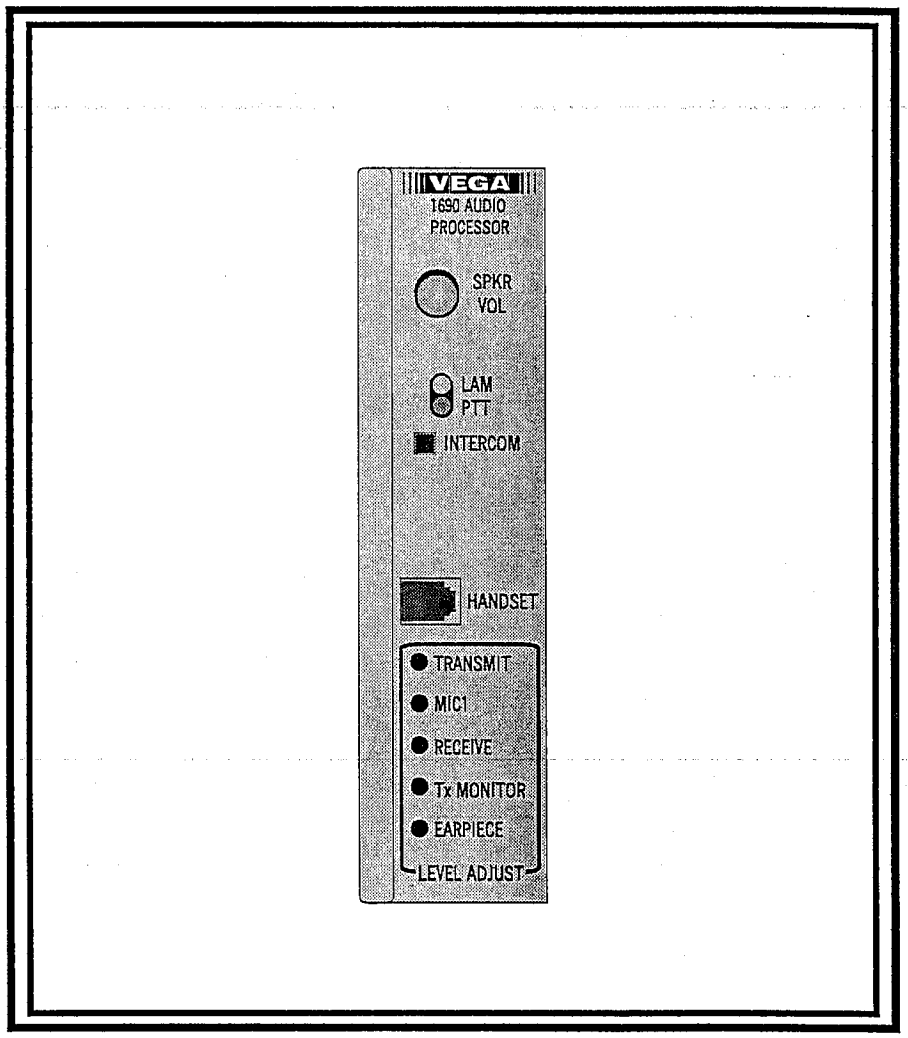
VEGA

a MARK IV company

1690 Audio Processor

Service Manual



Contents

1. Forward

This manual is intended for use by experienced technicians familiar with similar types of equipment. All the information required for installation, operation, and servicing is included.

The manual is divided into sections for easy reference. Each section, although related, may be read independently without first reading the previous section. Any special equipment, if supplied, will be included at the end of the manual.

2. General

The Vega Model 1690 Audio Processor module provides a transmit and receive 600-ohm audio processing interface with active receive mute switching. A microphone or handset may be plugged in the front panel for audio input and a five watt bridging audio output is available for an external speaker. Provisions for PTT and mute controls are provided as well as an input for tone control signaling. An intercom circuit is available to accommodate an intercom without generating a PTT command. Front panel indicators provide visual identification of line activity as well as PTT. Level setting controls are accessible through the front panel.

The 1609 plugs into a Tellabs, Type 10 or equivalent open frame rack and can be used in conjunction with any remote control console.

2.1 Standard Features

- One receive balanced 600-ohm/10-kilohm bridging line or one high-impedance 10-kilohm unbalanced input
- Microphone/handset input with front panel LED PTT indicator
- Compressor/limiter circuit to maintain proper system levels
- One 600-ohm balanced line transmit output
- Five watt, eight ohm bridging speaker output
- Front panel Line Activity Monitor (LAM) LED indicator
- Front panel intercom switch
- On-board voltage regulator allows operation from any semi-regulated 12 volt dc source

2.2 Optional Features include:

- Jumper selectable 600-ohm or 10-kilohm ohm receive input
- Jumper selectable microphone input for electret, carbon, or dynamic microphone elements
- TX monitor selectable in 4 wire operation
- PTT selectable, positive or negative
- Jumper selectable, 2 or 4 wire receive audio

3. Installation

Caution - ESD Sensitive

This piece of electronic equipment contains electronic components known to be susceptible to Electro-Static Discharge (ESD). Precautions have been taken to avoid the effects of ESD, however the user is encouraged to promote safe handling techniques in the handling, storage and service of this equipment.

3.1 Introduction

Only experienced technicians familiar with similar types of equipment should attempt to install the 1690. Only basic hand tools are required to remove the card, change jumper settings, connect phone, signal, and power lines. Read this section thoroughly before attempting to install the card. Exercise care to prevent wiring errors and equipment damage.

3.2 Inspection

Carefully unpack the equipment and inspect it thoroughly as soon as possible after delivery. If any part of the equipment has been damaged in shipment, report the extent of the damage to the transportation company immediately.

This unit has been inspected and adjusted to its recommended operation condition at the factory. Unless it has been handled roughly in shipment, abused or tampered with, it won't require further adjustments. Simply make the installation connections as described in the following sections.

3.3 Mounting

This card is intended to be mounted in a Tellabs Type 10 or equivalent open frame rack. To avert erroneous operation, don't install the card adjacent to equipment that generates high temperature or electromagnetic radiation. Always provide an appropriate service loop on interconnecting cables.

3.4 Access for Installation/Servicing

When installing into a Tellabs Type 10 or equivalent open frame rack, ensure the front and rear of the rack have clear access for card installation and wiring.

To service, remove the 1690 from the rack or place on a circuit card extension for access while troubleshooting.

3.5 Power

Primary power for the card is a regulated source of 12 V_{dc}. Either a Vega power supply or customer provided power supply may be used.

4. Connections

Warning - High Voltage! Remove Power Before Servicing!

High voltage may be present on this card (if used for switching phone lines with superimposed dc current signaling) which could cause serious injury or loss of life. Only qualified personnel familiar with this type of circuitry should work on this equipment. To prevent injury, damaging the card or other equipment, remove power before making connections.

4.1 Power connections

Connect positive 12 V_{dc} to pins 55 and 56. Connect the 12 V_{dc} return (normally ground) to pins 39 and 40. For best performance, use at least 20 AWG or larger wire for power connections.

4.2 Signal Connections and Card Edge Connector Pin Assignment

Refer to the schematic and Table 3 (shows the 1690's pin assignments and has a blank for any customized functions that might be configured) for the appropriate pin number to make connections. Use at least 24 AWG wire for signal connections.

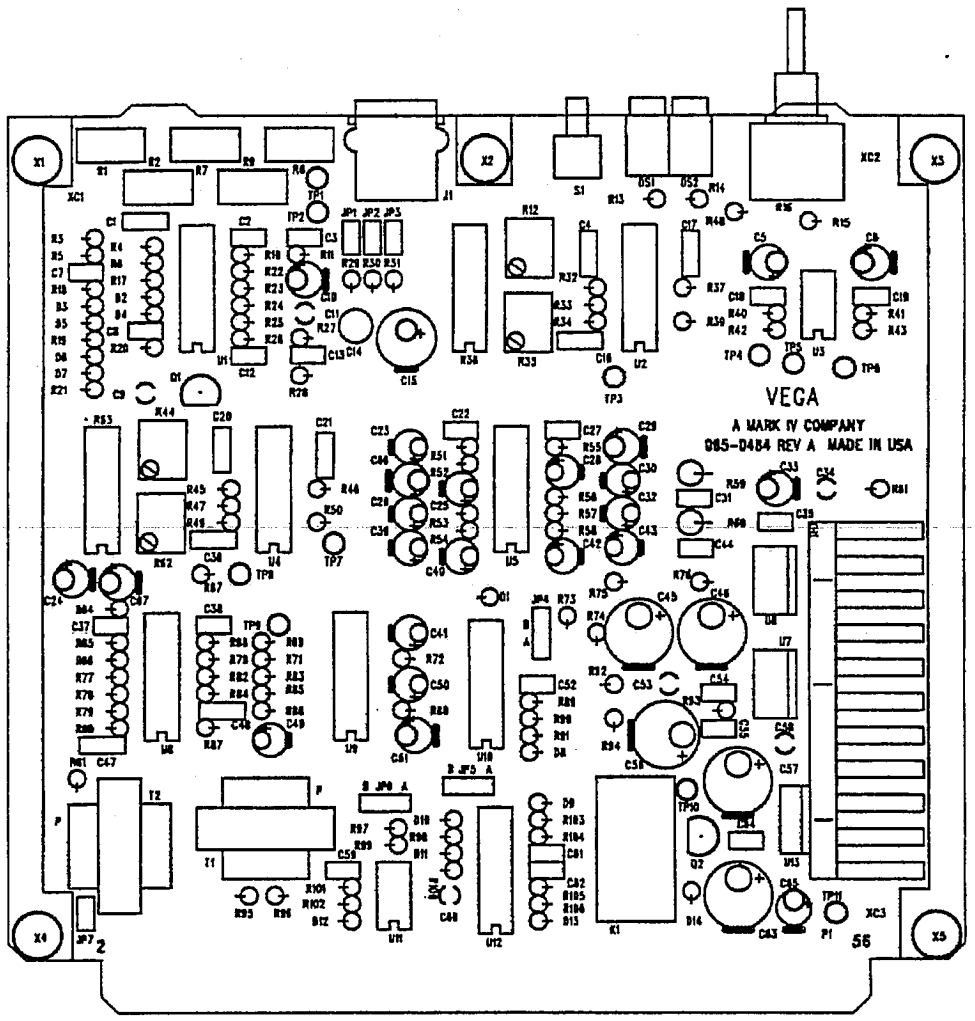


Figure 1. 1690 Component Location

4.3 Special Options

4.3.1 Microphone Jumpers

Depending on which microphone you are using, the following jumpers must be installed:
JP1 - dynamic element with a low output; JP2 - electret element; JP3 - carbon element.
No jumpers need to be installed for a dynamic microphone with a high output. Refer to Table 1 below for jumper information.

Table 1. Jumper Options

JP#	Function	Jumper Status				Notes
		In	Out	A	B	
1	Mic, Dynamic Element	In	-	N/A	N/A	Low Output
2	Mic, Electret Element	In	-	N/A	N/A	
3	Mic, Carbon	In	-	N/A	N/A	
N/A	Mic, Dynamic Element	-	-	N/A	N/A	High Output
4	2W/4W	N/A	N/A	2W	4W	
5	TX Monitor	N/A	N/A	In	Defeat	
6	PTT Polarity	N/A	N/A	Neg.	Pos.	
7	RX 600Ω/10kΩ	600Ω	10kΩ	N/A	N/A	

4.3.2 Two-Wire Receive Audio

This circuit allows monitoring of receive two-wire audio or transmit audio. It sends the signal to the receive compression\limiter circuit, and then to the same path as a normal four-wire receive input. The level may be adjusted from the front panel. Refer to Table 1 for proper jumper selection.

4.3.3 Two-Wire/Four-Wire Operation

The 1690 module is capable of operation over two-wire or four-wire phone lines, by changing the position of jumper JP4. Refer to Table 1 for proper jumper selection. In four-wire operation, separate inputs are provided for receive and transmit inputs. In Two-Wire operation, the single phone line connection is monitored and routed to the normal receive circuits.

4.3.4 Transmit Line Monitor (Four-Wire Operation)

The 1690 module is capable of monitoring the transmit phone line, in order to hear the audio of parallel units operating on the same phone line. This circuit monitors the transmit phone line, and sends the signal to the receive compression/limiter circuit, and then along the same path as the four-wire receive input. The level may be adjusted from the front panel. JP5 is used to select this function. Refer to Table 1 for proper jumper selection.

4.3.5 External PTT

This circuit provides for an external input to activate the PTT circuits. The polarity of the external input can be positive or negative and is selectable by the position of JP6. Refer to table 1 for proper jumper position.

4.3.6 Receive Line Input Impedance

A 620Ω terminating resistor is provided on the four-wire receive line input. Refer to the schematic and Table 1 for the proper jumper installation.

4.3.7 Parallel Transmit Line Impedance Matching

If the transmit line output is to operate in parallel with another line terminating device, a resistive pad must be added. A similar pad must be installed in each parallel device. The pad creates a impedance-matching network with the phone line, however it induces a loss in the transmission path which lowers the line level and may affect the ultimate performance.

To pad the circuit, refer to the schematic and Table 2 to replace resistors R95 and R96 (0-ohm) with the appropriate value resistors.

Table 2. Parallel Transmit Line Resistor Network Selection

		Parallel Lines, Resistor Value / Line Loss (dB)		
TX Ch #	**Resistor Designation**	2	3	4
1	R95, R96	300 Ω / 6 dB	620 Ω / 9.5 dB	910 Ω / 12.0 dB

4.4 Securing the Connections

After all power and line connections are made, the wires should be neatly bundled and secured in place to prevent accidental breakage when in service. Use one or more of the cable guides supplied with the card rack, or tie in place with appropriate wire ties.

4.5 Interface Connector Numbering

The Tellabs (or equivalent) card cage interface connector pins may have a different numbering scheme than the 1690. Table 3 depicts the card edge pin numbers as shown in the schematic, which is also the same as one type of connector, followed by two alternate numbering schemes as used on other connectors. Diligently review the actual connections being used, to Table 3, to ensure proper connections are made for optimum performance. Record the external connections made during installation in the blanks rows in Table 3's "User Connection" column (make copies of Table 3 and keep records for each 1690).

Table 3. Card Edge Connector Pin Assignments (Solder Side)

Card Edge	Alt #1 Conn	Alt #2 Conn	Function	User Connection
1	A	A	RX Bal. Line In (+)	
3	B	B	Mic. Earpiece	
5	C	C	Mic. Signal Tone In	
7	D	D	RX Unbal. Line In	
9	E	E	TX Balanced Line Output (-)	
11	F	F	*No Connection*	
13	H	H	*No Connection*	
15	J	J	Mic. PTT	
17	K	K	External PTT	
19	L	L	*No Connection*	
21	M	M	*No Connection*	
23	N	N	External Mute (low)	
25	P	P	*No Connection*	
27	R	R	Mic. Audio In	
29	S	S	IC (low)	
31	T	T	Burst (low)	
33	U	U	*No Connection*	
35	V	V	PTT Relay Output 1-NO	
37	W	W	PTT Relay Output 1-COM	
39	X	X	Power Supply 12 Vdc Gnd	
41	Y	Y	Speaker Out (-)	
43	Z	Z	PTT Relay Output 2-NO	
45	$\overline{A}$	AA	PTT OUT (Transistor Sw Low)	
47	$\overline{B}$	BB	*No Connection*	
49	$\overline{C}$	CC	*No Connection*	
51	$\overline{D}$	DD	*No Connection*	
53	$\overline{E}$	EE	*No Connection*	
55	$\overline{F}$	FF	Power Supply 12 Vdc Input	

(Component Side)

Card Edge	Alt #1 Conn	Alt #2 Conn	Function	User Connection
2	1	1	RX Bal. Line In (-)	
4	2	2	Signal Aux. Output	
6	3	3	Signal Aux. Ground	
8	4	4	RX Unbalanced Line In	
10	5	5	TX Balanced Line Output (+)	
12	6	6	*No Connection*	
14	7	7	*No Connection*	
16	8	8	*No Connection*	
18	9	9	*No Connection*	
20	10	10	*No Connection*	
22	11	11	*No Connection*	
24	12	12	*No Connection*	
26	13	13	*No Connection*	
28	14	14	MICAGND	
30	15	15	*No Connection*	
32	16	16	MON (low)	
34	17	17	*No Connection*	
36	18	18	*No Connection*	
38	19	19	PTT Relay Output 1-NC	
40	20	20	Power Supply 12 Vdc Gnd	
42	21	21	Speaker (+)	
44	22	22	PTT Relay Output 2-NC	
46	23	23	PTT Relay Output 2-COM	
48	24	24	*No Connection*	
50	25	25	*No Connection*	
52	26	26	*No Connection*	
54	27	27	*No Connection*	
56	28	28	Power Supply 12 Vdc Input	

5. Operation

5.1 Description

1690 audio processors have a balanced 600-ohm/10-kilohm bridging receive amplifier and/or an unbalanced high impedance 10k ohm input. The receive amplifier is adjustable from –30 to +10 dBm input. Following the receive input is the compression/limiter circuit which limits the input circuitry to no greater than 3 dB above the threshold setup by the receive input circuitry. Following the compression/limiter is the notch filter tuned to 2175 Hz.

The 1690 also has a 5 watt /8 ohm speaker amplifier.

On the transmit side, the 1690 has a microphone pre-amp which is jumper selectable for either a carbon, electret, or dynamic elements. The microphone level is adjustable to match the range of inputs. The microphone circuit also has a compression/limiter which limits the output to no greater than 3 dB above the preamp level. The transmit audio also has a notch filter to filter out audio energy in the 2175 Hz area. The line amplifier is capable of driving a 600-ohm load at a maximum of +10 dBm. In addition, the 1690 has circuitry to provide transmit switching and receive line muting as well as muting the speaker during transmission. Logic circuitry is provided for PTT, monitor function, burst tone for tone signaling and an external mute to mute the speaker. An intercom function is provided for communicating on the phone line without initiating a PTT.

The module has a PTT relay that is energized during PTT for keying a transmitter or other device during transmission. The module contains an onboard voltage regulator to allow operation from any semi-regulated 12 V_{dc}.

5.2 Operating Capabilities

Receive Audio

The 1690 accepts one balanced or unbalanced receive input and provides one 600-ohm balanced transmit audio output. The input is externally mutable by switched low input at the rear panel connection.

The module accepts a microphone or handset input through the front panel jack or the rear panel connector.

The transmit amplifier is a 600-ohm balanced line output. The amplifier output is adjustable with a range of -15 to +10 dBm.

The module has a speaker amplifier output that may drive an eight ohm external bridging speaker with an output level of five watts. The level is adjustable.

A PTT from the microphone or handset will gate on the microphone amplifier and mute the speaker to inhibit crosstalk.

5.3 Controls and Indicators

A front panel PTT LED lights when the microphone or handset PTT switch is activated. A Line Activity Monitor (LAM) LED lights when line audio input is detected.

An intercom push button switch is on the front panel for audio transmission without PTT relay activation. Speaker volume adjustment is controlled from the front panel. Six level adjusts are through the front panel.

6. Theory of Operation

6.1 General

The 1690 module uses a low loss, wide band transformer to interface to the phone line. Gain elements are low noise, low distortion, high gain operational amplifiers for quality performance.

A handset/microphone amplifier circuit is included, with provision for jumper selection of carbon, electret, or dynamic microphone elements. Also included is a compressor/limiter circuit to maintain system levels.

A five-watt 8-ohm speaker amplifier is provided for an external bridging speaker.

An on board voltage regulator maintains proper voltages for optimum performance.

6.2 Receive Amplifier

This amplifier is a jumper-selectable, 600-ohm or 10-kilohm, high impedance balanced input that is adjustable from a range of –30 dBm to 10 dBm.

The receive amplifier has an unbalanced input with an input level of 0.025 V_{rms} to 2.5 V_{rms} each. The amplifier output is adjustable and is accessed through the front panel. The receive amplifier's output level is normally setup for a level of 0.776 V_{rms} at the output test point.

6.3 Compression Limiter Circuit

This circuit amplifies and limits the output of the receive inputs ensuring uniform audio levels from all channels irrespective of the input level received from the external line input. Once achieving the compression level, a 30 dB increase in signal level results in only a maximum +3 dB increase in output level without distortion. Normally the input level, at zero dB, allows the limiter to amplify in a linear fashion below that level, and above the 0.776 V_{rms} will limit the output to no more than a 3 dB rise above that point.

6.4 Transmit Line Amplifier

This bridging amplifier drives a 600-ohm balanced line with an output level adjustable from –15 dBm to +10 dBm. The output level is adjustable through the front panel.

6.5 Microphone Input

A microphone input is available through a jack on the front panel. It allows connection of a handset or palm type microphone through a standard modular phone connection. The jumper options allow the use of a carbon, electret, or dynamic element. The microphone amplifier is adjustable to accommodate the full range of microphones. It's routed through a compression limiter similar to the receiver circuit. This compressor operates in a linear fashion below 0.776 V_{rms} input or will have a limit of +3 dBm increase if that level is exceeded. The output of the microphone circuit is normally muted and is gated on by the PTT switched in the handset or microphone. The output of the microphone circuit is routed to the transmit line output amplifier.

6.6 Two-Wire Receive

The 1690 is capable of receiving audio on a single two-wire phone line in simplex operation or it can monitor the transmit line in four wire operation.

6.7 TX Monitor and TX Monitor Defeat

1690s are shipped with the TX monitor function enabled (JP5 in the A position; page 2, C6 on the schematic). To defeat the TX monitor function move JP5 to the B position.

6.8 Line Activity Monitor (LAM)

This indicator is illuminated by audio from the receive audio channel. The output of the receive compressor is routed to the line activity monitor circuit which detects audio up to ten dB below nominal and illuminates the LED. The audio is filtered to charge up a capacitor which illuminates LAM LED.

6.9 Speaker Amplifier

This amplifier can supply five watts to an eight ohm external speaker. This output is adjustable and accessible from the front panel. The speaker output can be muted either through the microphone PTT or through a separate connection on the rear panel.

6.10 Controls

A PTT signal from the PTT switch on the handset or microphone unmutes the microphone audio amplifier. This PTT signal is also routed to the rear connector panel and can be activated by a switched low input. The PTT relay out is at the rear connector and switches when the PTT is activated.

6.11 Indicators

The front panel has a Line Activity Monitor (LAM) LED which illuminates when the receive channel is receiving audio and a PTT LED which illuminates when the PTT switch has been activated on the handset, microphone PTT or external PTT.

6.12 Power Supply

The 1690 is intended for operation with a 12 V_{dc} semi-regulated power supply. The onboard regulator limits the input voltage and regulates the output voltages to operate the module under various input voltages. The power supply is fixed and non-adjustable. The regulator safely limits the output current through the module. Reverse input protection is also provided in case of an inadvertent reverse voltage input.

7. Parts List

Part No.	Description	Ckt Sym
012-0087	1690 AUDIO CARD ASSEMBLY	
021-6782	HEAT SINK PC B 3X TO-220	
065-0464	PCB 1690 AUD PROCESSING	
102-0120	CAP CER 20P 5% 50V S2L	C12
		C37
102-0290	CAP CER 100P S2L 5% 50V	C 2
		C38
102-0390	CAP CER 270P S2L 5% 50V	C 1
		C16
		C36
102-0400	CAP CER 33OP S2L 5% 50V	C47
		C48
103-0001	CAP CER .001 10%50V Y5P	C22
		C27
104-0516	CAP TANT 10MF 25V	C 9
		C34
		C53
		C58
104-0758	CAP TANT .47MF 10% RAD	C60
104-0767	CAP TANT 1UF 35V	C11
110-1340	CAP CER .1MF SMALL	C 3
		C 7
		C 8
		C13
		C18
		C19
		C31
		C44
		C54
		C55
		C64
110-1345	CAP CER .0022MF 5% NPO	C 4
		C17
		C20
		C21
110-1452	CAP CER .001MF 20% 50V	C35
		C52
		C59
		C61
		C62
112-1606	CAP ELEC 10MF 25V	C25
		C43
112-1608	CAP ELEC 1.0MF 20% 25V	C23
		C26
		C28
		C30
		C32
		C39
		C40
		C41
		C42
		C49
		C50
		C15
112-1645	CAP ELEC 4.7UF 25V MINI	C10
		C24
		C29
		C33
		C51
		C66
		C67
112-1675	CAP ELEC 10UF 16V RAD	C 5
		C 6
		C65
112-1678	CAP ELEC 1.0UF 50V NP	C14
112-1689	CAP ELEC 470MF 25V RAD	C45
		C46
		C56
		C57
		C63
130-0673	RES VAR 10K 20T 3/8SQ	R12
		R35
		R44
		R62
130-0687	VAR RES 10K Z PNL/PC MT	R16
130-0778	RES VAR 10K LOG CERMET	R1
		R9
130-0779	RES VAR 50K LOG CERMET	R8
130-0780	RES VAR 500K LOG CERMET	R2
		R7
132-0009	RES 1/4W ZERO-OHM JUMPER	R67
		R73
		R87
		R92
		R95
		R96
133-0001	RES CRBN 1.0 OHM 5% 1/2W	R59
		R60
134-2837	RES RN55D 15.0K 1% 1/4W	R40
		R41
134-2949	RES RN55D 576 1% 1/4W	R39
		R50
134-2967	RES RN55D 12.1K 1% 1/4W	R43
134-3032	RES RN55D 15.8K 1% 1/4W	R42
134-3080	RES RN55D 33.2K 1% 1/4W	R33
		R49
136-0022	RES COMP 150 5% 1/4W	R31
136-0032	RES COMP 1K 5% 1/4W	R 6
		R13
		R14
		R74
		R94
136-0040	RES COMP 4.7K 5% 1/4W	R102
		R103
		R106
		R23
		R91
		R97
		R98
136-0044	RES COMP 10K 5% 1/4W	R 4
		R 5
		R15
		R17
		R18
		R19
		R25
		R27
		R32
		R34
		R37
		R38
		R45
		R46
		R47
		R54
		R57
		R65
		R66
		R68
		R69
		R78
		R79
		R80
		R83
		R85
136-0045	RES COMP 12K 5% 1/4W	R48
136-0048	RES COMP 22K 5% 1/4W	R89
		R99
136-0050	RES COMP 33K 5% 1/4W	R 11
		R 28
		R 51
		R 52
		R 55
		R 56
		R 90
		R100
		R101
		R104
		R105
136-0056	RES COMP 100K 5% 1/4W	R29
		R72
		R88
136-0060	RES COMP 220K 5% 1/4W	R53

		R58
136-0090	RES COMP 620 5% 1/4W	R71
		R81
136-0094	RES COMP 6.2K 5% 1/4W	R86
136-0096	RES COMP 2K 5% 1/4W	R 3
		R26
		R64
		R84
136-0257	RES COMP 30 5% 1/4W	R61
		R75
136-0268	RES COMP 430 5% 1/4W	R93
136-0278	RES COMP 20K 5% 1/4W	R21
136-0289	RES COMP 200K 5% 1/4W	R10
		R20
136-1951	RES COMP 200 5% 1/4W	R76
136-1955	RES COMP 5.1K 5% 1/4W	R22
		R24
		R70
		R77
		R82
136-1983	RES COMP 9.1K 5% 1/4W	R30
136-1989	RES COMP 3.0K 5% 1/4W	R 3
138-0071	RNET ISO 8X33K DIP 2%	R36
		R63
149-0642	XSTR NDMOS 2N7000 TO92 SW	Q1-2
161-0426	DIODE 1N4148	D1-14
161-0630	LED PCB RDT1 3/4 D1F RED	DS1
161-0631	LED PCB YLT1 3/4 D1F YEL	DS2
180-0329	RELAY PCB 12V DPDT MDX12	K1
286-1766	CONN JUMPER PLUG	JP3-7
286-1772	CONNECTOR 36PIN STRIP	JP1-7
	TIN	
286-1964	TEST POINTYELLOW .055 MNT	TP1-11
286-2011	CONN PCB MODULAR 4PIN HS	J1
296-0621	SWITCH RT TACT 6MM 150GF	S1
318-0246	XFORMER 10K CT-10K CT	T2
318-0259	XFORMER 600CT-600CT	T1
425-0105	IC OPAMP 4558 DUAL	U3
425-0178	INT CKT NE570N	U5
425-0181	IC OPAMP TL084 QUAD BFET	U2
		U4
425-0210	IC OPAMP LM348 QUAD	U1
425-0231	IC OPAMP LM393 DUAL COMP	U11
425-0255	IC CMOS 4093 QUAD TRIG	U10
425-0273	INT CKT CD4073B	U12
425-0454	IC PWRAMP TDA-2003V	U6
		U7
425-0488	OPAMP QUAD LMC660 0V INP	U8
425-0529	IC CMOS SW DG212B 4XSPST	U9
425-0530	IC LM2937 ET-10 VOLT REG	U13
528-0278	SCREW PH 4-40X1/4 BLK	
550-0297	KNOB CAP BLACK 4X4 MM	

Vega Fax Library

Information including more detailed procedures, schematics, and other Vega products is available 24 hours from: Vega's Fax Library. Simply call:

818-444-2017

or

800-274-2017

then follow voice the instructions.

Suggestions or Comments

If you have suggestions or comments concerning this manual, please fax (818-444-1342) or mail them to:

Vega
Documentation Manager
9900 East Baldwin Place
El Monte, CA 91731-2204

Warranty (Limited)

All Vega signaling products are guaranteed against malfunction due to defects in materials and workmanship for three years, beginning at the date of original purchase. If such a malfunction occurs, the product will be repaired or replaced (at our option) without charge during the three-year period, if delivered to the Vega factory. Warranty does not extend to damage due to improper repairs, finish or appearance items, or malfunction due to abuse or operation under other than the specified conditions, nor does it extend to incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you. This warranty gives the customer specific legal rights, and there may be other rights which vary from state to state.

1690 Specifications

Operating Temperature Range: 0°C to 60°C

Power Requirements: 11 to 16 V_{rms} semi-regulated,
250 mA nominal @ 1 Watt audio

Balanced Receive Line Input Level: -30 dBm to +10 dBm, adjustable 10K Ω/620 Ω

Unbalanced Receive Input Level: 0.025 V_{rms} to 2.5 V_{rms}, adjustable10K Ω

Mic Input Sensitivity: 0.010 V_{rms} to 1.0 V_{rms}

Receive Amplifier Distortion: 1% THD max.

Receive Frequency Response: +1/-2 dB, 100 Hz to 10 KHz

Compression range: 30 dB increase in signal,
output increases less than 3 dB

Balanced Transmit Line Output Level: -15 dBm to +10 dBm, 600 Ω Line

Transmit Amplifier Distortion: 1% THD max. @ 0 dBm

Transmit Frequency Response: +1/-2 dB, 100 Hz to 10 KHz

Speaker Amplifier Output Level: 5 Watt max., adjustable

Speaker Amplifier Distortion: 2% THD max.

Speaker Amplifier Frequency Response: +1/-2 dB, 300 Hz to 5 KHz

Notch-Frequency Rejection: 45 dB min. at center frequency

Notch-Frequency Bandwidth: 70 Hz @ –3 dB points, 1 Hz @ –40 dB typical

Logic High/Low Inputs: >8 V_{dc} High/ <1.0 V_{dc} Low

PTT Output (transistor): Switched low, 1.0 V_{dc} max.

PTT Relay Contacts: 2 pole, double throw

PTT Relay Contact Ratings: 2 A@30 V_{dc}
0.6 A @ 120 V_{ac}
Complies with FCC part 68, 1500 V_{dc} surge

VEGA
a **MARK IV** company
9900 East Baldwin Place • El Monte, California 91731-2294
Telephone: (818) 442-0782 • Toll-Free: 800-877-1771
Fax: (818) 444-1342 • CompuServe: 73513,1417
FaxBack: (818) 444-2017 • Toll-Free FaxBack: 800-274-2017

REVISIONS				
SYM	ACT#	DESCRIPTION	APP	DATE
A	95-041	RELEASE TO PRODUCTION		6/14/95

Receive Input

Unbalanced Input

Balanced Line Input (+) (-)

p/o P1 P1-7 P1-8 P1-1 P1-2

RXAGND

C11 1uF, R27 10K, C12 20pF, R26 2K, R7 LOG 500K, TP1 (0 dB), Rx Level Adjust

JP7, T2 10K:10K, R81 620, R24 5.1K, R25 10K, U1A LM348, VR1

C66 4.7uF, R78 10K, R79 10K, R77 5.1K, VR2

Buffer/Mixer

TP7 (0 dB Tx/ 4W Rx) (-2.1 dB 2W Rx)

C47 330pF, R80 10K, U8D LMC660, C13 .1uF, R28 33K

Compressor/Limiter

+10V

R53 220K, C40 1uF, C26 1uF, R54 10K

U5B NE570

C25 10uF, C22 .001uF, R52 33K, C39 1uF, R51 33K

C23 1uF, C24 4.7uF

RXAGND

Line Activity Monitor

+12V

R14 1K, LAM, DS2, Q1 2N7000

D6 1N4148, R20 200K, C8 .1uF, R19 10K

D7 1N4148, D4 1N4148, D5 1N4148, U10 LM348, R17 10K, +10V

R21 20K, C9 10uF, D2 1N4148, D3 1N4148

Rx Notch Filter

(Ref. -1.8 dB)

R63B 33K 2x, R63G 33K 2x, R63A 33K 2x, R63C 33K 2x, R44 10K 20T Depth

TL084 U4A, R63E 33K 2x, C21 .0022uF 5x, U4B TL084, R63D 33K 2x, R46 10K, C20 .0022uF 5x, U4C TL084, R63H 33K 2x, R63F 33K 2x, R62 10K 20T Frequency, R50 576 1x, R45 10K

VR2, C67 4.7uF

C36 270pF 5x, R48 33.2K 1x, U4D TL084, (-1.8 dB), TP6

U9A DG212B, SPKR, R88 100K, VR2, Speaker Volume Adjust

C51 4.7uF, R47 10K, R49 12K, R16 10K

Speaker Amplifier

+12V

C33 4.7uF, C35 .001uF, C34 10uF, R15 10K, R61 30

U6 TDA2003, R76 200, R75 30, C46 470uF, C45 470uF, R60 1 .5W, R59 1 .5W, C44 .1uF, C31 .1uF, R74 1K

Speaker Out

(6.3 Vac Max - 8 ohm/5W)

p/o P1 P1-42 Spkr (+)

p/o P1 P1-41 Spkr (-)

SPKRAGND

+12V, R93 430, C58 10uF, C54 .1uF, C53 10uF, U7 TDA2003, C57 470uF, C55 .1uF, C56 470uF, R54 1K

Earpiece Amplifier

C1 270pF, Earpiece Level Adjust, R3 3K, R1 10K LOG, R5 10K, R4 10K

U1C LM348, C7 .1uF, R6 1K, VR1, R18 10K

Handset/ Microphone

J1 (Front Panel)

Mic Audio, Ground, Mic PTT, Earpiece

J1-1 J1-2 J1-3 J1-4

JP3 R31 150, JP2 R30 9.1K, JP1 R29 100K, C14 1.0uF, C15 100uF 25V

Mic Preamp

+10V

R9 10K LOG Mic Level Adjust, VR1, MICAGND

p/o P1 P1-27 Mic Audio, P1-28 Ground, P1-15 Mic PTT, P1-3 Earpiece, P1-5 Signal Tone In (+8dB Hi Guard)

D1 1N4148, PTT

Compressor/Limiter

TP2 (0 dB)

C2 100pF, R10 200K, U1B LM348, C3 .1uF, R11 33K, R22 5.1K, C10 4.7uF

R58 220K, C42 1uF, C28 1uF, U5A NE570, C43 10uF, C27 .001uF, R56 33K, C30 1uF, R57 10K, R55 33K

C32 1uF, C29 4.7uF

MICAGND

Tx Notch Filter

(-1.8 dB)

R36B 33K 2x, R36G 33K 2x, R36A 33K 2x, R36C 33K 2x, R12 10K 20T Depth

TL084 U2A, R36E 33K 2x, C17 .0022uF 5x, U2B TL084, R36D 33K 2x, R37 10K, R36H 33K 2x, C4 .0022uF 5x, R35 10K 20T Frequency, R36F 33K 2x, U2C TL084, R32 10K

VR2

C16 270pF 5x, TP3, (-1.8 dB), R33 33.2K 1x, C41 1uF, U2D TL084, U9B DG212B, TX

R85 10K, R34 10K, R82 5.1K

C49 1uF, R86 6.2K, VR2

U9C DG212B, 2WR/TX_MON

VR2, R72 100K, U9D DG212B, RX

C50 1uF

C37 20pF, R64 2K, R2 500K LOG, 2W Rx/Tx Mon Level Adjust

U8C LMC660, R66 10K, VR2

TP9, C48 330pF, R84 2K, R8 50K LOG, Tx Level Adjust

R83 10K, R65 10K

Transmit Amplifier

U8A LMC660, R71 620

T1 600:600

R69 10K, C38 100pF, R68 10K, U8B LMC660, R70 5.1K

Transmit Output

p/o P1 P1-10 (+), P1-9 (-) Balanced Line Output

R95 0, R96 0

p/o P1 P1-4 Signal/ Auxiliary Output, P1-5 Ground

RXAGND

NOTES:
1. Unless other specified:
   Resistors are 1/4 watt, 5%, and values are in ohms.
   Capacitor values are in microfarads.
2. Receive channels are jumper selected for input impedance of 10K ohm bridging, or 600 ohm line termination. i.e. Rx Channel, JP7 ommitted for bridging, and installed for line termination.
3. Text located in an outline box, indicates front panel labels. LAM
4. Signal levels shown in brackets are nominal values, for reference.

Microphone Jumper Table			
Mic Type	JU1	JU2	JU3
Electret	OUT	IN	OUT
Carbon	OUT	OUT	IN
Dynamic (Hi)	OUT	OUT	OUT
Dynamic (Lo)	IN	OUT	OUT

PCB 045-0484

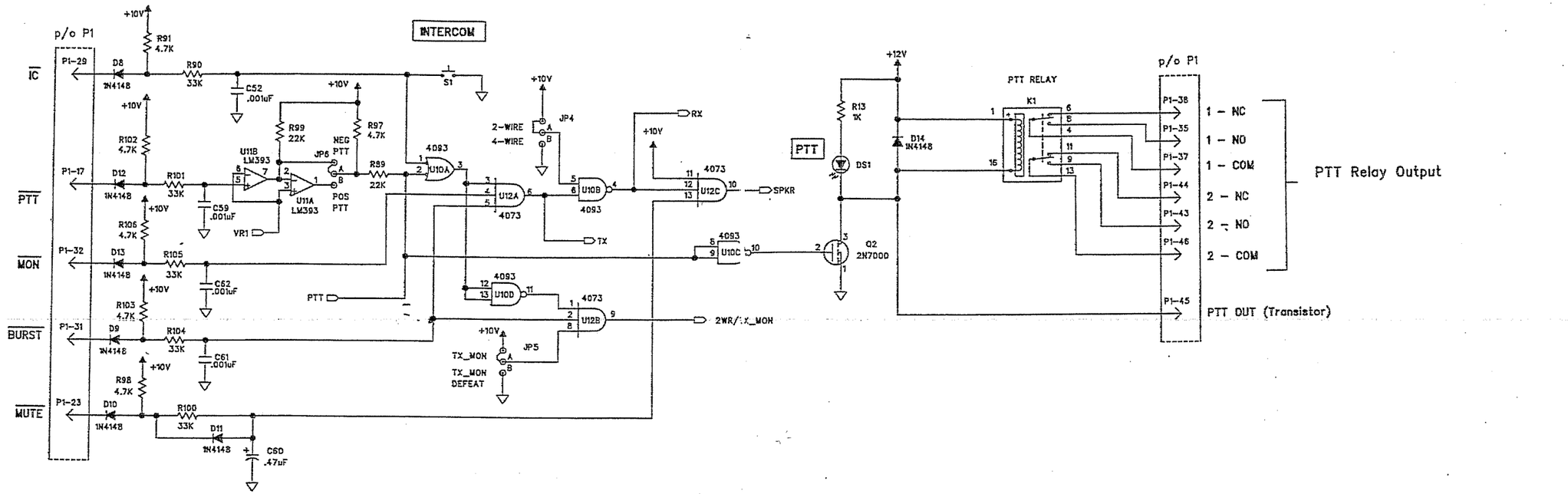
Last Used		Not Used
C	C67	
D	D14	
R	R106	R38
RN	N/A	
Q	Q2	
U	U13	
JP	JP7	
DS	DS2	

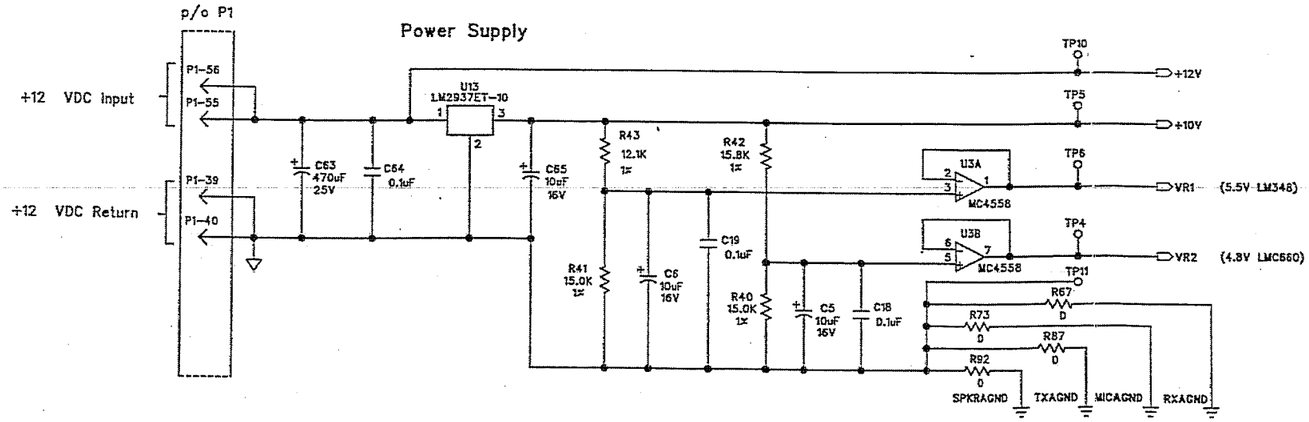
DRAWN John Mike
CHECK
ENG
APP

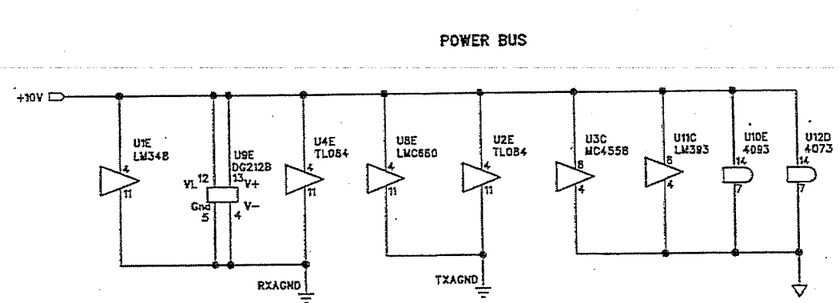
MODEL 1690 NEXT ASSY. 012-0087

VEGA
A MARK IV COMPANY
1690 Audio Processing Card
D 071-0565 A
SCALE: 1:1 SHEET 1 OF 2

REVISIONS				
SYM	ACT#	DESCRIPTION	APP	DATE
A	95-041	RELEASE TO PRODUCTION		01/4/95







VEGA A MARK IV COMPANY		
1690 Audio Processing Card		
D	071-0565	A
SCALE: 1:1		SHEET 2 OF 2