC SYSTEM WITH IFB

A. INTRODUCTION TO THE IFB SYSTEM

The Clear-Com IFB System is a one-way program interrupt system that is fully integrated within the DLC System.

This flexible IFB System sends one of two program channels to talent, and permits multiple intercom station operators to interrupt the program and access the talent.

Split program feeds are possible, which allow the talent to monitor a program continuously in one ear and have program interrupted in the other ear.

A system with one PIC-4 provides four channel outputs to talent; however, **eight** channels are possible by daisy-chaining two Program Controllers (PIC-4) together. One is called the "primary" PIC-4, while the other is the "secondary"

PIC-4. The DLC System input is only connected to the primary PIC-4, which then connects to the secondary unit via a 25-pin D connector and ribbon cable.

When the director (a DLC Station operator) presses a button on the IFB-4 Module, the station's mic activates and disconnects from the "talk" portion of the intercom system to allow talent cueing. The "listen" portion of the intercom is not affected, which permits continuous monitoring of the intercom during IFB use.

Components of an IFB System:

- PIC-4 Program Controller
- Talent Receivers (TR-50 or TR-62), up to 4 per PIC-4
- a DLC Intercom System with at least one IFB-4 Control Module

1. PIC-4 Program Controller

The PIC-4 contains all the controls and connectors to provide the link between the IFB/intercom stations and the talent receivers. Each PIC-4 has four outputs to Talent.

With each Talent output, the PIC-4 provides a control for dip level and switches for selecting which continuous and/or interruptible program feeds the Talent will hear. The PIC-4 is powered by Clear-Com, connected via the 12-pair DLC System cable.

2. Talent Receivers

Talent Receivers allow talent to hear the program and cues coming through the PIC-4 from the intercom system.

TR-50

This miniature, lightweight belt-pack has volume control and a clip for attaching it to a belt or under a table. It contains an earphone connector and is supplied with Model TS-1 earpiece.

The TR-50 accepts one program channel, and connects to the PIC-4 with standard two-conductor shielded mic cable.

continued

IV. DLC System with IFB

2. Talent Receivers, continued

TR-62

The **TR-62** is a compact two-channel belt-pack that allows the talent to monitor uninterrupted program in one ear and interrupted program in the other ear. Ideal for sportscasting, the TR-62 provides a separate volume control for each program. It works with any binaural headset, 150 ohms or greater.

The TR-62 connects to the PIC-4 with individually-shielded two-pair cable.

3. DLC System With IFB

IFB-4 Control Module

This 4-channel module plugs into the DLC Station mainframe. One or two Modules can be plugged in for accessing up to eight talent.

The IFB-4 Module contains 4 momentary push-buttons, each of which is associated with a separate IFB channel/Talent output. The buttons glow continuously for easy identification.

The DLC Station mainframe contains an **ALL IFB** pushbutton that simultaneously accesses all talent.

B. IFB SYSTEM CONNECTIONS

The PIC-4 rear panel provides two types of intercom input connectors: 3-pin, XLR-type female connectors for separate intercom channels (four), and the 30-pin male connector for the DLC System line. The PIC-4 is powered by Clear-Com.

1. Intercom System Input

Route 12-pair DLC interconnect cable from any MS/IS mainframe to the PIC-4's 30-pin connector ("IFB Interconnect").

2. Program Input

The PIC-4 has two 3-pin female XLR connectors for balanced program inputs. The program input uses a differential amplifier to accept two separate, balanced signals, without using a transformer. A signal ranging from -18 dB to +16 dB will drive the line to full output. The input impedance of the program amplifier is approximately 50k ohms bridging.

3. Talent Receiver Output

If a single program signal is fed to Talent, then the Receiver used is a TR-50 with TS-1 earpiece, and the Talent Out connector on the PIC-4 is a 3-pin XLR male. Interconnect cable is standard two-conductor shielded mic cable.

If a split program is fed to Talent (both program inputs used), then the Receiver is a TR-62 with a binaural headset, and the Talent Out connector on the PIC-4 is a 6-pin XLR male. Interconnect cable is two-pair, individually shielded cable.

NOTE: On the DLC mainframe rear panel, the auxiliary program input (3-pin XLR-type female) is wired to the Program 1 pins in the 30-pin male connector.

IV. DLC System with IFB, continued

C. PIC-4 OPERATING CONTROLS

After you connect the PIC-4 between the intercom system and the Talent Receivers, and you adjust all levels and controls according to desired operation, then the PIC-4 becomes "transparent" and need not be an "active" system component.

Program Level 1 & 2: Adjusts volume level of associated program inputs #1 and #2.

Program Select Toggle Switches
Each Talent Output (A, B, C, and D) is associated with three controls.

The "Non-Int" switch allows you to select which one program the TR-62 will receive continuously, while the "Int" switch selects which interrupted program (plus cues) will be monitored by either the TR-62, or the TR-50. The numbers "1" and "2" designate the program feeds as input to the PIC-4 rear panel (ie, Pgm #1 & Pgm #2).

Dip Adjust: Allows you to vary the dip amount from full on to full off.

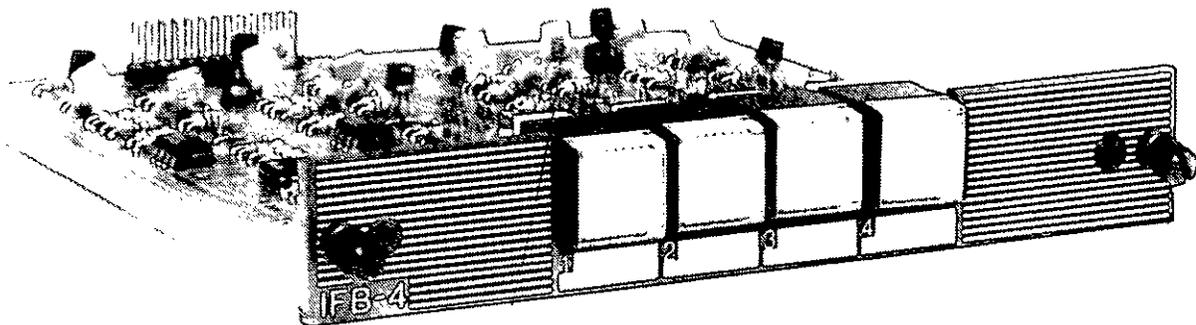
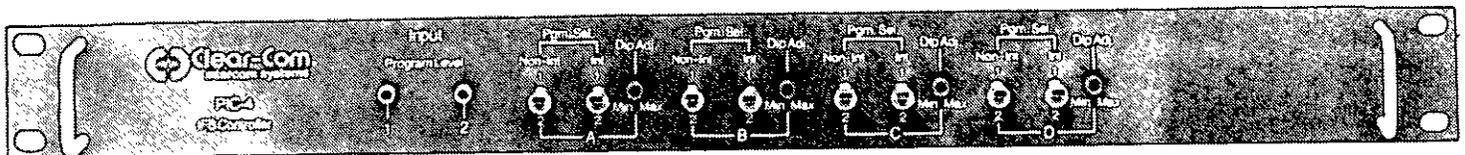
8-CHANNEL IFB SYSTEM

If your system includes two PIC-4 Controllers, one is considered a "primary" unit and the other is considered "secondary."

The secondary PIC-4:

- connects to the DLC System via ribbon cable input to the 25-pin D connector on the rear panel (labelled "extender")
- is modified (by Clear-Com) with the addition of four jumpers (at JP1-JP4 on PCB) that permit the system extension.

To send program and cues to eight talent people, two IFB-4 Control Modules are required; these modules, however, need not be in the same DLC MS/IS mainframe. One Station operator (the director, for instance) can have access to Talent 1-4 via one IFB-4 Module, while another operator (such as the assistant director) has access to Talent 5-8 with another IFB-4 Module.



IV. DLC System with IFB, continued

D. IFB SYSTEM SPECIFICATIONS

Frequency Response: 100-15k Hz, +/-1 dB
Distortion: <.1% THD @ 1kHz
Signal-to-Noise Ratio: better than -55 dB
IFB Line Level: -10 dB

PIC-4

Program Inputs: two, selectable to each talent
1 for interrupt, 1 for non-interrupt
Program Input Level: -20 to +15 dBm, 50k ohms bridging, balanced
Program Output on IFB Line: -10 dBm
Program Dip Range: 0 to -40 dB
Power Required: 27 ma quiescent @ 28VDC supplied
by Clear-Com line
Dimensions: 19"W x 1.75"H x 6.5"D

Connectors:

Program Input: (2) 3-pin XLR female
Intercom Input: (4) 3-pin XLR female
Talent Output: (4 total) 3-pin XLR male (single program feeds)
or 6-pin XLR male (optional split-feed program feed)
DLC Input: (1) 30-pin connector
Extension: (1) 25-pin "D" connector for
extension to second PIC-4

IFB-4 MODULE

Controls: (4) momentary push-buttons (glowing)
IFB interconnect: 20-pin ribbon cable

TR-50 TALENT RECEIVER

Earphone Type: dynamic
Earphone Impedance: 30 ohms or greater
Max. Output Level: +20 dBm
Power Required: 10 ma quiescent @ 28VDC supplied by Clear-Com line
Headset Connector: 1/8" miniature jack
IFB Connector: 3-pin XLR male

TR-62 TALENT RECEIVER

Headset Type: dynamic
Headset Impedance: >150 ohms
Max. Output Level: +20 dBm
Power Required: 15 ma quiescent @28VDC supplied by Clear-Com line
Headset Connector: 6-pin XLR male
IFB Connector: 6-pin XLR male

Specifications are subject to change without notice

V. WARRANTY & MAINTENANCE

Your Clear-Com System contains modular, solid-state equipment that allows system expansion and field serviceability. Efficient ventilation is inherent in chassis design. Rugged packaging guards against abuse. The intercom station chassis is constructed of .090 5052-H32 aluminum, and it contains double-sided, glass epoxy plug-in PC Boards. Our circuitry is conservatively engineered to assure the longest component life. We shield heavily against hum, RF pick-up, and solid-state dimmer noise.

Before shipping, we test each unit individually to ensure that it

meets or exceeds all specifications. All units are guaranteed by Clear-Com against defects in materials and workmanship for a period of one year following date of purchase (90 days for headsets-- see the warranty card enclosed with the unit).

Our Engineering and Service Departments will gladly give you technical advice and assistance. If you have any questions regarding operation, modifications, or applications of your intercom system, call us between 9 a.m. and 5 p.m. at (415) 861-6666 (Pacific Standard Time).

VI. TROUBLESHOOTING

<u>Symptom</u>	<u>Cause</u>	<u>Remedy</u>
System is non-operable; power switch is not illuminated	<ul style="list-style-type: none"> a. Loss of AC power b. Internal fuse is blown; could be caused by power supply failure. 	<ul style="list-style-type: none"> a. Plug unit into dependable AC source b. Replace fuse; if it blows repeatedly, bridge rectifier or other component probably shorted inside power supply. Have power supply fixed.
Circuit breaker trips repeatedly; short circuit LED remains lit	<ul style="list-style-type: none"> a. Shorted or mis-wired interconnect cable b. Defective remote unit 	<ul style="list-style-type: none"> a. Remove cables, one at a time, from Main Station until faulty line is located. Check for shorts between Pins 1 and 2. b. Check remote unit.
Hum or buzz in system	<ul style="list-style-type: none"> a. Inductive pick-up caused by close proximity of Main or Remote Station to power lines or transformers. b. Due to ground loop, caused by improper grounding of system. c. 10 ohm chassis ground resistor (R14) in power supply is open* d. inductive pick-up by headset mic; check by switching mic on and off 	<ul style="list-style-type: none"> a. Relocate offending unit. b. Reverse power cord, lift ground (see Installation Instructions). c. Check resistance between chassis and Pin 1 of connector, make sure it's ten ohms. If not, open power supply and replace resistor. d. Move mic away from "hum field" or use carbon or electret headset.
Excessive background noise pick-up by mic	<ul style="list-style-type: none"> a. distance from mic to lips is too far b. volume too high c. too many mics "on" in entire system 	<ul style="list-style-type: none"> a. Move closer to mic b. Lower headset/speaker volume c. Turn off all unused mics

(continued)

TROUBLESHOOTING

<u>Symptom</u>	<u>Cause</u>	<u>Remedy</u>
System Feedback	Acoustical	a. Check sidetone levels b. Check termination c. Volume too high at one station d. Two or more speaker stations have mics on simultaneously; speak one at a time (per channel)

* Power Supply's 10-ohm resistor is opened when the system ground comes in contact with something "hot," with respect to the Main Station Earth Ground. Should this occur, we recommend you carefully check the system ground and AC distribution in the area. **NOTE: THIS IS A POTENTIALLY DANGEROUS SITUATION; IF IT OCCURS, A SHOCK HAZARD MAY OCCUR BETWEEN METAL BOOM OF HEADSET AND GROUND.**

BILL OF MATERIALS

ASSEMBLY 710144

ASY DLC I/O MODULE REV.A

PAGE 1

P/N	DESCRIPTION	QTY	REF DESIG
150001	CAP 20PF DISC 10%	1	C22
150006	CAP 100FF DISC 10%	3	C74 C39 C45
150007	CAP 200FF DISC 10%	3	C52 C20 C60
150009	CAP 1UF TANTALUM 35V A.L.	3	C61 C26 C6
150010	CAE 22UF ELECTROLYTIC 16V R.L.	2	C65 C66
150011	CAE 100UF ELECTROLYTIC 35V R.L.	6	C55 C68 C37 C32 C71 C54
150013	CAP 15PF DISC 10%	1	C15
150014	CAP 470FF CERAMIC DISC 10% 50V	3	C29 C18 C10
150016	CAP .005UF DISC 10%	3	C13 C34 C16
150019	CAP 2.2UF TANTALUM 35V	2	C59 C56
150021	CAE 220UF ELECTROLYTIC 35V R.L.	1	C62
150026	CAP 39PF DISC 5%	2	C23 C3
150027	CAE 10UF ELECTROLYTIC 16V R.L.	3	C33 C19 C11
150034	CAN .22UF MONOLYTHIC 50V	3	C36 C44 C43
150035	CAN .1UF MONOLYTHIC 104ZU 50V	8	C57 C53 C48 C47 C40 C35 C1 C58
150041	CAP 47PF DISC 10% 50V	2	C72 C67
150043	CAN .47UF MONOLYTHIC 50V	2	C73 C63
150044	CAP 4.7 UF TANTALUM 35V R.L.	1	C8
150061	CAP 680PF DISC 10% 50V	2	C21 C17
150065	CAE 2.2UF N.P. ELECTROLYTIC 50V	1	C64
150072	CAE 10UF 20ZMAX 25V MIN NP	4	C4 C42 C38 C31
150073	CAN 1 MFD CERAMIC MONO 15% 50V RADIAL	2	C27 C14
150076	CAN .01 MONOLYTHIC 10% 50V	2	C25 C5
150078	CAN .047 MONOLYTHIC 10% 50V	6	C2 C7 C12 C24 C28 C51
150080	CAN .22UF MONOLYTHIC 104ZU 100V	4	C69 C49 C46 C70
150081	CAE 47 UF 35V ELECTROLYTIC CAP (SMALL)	1	C50
150082	CAN .022 UF MONO CK05 10% 50V	2	C41 C9
150084	CAP .002 UF DISC OR MONO CK05 10% 50V	1	C30
150085	CAN .1UF MONO CK05 100V 10%	1	C75
170075	PCB DLC I/O CIRCUIT BOARD	1	
210075	TER DIP 16 PIN DIP SOCKET	2	
210101	SOC 8 PIN DIP SOCKET	7	
210102	TER 3M 26 PIN(DBL ROW)3M#3491-1002	4	J103 J106 J105 J104
210109	SOC SINGLE PIN SOCKET FOR DLC OPTION JUMPS	20	
210112	TER HEADER MULTI PIN HEADER(MIN 18 PIN)	59	
250216	LBL DLC I/O BOARD MATRIX SWT LABEL	1	
410001	RES CF 1/4W 5% 3.9 OHMS	5	
410004	RES CF 1/4W 5% 22 OHMS	4	R101 R12 R111 R110
410007	RES CF 1/4W 5% 220 OHMS	1	R47
410010	RES CF 1/4W 5% 1K OHMS	4	R1 R93 R39 R17
410011	RES CF 1/4W 5% 2.2K OHMS	2	R32 R38
410013	RES CF 1/4W 5% 4.7K OHMS	8	R106 R50 R49 R48 R46 R44 R112 R109
410016	RES CF 1/4W 5% 10K OHMS	9	R86 R96 R40 R87 R19 R15 R104 R103 R102
410017	RES CF 1/4W 5% 15K OHMS	3	R114 R11 R98
410018	RES CF 1/4W 5% 22K OHMS	4	R6 R4 R6B R67
410020	RES CF 1/4W 5% 33K OHMS	1	R89
410021	RES CF 1/4W 5% 47K OHMS	8	R76 R100 R59 R30 R18 R8 R84 R83
410022	RES CF 1/4W 5% 27K OHMS	6	R5 R107 R66 R65 R64 R63
410023	RES CF 1/4W 5% 56K OHMS	1	R35
410024	RES CF 1/4W 5% 100K OHMS	2	R78 R69
410025	RES CF 1/4W 5% 68K OHMS	1	R34
410026	RES CF 1/4W 5% 150K OHMS	1	R113
410027	RES CF 1/4W 5% 180K OHMS	2	R61 R62
410028	RES CF 1/4W 5% 220K OHMS	10	R74 R72 R70 R56 R23 R3 R94 R92 R91 R88
410030	RES CF 1/4W 5% 470K OHMS	3	R81 R16 R99
410031	RES CF 1/4W 5% 12K OHMS	3	R75 R58 R57
410032	RES CF 1/4W 5% 18K OHMS	2	R2 R10
410033	RES CF 1/4W 5% 330K OHMS	1	R27
410036	RES CF 1/4W 5% 6.8K OHMS	6	R21 R45 R31 R20 R25 R26
410038	RES CF 1/4W 5% 82 OHMS	1	R53
410039	RES CF 1/4W 5% 47 OHMS	2	R22 R85
410040	RES CF 1/4W 5% 2.7K OHMS	2	R37 R24
410041	RES CF 1/4W 5% 1.2K OHMS	1	R73
410044	RES CF 1/4W 5% 680 OHMS	3	R29 R55 R54
410046	RES CF 1/4W 5% 560 OHMS	2	R52 R51
410049	RES CF 1/4W 5% 91K OHMS	1	R60
410055	RES CF 1/4W 5% 1.5K OHMS	2	R42 R33
410058	RES CF 1/4W 5% 1 MEGAOHM	1	R97
410059	RES CF 1/4W 5% 10 MEGAOHM	3	R80 R71 R28
410063	RES CF 1/8W 1% 6.81K OHMS	1	R36
410065	RES CF 1/2W 5% 22 OHMS	1	R108
410067	RES CF 1/4W 5% 1.8 MEGAOHMS	3	R14 R95 R90
410071	RES CF 1/4W 5% 100 OHMS	1	R43
410077	RES CF 1/4W 5% 4.7 MEGAOHMS	1	R82
410082	RES CF 1/2W 5% 470 OHMS	1	R105
410083	RES CF 1/4W 5% 24K OHMS	1	R77
410084	RES CF 1/4W 5% 43K OHMS	1	R9
410085	RES CF 1/8W 1% 2.67K OHMS	1	R7
410086	RES CF 1/8W 1% 20.0K OHMS	1	R41
410095	RES CF 5% 1/4 WATT 1.2 MEGAOHM	1	R79
410097	RES CF 1/4W 5% 240K OHMS	1	R13
470033	REV 2K TRIMPOT BECKMAN #91AR2K	1	P5
470034	REV 50K TRIMPOT CTS/BECKMAN #91AR50K	2	P6 P4
470040	REV 100K POT PC MTG CLAROSTAT #P0415	3	P2 F1 F3
480000	DIO 1N4148 SIGNAL DIODE	16	D18 D5 D4 D3 D2 D1 D15 D14 D13 D12 D11 D10 D9 D8 D7 D6
480001	DIO 1N4001 RECTIFIER DIODE	1	D17
480008	TRA MPS-A63 TRANSISTOR	1	Q2
480012	ICS LM384 IC POWER AMP 14-PIN DIP	1	IC8
480018	ICS LM741 IC OP AMP 8-PIN DIP	1	IC10
480021	ICS NE5534 OP AMP LOW NOISE	1	IC2
480026	DIO 1N957 ZENER DIODE 6.8V .4W	1	D16
480056	ICS RC4559NB DUAL OP AMP 8-PIN DIP	3	IC3 IC5 IC4
480069	TRN 2N5639 N CHANNEL JFET	1	Q1
480070	AAA ICS NE5532 DUAL LD NOISE OP AMP	2	IC1 IC11
480073	ICS DG308A ANALOG SWITCH QUAD	1	IC6
480076	ICS CD4049B CMOS HEX INVERT BUFFER	1	IC7
480078	TRA UPC78L15H NEG VOLT REG. 15V 100MA	1	IC9
480079	TRA J174 P-CHANNEL JFET	1	Q3
510041	SWT IPDT SNAP ACTION C&K #8221YAV2	1	S2
510043	SWT SPDT SNAP ACTION C&K#8121YAV2	2	S1 S3
510046	SWT 10X10 MINI MATRIX AMP#436270-1	1	S4

BILL OF MATERIALS

ASSEMBLY 710137

ASY DLC-4/CH MODULE REV.A

P/N	DESCRIPTION	QTY	REF DESIG
150011	CAE 100UF ELECTROLYTIC 35V R.L.	3	C83 C82 C81
150016	CAD .005UF DISC 10X	4	C20 C19 C18 C17
150019	CAT 2.2UF TANTALUM 35V	4	C24 C23 C22 C21
150027	CAE 10UF ELECTROLYTIC 16V R.L.	4	C52 C50 C48 C46
150031	CAD .033UF DISC 30V 10X	4	C78 C77 C79 C80
150034	CAN .22UF MONOLYTHIC 50V	8	C15 C16 C14 C13 C65 C68 C67 C66
150035	CAN .1UF MONOLYTHIC 104ZU 50V	20	C8 C7 C6 C5 C4 C3 C2 C1 C32 C30 C28 C26 C31 C29 C27 C25 C12 C11 C10 C9
150044	CAT 4.7-UF TANTALUM 35V R.L.	4	C61 C64 C63 C62
150061	CAD .680PF DISC 10X 50V	4	C59 C57 C55 C53
150073	CAM 1 MFD CERAMIC MONO 15X 50V RADIAL	8	C51 C33 C34 C36 C35 C45 C47 C49
150074	CAM 220 PF MONOLYTHIC 10X 50V	4	C56 C54 C58 C60
150077	CAM 15 PF DIPPED MICA/CERAMIC 10X 50V	4	C70 C72 C74 C76
150078	CAM .047 MONOLYTHIC 10X 50V	12	C73 C38 C40 C42 C44 C37 C39 C41 C43 C69 C71 C75
170069	PCB DLC-4/CH CIRCUIT BOARD	1	
210000	DIP 14-PIN DIP SOCKET	4	
210075	TER DIP 16 PIN DIP SOCKET	4	
210101	SOC 8 PIN DIP SOCKET	8	
210102	TER 3M 26 PIN(DBL ROW)3M#3491-1002	1	H9
210112	TER HEADER MULTI PIN HEADER(MIN 18 PIN)	20	
410007	RES CF 1/4W 5% 220 OHMS	4	R126 R128 R124 R122
410011	RES CF 1/4W 5% 2.2K OHMS	4	R136 R135 R134 R133
410013	RES CF 1/4W 5% 4.7K OHMS	16	R185 R188 R187 R186 R140 R139 R138 R137 R132 R131 R130 R129 R35 R33 R31 R29 R24 R23 R22 R21 R20 R19 R18 R17 R56 R55 R54 R53 R60 R59 R58 R57 R52 R51 R50 R49 R125 R127 R81 R83 R85 R87 R25 R26 R27 R28 R105 R106 R107 R108 R121 R123 R120 R118 R116 R114 R80 R78 R76 R74 R64 R63 R62 R61 R48 R47 R46 R45 R197 R200 R199 R198 R174 R180 R178 R176 R205 R206 R208 R207 R117 R119 R101 R102 R103 R104 R113 R115 R173 R204 R203 R202 R201 R179 R177 R175 R148 R147 R146 R145 R112 R111 R110 R109 R99 R97 R95 R93 R44 R43 R42 R41 R79 R77 R75 R73 R40 R39 R38 R37 R160 R159 R158 R157 R83 R85 R68 R67 R66 R65 R88 R86 R84 R82 R189 R196 R195 R194 R193 R192 R191 R190 R12 R10 R8 R6 R72 R71 R70 R69 R16 R15 R14 R13 R11 R9 R7 R5 R92 R91 R90 R89 R100 R98 R96 R94 R183 R182 R181 R171 R184 R169 R167 R165 R144 R143 R142 R141 R156 R155 R154 R153 R4 R3 R2 R1 R164 R163 R162 R161 R166 R172 R170 R168 R36 R34 R32 R30 R152 R151 R150 R149 P2 P1 P3 P4 P5 P6 P7 P8 D40 D39 D38 D37 D36 D35 D34 D33 D32 D31 D30 D29 D28 D27 D26 D25 D24 D23 D22 D21 D20 D19 D18 D17 D16 D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 Q4 Q3 Q2 Q1 Q8 Q7 Q6 Q5 Q12 Q11 Q10 Q9 IC8 IC6 IC4 IC2 IC7 IC5 IC3 IC1 IC12 IC11 IC10 IC9 IC16 IC15 IC14 IC13 S5678 S12 S11 S10 S9 S4 S3 S2 S1
410016	RES CF 1/4W 5% 10K OHMS	12	
410017	RES CF 1/4W 5% 15K OHMS	8	
410018	RES CF 1/4W 5% 22K OHMS	16	
410021	RES CF 1/4W 5% 47K OHMS	16	
410022	RES CF 1/4W 5% 27K OHMS	4	
410023	RES CF 1/4W 5% 56K OHMS	4	
410024	RES CF 1/4W 5% 100K OHMS	44	
410025	RES CF 1/4W 5% 68K OHMS	4	
410027	RES CF 1/4W 5% 180K OHMS	10	
410028	RES CF 1/4W 5% 220K OHMS	12	
410033	RES CF 1/4W 5% 330K OHMS	4	
410036	RES CF 1/4W 5% 6.8K OHMS	4	
410039	RES CF 1/4W 5% 47 OHMS	4	
410041	RES CF 1/4W 5% 1.2K OHMS	4	
410055	RES CF 1/4W 5% 1.5K OHMS	4	
410059	RES CF 1/4W 5% 10 MEGOHM	12	
410063	RES CF 1/8W 1% 6.81K OHMS	4	
410082	RES CF 1/2W 5% 470 OHMS	4	
410084	RES CF 1/4W 5% 43K OHMS	4	
410085	RES CF 1/8W 1% 2.67K OHMS	4	
410086	RES CF 1/8W 1% 20.0K OHMS	4	
410093	RES CF 5% 1/4 WATT 3.9 MEG	4	
470034	REV 50K TRIMPOT CTS/BECKMAN #91A50K	8	
480000	DIO 1N4148 SIGNAL DIODE	40	
480004	TRA MPS-A13 TRANSISTOR	8	
480008	TRA MPS-A63 TRANSISTOR	4	
480056	ICS RC4559NB DUAL OP AMP 8-PIN DIP	4	
480073	ICS DG308A ANALOG SWITCH QUAD	4	
480074	ICS CD4081B QUAD DUAL INPUT NAND GATE	4	
480075	ICS LM358 DUAL GND SENSING OP AMP	4	
510025	SWT SCH#4-FL-17.5-FRV-BLK-CLR-4U-EE	1	
510027	SWT MINI DIP SWITCH GRAYHILL#76SB04	4	
510043	SWT SPDT SNAP ACTION C&K#8121YAV2	4	

BILL OF MATERIALS

ASSEMBLY 720031

ASY IS-808 CHASSIS ASSY

P/N	DESCRIPTION	QTY
210046	AMP 7 PIN MTA HOUSING #640440-7	3
210082	TER SLIP-ON CRIMP TERMINAL HOLLINGSWORTH#S09619SF	9
210088	TER CRIMP SPADE HOLLINGSWORTH #SS29028SF	2
210115	AMP 16 PIN MTA HOUSING #1-640440-6	1
210117	AMP 6 PIN MTA HOUSING AMP #640440-6	1
210118	AMP 8 PIN MTA HOUSING AMP #640440-8	2
240020	KNB RED BUTTON FOR C&K SWITCH #8121	2
250168	MET 3 1/2 INCH RACK CHASSIS MS-800	1
250175	MET COVER FOR 3 1/2X13 INCH RACK CHASSIS	1
250208	MET POWER SUPPLY COVER DLC/8 CH	1
250211	MET BRACKET CRD CAGE DLC	2
280067	HDS DRESS CONE NUT C&K #7025	2
640023	HDS 9.350IN PC SLIDE CALABRO PLASTICS #LI-6200	4
710044	ASY 1/2 REG POWER SUPPLY MODULE REV.D	1
710144	ASY DLC I/O MODULE REV.A	1

BILL OF MATERIALS

ASSEMBLY 710044

ASY 1/2 REG POWER SUPPLY MODULE

P/N	DESCRIPTION	QTY	REF	DESIG
140002	HTS HEATSINK 1/2 REG PS AAVID#5630D	2		
150022	CAE 2200UF ELECTROLYTIC 50V A.L.	2	C1	C2
150029	CAD .01UF DISC 1.4KVDC 150VAC UL APPROVED	1		C4
150036	CAE 2200UF ELECTROLYTIC 35V A.L.	1		C3
150043	CAN .47UF MONOLYTHIC 50V	1		C5
170037	PCB 1/2 REG. POWER SUPPLY REV.A CIRCUIT BOARD	1		
210079	TUR DIODE TURRET CAMBION#140-1578-02-01-00	8		
210080	TER P.C. QUICK-CONNECT TAB KEYSTONE#1285	14		
240010	KNB RUBBER FOOT .50 INCH SQ. MOUSER#517-8018	1		
410002	RES CF 1/4W 5% 10 OHMS	1		R14
410009	RES CF 1/4W 5% 270 OHMS	1		R11
410010	RES CF 1/4W 5% 1K OHMS	2	R5	R10
410013	RES CF 1/4W 5% 4.7K OHMS	1		R6
410016	RES CF 1/4W 5% 10K OHMS	1		R7
410038	RES CF 1/4W 5% 82 OHMS	1		R3
410071	RES CF 1/4W 5% 100 OHMS	1		R4
410073	RES CF 2W 5% .39 OHMS	2	R1	R2
410074	RES CF 1/2W 5% 1.5K OHMS	1		R8
410075	RES CF 1/2W 5% 1.3K OHMS	1		R9
410076	RES CF 2W 5% .5 OHMS	2	R12	R13
480001	DIO 1N4001 RECTIFIER DIODE	1		D5
480005	DIO 1N5401 RECTIFIER DIODE 3A 100PIV	4	D4	D3 D2 D1
480048	SCR TECCOR#S2010LS2 10A SENSITIVE	1		SCR1
480049	TRA MOTO MJE 4350 TRANSISTOR T0218AC PKG	1		Q1
480050	TRA MPS-A55 TRANSISTOR	1		Q2
480051	TRA TIP30B TRANSISTOR T0220 PKG	1		Q3
480052	TRA MPS-A05 TRANSISTOR	1		Q4
480053	DIO 1N5245B ZENER 15V 5% .5WATTS	1		D6
480054	DIO 1N5257B ZENER 33V 5% .5WATTS	1		D8
520017	FUS FUSE CLIP KEYSTONE #3530	2		
520021	FUS 3AG 1 AMP SLOW BLOW #31301.0	1	F1	
640016	STR CABLE TIE TYTON#T40R	2		

BILL OF MATERIALS

ASSEMBLY 710044

ASY 1/2 REG POWER SUPPLY MODULE

P/N	DESCRIPTION	QTY	REF	DESIG
140002	HTS HEATSINK 1/2 REG PS AAVID#5630D	2		
150022	CAE 2200UF ELECTROLYTIC 50V A.L.	2	C1	C2
150029	CAD .01UF DISC 1.4KVDC 150VAC UL APPROVED	1		C4
150036	CAE 2200UF ELECTROLYTIC 35V A.L.	1		C3
150043	CAN .47UF MONOLYTHIC 50V	1		C5
170037	PCB 1/2 REG. POWER SUPPLY REV.A CIRCUIT BOARD	1		
210079	TUR DIODE TURRET CAMBION#140-1578-02-01-00	8		
210080	TER P.C. QUICK-CONNECT TAB KEYSTONE#1285	14		
240010	KNB RUBBER FOOT .50 INCH SQ. MOUSER#517-8018	1		
410002	RES CF 1/4W 5% 10 OHMS	1		R14
410009	RES CF 1/4W 5% 270 OHMS	1		R11
410010	RES CF 1/4W 5% 1K OHMS	2	R5	R10
410013	RES CF 1/4W 5% 4.7K OHMS	1		R6
410016	RES CF 1/4W 5% 10K OHMS	1		R7
410038	RES CF 1/4W 5% 82 OHMS	1		R3
410071	RES CF 1/4W 5% 100 OHMS	1		R4
410073	RES CF 2W 5% .39 OHMS	2	R1	R2
410074	RES CF 1/2W 5% 1.5K OHMS	1		R8
410075	RES CF 1/2W 5% 1.3K OHMS	1		R9
410076	RES CF 2W 5% .5 OHMS	2	R12	R13
480001	DIO 1N4001 RECTIFIER DIODE	1		D5
480005	DIO 1N5401 RECTIFIER DIODE 3A 100PIV	4	D4	D3 D2 D1
480048	SCR TECCOR#S2010LS2 10A SENSITIVE	1		SCR1
480049	TRA MOTO MJE 4350 TRANSISTOR T0218AC PKG	1		Q1
480050	TRA MPS-A55 TRANSISTOR	1		Q2
480051	TRA TIP30B TRANSISTOR T0220 PKG	1		Q3
480052	TRA MPS-A05 TRANSISTOR	1		Q4
480053	DIO 1N5245B ZENER 15V 5% .5WATTS	1		D6
480054	DIO 1N5257B ZENER 33V 5% .5WATTS	1		D8
520017	FUS FUSE CLIP KEYSTONE #3530	2		
520021	FUS 3AG 1 AMP SLOW BLOW #31301.0	1	F1	
640016	STR CABLE TIE TYTON#T40R	2		

ASSEMBLY IFB-4

FGI 4 CHANNEL TALENT IFB MODULE

P/N	DESCRIPTION	QTY
250183	MET DLC SERIES 4 CHAN BOARD-TO-PLATE BRACKET	2
250184	MET IFB-4 FRONT PANEL	1
280004	HDS 4-40 CAPTIVE PANEL SCREW-BLK RAF#369-SS-26	2
280005	HDS CAPT PNL SCRW RETAINER-BLK RAF#1000-125-SS-26	2
710142	ASY IFB-4 MODULE REV.C	1

ASSEMBLY CH-4

FGI 4 CHANNEL INSERT

P/N	DESCRIPTION	QTY
250212	MET FRONT PLATE CH-4 DLC	1
280004	HDS 4-40 CAPTIVE PANEL SCREW-BLK RAF#369-SS-26	2
280005	HDS CAPT PNL SCRW RETAINER-BLK RAF#1000-125-SS-26	2
710137	ASY DLC-4/CH MODULE REV.A	1
735005	ASY CH-4 HARNESS FLAT CABLE	1

BILL OF MATERIALS

ASSEMBLY 820017

ASY MS-800 SPARE PARTS KIT

P/N	DESCRIPTION	QTY
240015	AAA KNB ROGAN#RB-67-0-DC-ML.125 1/2 W/1/8 SHAFT	1
240020	KNB RED BUTTON FOR C&K SWITCH #8121	1
390005	LAM LAMP FOR CC#5125 24V 20mA SCHADOW #72524	8
470020	AAA REV 100K LINEAR PC MTG CTS#FB6645	1
470034	REV 50K TRIMPOT CTS/BECKMAN #91AR50K	2
480004	TRA MFS-A13 TRANSISTOR	2
480008	TRA MFS-A63 TRANSISTOR	2
480044	TRA 2N5021 JFET	1
480047	TRA 2N4401 NPN TRANSISTOR	1
480056	ICS RC4559NB DUAL OP AMP 8-PIN DIP	3
480069	TRN 2N5639 N CHANNEL JFET	1
480070	AAA ICS NE5532 DUAL LO NOISE OP AMP	2
480073	ICS DG308A ANALOG SWITCH QUAD	3
480074	ICS CD4081B QUAD DUAL INPUT NAND GATE	2
480075	ICS LM358 DUAL GND SENSING OP AMP	2
480076	ICS CD4049B CMOS HEX INVERT BUFFER	1
480078	TRA UPC78L15H NEC VOLT REG. 15V 100MA	1
510027	SWT MINI DIP SWITCH GRAYHILL#76SR04	1
510028	AAA SWT SNAP-ACTION C&K#8121WB025RED3	1
510041	SWT DPDT SNAP ACTION C&K #8221YAV2	1
510043	SWT SPDT SNAP ACTION C&K#8121YAV2	2
510044	SWT SP3T ON-OFF-(ON) C&K#7107P3YW	1
510046	SWF 10X10 MINI MATRIX AMP#436270-1	1
510050	SWT SCH#F-N-00-2U-EE-N-21-01-16-01-B-AG-3-03	4

ASSEMBLY 820018

ASY TUCHEL CONNECTOR ASSY FEMALE FOR WIRE

P/N	DESCRIPTION	QTY
210096	TER 30 PIN DIN RECEPTACLE	1
210119	TUC CONNECTOR SHELL-RIGHT HALF W/THROUGH HOLES	1
210120	TUC CONNECTOR SHELL-LEFT HALF W/STRAIN RELIEF	1
280008	TUC 1/2 SELF TAPPING SCREW FOR CONNECTOR	2
280009	TUC 5/8 SELF TAPPING SCREW FOR CONNECTOR SHELL	3
280010	TUC 3/8 SELF TAPPING SCREW FOR STRAIN RELIEF	2
640025	TUC RUBBER BUSHING FOR TUCHEL	1
640026	TUC STRAIN RELIEF BRACKET FOR TUCHEL	1
810006	MAN TUCHEL WIRING INSTRUCTIONS DLC ICW-B-C	1

ASSEMBLY 720029

ASY MS-808/ IS-808 FRONT PANEL ASSY

P/N	DESCRIPTION	QTY
150048	CAD 100PF 1KV 20% RF CAP	1
210013	AAA SWC D4M CONNECTOR	1
210089	TER CRIMP LUG SLIPONS SMITH#2777	3
240007	HAN PANEL HANDLE 2 INCH SMITH#1638	2
240015	AAA KNB ROGAN#RB-67-0-DC-ML.125 1/2 W/1/8 SHAFT	3
240020	KNB RED BUTTON FOR C&K SWITCH #8121	1
240021	KNB BLACK BUTTON FOR C&K SWITCH #8121	2
250157	MET ELECTRET MIC COLLAR	3
250166	TBA SEE 280068	1
250202	MET BRACKET (SIDES) SUBPANEL DLC	1
250203	MET - SURPLATE SPK MTG - DLC	1
250204	MET SPEAKER PANEL INSERT DLC	1
250207	MET SPK SCREEN DLC	1
250210	MET FRONT PANEL DLC/16 CH	1
280067	HDS DRESS CONE NUT C&K #7025	2
390007	LED PANEL MOUNTED RED LED IDI#5100H1	1
500089	AAA SPK 3INCH ROUND SPEAKER CTS#3A2479	1
500090	MIC PRIMO MICROPHONE W/GSNIK #EH4544 STANDARD	1
510002	SWT POWER ILLUM. ROCKER ARCOL.#403SCBR2	1
510006	SWT MINI-TOG W/ LOND LEADS C&K#7101P3YW	1
510044	SWT SP3T ON-OFF-(ON) C&K#7107P3YW	1
520018	FUS PLASTIC PLATE FOR CB ALLIED#851-B200	1
520019	FUS CIRCUIT BREAKER LITTELFUSE#81502.5	1

ASSEMBLY 720030

ASY MS-808 CHASSIS ASSY

P/N	DESCRIPTION	QTY
180000	TRN FILTER CHOKE 15MH CARSON# 6450	1
210046	AMP 7 PIN MTA HOUSING #640440-7	3
210082	TER SLIP-ON CRIMP TERMINAL HOLLINGSWORTH#S09619SF	9
210088	TER CRIMP SPADE HOLLINGSWORTH #SS2902BSF	2
210115	AMP 16 PIN MTA HOUSING #1-640440-6	1
210117	AMP 6 PIN MTA HOUSING AMP #640440-6	1
210118	AMP 8 PIN MTA HOUSING AMP #640440-8	2
240020	KNB RED BUTTON FOR C&K SWITCH #8121	2
250168	MET 3 1/2 INCH RACK CHASSIS MS-800	1
250175	MET COVER FOR 3 1/2X13 INCH RACK CHASSIS	1
250208	MET POWER SUPPLY COVER DLC/B CH	1
250211	MET BRACKET CRD CAGE DLC	2
280067	HDS DRESS CONE NUT C&K #7025	2
640023	HDS 9.350IN PC SLIDE CALABRO PLASTICS #LI-6200	4
710044	ASY 1/2 REG POWER SUPPLY MODULE REV.D	1
710144	ASY DLC I/O MODULE REV.A	1

BILL OF MATERIALS

ASSEMBLY 710142 ASY IFR-4 MODULE REV.C

P/N	DESCRIPTION	QTY	REF DESIG
150025	CAD 330PF DISC 5X	4	C2 C5 C4 C3
150030	CAT 4.7UF TANTALUM 16V	1	C1
150035	CAN .1UF MONOLYTHIC 104ZU 50V	4	C6 C7 C8 C9
150073	CAN 1 MFD CERAMIC MOND 15Z 50V RADIAL	9	C21 C20 C19 C18 C10 C11 C12 C22 C13
150080	CAN .22UF MONOLYTHIC 104ZU 100V	4	C14 C17 C16 C15
170074	PCB IFR-4 CIRCUIT BOARD	1	
210102	TER 3M 26 PIN(DEL ROW)3M#3491-1002	1	
210112	TER HEADER MULTI PIN HEADER(MIN 18 PIN)	12	
410016	RES CF 1/4W 5% 10K OHMS	8	R31 R29 R35 R33 R47 R48 R45 R46
410017	RES CF 1/4W 5% 15K OHMS	5	R69 R17 R18 R19 R20
410018	RES CF 1/4W 5% 22K OHMS	4	R36 R34 R32 R30
410019	RES CF 1/4W 5% 39K OHMS	4	R23 R24 R22 R21
410021	RES CF 1/4W 5% 47K OHMS	12	R44 R42 R16 R53 R54 R55 R40 R38 R56 R13 R14 R15
410024	RES CF 1/4W 5% 100K OHMS	4	R9 R10 R11 R12
410026	RES CF 1/4W 5% 150K OHMS	4	R8 R7 R6 R5
410028	RES CF 1/4W 5% 220K OHMS	2	R4 R3
410032	RES CF 1/4W 5% 18K OHMS	4	R60 R59 R58 R57
410036	RES CF 1/4W 5% 6.8K OHMS	4	R28 R27 R26 R25
410041	RES CF 1/4W 5% 1.2K OHMS	4	R64 R62 R68 R66
410049	RES CF 1/4W 5% 91K OHMS	4	R39 R37 R41 R43
410055	RES CF 1/4W 5% 1.5K OHMS	4	R65 R67 R61 R63
410082	RES CF 1/2W 5% 470 OHMS	2	R2 R1
410086	RES CF 1/8W 1Z 20.0K OHMS	4	R52 R49 R50 R51
480000	DIO 1N4148 SIGNAL DIODE	13	D2 D3 D4 D5 D6 D7 D13 D8 D9 D10 D11 D12 D1
480008	TRA MPS-A63 TRANSISTOR	4	Q5 Q6 Q7 Q8
480018	ICS LM741 IC OP AMP 8-PIN DIP	1	IC1
480047	TRA 2N4401 NPN TRANSISTOR	4	Q2 Q1 Q4 Q3
480056	ICS RC4559NB DUAL OP AMP 8-PIN DIP	4	IC4 IC3 IC6 IC5
480073	ICS DG308A ANALOG SWITCH QUAD	1	IC2
510025	SWT SCH#4-FL-17.5-FRV-BLK-CLR-4U-EE	1	S1234

ASSEMBLY 720011 ASY MS-800 REAR PANEL ASSY

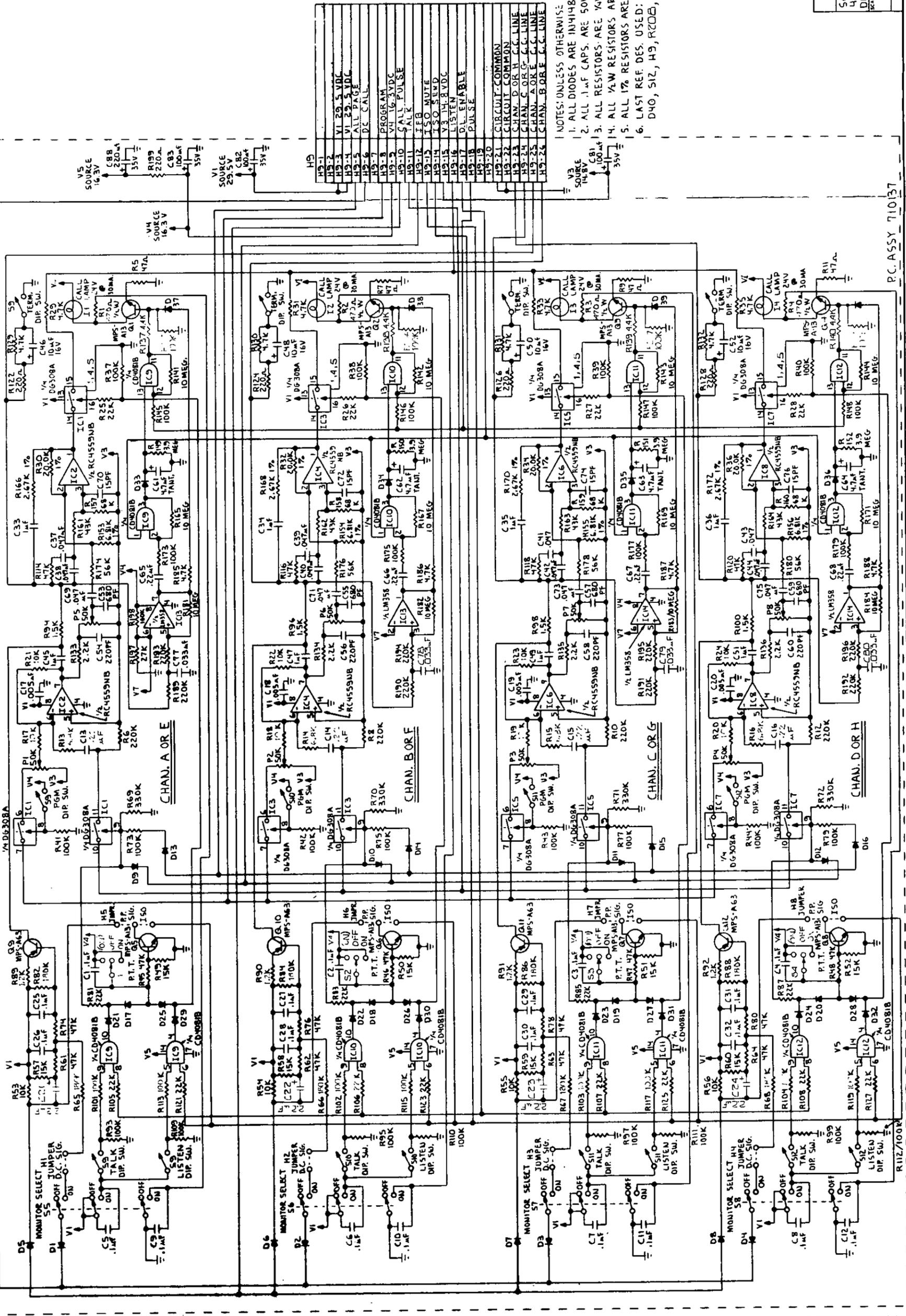
P/N	DESCRIPTION	QTY
210002	AAA SWC D3F CONNECTOR	1
210003	AAA SWC D3M CONNECTOR	9
210050	SWC PHONE JACK FOR CARBON MOD SWTC#N112B	2
210055	SWC JACK FOR SPEAKER EXT.U/SWITCH #N112A	1
210082	TER SLIP-ON CRIMP TERMINAL HOLLINGSWORTH#S09619SF	3
210095	TER 30 PIN DIN PLUG	1
210098	TER 30 PIN DIN BASE	1
250142	MET REAR PANEL MS/RM 800	1
560011	TRN POWER XFORMER CARSON# 6832	1
610000	CBL POWER CORD SET 3-COND BELDEN# 17237	1
640000	STR STRAIN RELIEF FOR POWER CORD HEYCO SR-5H-4	1

ASSEMBLY 720032 ASY IS-808 REAR PANEL ASSY

P/N	DESCRIPTION	QTY
210002	AAA SWC D3F CONNECTOR	1
210055	SWC JACK FOR SPEAKER EXT.U/SWITCH #N112A	1
210082	TER SLIP-ON CRIMP TERMINAL HOLLINGSWORTH#S09619SF	3
210095	TER 30 PIN DIN PLUG	2
210098	TER 30 PIN DIN BASE	2
250215	MET IS-808 REAR PANEL	1
510002	SWT POWER ILLUM. ROCKER ARCOL.#4035C8R2	1
560016	TRN XFORMER POWER 1 AMP CARSON#6969	1
610000	CBL POWER CORD SET 3-COND BELDEN# 17237	1
640000	STR STRAIN RELIEF FOR POWER CORD HEYCO SR-5H-4	1

NOTICE:

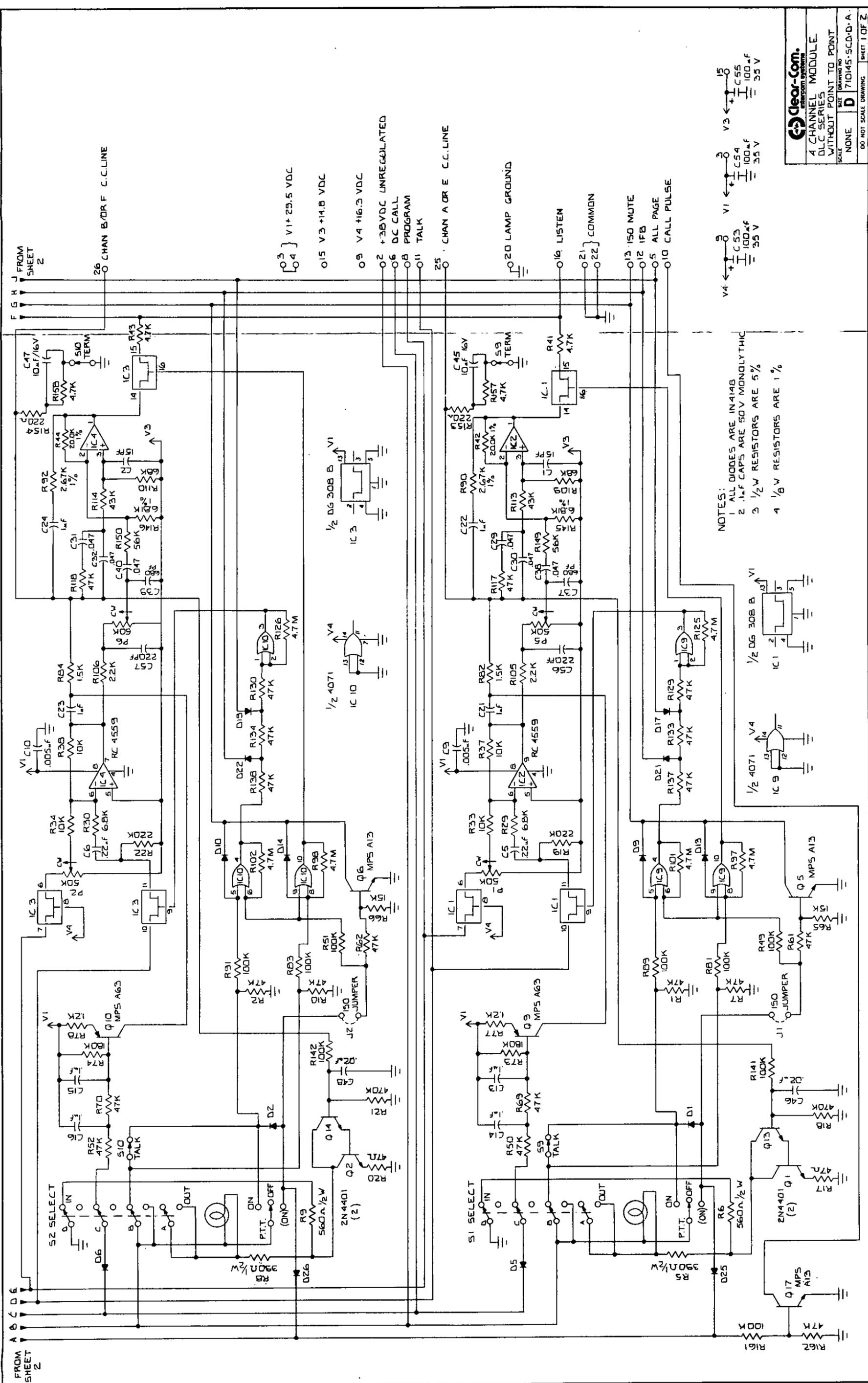
"While Clear-Com makes every attempt to maintain the accuracy of the information contained in its product manuals, the information is subject to change without notice."



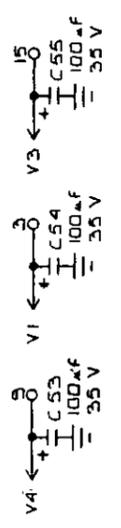
H5-1	VI 29.5 VDC
H5-2	VI 29.5 VDC
H5-3	VI 29.5 VDC
H5-4	VI 29.5 VDC
H5-5	ALL PAGE
H5-6	DC CALL
H5-7	PROGRAM
H5-8	V4 16.5VDC
H5-9	V4 16.5VDC
H5-10	CALL PULSE
H5-11	TALK
H5-12	IEB
H5-13	ISO MUTE
H5-14	ISO SEND
H5-15	V3 14.8VDC
H5-16	V3 14.8VDC
H5-17	D.L. ENABLE
H5-18	PULSE
H5-19	
H5-20	
H5-21	CIRCUIT COMMON
H5-22	CIRCUIT COMMON
H5-23	CHAN. D OR G C.C. LINE
H5-24	CHAN. C OR F C.C. LINE
H5-25	CHAN. A OR E C.C. LINE
H5-26	CHAN. B OR F C.C. LINE

- NOTES: UNLESS OTHERWISE SPECIFIED.
1. ALL DIODES ARE IN4148.
 2. ALL .1µF CAPS. ARE 50V MONOLITHIC.
 3. ALL RESISTORS ARE ¼W 5%. ALL 1% RESISTORS ARE ¼W.
 4. ALL ½W RESISTORS ARE ½W.
 5. ALL 1% RESISTORS ARE ½W.
 6. LAST REF. DES. USED: IC14, C88, D40, S12, H9, R20B, I4, Q12.

PC ASSY 710137



- 03 } V1 +25.5 VDC
- 04 }
- 05 V3 +14.8 VDC
- 09 V4 +16.3 VDC
- 02 +35VDC UNREGULATED
- 06 DC CALL
- 08 PROGRAM
- 011 TALK
- 25 CHAN A OR E C.C.LINE



- NOTES:
- 1 ALL DIODES ARE IN4148
 - 2 .1µF CAPS ARE 50V MONOLYTHIC
 - 3 1/2W RESISTORS ARE 5%
 - 4 1/8W RESISTORS ARE 1%

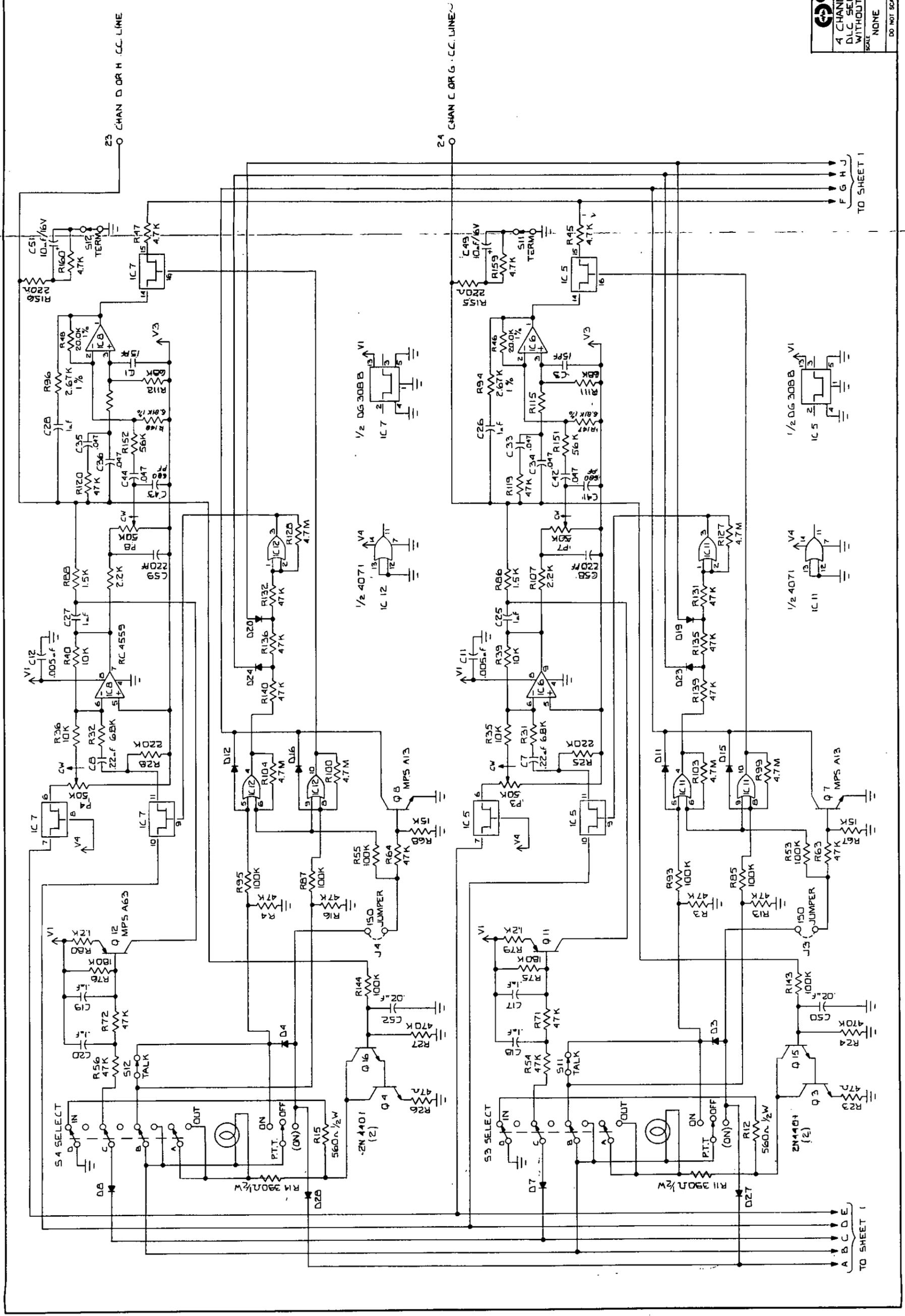
Clear-Com
INTERCOM SYSTEMS

4 CHANNEL MODULE
DLC SERIES
WITHOUT POINT TO POINT

SCALE NONE DRAWING NO 71045-SCD-D-A
DO NOT SCALE DRAWING SHEET 1 OF 2

FROM SHEET Z

FROM SHEET Z



NOTES:
 1. UNLESS OTHERWISE SPECIFIED:
 -ALL RESISTOR VALUES ARE IN OHMS.
 -ALL CAPACITOR VALUES ARE IN MICROFARADS.
 -ALL DIODES ARE IN4149.

- 2. JF3: ADD JUMPER TO TURN OFF DL LISTEN DURING ISO
- 3. J1A: REMOVE JUMPER TO DISABLE RECEPTION OF POINT-TO-POINT SIGNALING.
- 4. J1B: REMOVE JUMPER TO DISABLE SENDING OF POINT-TO-POINT SIGNALING.
- 5. LAST REF DESIG'S USED: R115, C75, D18, Q2, IC11.
- 6. CONNECT JF-D TO PREVENT THE S/A BUTTON FROM INTERRUPTING THE TALK PATHS TO INTERCOM CHANNELS

