

CLEAR-COM LIMITED WARRANTY

The Clear-Com product is warranted to be free from defects in materials and workmanship for a period of two years from the date of sale.

The Clear-Com warranty does not cover any defect, malfunction or failure caused beyond the control of Clear-Com, including unreasonable or negligent operation, abuse, failure to follow instructions in the manual, defective or improper associated equipment, alterations, modification and repair not authorized by Clear-Com, and shipping damage. Products with their serial numbers removed or defaced are not covered by this warranty.

This warranty is the sole responsibility of the user to determine before purchase that this product is suitable for the user's intended use.

Clear-Com Systems

IF-4B 4-Wire Interface

Instruction Manual

Any and all implied warranties, including the implied warranty of merchantability are limited to the duration of this warranty. Clear-Com and the dealer who sells Clear-Com products are not liable for consequential damages of any kind.

For your own records fill in the information below.

Model No.	Serial No.
Date Purchased	
Purchased from (dealer)	
Address	
City	State ZIP

Factory Service

All equipment returned for repair must be accompanied by documentation stating your return address, telephone number and date of purchase, along with a description of the problem.

Note: Do not ship any equipment to Clear-Com without first calling and obtaining a Return Authorization Number. Send equipment to be repaired to:

Customer Service Department
Clear-Com Intecom Systems
4065 Hollis Street
Emeryville, CA 94608-3505
Telephone: (510) 488-8888
Fax: (510) 488-8810
Web Site: www.clearcom.com

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Clear-Com Systems
4065 Hollis Street
Emeryville, CA 94608-3505
www.clearcom.com

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

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This warranty is the sole and exclusive express warranty given with respect to Clear-Com products. It is the responsibility of the user to determine before purchase that this product is suitable for the user's intended purpose.

Any and all implied warranties, including the implied warranty of merchantability are limited to the duration of this express limited warranty. Neither Clear-Com nor the dealer who sells Clear-Com products is liable for incidental or consequential damages of any kind.

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Send equipment to be repaired to:

Customer Service Department
Clear-Com Intercom Systems
4065 Hollis Street
Emeryville, CA 94608-3505
Telephone: (510) 496-6666
Fax: (510) 496-6610
Web Site: www.clearcom.com

Warranty Repairs - if in warranty, no charge will be made for the repairs. Equipment being returned for warranty repair must be sent prepaid and will be returned prepaid.

Non-Warranty Repair - Equipment that is not under warranty must be sent prepaid to Clear-Com. If requested, an estimate of repair costs will be issued prior to service. Once your approval for repair, and repair of equipment is completed, the equipment will be shipped freight collect from the factory to the customer.

NOTICE ABOUT SPECIFICATIONS

Performance specifications included in this manual are design-center specifications and are included for customer guidance and to facilitate system installation. Actual operating performance may vary.

ABOUT THIS MANUAL . . .

To get the most out of the IF-4B 4-Wire Interface, read this manual carefully. It will answer questions you might have about installation and operation.

SECTION 1 DESCRIPTION OF THE IF-4B INTERFACE PANEL

For each module, the IF-4B front panel contains transmit, receive, and null level controls, a transmit level indicator, a test jack that connects to a full-in test oscillator, and SETUP switches. The SETUP switches enable you to assign each of the 4-wire systems to separate intercom channels, or put two, three, or all four systems on one "Party-Line" (see Table 1 for a description of these switches).

The IF-4B rear panel provides four 5-pin XLR connectors (DBF) for interfacing up to four different Clear-Com lines as well as four terminal block connectors for 4-wire input and output. The interface mounts in a standard 19" equipment rack and is 1.75" in height.

Installation and setup requirements are the same for all models of the IF-4B interface (i.e., 1, 2, 3, or 4 modules).

SPECIFICATIONS

GENERAL: Frequency Response: 200 - 17KHz ± 3dB
 Hybrid Null: > 40dB
 Distortion: < 0.5% THD
 Clear-Com Line Level: -15dBm nominal
 Line Impedance: 15K Ω bridging
TRANSMIT: Switchable Gain, Transformer Isolated
LINE OUTPUT: Impedance: 600 Ohms
 Level @ 1KHz: -25dB to +10dB
CARBON MIC OUTPUT: Impedance: approx 150 Ohms
 Level @ 1KHz: -24dB to +1dB
DYNAMIC MIC OUTPUT: Impedance: approx 150 Ohms
 Level @ 1KHz: -71dB to -50dB

* Referenced to -15dB on the Clear-Com line

RECEIVE: Transformer Isolated
 Level: Adjustable, -30dB to +10 dBm
 Impedance: 10K Ω bridging, Transformer Isolated
Connectors: (4) 3-pin XLR and (4) 4-terminal blocks

POWER: DC Voltage: Powered by Clear-Com line
 DC Current: 50mA

DIMENSIONS: 19" x 1.75" x 6.8" (487mm x 44.8mm x 172.4mm)

WEIGHT: 3.25 lbs (1.47kg)

0.45V is referenced to 0.775 volts rms

SECTION 1 DESCRIPTION OF THE IF-4B INTERFACE PANEL

The IF-4B 4-Wire Interface is a modular interface that enables up to four 4-wire communication systems (such as cameras, TELCO lines and 2-way radio) to interface with the Clear-Com Intercom System. It matches standard 600 ohm transmit/receive lines (at normal levels) to Clear-Com line level.

The IF-4B is powered by the Clear-Com line using standard two-conductor shielded mic cable. The cable is run from the output connector of a Clear-Com Main or Remote Station to the rear panel of the IF-4B. One wire carries 30 VDC, the other wire carries the intercom signal, and the shield acts as common ground.

For each module, the IF-4B front panel contains transmit, receive, and null level controls; a transmit level indicator; a test jack that connects to a built-in test oscillator; and SETUP switches. The SETUP switches enable you to assign each of the 4-wire systems to separate intercom channels, or put two, three, or all four systems on one "Party-Line" (see Table 1 for a description of these switches).

The IF-4B rear panel provides four 3-Pin XLR connectors (D3F) for interfacing up to four different Clear-Com lines as well as four terminal block connectors for 4-wire input and output. The interface mounts in a standard 19" equipment rack and is 1.75" in height.

Installation and setup requirements are the same for all models of the IF-4B interface (i.e. 1, 2, 3, or 4 modules).

SPECIFICATIONS

GENERAL: Frequency Response: 200 -17KHz \pm 3dB
Hybrid Null: > 40dB
Distortion: < 0.5% THD
Clear Com Line Level: -15dBv nominal
Line Impedance: 15K Ω bridging

TRANSMIT: Switchable Gain, Transformer Isolated

LINE OUTPUT: Impedance: 600 Ohms
Level @1KHz: -25db to +10dB

CARBON MIC OUTPUT: Impedance: approx. 120 Ohms
Level @1KHz: -34dB to + 1dB

DYNAMIC MIC OUTPUT: Impedance: approx. 150 Ohms
Level @1KHz: -71dB to -36dB

** Referenced to -15dB on the Clear-Com line*

RECEIVE: Transformer Isolated
Level: Adjustable, -30dB to +10 dBv
Impedance: 10K Ω bridging, Transformer Isolated

Connectors: (4) 3-pin XLR and (4) 4 terminal blocks

POWER: DC Voltage: Powered by Clear-Com line
DC Current: 50ma

DIMENSIONS: 19" x 1.75" x 6.8" (487mm x 44.8mm x 179.4mm)

WEIGHT: 3.25 lbs (1.47kg)

0 dBv is referenced to 0.775 volts rms.

SECTION 2 INSTALLATION OF THE IF-4B INTERFACE PANEL

Installation and setup requirements are the same for all models of the IF-4B interface (i.e. 1, 2, 3 or 4 modules). This manual describes installation of a four module interface.

The IF-4B interface can be set up to operate as 4 independent interfaces, or may be internally bussed into a single common party-line. It can also be setup to emulate a carbon or dynamic headset. Therefore, installation requirements will vary according to the configuration. Installation for 4-wire and headset emulation are discussed separately.

The SETUP switches on the IF-4B front panel play an important role in every installation as they control the operating parameters of each module. They are preset to the open position.

Table 1 provides a brief description of each switch:

Table 1: Setup Switches

Switch	Designation	Function
1	Power Bus	Connects to an internal power bus.
2	Party Line	Connects to an internal Party-Line bus.
3	Line Compensation 1	Allows for line length compensation of the Party-Line hybrid null (200 ft. step).
4	Line Compensation 2	Allows for line length compensation of the Party-Line hybrid null (400 ft. step).
5	Output Level Set	Sets Line Level output.
6	Carbon Mic Loading	Sets Carbon Mic Output Impedance.

The possible settings for these switches are discussed in the following subsections according to the type of installation.

2.1 Party-Line Installation

To connect Clear-Com to the interface, route a two-conductor shielded cable from a Clear-Com Main or Remote Station output connector to the IF-4B rear panel. Connect the cable to the D3F connector input marked CLEAR-COM LINE. The pin assignments in a Clear-Com 3-pin intercom connector are:

- Pin 1 Common
- Pin 2 +30 volts DC
- Pin 3 Intercom audio

2.1.1 Connection To Party-Line: Independent Interfaces

In a multi-channel configuration, each module of the IF-4B is individually powered from the Party-Line source (Clear-Com). Connect a Clear-Com line to each of the modules and set SETUP switches 1 and 2, on all four modules, as follows:

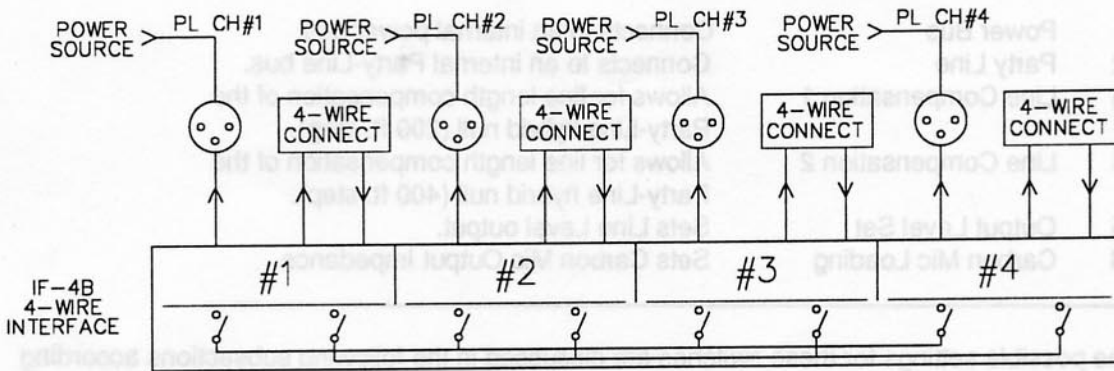
Party-Line Switch Settings for Independent Interfaces:

Switch	1	2	3	4	5	6
	↑	↑	-	-	-	-

↑=open, ↓=closed

A dash (-) indicates that the switch doesn't apply to this function.

Figure 1 illustrates the connections for this type of installation:



Typical Multichannel Use

Figure 1

To connect Clear-Com to the interface, use a two-conductor shielded cable from a Clear-Com Main or Remote Station output connector to the IF-4B set panel. Connect the cable to the D3F connector input marked CLEAR-COM LINE. The pin assignments in a Clear-Com 3-pin intercom connector are:

- Pin 1: Common
- Pin 2: +30 volts DC
- Pin 3: Intercom audio

2.1.2 Connection To Party-Line: Internal Party-Line and Independent Intercom

The IF-4B can be configured to provide both Internal Party-Line and Independent Intercom Station communication. Figure 2 illustrates one "mixed-use" configuration. Other mixed-use configurations are possible.

To set up a 3-module party-line as shown in Figure 2, connect one Clear-Com intercom line to one of the three interface modules. Set SETUP Switches 1 and 2, on all three party-line modules, as follows:

Party-Line Switch Settings:

Switch	1	2	3	4	5	6
	↓	↓	-	-	-	-

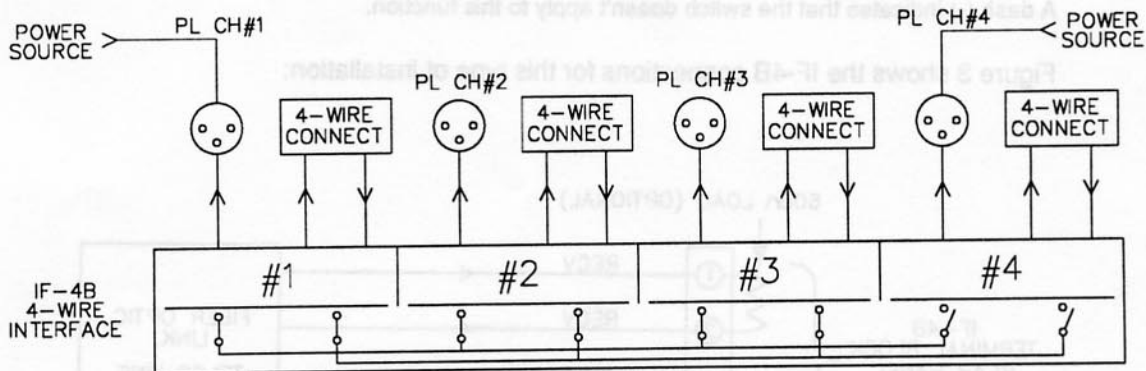
↑=open, ↓=closed

A dash (-) indicates that the switch doesn't apply to this function.

For the independent intercom module, connect a separate Clear-Com intercom line to its rear panel and set its SETUP Switches 1 and 2 as follows:

Independent Intercom Switch Settings:

Switch	1	2	3	4	5	6
	↑	↑	-	-	-	-



**Typical Internal Party-Line Use
Figure 2**

2.2 4-Wire In/Out

To connect a 4-wire device to the interface, for each module, attach one set of 4-wire output lines to one set of terminal block connectors on the IF-4B rear panel. On the terminal block, pins 1 and 2 are for input (RCV) and pins 3 and 4 are for output (XMIT). The IF-4B ships with a 600 ohm resistor providing line termination across pins 1 and 2. It can be removed if not desired.

Switches 5 and 6 control the types of output from the IF-4B. The possible settings for these two switches are provided in the next subsections according to the type of installation.

Note: In the external 4-wire link, any artificial sidetone leakage from the TRANSMIT to the RECEIVE signal must be eliminated as much as possible. For headset emulation (sections 2.2.2 and 2.2.3), local sidetone in the 4-wire devices (i.e. cameras) must be completely turned off.

2.2.1 Standard 4-Wire Installation: Line-Level In/Out

The standard 4-Wire Installation provides 0 dB line-level input/output for general purpose 4-wire interfaces. Pins 2 and 3 can be connected together to provide 3-wire connection, if desired.

For line level output, set SETUP Switches 5 and 6 as follows:

Line Level Output Switch Settings:

Switch	1	2	3	4	5	6
	-	-	-	-	↓	↑

↑=open, ↓=closed

A dash (-) indicates that the switch doesn't apply to this function.

Figure 3 shows the IF-4B connections for this type of installation:

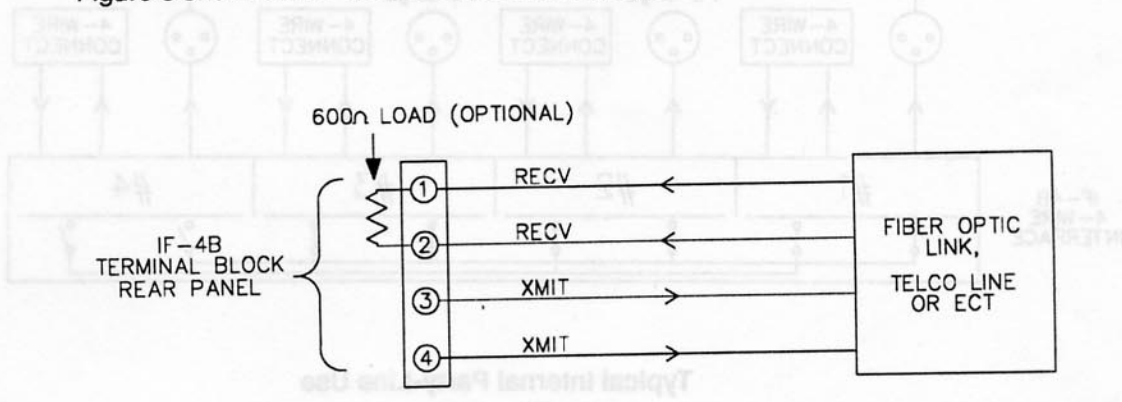


Figure 3
Standard 4-Wire Installation

2.2.2 Dynamic Mic Headset Emulation

Figure 4 shows the IF-4B connections to a Clear-Com style headset connector. Pins 1 and 2 are for microphone output. Pins 3 and 4 are for headset emulation. For Dynamic Mic Output, set SETUP Switches 5 and 6 as follows:

Dynamic Mic Output Switch Settings:

Switch	1	2	3	4	5	6
	-	-	-	-	↑	↓

↑=open, ↓=closed

A dash (-) indicates that the switch doesn't apply to this function.

Note: Local sidetone in the 4-wire device must be completely turned off.

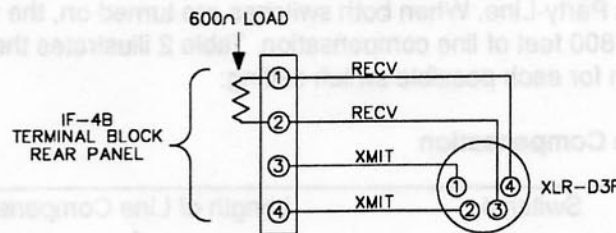


Figure 4
Dynamic Mic Headset Emulation

2.2.3 Carbon Mic Headset Emulation

Figure 5 shows the IF-4B connections to a Carbon Mic Headset. For Carbon Mic Output, set SETUP Switches 5 and 6 as follows:

Carbon Mic Output Switch Settings

Switch	1	2	3	4	5	6
	-	-	-	-	↓	↓

Note: Local sidetone in the 4-wire device must be completely turned off.

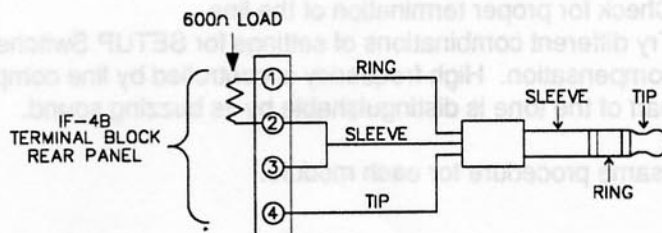


Figure 5
Carbon Mic Headset Emulation

SECTION 3 SETUP, ADJUSTMENT, AND OPERATION

For normal operation, the position of the SETUP switches does not change after installation. The only controls on the IF-4B that require adjustment on a day-to-day basis are TRANSMIT and RECEIVE. Remove the front panel cover to reach these controls.

3.1 NULL Adjustment

The NULL control eliminates most of the RECEIVE signal from the TRANSMIT signal. This control should be adjusted at installation and when the Party-Line cable configuration changes. For example, if the number of stations on the Party-Line or the length of the cable increases or decreases.

SETUP Switches 3 and 4 provide line length compensation for adjusting the null. Switch 3 adds 200 feet of nominal Party-Line compensation, switch 4 adds 400 feet of compensation. Without compensation, the NULL circuit is optimized for 200 feet of Clear-Com Party-Line. When both switches are turned on, the NULL circuit is optimized for 800 feet of line compensation. Table 2 illustrates the amount of line compensation for each possible switch setting:

Table 2: Line Compensation

Switch 3	Switch 4	Length of Line Compensation
↑	↑	0-300 feet
↓	↑	300-500 feet
↑	↓	500-700 feet
↓	↓	700-900 feet

0 = 200 feet of compensation

↑=open, ↓=closed

To adjust the null:

Connect a TS1 earphone (for monitoring the automatically inserted test tone provided with the interface) into the jack on the front panel. Turn the null control in either direction until a decrease in audible tone is observed. Make fine adjustments for complete null.

If complete null is not possible:

- 1) Check for proper termination of the line.
- 2) Try different combinations of settings for SETUP Switches 3 and 4 for line compensation. High frequency is controlled by line compensation. This part of the tone is distinguishable by its buzzing sound.

Repeat the same procedure for each module.

3.2 RECEIVE Level Adjustment

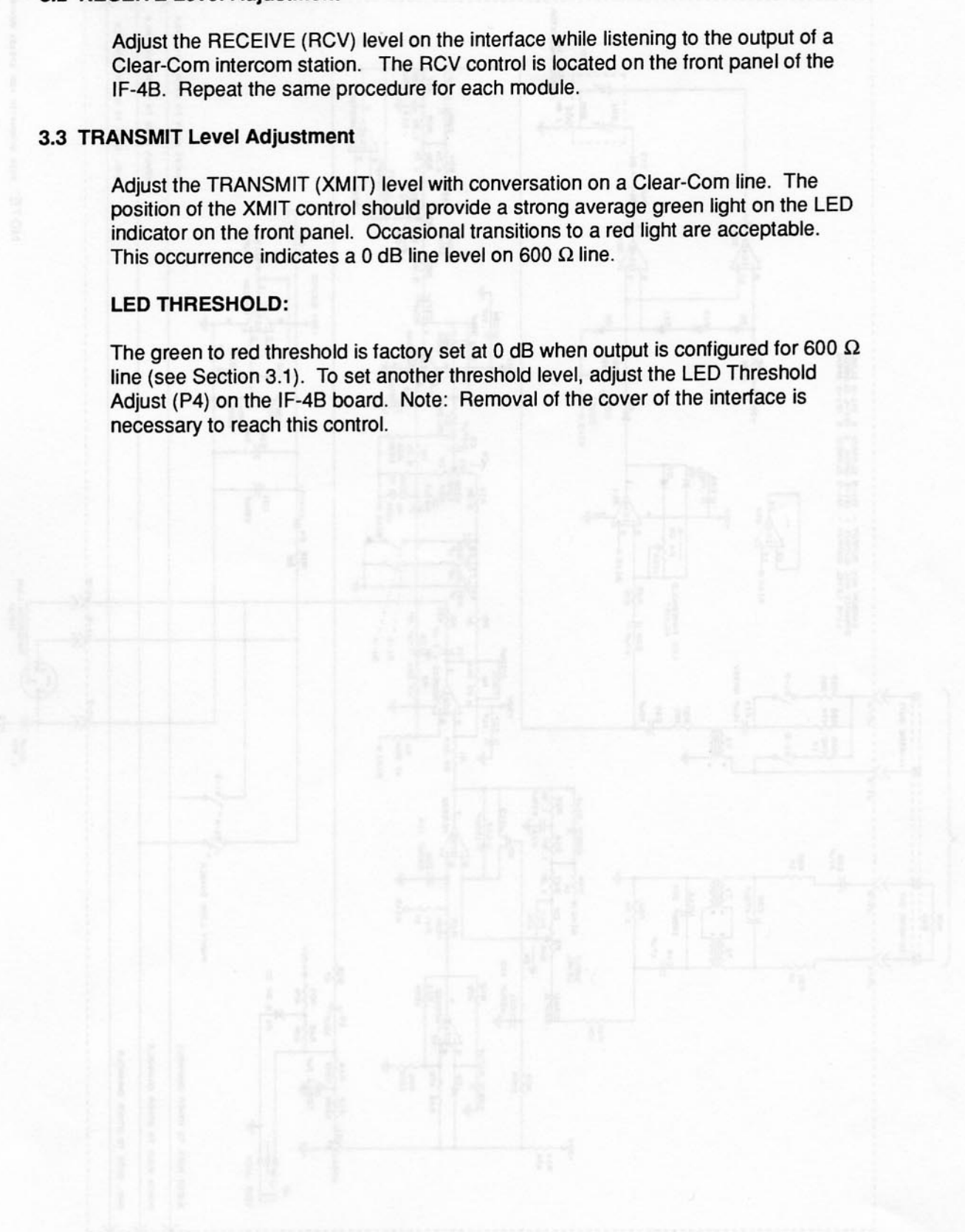
Adjust the RECEIVE (RCV) level on the interface while listening to the output of a Clear-Com intercom station. The RCV control is located on the front panel of the IF-4B. Repeat the same procedure for each module.

3.3 TRANSMIT Level Adjustment

Adjust the TRANSMIT (XMIT) level with conversation on a Clear-Com line. The position of the XMIT control should provide a strong average green light on the LED indicator on the front panel. Occasional transitions to a red light are acceptable. This occurrence indicates a 0 dB line level on 600 Ω line.

LED THRESHOLD:

The green to red threshold is factory set at 0 dB when output is configured for 600 Ω line (see Section 3.1). To set another threshold level, adjust the LED Threshold Adjust (P4) on the IF-4B board. Note: Removal of the cover of the interface is necessary to reach this control.



Clear-Com IF4B 4-Wire Interface

IF4-4B SCHEMATIC REV.D

