

IFB SYSTEM

MA-4 AX-4

PIC-4000B

INSTRUCTION
and
SERVICE MANUAL



Clear-Com[®]
Intercom Systems

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** IFB SYSTEM MANUAL **
** DOCUMENTATION ADDENDUM **
** MA-4 & AX-4 **
** REV. B **
** December 22, 1987 **
** *****

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>
15K OHM	R27, 28, 29, 30	6.8K OHM

** CLEAR-COM **
** DOCUMENTATION ADDENDUM **
** PIC-4000B/IFB SYSTEM **
** DATE: JUNE 25, 1987 **

- * PIC-4000B - STEREO/SPLIT FEED IFB OUTPUTS.
 - * PIC-4000B - CONNECTION TO MS-808 MAIN STATION.
- =====

1. PIC-4000B:

1.1 Stereo/Split Feed Outputs:

- 1.1.1 The Model PIC-4000 IFB Central Electronics has been upgraded to the Model PIC-4000B. The upgrade consists of a circuit design change that permits all of the four IFB outputs to feed two discrete audio channels ("Interrupt" & "Non-Interrupt") to the new Model TR-532 Stereo/Split Feed Talent Receivers. The two discrete signals, plus the DC operation power, are sent to the TR-532 via 3-pin XL type connectors and two conductor shielded cable (standard microphone cable).
- 1.1.2 This upgrade in no way effects the PIC-4000B's operation with TR-50 Single Channel Talent Receivers, which receive only the "Interrupt" signal.
- 1.1.3 TR-50s and TR-532s should not be combined on the same IFB output. However, if they are accidentally connected to the same output, no damage will result to the units or to the system.
- 1.1.4 Each of the four IFB outputs can operate a maximum of four TR-50 Single Channel Talent Receivers or two TR-532 Stereo/Split Feed Talent Receivers.
- 1.1.5 This upgrade eliminates the "SPC" Sportscaster/Two Channel Output" option, which provided the "Interrupt/Non-Interrupt" outputs to two channel Talent Receivers via a 6-pin cable.

1.2 Connection between a PIC-4000B and a MS-808 Main Station:

- 1.2.1 The new PIC-4000B now replaces the Model PIC-4 IFB Central Electronics. The PIC-4 was originally designed as the IFB Central Electronics for MS-808 Main Stations. The PIC-4 was controlled by one or more Model IFB-4 IFB Control Modules installed in an MS-808 Main Station.
- 1.2.2 An MS-808 connects to the PIC-4000B via 6-pin connectors in the same manner as an MA-4 or AX-4 IFB Control Panel connection. (The MS-808 originally connected to the PIC-4 via a 12 pair cable terminating in a 30-pin "Tuchel" connector. MS-808s are now equipped with 6-pin male XL type connectors for connection to the PIC-4000B.)
- 1.2.3 An IFB system can contain a combination of MA-4/AX-4 "stand-alone" Control Panels and MS-808 Main Stations equipped with IFB-4 Control Modules to control one or more PIC-4000Bs.

IFB System Installation and Operation Manual

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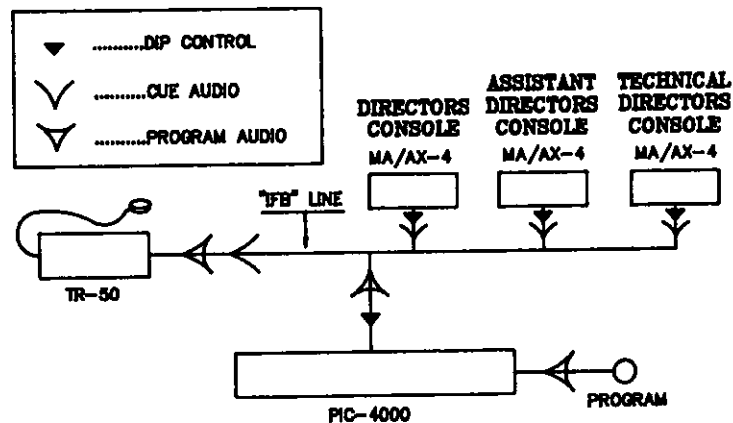
NOTICE:

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I. INTRODUCTION

A. IFB System

During production of a program for transmission or recording, a director or producer frequently needs to cue the performing talent. This is done using Interrupt FoldBack, a type of closed-circuit intercom for sending program and cue audio on "IFB" lines for the talent to monitor. The IFB line carries three signals: program audio, cue audio, and the dip or mute control. See the signal flow diagram below. Electronic control allows the director to interrupt the program signal when addressing the talent. IFB communications are one-way only -- from an access location to the selected talent position.

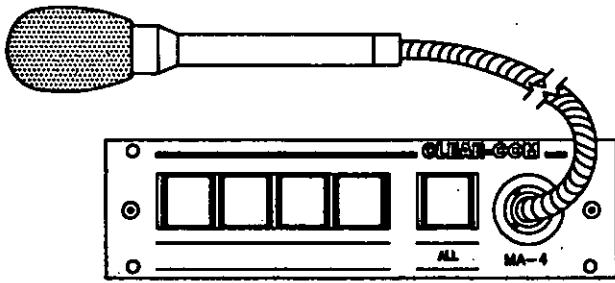


Clear-Com's new stand-alone IFB components provide high performance, cost-effective answers for applications where regular intercom functions are not also required, or where space constraints require compact, versatile packaging. The simplest stand-alone system consists of a PIC-4000, an MA-4, a PS-20 for power and one to four TR-50 talent receivers. This system will permit cuing of one to four talent positions from only one access location.

NOTE: Throughout this manual, access location refers to the physical place someone needs to cue the talent from. Talent position refers to the individual "talent" cue channels.

B. Unit Descriptions

Clear-Com's stand-alone series of IFB components offers two types of talent access station. The MA-4 has a built-in electret gooseneck microphone and a pre-amplifier with line-level output. It provides access to four talent positions. Each AX-4 allows access, from the same location, to an additional group of four talent positions; it requires an external line-level signal for its cue audio source. The MA-4's cue audio and ALL control signals will feed up to twenty-three AX-4's, so that only one MA-4 is required at each access location. Each talent position may be accessed independently, or simultaneously with any other(s). The ALL button on the MA-4 simultaneously accesses all talent positions of the MA-4 and each AX-4 extension unit fed from that MA-4.

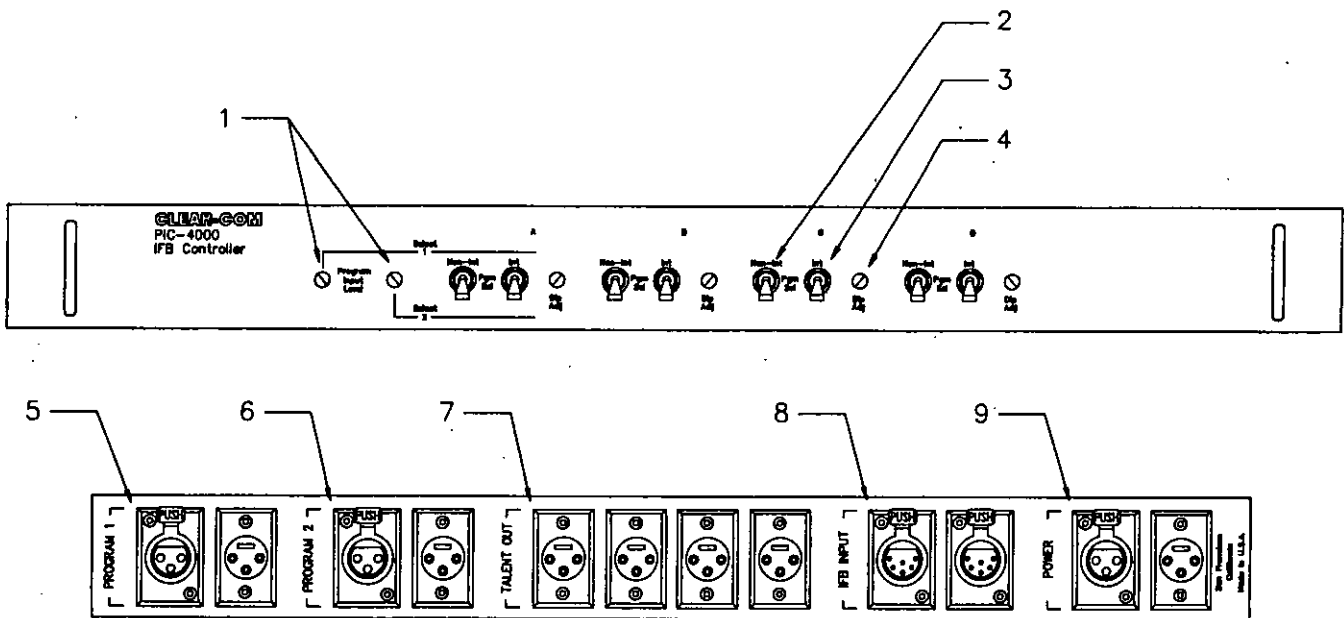


THE MA-4



THE AX-4

A PIC-4000 unit is required for every four talent positions, or fraction thereof. For example, a system with five to eight talent positions will require two PIC-4000's. The same IFB system with three access locations will require three MA-4's and three AX-4's, but will still need only two PIC-4000's. The PIC-4000 performs the program feed and interrupt functions for each talent position, and also terminates the IFB lines.



THE PIC-4000

The connectors on the MA-4, AX-4, and PIC-4000 are arranged for convenient interconnection as a stand-alone system. However, all units' electrical characteristics are identical to those of the integrated IFB systems on our standard broadcast intercom line. So with suitable connector adaptors, both types of units may be mixed in a system.

II. INSTALLATION

A. System Capacity

A system may have up to fifty access locations. Cue audio from the MA-4 can drive up to twenty-three AX-4 units, thus permitting a maximum of ninety-six talent positions.

In order to use the IFB system at its maximum capacity, two factors must be considered: system wiring (architecture) and power requirements. The MA-4 consumes a maximum of 180 mA (idle current 140 mA), and the AX-4 consumes a maximum of 150 mA (idle current 120 mA). Since the resistance of the conductors in the interconnect cable may be on the order of five to ten Ohms per 1000 feet, care must be taken to avoid having too many stations on one long cable run. For example, a system with two MA's on a 2000 foot cable which has 16 Ohms cumulative resistance in the power conductor plus another 10 Ohms in the common conductor, the voltage drop is a maximum of 9 V. If another two MA's were to be added for the same cable run, the voltage drop would be an unacceptable 18 V. Therefore the other set of access stations would have to be connected on a separate cable run from the PIC-4000.

To determine the number and type of power supplies a system requires, add up the number of Unit Loads. (1 Unit Load = 50 mA)

PIC-4000	= 1 Unit Load	MA-4	= 4 Unit Loads
four TR-50	= 1 Unit Load	AX-4	= 3 Unit Loads

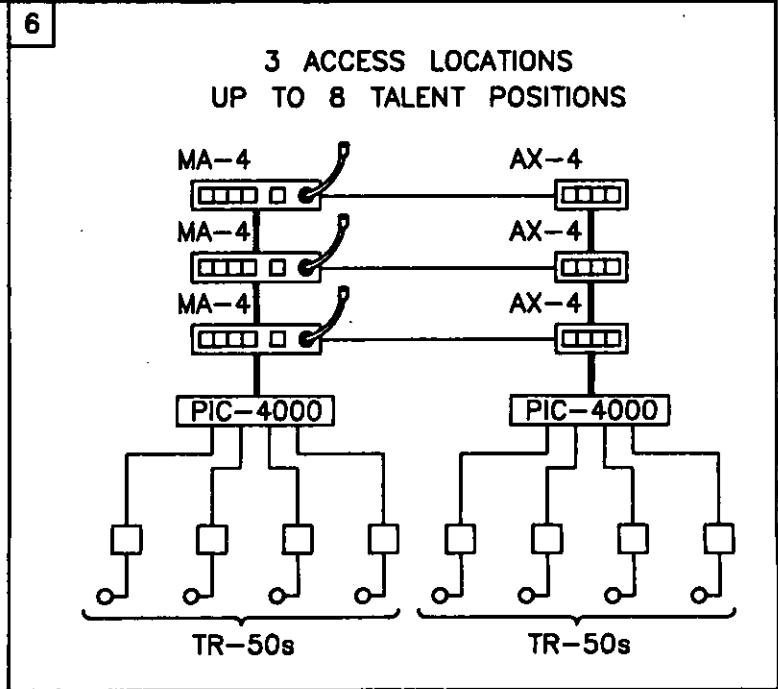
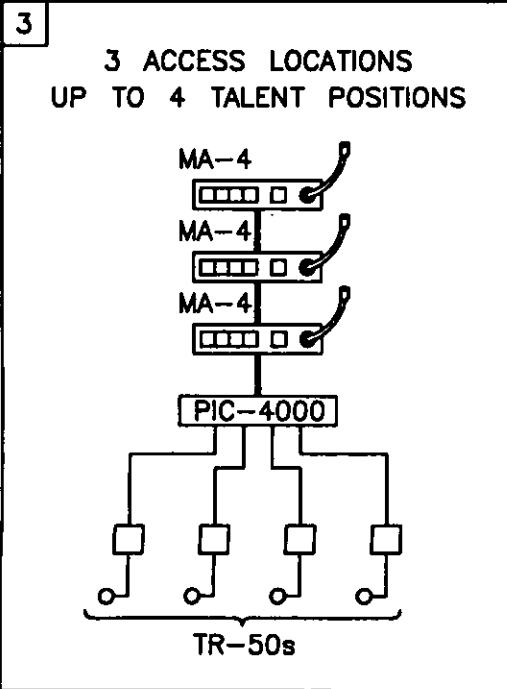
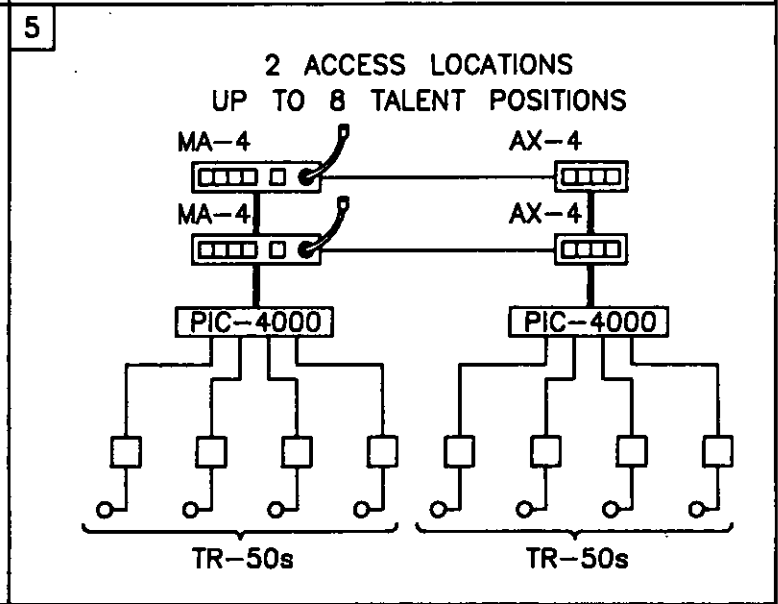
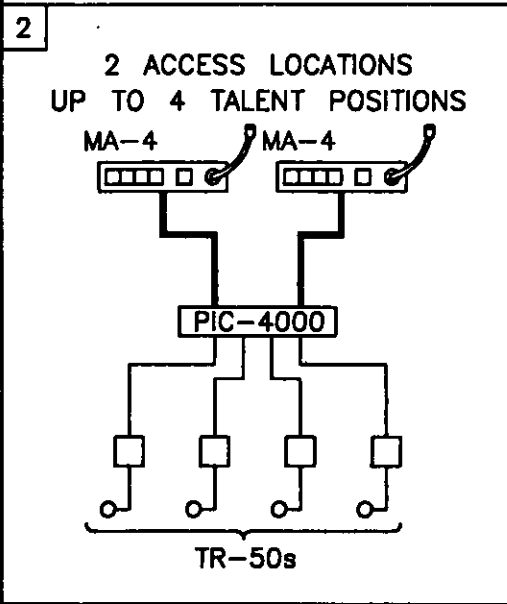
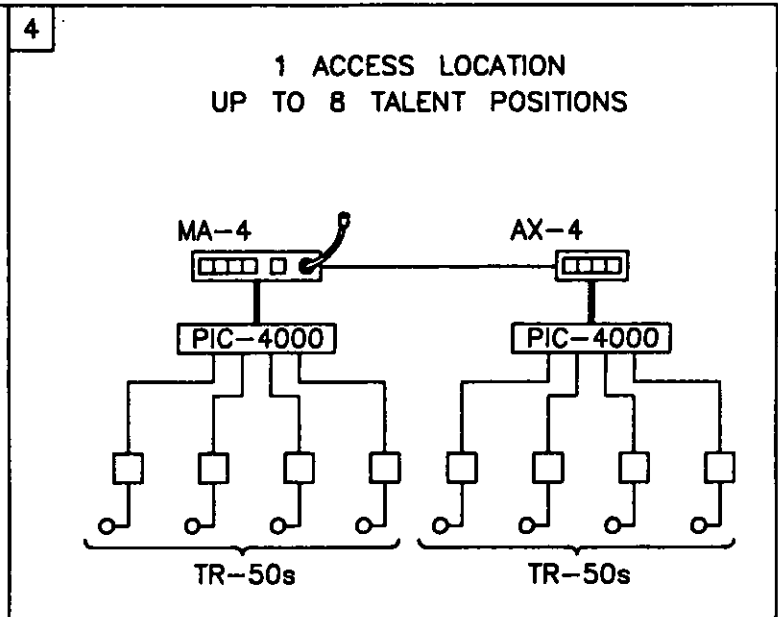
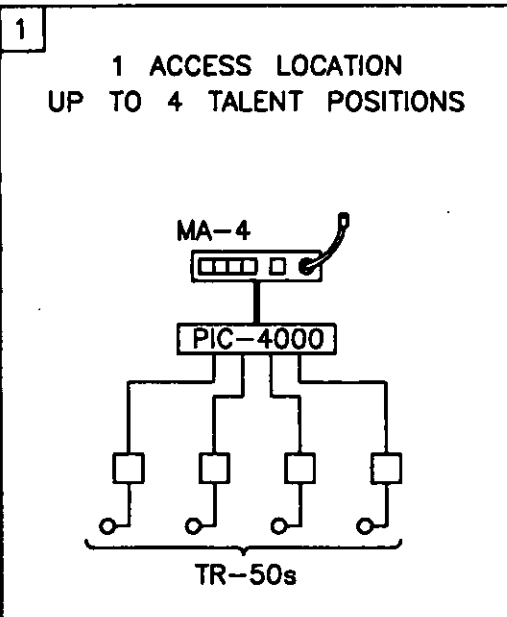
A PS-20 has enough capacity for 20 Unit Loads, a PS-452 can supply 40 Unit Loads.

Example: System #5 on page 5 has a total of 20 unit loads, so a PS-20 has exactly enough capacity for this system.

B. System Architecture

Two basic cabling methods for connecting the system may be used: Daisy-Chain (or Loop-Through) and Hub. Both methods may be combined in any system. Since the PIC-4000 has only two IFB line connectors, a Hub-type system is limited to two branches unless a special splitter box is used. Generally, resistance-buildup effects and resultant voltage drop are worse when using the daisy chain approach. The "hub" approach minimizes voltage-drop effects at the expense of greater cumulative cable capacitance. Cable capacitance is not quite the problem it is in regular intercom systems, because there is no sidetone null change, only a degradation of high-frequency response.

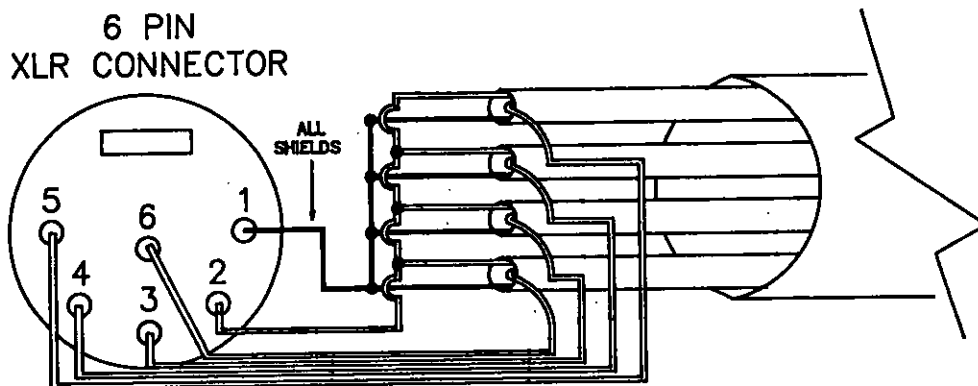
Referring to the typical System block diagrams on page 5, only System #2 is connected using the "hub" method; all other systems are shown connected via the "daisy-chain" method.



C. Interconnect Cabling

Use one multi-pair cable for each group of four channels when connecting the IFB lines between the access stations and their associated component (other MA's or AX's and the PIC-4000). This cable MUST have (four) SEPARATELY shielded conductors or pairs of conductors to prevent crosstalk. Suitable cable types are: Alpha #6054, Belden #'s 8725 or 9330, and Mogami #2602. As noted in Section B, the resistance buildup in both the power and common (or ground) conductors must be kept at a minimum for proper operation. Resistance buildup in the common conductor will also increase crosstalk. Follow the diagram below for best results in connecting the cable to the XLR connectors. Notice that all four of the spare conductors in each pair are tied together to pin 2 (DC power), and all shields are tied together to pin 1 (common). This arrangement minimizes resistance buildup effects in long cable runs.

Clear-Com has ready-made cable in 25, 50, and 100 foot lengths to fit your cabling and system architecture needs. The model number is ICxx/6.



In a system with more than four talent positions (one group), the cue audio from the MA's mic preamp and the ALL control signal must be bussed from the MA to each AX unit. A two-conductor shielded mic cable with 1/4" TRS 'phone plugs at each end is used for this purpose. Refer to the diagram on page 8, system wiring, for pin-out details.

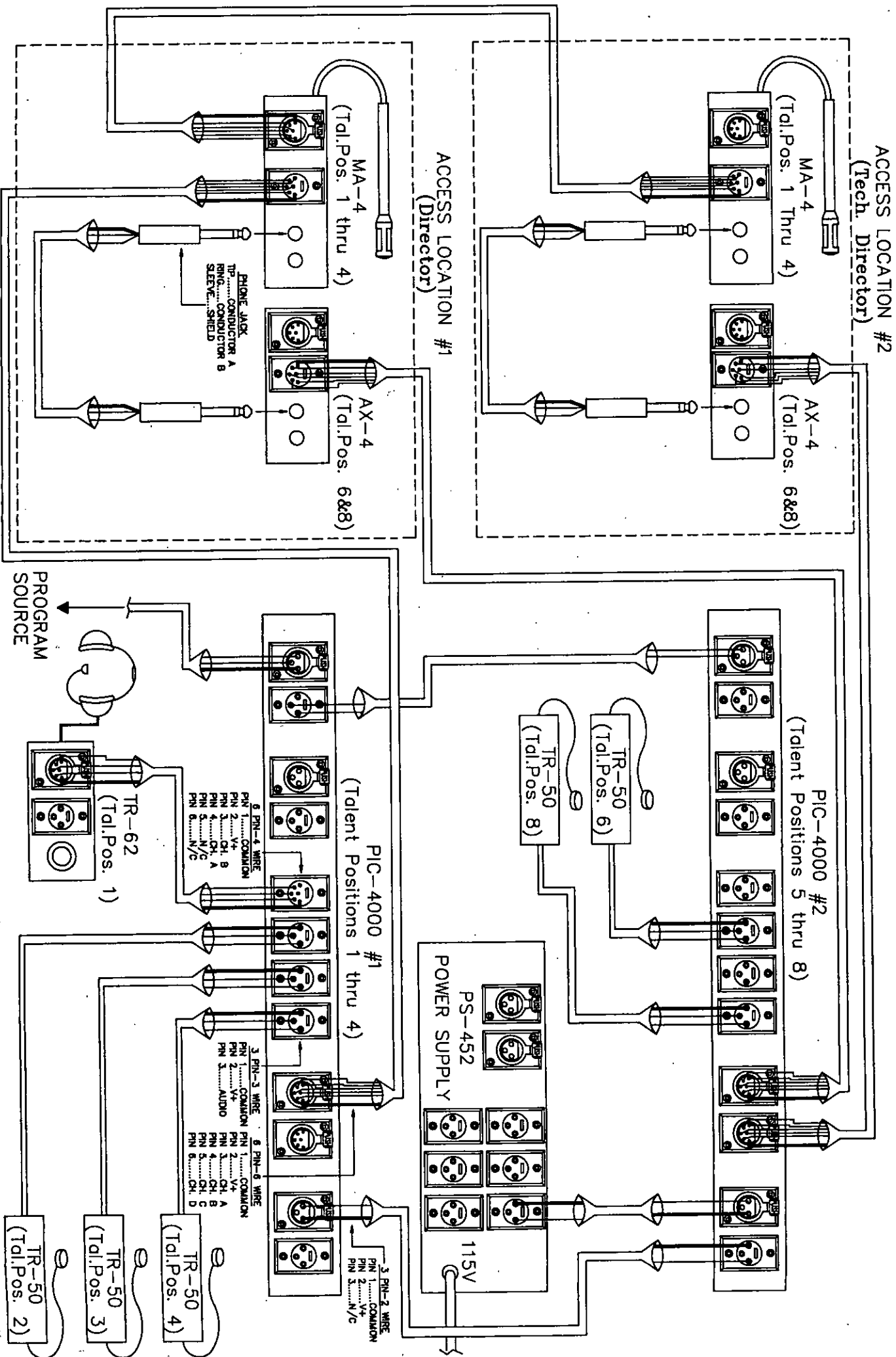
Note: the diagram shows the access stations for talent positions 5-8 connected in a "hub" from the second PIC-4000 while the stations for the first group of talent positions (1-4) are shown connected in the "daisy-chain" method. In practice, stations for both groups of talents would be interconnected in the same manner.

Connect single channel talent receivers to the PIC-4000 using standard two-conductor mic cable. For a split-feed receiver, our standard 2/4 channel interconnect cable (ICxx/6 can be used. If custom cabling is made, refer to the diagram on page 8 for pinouts. Notice that pins 5 and 6 are not used, and be sure to keep the conductors for pins 3 and 4 in separate shields. Only two conductors are necessary for the cabling between the power supply and the PIC-4000(s). If any section of this cable is more than a few feet long, be sure that heavy-gauge wire is used.

D. System Connection

- 1) Determine the architecture for your IFB system.
- 2) Decide upon a location for the PIC-4000(s). Then:
- 3) Connect the PIC-4000(s) to Clear-Com power supply(s) such as the PS-452 or PS-20. (#9)
- 4) Connect the program source(s) to the PIC-4000(s) as required. (#5,6) A balanced program source is connected to pins 2 and 3 of the program input. The common pin can be connected to the common or ground point of the source, if necessary to eliminate any residual hum. If a single-ended source is used, either pin 2 or 3 must be connected to the common point of the source. The "high" side is connected to the other pin (2 or 3).
- 5) Use standard multi-pair shielded cables and two-conductor shielded mic cables to interconnect the access stations as described in the preceding section.
- 6) Route all cables from the access locations and the talent receivers to the PIC-4000's using either or both of the methods discussed in Section B above. Pin assignments for the rear panel IFB XLR connectors are: Pin 1, COMMON; Pin 2, POWER; Pins 3-6, TALENT CHANNELS 1-4 respectively. (#7)
- 7) Route cables away from heavy AC power sources such as lighting panels or electric motors.
- 8) In permanent installations, cables should be installed in accordance with approved local building codes.

(The numbers in () refer to the diagram on page 3.)

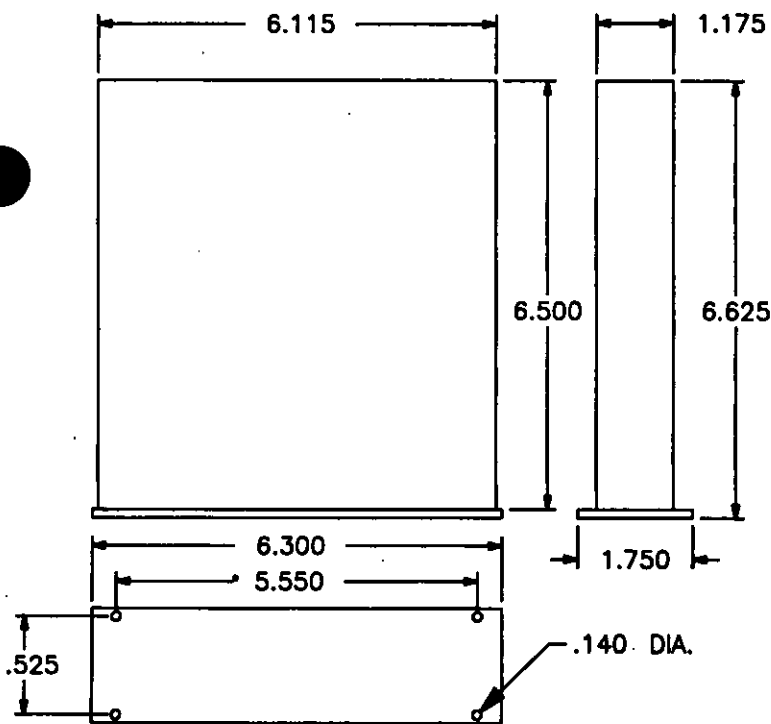


IFB SYSTEM WIRING EXAMPLE

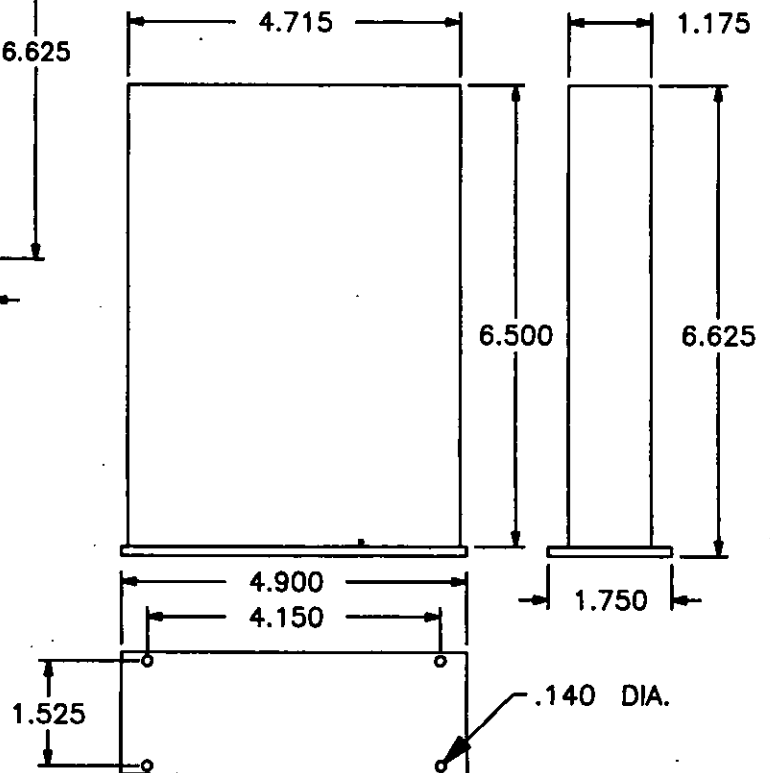
E. Physical Mounting

The PIC-4000 is designed for mounting in a standard 19" rack. It requires only one 1.75" rackspace, and is 6.5" deep.

The MA-4 and AX-4 may be mounted in a console or desk, or in a standard 19" rack using the optional rack kit (CC# 820022). Refer to the diagrams below for mounting dimensions when installing in a desk or console. There are no special constraints on relative positioning of MA's and AX's, though it is expected that the extension bus cable (the one with phone plugs) will be no more than 10 feet (normally 18 inches long). Be sure to make allowance for the XLR connectors to be plugged into the back of each access station.



MOUNTING DIMENSIONS OF MA-4



MOUNTING DIMENSIONS OF AX-4

F. Set-Up and System Check

After Program Sources are connected, assign them at the PIC-4000 to the talent channels with the Program (Source) select switches for each channel's interrupt (#3) and non-interrupt (#2) talent feeds. Set the toggle handle up to select source #1, or down to select source #2.

Set the attenuation or dip of the program feed during cuing with the dip adjust trims (#4). They can be set from no attenuation (fully CW) to greater than 50dB (fully CCW).

Before adjusting the Program Level trims at the PIC-4000, the volume at the Talent Receivers must be adjusted (via the control on the Receiver) for a comfortable cue audio level in the earpiece or headset while someone is cuing that talent position from one of the access locations.

The PROGRAM INPUT LEVEL trims (#1) permit use of program levels ranging from -20dBv to 0dBv. At full clockwise rotation, the gain from program input to the IFB line is approximately unity. So at maximum gain setting, a program level of -20dBv will be roughly the same volume on the IFB line as the cue audio. If the program source level is around 0dBv, the trims will have to be set near full counter-clockwise rotation to match the cue audio level on the IFB lines.

(NOTE: The numbers in () refer to the diagram on page 3.)

The only adjustment possible at the MA-4 is a trim (+/- 5dB) of the mic gain. Adjusting this gain should be necessary only in unusual circumstances, because of the mic preamp's limiter.

III. OPERATION

The system is operated by engaging the desired cue buttons on the access stations. A control voltage on the IFB line causes the PIC-4000 to dip the program feed to that channel so that the cues given are understandable. (At an optional split-feed receiver, the program is dipped only in the cue side; the other side has continuous program with no cue.)

- A. Press the IFB button on the access station corresponding to the talent position(s) you wish to cue, then speak into the MA-4's microphone.
- B. Press the MA-4's ALL button, and you simultaneously activate every IFB line, including those on any accompanying AX-4 units.

The control voltage also causes the corresponding buttons at all other access locations to be brightly lit, indicating which channels are in use.

IV. TECHNICAL INFORMATION

A. Trouble Shooting

The table of troubles on the next page, which generally involves system wiring, covers only the most likely problems. In any trouble-shooting effort, keep these points in mind:

- 1) The power for all units in the system is routed from the power supplies through the PIC-4000.
- 2) All access stations (MA's and AX's) and the talent receivers are connected across the IFB lines in a bridging configuration (high-impedance)
- 3) Each IFB line is terminated by its associated PIC-4000. The termination is about 220 ohms A.C., and approximately 5000 Ohms D.C.
- 4) Three different types of signals are present on the IFB line:
 - a. Cue audio, which originates from an access station's mic
 - b. Program audio, from the associated PIC-4000, and
 - c. Interrupt control signal, a D.C. voltage which also originates at an access station.
- 5) The audio levels are approximately -15 dBv ref.0-.775VRMS), and the D.C. control voltage is about +13 Volts.
- 6) The cue audio and ALL control signal for operation of the AX-4 stations at any given location are supplied by the MA-4 station at that location.

TROUBLE SHOOTING

SYMPTOM

CAUSE

REMEDY

Channel access buttons not lit or too dim.

A No power

A Check that power supply is operating & connected to the PIC-4000.

B Insufficient power

B Increase power capacity or connect fewer stations on each cable run.

Access button won't light brightly when engaged at any station.

A Excessive DC load on affected IFB line

A Isolate & replace faulty module on affected line.

B IFB line shorted in cabling

B Isolate & repair cable.

Access button remains brightly lit after being released.

IFB line not terminated

Insure that station connections to PIC-4000 are intact.

No cue from an AX-4 station.

A Associated MA-4 not operating

A Insure that MA-4 is connected to a PIC-4000.

B Faulty or missing connection to MA- or AX- unit.

B Verify connection of extension bus to affected AX-unit.

Hum or buzz from program. (pgm. trim affects loudness)

Mis-connection of program source to input.

Program inputs are balanced. If single-ended source is used, one of inputs must be referenced to Common.

ASSEMBLY 710161

ASY PC MODULE FOR MA-4

P/N	DESCRIPTION	QTY	REF DESIG
150001	CAD 22 PF 20X 50V Z5U .2LS .15THK	4	C30 C33 C32 C31
150002	AAA CAE 1UF N.P. ELECTROLYTIC 50V R.L.	4	C46 C49 C48 C47
150006	CAD 100PF DISC 10X	2	C6 C20
150010	CAE 22UF ELECTROLYTIC 16V R.L.	2	C18 C9
150011	CAE 100UF ELECTROLYTIC 35V R.L.	3	C16 C3 C2
150014	CAD 470PF CERAMIC DISC 10X 50V	1	C13
150026	CAD 39PF DISC 5X	2	C21 C17
150030	CAT 4.7UF TANTALUM 16V	1	C15
150034	CAN .22UF MONOLYTHIC 50V	4	C25 C24 C23 C22
150035	AAA CAN .1 MONOLYTHIC 104ZU 50V	4	C38 C41 C40 C39
150043	CAN .47UF MONOLYTHIC 50V	2	C5 C12
150058	CAD .0039 UF AT 1KV	1	C14
150064	CAE 10UF 50V R.L. ELECTROLYTIC	1	C1
150068	CAM .0047UF MYLAR 50V 10X	1	C11
150076	CAM .01 MONOLYTHIC 10X 50V	1	C4
150078	CAM .047 MONOLYTHIC 10X 50V	1	C8
150082	CAM .022 UF MONO CK05 10X 50V	9	C7 C52 C51 C50 C29 C28 C27 C26 C53
150085	CAM .1UF MONO CK05 100V 10X	1	C19
150087	CAE 4.7UF/50V NP ELECTROLYTIC R.L.	4	C43 C42 C45 C44
150094	CAD 680PF 5X DISC OR MONO 50V .25LS	1	C10
170089	PCB MA-4 PC BOARD	1	
210112	TER HEADER MULTI PIN HEADER(MIN 18 PIN)	10	X X X J2(4) X X J1 X X X
210134	SWC PC MOUNT 1/4 IN JACK DOUBLE OPEN CIRCUIT	1	J3
210135	SWC R/A PC MOUNT 1/4 IN STERED JACK TIP SWITCHED	1	J4
410002	RES CF 1/4W 5X 10 OHMS	1	R4
410004	RES CF 1/4W 5X 22 OHMS	1	R3
410010	RES CF 1/4W 5X 1K OHMS	2	R110 R18
410011	RES CF 1/4W 5X 2.2K OHMS	1	R40
410013	RES CF 1/4W 5X 4.7K OHMS	1	R26
410014	RES CF 1/4W 5X 2K OHMS	4	R86 R85 R87 R88
410016	RES CF 1/4W 5X 10K OHMS	4	R13 R6 R39 R20
410017	RES CF 1/4W 5X 15K OHMS	9	R11 R30 R29 R28 R27 R44 R43 R42 R41
410021	RES CF 1/4W 5X 47K OHMS	5	R54 R53 R23 R56 R55
410024	RES CF 1/4W 5X 100K OHMS	10	R22 R21 R37 R36 R35 R34 R33 R32 R31 R38
410028	RES CF 1/4W 5X 220K OHMS	10	R90 R25 R24 R89 R68 R67 R66 R65 R92 R91
410030	RES CF 1/4W 5X 470K OHMS	13	R7 R61 R100 R99 R98 R97 R76 R75 R74 R73 R64 R63 R62
410031	RES CF 1/4W 5X 12K OHMS	1	R14
410033	RES CF 1/4W 5X 330K OHMS	1	R8
410036	RES CF 1/4W 5X 6.8K OHMS	1	R15
410037	RES CF 1/4W 5X 8.2K OHMS	4	R47 R45 R48 R46
410040	RES CF 1/4W 5X 2.7K OHMS	1	R16
410042	RES CF 1/4W 5X 470 OHMS	2	R17 R1
410057	RES CF 1/4W 5X 68 OHMS	4	R104 R103 R102 R101
410058	RES CF 1/4W 5X 1 MEGAOHM	4	R60 R59 R58 R57
410059	RES CF 1/4W 5X 10 MEGAOHM	1	R5
410067	RES CF 1/4W 5X 1.8 MEGAOHMS	1	R9
410071	RES CF 1/4W 5X 100 OHMS	4	R19 R12 R10 R2
410099	RES CF 1/2W 5X 560 OHMS	5	R109 R108 R107 R106 R105
410105	RES CF 1/8W 1X 47.5K OHMS	12	R72 R71 R70 R69 R84 R83 R82 R81 R80 R79 R78 R77 R95 R94 R93 R96
410106	RES CF 1/4W 5X 430 OHMS	4	R51 R50 R49 R52
410111	RES MF 1/8W 1X 39.2K OHMS	4	
470046	REV 5K TRIMPOT H MTG BECKMANN #91ASK	1	P1
480000	DIO 1N4148 SIGNAL DIODE	12	D7 D6 D8 D9 D10 D11 D12 D13 D3 D4 D5 D2
480001	DIO 1N4001 RECTIFIER DIODE	1	D1
480004	TRA MPS-A13 TRANSISTOR	4	Q10 Q13 Q12 Q11
480006	TRA 2N2222 TRANSISTOR	4	Q2 Q5 Q4 Q3
480008	TRA MPS-A63 TRANSISTOR	4	Q6 Q9 Q8 Q7
480018	ICS LM741 IC OP AMP 8-PIN DIP	1	IC2
480026	DIO 1N957B ZENER DIODE 6.8V 5X .4W	4	D14 D15 D16 D17
480069	TRN 2N5639 N CHANNEL JFET	1	Q1
480070	AAA ICS NE5532 DUAL LO NOISE OP AMP	3	IC1 IC4 IC5
480092	ICS QUAD CMOS ANALOG SWITCH DG211CJ	1	IC3
510050	SWT SCH#F-N-00-4U-EE-N-21-01-16-01-B-AG-3-03	1	S1
510070	SWT NON-LOCK MOM #F1750044UDAT821011601BAG303	1	

ASSEMBLY 720055

ASY GOOSENECK MIC KIT W/O ADAPTER PLATE

P/N	DESCRIPTION	QTY
210062	AMP 4 PIN MTA HOUSING #640440-4	2
250157	MET ELECTRET MIC COLLAR	1
280002	HDS SHOULDER WASHER GM AMATON#2721-68763-F625	2
280011	HDS 4-40 X .132 SET SCREW ALLEN HEAD	3
280068	HDS 5/8X27X.750AFX.010 HEX NUT	1
500090	AAA MIC PRIMO GOOSENECK MIC #EM4544	1
500096	GSN FOAM WINDSCREEN FOR 500090 PRIMO #WS-31	1

ASSEMBLY 720052

ASY CHASSIS SUB-ASSY FOR MA-4

P/N	DESCRIPTION	QTY
210004	SWC D6M CONNECTOR	1
210063	SWC D6F CONNECTOR	1
210117	AMP 6 PIN MTA HOUSING AMP #640440-6	1
250271	MET MA-4 CHASSIS	1
710161	ASY PC MODULE FOR MA-4	1

ASSEMBLY MA-4

FGI IFB MIC ACCESS STATION

P/N	DESCRIPTION	QTY
250270	MET MA-4 FRONT PANEL	1
250272	MET MA-4 COVER	1
250278	MET CHASSIS MTG PLATE (INTERNAL) FOR MA/AX	2
720052	ASY CHASSIS SUB-ASSY FOR MA-4 REV.99	1
720055	ASY GOOSENECK MIC KIT W/O ADAPTER PLATE REV.99	1
810045	MAN MA-4 INSTRUCTION MANUAL REV.99	1

ASSEMBLY 710162

ASY PC MODULE FOR AX-4

P/N	DESCRIPTION	QTY	REF DESIG
150001	CAD 22 PF 20% 50V Z5U .2LS .15THK	4	C30 C33 C32 C31
150002	AAA CAE 1UF N.P. ELECTROLYTIC 50V R.L.	4	C46 C49 C48 C47
150006	CAD 100PF DISC 10%	1	C20
150011	CAE 100UF ELECTROLYTIC 35V R.L.	2	C3 C2
150030	CAT 4.7UF TANTALUM 16V	1	C54
150034	CAN .22UF MONOLYTHIC 50V	4	C25 C24 C23 C22
150035	AAA CAN .1 MONOLYTHIC 104ZU 50V	4	C38 C41 C40 C39
150058	CAD .0039 UF AT 1KV	1	C55
150064	CAE 10UF 50V R.L. ELECTROLYTIC	1	C1
150082	CAN .022 UF MONO CK05 10% 50V	8	C52 C51 C50 C29 C28 C27 C26 C53
150085	CAN .1UF MONO CK05 100V 10%	1	C19
150087	CAE 4.7UF/50V NP ELECTROLYTIC R.L.	4	C43 C42 C45 C44
170090	PCB AX-4 PC BOARD	1	
210112	TER HEADER MULTI PIN HEADER(MIN 18 PIN)	6	X X J1 X X X
210134	SWC PC MOUNT 1/4 IN JACK DOUBLE OPEN CIRCUIT	2	J3 J4
410002	RES CF 1/4W 5% 10 OHMS	1	R4
410004	RES CF 1/4W 5% 22 OHMS	1	R3
410010	RES CF 1/4W 5% 1K OHMS	1	R112
410011	RES CF 1/4W 5% 2.2K OHMS	1	R40
410014	RES CF 1/4W 5% 2K OHMS	4	R86 R85 R87 R88
410016	RES CF 1/4W 5% 10K OHMS	2	R39 R20
410017	RES CF 1/4W 5% 15K OHMS	8	R30 R29 R28 R27 R44 R43 R42 R41
410021	RES CF 1/4W 5% 47K OHMS	5	R54 R53 R23 R56 R55
410024	RES CF 1/4W 5% 100K OHMS	8	R37 R36 R35 R34 R33 R32 R31 R38
410028	RES CF 1/4W 5% 220K OHMS	10	R90 R89 R68 R67 R66 R65 R111 R110 R92 R91
410030	RES CF 1/4W 5% 470K OHMS	12	R61 R100 R99 R98 R97 R76 R75 R74 R73 R64 R63 R62 R47 R45 R48 R46
410037	RES CF 1/4W 5% 8.2K OHMS	4	R1
410042	RES CF 1/4W 5% 470 OHMS	1	
410057	RES CF 1/4W 5% 68 OHMS	4	R104 R103 R102 R101
410058	RES CF 1/4W 5% 1 MEGOHM	4	R60 R59 R58 R57
410099	RES CF 1/2W 5% 560 OHMS	4	R108 R107 R106 R105
410105	RES CF 1/8W 1% 47.5K OHMS	12	R72 R71 R70 R69 R84 R83 R82 R81 R80 R79 R78 R77
410106	RES CF 1/4W 5% 430 OHMS	4	R95 R94 R93 R96
410111	RES MF 1/8W 1% 39.2K OHMS	4	R51 R50 R49 R52
480000	DID 1N4148 SIGNAL DIODE	9	D18 D13 D12 D11 D10 D9 D8 D7 D6
480001	DID 1N4001 RECTIFIER DIODE	1	D1
480004	TRA MPS-A13 TRANSISTOR	4	Q10 Q13 Q12 Q11
480006	TRA 2N2222 TRANSISTOR	4	Q2 Q5 Q4 Q3
480008	TRA MPS-A63 TRANSISTOR	4	Q6 Q9 Q8 Q7
480026	DIO 1N957B ZENER DIODE 6.8V 5% .4W	4	D14 D15 D16 D17
480070	AAA ICS NE5532 DUAL LO NOISE OP AMP	3	IC4 IC2 IC5
480092	ICS QUAD CMOS ANALOG SWITCH DG211CJ	1	IC3
510070	SWT NON-LOCK MOM #F1750044U0ATB21011601BA6303	1	

ASSEMBLY 720053

ASY CHASSIS SUB-ASY FOR AX-4

P/N	DESCRIPTION	QTY
210004	SWC D6M CONNECTOR	1
210063	SWC D6F CONNECTOR	1
210117	AMP 6 PIN MTA HOUSING AMP #640440-6	1
250274	MET AX-4 CHASSIS	1
710162	ASY PC MODULE FOR AX-4	1

ASSEMBLY AX-4

FGI IFB EXTENSION ACCESS STATION

P/N	DESCRIPTION	QTY
250273	MET AX-4 FRONT PANEL	1
250275	MET AX-4 COVER	1
250278	MET CHASSIS MTG PLATE (INTERNAL) FOR MA/AX	2
720053	ASY CHASSIS SUB-ASY FOR AX-4	1
810046	MAN AX-4 INSTRUCTION MANUAL REV.99	1
B20028	ASY MA/AX INTERCONNECT CABLE	1

ASSEMBLY 710141

ASY PIC-4 MODULE

P/N	DESCRIPTION	QTY	REF	DESIG
150007	CAD 200PF DISC 10X	8	C42 C45 C32 C29 C17 C16	
150008	CAM .022UF MYLAR POLY ONE 10X (150046 EQUIV)	4	C6 C5 C44 C43 C31 C30	
150009	AAA CAT 1UF TANTALUM 35V A.L.	1	C11	
150021	CAE 220UF ELECTROLYTIC 35V R.L.	1	C37	
150026	CAD 39PF DISC 5X	5	C22 C38 C50 C49 C23	
150027	CAE 10UF ELECTROLYTIC 16V R.L.	8	C26 C20 C13 C9 C2 C48	
150035	AAA CAN .1 MONOLYTHIC 104ZU 50V	4	C39 C35 C24 C52 C51 C25	
150043	CAN .47UF MONOLYTHIC 50V	8	C4 C46 C41 C33 C28 C19	
150044	CAT 4.7 UF TANTALUM 35V R.L.	1	C15 C8 C36	
150065	CAE 2.2UF N.P. ELECTROLYTIC 50V	8	C47 C40 C34 C27 C18 C14	
170072	PCB PIC-4 CIRCUIT BOARD REV.A	1	C7 C3	
210075	TER DIP 16 PIN DIP SOCKET	1		
210101	SOC 8 PIN DIP SOCKET	5		
210106	TER MOLEX 8624-NC 10-89-1203 HEADER	1	H2	
210109	SOC SINGLE PIN SOCKET FOR DLC OPTION JUMPS	8		
210112	TER HEADER MULTI PIN HEADER(MIN 18 PIN)	32		
410011	RES CF 1/4W 5% 2.2K OHMS	4	R45 R43 R32 R56	
410013	RES CF 1/4W 5% 4.7K OHMS	8	R2 R89 R78 R75 R64 R23	
410016	RES CF 1/4W 5% 10K OHMS	8	R14 R11 R5 R87 R80 R73 R66 R20	
410018	RES CF 1/4W 5% 22K OHMS	4	R17 R8 R83 R70 R69 R84	
410022	RES CF 1/4W 5% 27K OHMS	16	R28 R19 R18 R7 R6 R86	
410024	RES CF 1/4W 5% 100K OHMS	16	R81 R72 R67 R62 R63 R31	
410028	RES CF 1/4W 5% 220K OHMS	2	R30 R61 R60 R29 R92 R93 R91 R90 R24 R13	
410030	RES CF 1/4W 5% 470K OHMS	4	R12 R1 R35 R55 R46 R42	
410031	RES CF 1/4W 5% 12K OHMS	6	R33 R53 R48 R40 R76 R77	
410041	RES CF 1/4W 5% 1.2K OHMS	8	R71 R68 R85 R82 R25 R52 R49 R39 R36 R57	
410049	RES CF 1/4W 5% 91K OHMS	4	R4 R88 R79 R74 R65 R21	
410058	RES CF 1/4W 5% 1 MEGOHM	4	R16 R9 R26 R59 R27 R58	
410060	RES CF 1/4W 5% 240 OHMS	8	R37 R51 R50 R38 R3 R54 R47 R41 R34 R22	
410065	RES CF 1/2W 5% 22 OHMS	1	R15 R10 R44	
470035	REV 50K TRIMPOT PIHER#PT15NB-50K	6	P5 P4 P3 P2 P1 P6	
480000	DIO 1N4148 SIGNAL DIODE	9	D2 D10 D9 D8 D7 D6	
480001	DIO 1N4001 RECTIFIER DIODE	1	D5 D4 D3 D1	
480004	TRA MPS-A13 TRANSISTOR	4	Q8 Q7 Q4 Q3	
480021	AAA ICS NE5534N OP AMP LOW NOISE	1	IC5	
480056	ICS RC4559NB DUAL OP AMP 8-PIN DIP	6	IC7 IC6 IC4 IC3 IC2 IC1	
480079	TRA J174 P-CHANNEL JFET	4	Q6 Q5 Q2 Q1	
510071	SWT SPDT MINI TOG PC	8	S7 S8 S6 S5 S4 S3	
			S2 S1	

ASSEMBLY 720054

ASY PIC-4000 REAR PANEL ASSY

P/N	DESCRIPTION	QTY
150029	CAD .01UF DISC 1.4KVDC 150VAC UL APPROVED	1
210002	AAA SWC D3F CONNECTOR	3
210003	AAA SWC D3M CONNECTOR	7
210063	SWC D6F CONNECTOR	2
250281	MET PIC-4000 REAR PANEL	1

ASSEMBLY PIC-4000

FGI PGM. INTERR. CONT. (STAND ALONE)

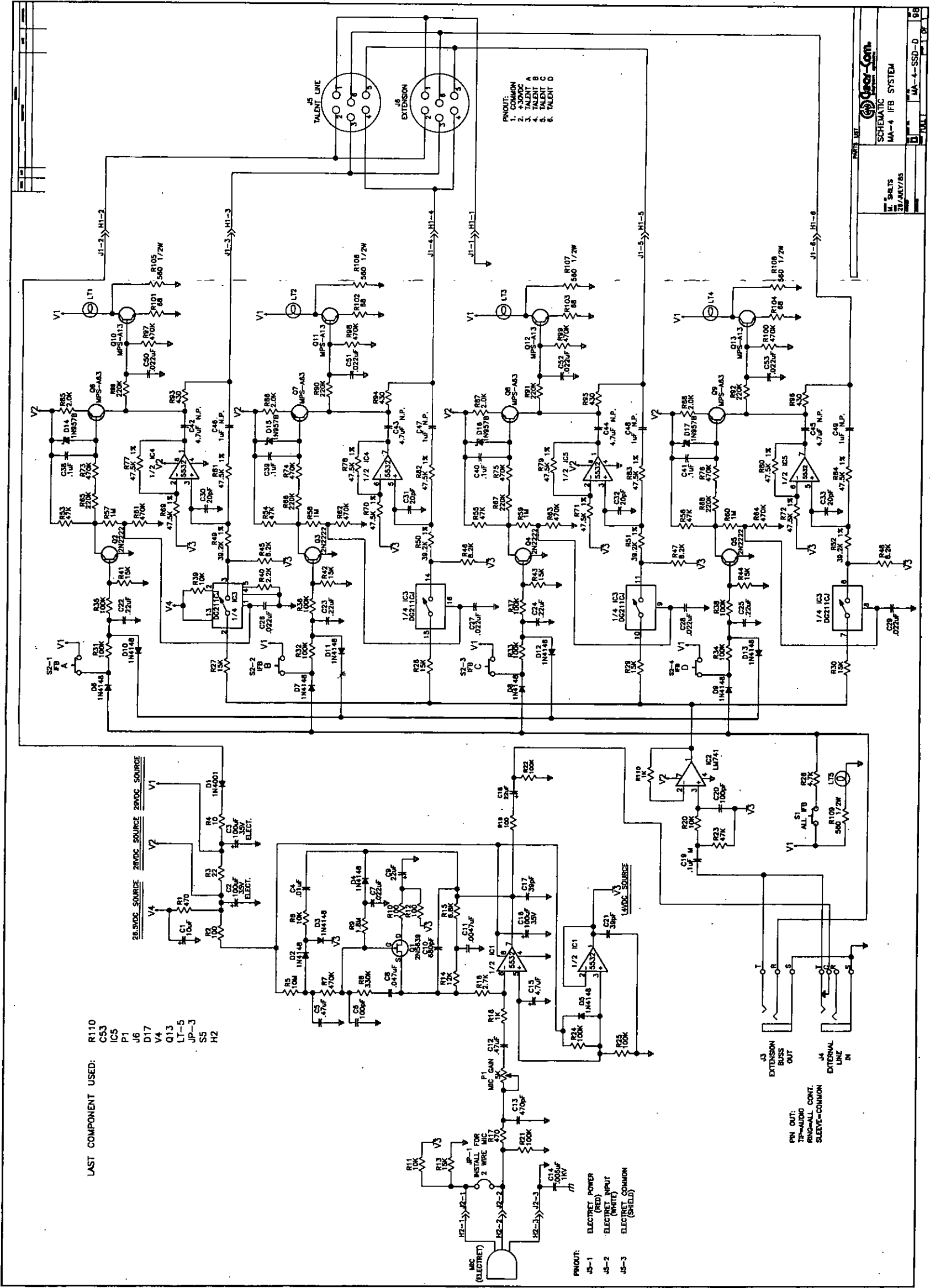
P/N	DESCRIPTION	QTY
210115	AMP 16 PIN MTA HOUSING #1-640440-6	2
240025	KNB PIHER KNOB CODE 1 RED	4
240033	KNB SHORT BROWN PIHER KNOB CODE 1	2
250073	AAA MET MODULAR CHASSIS MAIN FRAME 1 3/4 INCH	1
250152	AAA MET COVER FOR 1 3/4 INCH RACK	1
250282	MET PIC-4000 FRONT PANEL	1
280103	HDS PCB SUPPORT RICHCO#LCBSB-4-NA	2
710141	ASY PIC-4 MODULE REV.D	1
720054	ASY PIC-4000 REAR PANEL ASSY	1
735011	ASY PIC-4000 HARNESS	1
810047	MAN PIC-4000 INSTRUCTION MANUAL	1

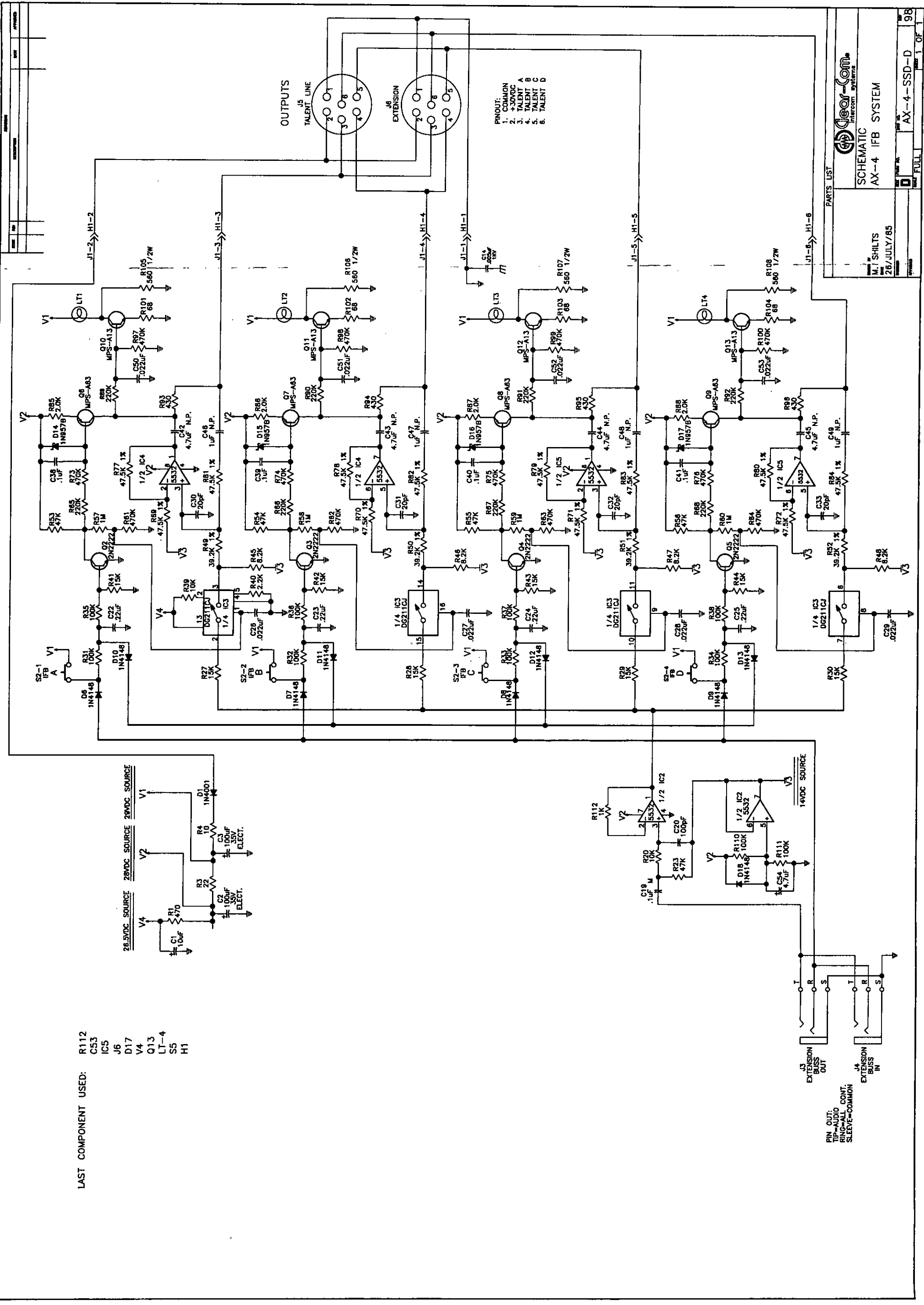
D. Specifications

Circuit Design:	IC amps, solid state audio switching
Power Required:	24-32 V.D.C. 60 mA max. (PIC-4000) 180 mA max, 140 mA idle (MA-4) 150 mA max, 120 mA idle (AX-4)
Frequency response:	200 HZ to 18 kHz.
Signal to noise ratio:	better than -60 dB (mic input) better than -65 dB (pgm input)
Distortion:	< 0.1% T.H.D. @ 1kHz
Nominal IFB Line Level:	-18dBv *
Gains:	
(PIC-4000) Pgm to IFB line:	unity (trims full clockwise)
(MA-4) Mic to IFB line:	+40 dB (trim at mid position)
(AX-4) Extension bus to IFB line:	-14 db
Maximum number of access locations:	50
Maximum number of talent positions:	96 (24 4-channel access stations)
IFB Line Connectors:	6-pin XLR
Dimensions (HxWxD):	(PIC-4000) 1.75" x 19" x 6.5" (MA-4) 1.75" x 6.3" x 6.3" (AX-4) 1.75" x 4.9" x 6.5"
Weight:	(PIC-4000) 3.2 lbs. (1.5 kg.) (MA-4) 1 lb. 7.68 oz (.67 kg) (AX-4) .96. lb (.43 kg)

* 0 dBv is referred to 0.775 V.RMS
Specifications subject to change without notice.

E. Schematics





- LAST COMPONENT USED:
- R112
 - C53
 - IC5
 - J6
 - D17
 - V4
 - Q13
 - LT-4
 - S5
 - H1

OUTPUTS

J5 TALENT LINE

J6 EXTENSION

PNOUT:

1. COMMON
2. 7.50VDC
3. TALENT A
4. TALENT B
5. TALENT C
6. TALENT D

PIN OUT:

TIP-AUDIO CONT.

RING-ALL SLEEVE-COMMON

AX-4 IFB SYSTEM

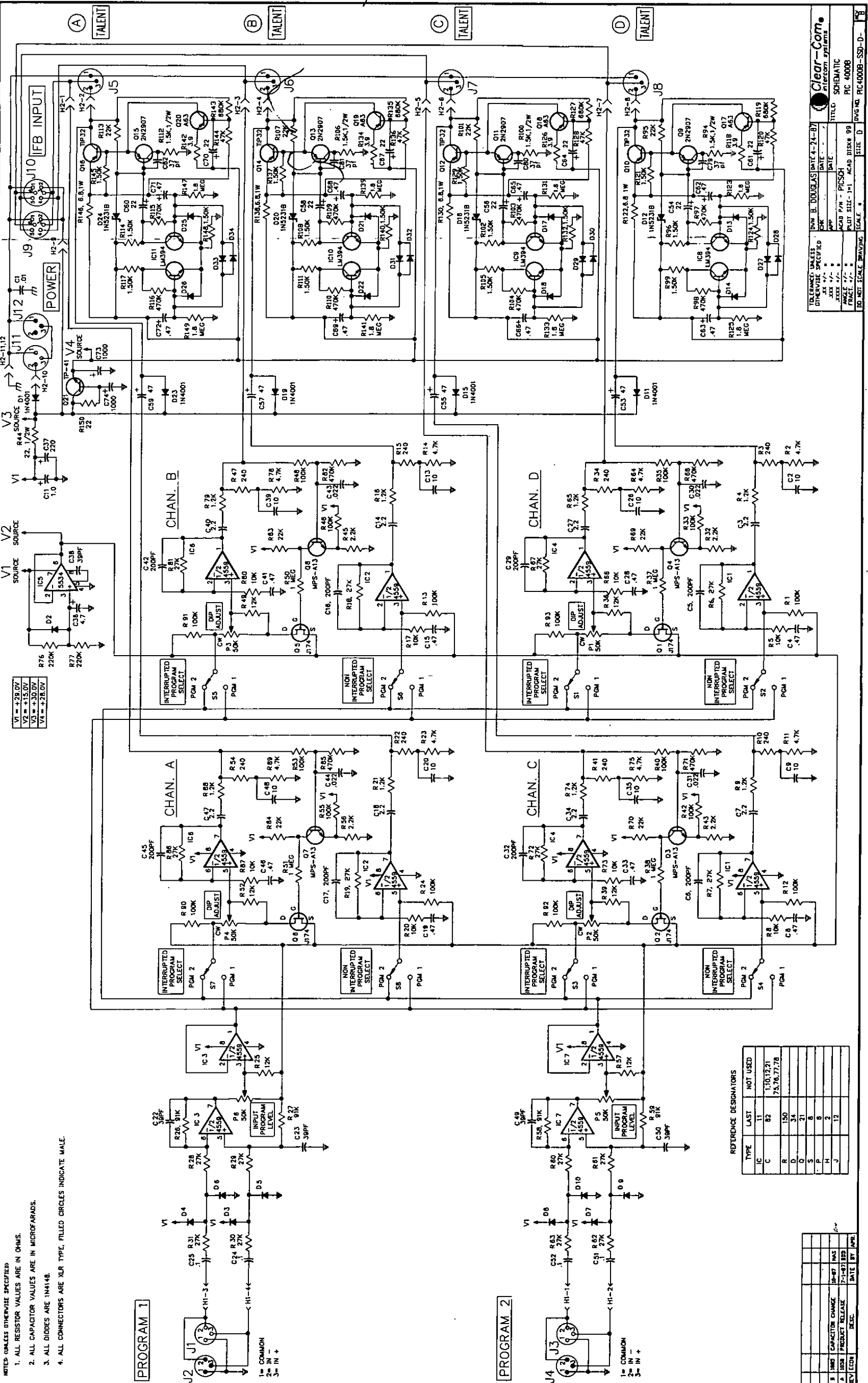
SCHEMATIC

M.I. SHILTS

28/JULY/85

AX-4-SSD-D

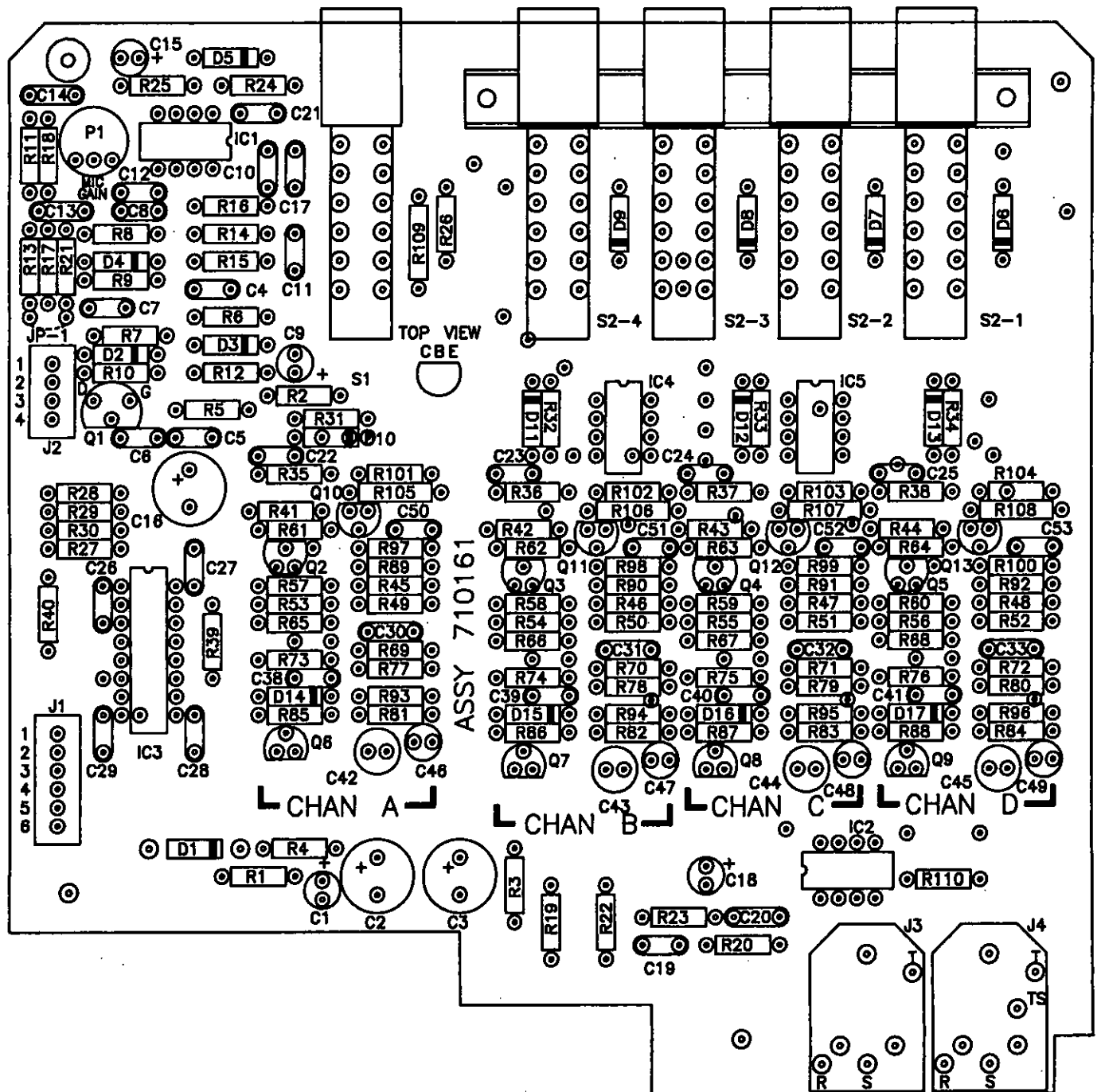
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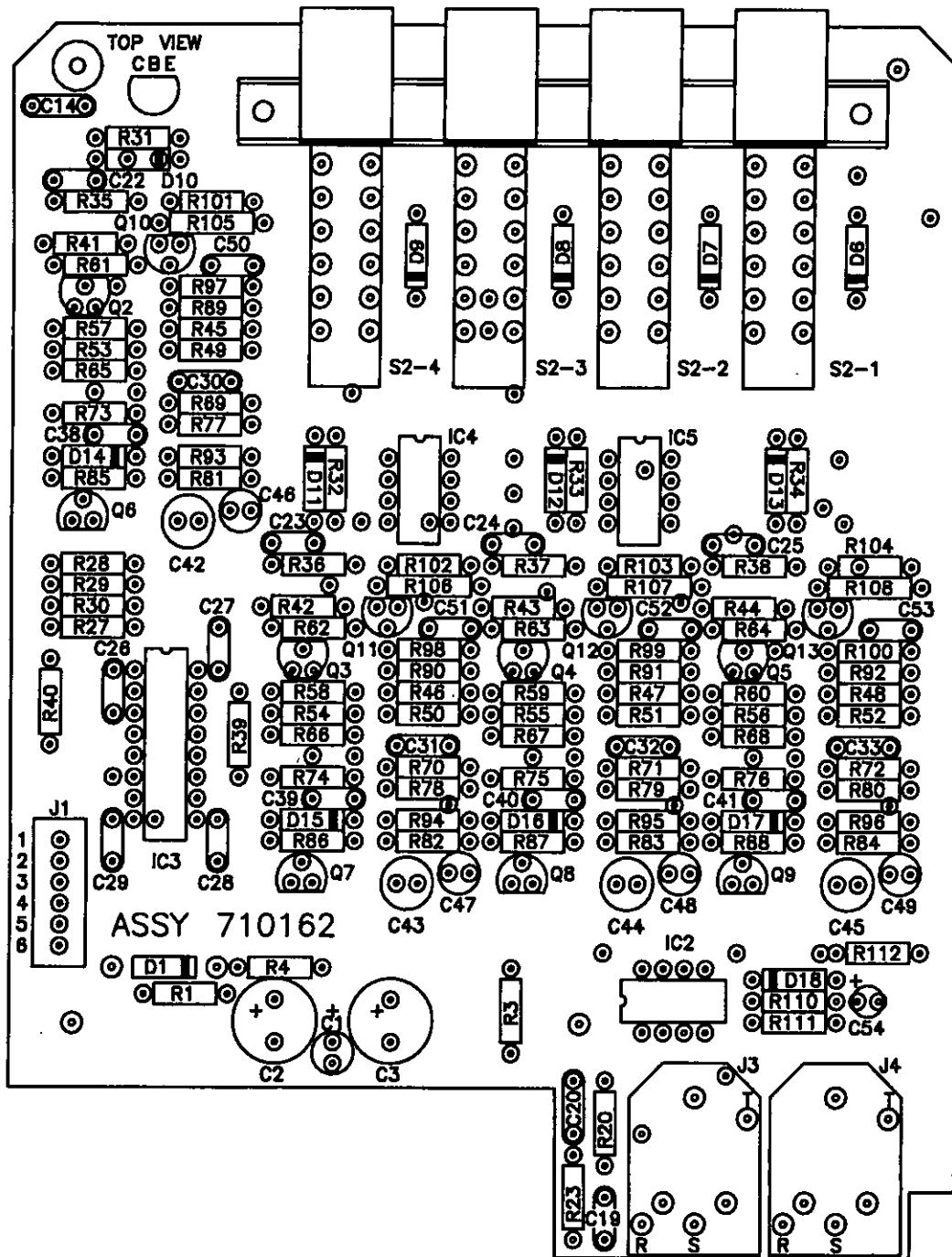
- NOTES (UNLESS OTHERWISE SPECIFIED)
1. ALL RESISTOR VALUES ARE IN OHMS.
 2. ALL CAPACITOR VALUES ARE IN MICROFARADS.
 3. ALL DIODES ARE 1N4148.
 4. ALL CONNECTORS ARE XLR TYPE, FILLED CIRCLES INDICATE MALE.

Clear-Com
 TITLE: SCHEMATIC
 PART: PIC 4000B
 DATE: 7-1-80
 DRAWN BY: J. B. DOUGLAS
 CHECKED BY: J. B. DOUGLAS
 DATE: 7-1-80
 SCALE: 1:1
 SIZE: D
 DWG NO: PIC 4000B-SSD-D-1

F. Component Locations



MA-4



AX-4