CLEAR-COM ECLIPSE

FOR-22
DUAL 4-WIRE INTERFACE

INSTRUCTION MANUAL

FOR-22 Dual 4-Wire Interface Instruction Manual

Part Number 810306Z Rev. 3

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IMPORTANT SAFETY INSTRUCTIONS

Please read and follow these instructions before operating a FOR-22 dual 4-Wire interface.

For your safety, it is important to read and follow these instructions before operating a FOR-22 dual 4-wire interface:

(1) **WARNING:** To reduce the risk of fire or electric shock, do not expose a FOR-22 dual 4-wire inteface to rain or moisture. Do not operate a FOR-22 dual 4-wire interface near water, or place objects containing liquid on it. Do not expose a FOR-22 dual 4-wire interface to splashing or dripping water.

(2) For proper ventilation, make sure ventilation openings are not blocked. Install the FOR-22 dual 4-wire interface according to the directions in the Installation chapter of this manual.

(3) Do not install a FOR-22 dual 4-wire interface near a heat source such as a radiator, heat register, stove, or other apparatus (including amplifiers) that produces heat. Do not place naked flame sources such as candles on or near a FOR-22 dual 4-wire interface.

(4) Only use attachments/accessories specified by Clear-Com Intercom Systems.

(5) Unplug the FOR-22 dual 4-wire interface during lightning storms or when unused for long periods of time.

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

- The FOR-22 dual 4-wire interface has been damaged in any way.
- Liquid has been spilled or objects have fallen into the FOR-22 dual 4-wire interface chassis.
- The FOR-22 dual 4-wire interface has been exposed to rain or moisture.
- The FOR-22 dual 4-wire interface does not operate normally.
- The FOR-22 dual 4-wire interface has been dropped.

Please familiarize yourself with the safety symbols in Figure 1. When you see these symbols on a FOR-22 dual 4-wire interface, they warn you of the potential danger of electric shock if the FOR-22 dual 4-wire interface is used improperly. They also refer you to important operating and maintenance instructions in the manual.

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

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

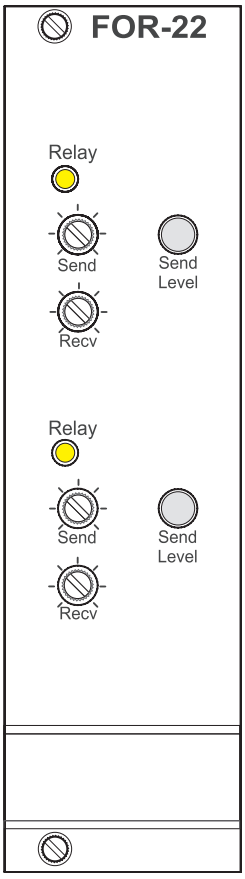
Figure 1: Safety Symbols

OPERATING THE FOR-22 INTERFACE

This chapter describes how to use the FOR-22 dual 4-wire interface. System operators can use this manual once the Eclipse System is correctly installed and configured with the Eclipse Configuration System (ECS) software, and after the FOR-22's internal jumpers are set.

For information on configuring the FOR-22 interface, see the separate manual for the Eclipse Configuration System.

DESCRIPTION



The FOR-22 dual 4-wire/radio unit forms an interface between an Eclipse matrix and two external 4-wire devices, allowing the matrix and the 4-wire devices to communicate with each other.

The external 4-wire devices that you can connect to the matrix with the FOR-22 interface include camera intercoms, two-way radios, microwave and satellite links, IFBs, and program audio.

Each of the two channels of the FOR-22 unit provides the following functions for a port in the Eclipse System:

- Transformer isolation between an external 4-wire audio device or system and the port.
  - A set of relay contacts which are activated by a call signal from the matrix.
  - An LED indicator that lights when the relay is active.
  - An optically isolated call signal input (from the external device to the matrix).
  - Separate "send" (to external device) and "receive" (from external device) level controls on front panel.
  - Send levels adjustable for line level, IFB feed level, and microphone level (set by internal jumpers).
  - A 2-color LED indicates correct signal level to external device.

The FOR-22 occupies one slot in an IMF-3 or IMF-102 interface module frame or in an Eclipse Median frame. The two FOR-22 channels connect to the matrix frame via two 8-pin RJ-45 connectors, and connect to external devices via two DB-9 9-pin connectors.

The installation chapter of this manual gives more information on interface frames and on wiring the FOR-22 unit to the matrix and to external devices.

OPERATION

In normal use, the FOR-22 interface does not require operator interaction. Each channel features the same set of front panel controls:

- A "send" level control
- A "receive" level control
- A "send level" LED
- A "relay active" LED

"SEND" CONTROLS

The "send" controls affect the level of the signals from the matrix to the external devices. This control should be adjusted so that the "send level" LED (see below) lights green when a signal is present. Occasional red flashes due to peaks in the audio signal are acceptable. The "send" controls have a range of ± 10 dB.

"SEND LEVEL" LEDS

The 2-color "send level" LED lights green when the audio signal is being sent to the external device at a typical acceptable level. The LED lights red when the audio output signal level is too high.

"RECV" CONTROLS

The "recv" ("receive") level controls affect the level of the signals sent from the external devices to the matrix. The "recv" controls have a range of ± 10 dB.

RELAY ACTIVE LED

The amber "relay" LED lights whenever the relay is activated.

2 INSTALLING THE FOR-22 INTERFACE

This chapter includes the following topics about installing the FOR-22 interface:

- Overview of interface frames and power supplies.
  - Installing the interface in an interface frame.
  - Wiring the interface to the matrix and to external devices.
  - Adjusting the interface's front-panel controls after installation.

INTERFACE FRAMES AND POWER SUPPLIES

Interface modules convert the 4-wire signals of a central matrix port to some other form of communication, such as for telephones, camera intercoms, two-way radios, and so on.

Each interface module connects to both the central matrix and to the external device through cable attached to hardware connectors on the rear of the interface module. To house these interface modules, Clear-Com offers various types of interface frames. The two interface frames which can house the FOR-22 dual 4-wire/radio interface are the IMF-3 and the IMF-102 frames, which are described below.

IMF-3 Interface Module Frame

The IMF-3 interface frame holds up to 11 interface modules in three rack units (3 RU) of a standard Electronics Industry Association 19-inch wide (48.26 cm) rack. The frame holds a modular, rear-mounted connector panel for each interface, containing two RJ-45 connectors for connecting cable to matrix ports, and two DB-9 connectors for connecting cable to external devices. Figure 2-1 illustrates the rear panel of an IMF-3 interface frame, with 11 rear-panel assemblies installed.

The frame uses an external PSU-101 rack-mounted power supply to supply power to the interface modules. A second PSU-101 can be attached for redundancy.

As a rule-of-thumb, one PSU-101 power supply unit is required for every two IMF-3 frames. A PSU-101 power supply unit requires 90 to 260 VAC at 45 to 65 Hz with a maximum dissipation of 80 watts. A PSU-101 connected for redundancy requires very little current unless used.

For more information on the IMF-3 frame, refer to its manual in the Eclipse manual set.

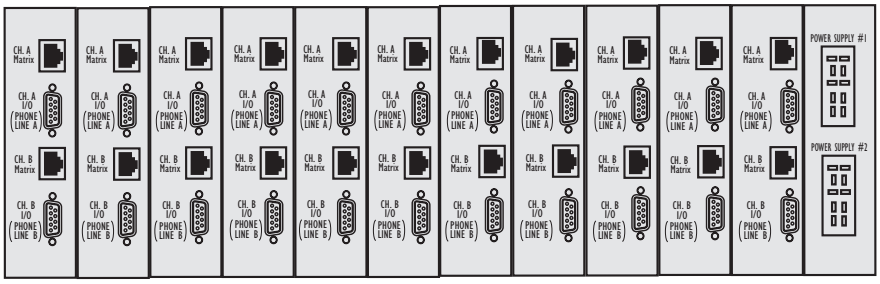


Figure 2-1: IMF-3 Interface Frame Rear Panel

Note: The IMF-3 frame has an individual rear panel for each interface. All interfaces use the same rear panel; however the use of the rear-panel connectors will vary with the type of interface.

Each interface features indicators and controls that must be accessible to operators, so put the interface module frame(s) in a convenient location. Usually interface module frames are located near the matrix frame, but they can be located farther away. The maximum distance between the matrix frame and the interface frame is 500 feet (150 meters).

Each Eclipse frame contains its own power supplies and does not supply any power for interfaces. A separate power supply (PSU-101) is only necessary for interfaces mounted in IMF-3 frames. If redundant power supply pairs are used for interfaces, mount them together.

It is required that you leave an extra rack unit (1.75 in. or 44.45 mm) above and below each external power supply unit. This allows for needed cooling for larger system loads.

IMF-102 Interface Module Frame

The IMF-102 interface frame has slots for two interface modules in one rack unit (1 RU) of a standard Electronics Industry Association 19-inch wide (48.26 cm) rack.

It has an internal power supply and a connector for a redundant power supply. The IMF-102 requires 90 to 250 VAC with a maximum dissipation of 20 watts.

Its rear input/output connector panel has two RJ-45 connectors and two DB-9 connectors for the two interface modules. Figure 2-2 illustrates the rear panel of an IMF-102 interface frame, with two installed rear-panel assemblies.

Figure 2-2: IMF-102 Interface Frame Rear Panel

For more information on the IMF-102 interface frame, refer to the Interface Module Frames Instruction Manual in the Eclipse manual set (part no. 810313Z).

INSTALLING THE FOR-22 IN AN INTERFACE FRAME

IMF-3 INTERFACE FRAME

This section describes how to install an FOR-22 unit in an IMF-3 frame. There are certain options available on the FOR-22 that can be changed before installation. The audio output level can be set to different ranges depending on the type of input is being driven. The input of a channel can have a bridged pad added to allow higher input levels.

To install the FOR-22 interface module in the IMF-3 interface frame:

1. Select a slot to install the interface in.
2. Remove the blank plate covering the slot.
3. Set any necessary Audio Output Level Jumpers.
4. Set any necessary Audio Input Level modifications.
5. Slide the FOR-22 in the slot and ensure that the card is fully seated.
6. Tighten the FOR-22's front panel mounting screws.

IMF-102 INTERFACE FRAME

The IMF-102 interface frame contains two slots for installing interfaces. Interfaces are installed horizontally in one rack unit (1 RU) of a standard Electronics Industry Association equipment rack.

You install the FOR-22 interface in an IMF-102 interface frame as you would install an interface in an IMF-3 interface frame.

AUDIO OUTPUT LEVEL JUMPER

The audio output is transformer isolated. There is a jumper field for each channel that allows three basic operating levels depending on what type of external input is being driven. The following levels can be produced by each channel:

- Line level ---------- 0.0 dBu at 600 ohms
- Clear-Com IFB level ---------- -15 dBu at 200 ohms

• Microphone level ---------- -55.0 dBu at 20 ohms

To set channel 1 for the desired level:

1. Find jumper block JP100 on the circuit board.
2. Move the jumper so that it connects the pair of jumper pins labeled with the desired level (Line, IFB, or Mic).

To set channel 2, repeat the above procedure using JP200.

Each FOR-22 channel can also be adjusted using its "Send" front panel control.

See Figure 3-1 in Chapter 3 for a diagram of the FOR-22 main PCB showing the location of the jumpers.

AUDIO INPUT LEVEL GREATER THAN +10 DBU

To accommodate input levels greater than +10 dBu on either channel, the FOR-22 circuit board can be modified to build bridging pads on the primary side of each channel's input transformer. To build a bridging pad:

1. Find the jumpers labeled R111 and R112 (for channel 1) or R211 and R212 (for channel 2). These jumpers are located under the "Level Detect" daughterboard; it may be necessary to disassemble the FOR-22 module to access them. The jumpers look like 1/4 watt resistors with a single black band (indicating "0 ohms").
2. Replace the jumpers with resistors according to the values shown in Table 2-1.
3. Install R113 (for channel 1) or R213 (for channel 2) according to the values shown in Table 2-1.

Attenuation (dBu)	R111/R211 (Ohm)	R112/R212 (Ohm)	R113/R213 (Ohm)
15	470	470	1.2k
20	1k	1k	1k
25	1k	1k	470
30	1.2k	1.2k	470

Table 2-1: Resistor Values for Audio Input Bridging Pads

See Figure 3-1 in Chapter 3 for a diagram of the FOR-22 main PCB showing the location of the jumpers.

WIRING

The FOR-22 interface connects to an Eclipse matrix through the two RJ-45 connectors on the IMF-3 or IMF-102 rear-panel assembly to which the FOR-22 unit is connected. One RJ-45 connector is for the first channel of the interface. The second RJ-45 connector is for the second channel. Figure 2-3 shows pin assignments of the RJ-45 connectors used to connect the interface to an Eclipse matrix.

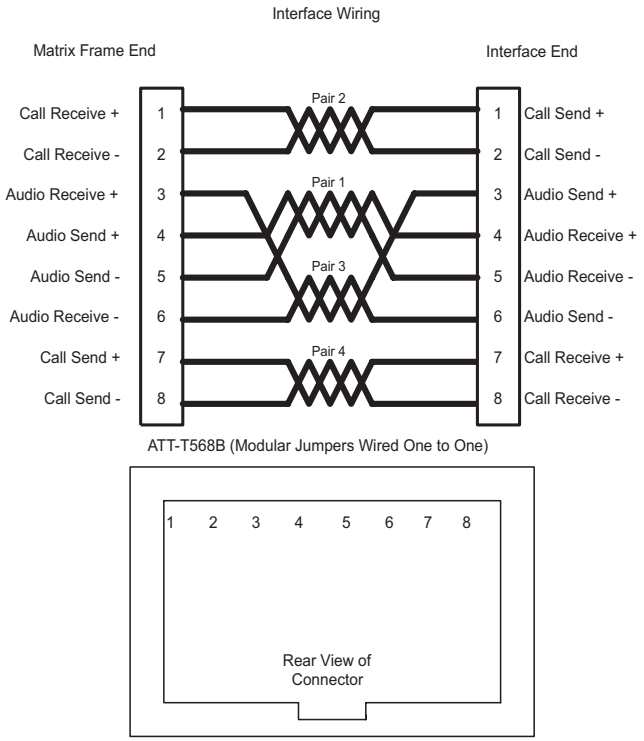


Figure 2-3: Matrix to Interface Frame Wiring

The "user" side of the FOR-22 for each channel is on a DB-9M connector on the rear of the IMF-3 or IMF-102 frame. Figure 2-4 shows the pinout of either one of these connectors. Each channel is identical.

The following sections describe how to wire for the various type of inputs and outputs available on this connector:

- External Audio Devices
    - Call Signal Input
    - Relay Contacts

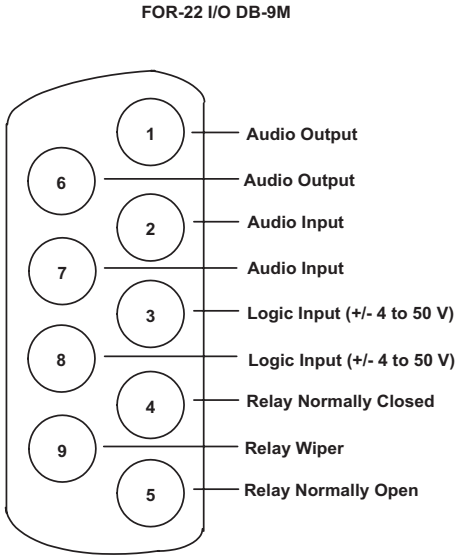


Figure 2-4: Pinout of the DB-9M I/O Connectors for FOR-22s

EXTERNAL AUDIO DEVICES

Connect external audio devices to the FOR-22 ports through the two DB-9M connectors labeled "I/O" on the rear panel assembly panel. Both audio input and output are transformer isolated. Refer to Figure 2-4 for pinouts.

CALL SIGNAL INPUT

The Call Signal input is used to receive a "call signal" or logic input from an external device and send it to the matrix. The voltage across the pins required to receive a call signal ranges from 4 Volts to 50 volts; it can be either positive or negative polarity or AC. The input will draw between 4 and 8 milliamps. Refer to Figure 2-4 for pinouts.

RELAY CONTACTS

Each FOR-22 channel features a relay that is associated with the logical "call signal" output of a port. A relay's function depends on the function assigned to the FOR-22 port in the configuration software. A relay can be assigned to operate with any label in the system: when that label is activated (either by a talk, listen, or both as set from the configuration program), the relay will be activated. Or it can be assigned to be activated by a call signal, for example to operate a 2-way radio transmitter.

You can use the relay to activate an external device, such as an applause light in a studio, a cue light, or a security door lock. The relays feature both "normally open" and "normally closed" contacts. The contacts are rated at 1 Amp at 24 volts DC; they are not designed for switching mains AC line voltage. Refer to Figure 2-4 for pinouts.

ADJUSTMENTS

After installation the front-panel controls should be set to accommodate the normal range of input and output levels encountered. The following is a discussion of the controls and indicators on the front of the interface.

"Send Level" Control

The "send level" control allows adjustment of the output level of the channel from the matrix to the external device/system.

"Send Level" LED

The 2-color "send level" LED lights green when an audio signal is being sent to the external device or system at a typical acceptable level. The LED lights red when the audio output signal level is too high.

"Recv" Control

The "recv" ("receive") level controls affect the level of signals sent from external devices or system to the matrix. The "recv" controls have a range of ± 10 dB.

Relay Active LED

The yellow "relay" LED lights whenever the relay is activated. Intermittent fast blinking on this LED is normal.

CONFIGURATION

You configure a central matrix port to work with the FOR-22 interface by setting parameters in the Eclipse Configuration System (ECS) programming software. Refer to the *Eclipse Configuration System Instruction Manual* for more information.

3 MAINTENANCE

This chapter provides schematics, assembly drawings, and component lists for the FOR-22 dual 4-wire interface module.

FOR-22 MAIN PCB

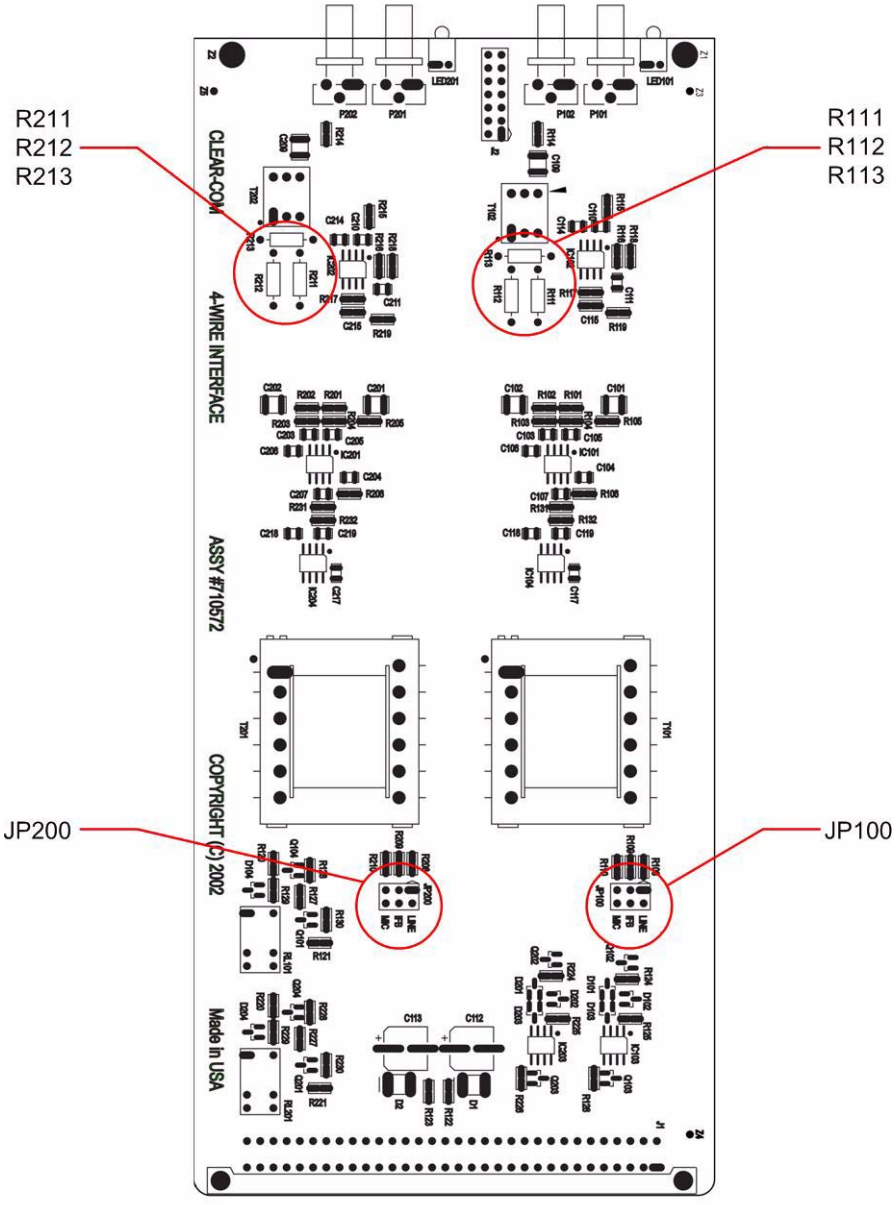


Figure 3-1: FOR-22 Main Board PCB (Part No. 710572)

BILL OF MATERIALS FOR FOR-22 MODULE PCB

Designator	Component Description	Qty
C103,C105,C107,C110,C115, C119,C203,C205,C207,C210, C215,C219	33PF 50V 5% NPO SMD 0805	12
C104,C106,C111,C114,C117, C118,C204,C206,C211,C214, C217,C218	.1UF 50V 10% X7R SMD 0805	12
C101,C102,C109,C201,C202, C209	.22UF 50V 10% X7R SMD 1210	6
C113,C112	22UF ALU 50V 20% SMD 8X6MM	2
	FOR-22 MAIN SMT PCB FAB	1
J1	EURO CARD RT ANG CONN 64 PIN M	1
JP100,JP200	JUMP JACK .1IN WITH HANDLE	2
J2	7 PIN DUAL ROW SOCKET SPECIAL	1
JP200,JP100	DUAL ROW HEADER 3 POS .230IN	2
P101,P102,P201,P202	PIHER TRIMPOT SHAFT #5116 BLAC	4
J1(2)	RIVET AVDEL #1189-2510	2
LED101,LED201	T1 RT ANG PC MTG 5mA AMBER LED	2
R110,R122,R123,R210	10.0 1/10W 1% SMD 0805	4
R118,R119,R218,R219	56.2 1/10W 1% SMD 0805	4
R125,R225	82.5 1/10W 1% SMD 0805	2
R115,R215	100 1/10W 1% SMD 0805	2
R229,R129	150 1/10W 1% SMD 0805	2
R109,R209	221 1/10W 1% SMD 0805	2
R130,R230	1.00K 1/10W 1% SMD 0805	2
R208,R108	2.74K 1/10W 1% SMD 0805	2
R120,R121,R124,R220,R221, R224	4.75K 1/10W 1% SMD 0805	6
R105,R106,R114,R116,R117, R126,R127,R131,R132,R205, R206,R214,R216,R217,R226, R227,R231,R232	10.0K 1/10W 1% SMD 0805	18
R101,R102,R103,R104,R201, R202,R203,R204	27.4K 1/10W 1% SMD 0805	8
R228,R128	47.5K 1/10W 1% SMD 0805	2
RL101,RL201	SPDT 12V MINI PC RELAY ITT#SZ1	2
P101,P102,P201,P202	50K TRIMPOT PIHER#PT10WH-50K	4
D201,D101	BAV70 DUAL DIODE COMMON CATHOD	2
D103,D104,D203,D204	BAW56 DUAL DIODE COMMON ANODE.	4
IC101,IC102,IC104,IC201, IC202,IC204	833 DUAL OPAMP... SOIC8	6
Q101,Q103,Q201,Q203	PMBT2222A NPN 40V 600MA SOT-23	4
IC203,IC103	M0C211 OPTOCOUPLER... S0IC8	2

SCHEMATIC FOR FOR-22 MODULE PCB

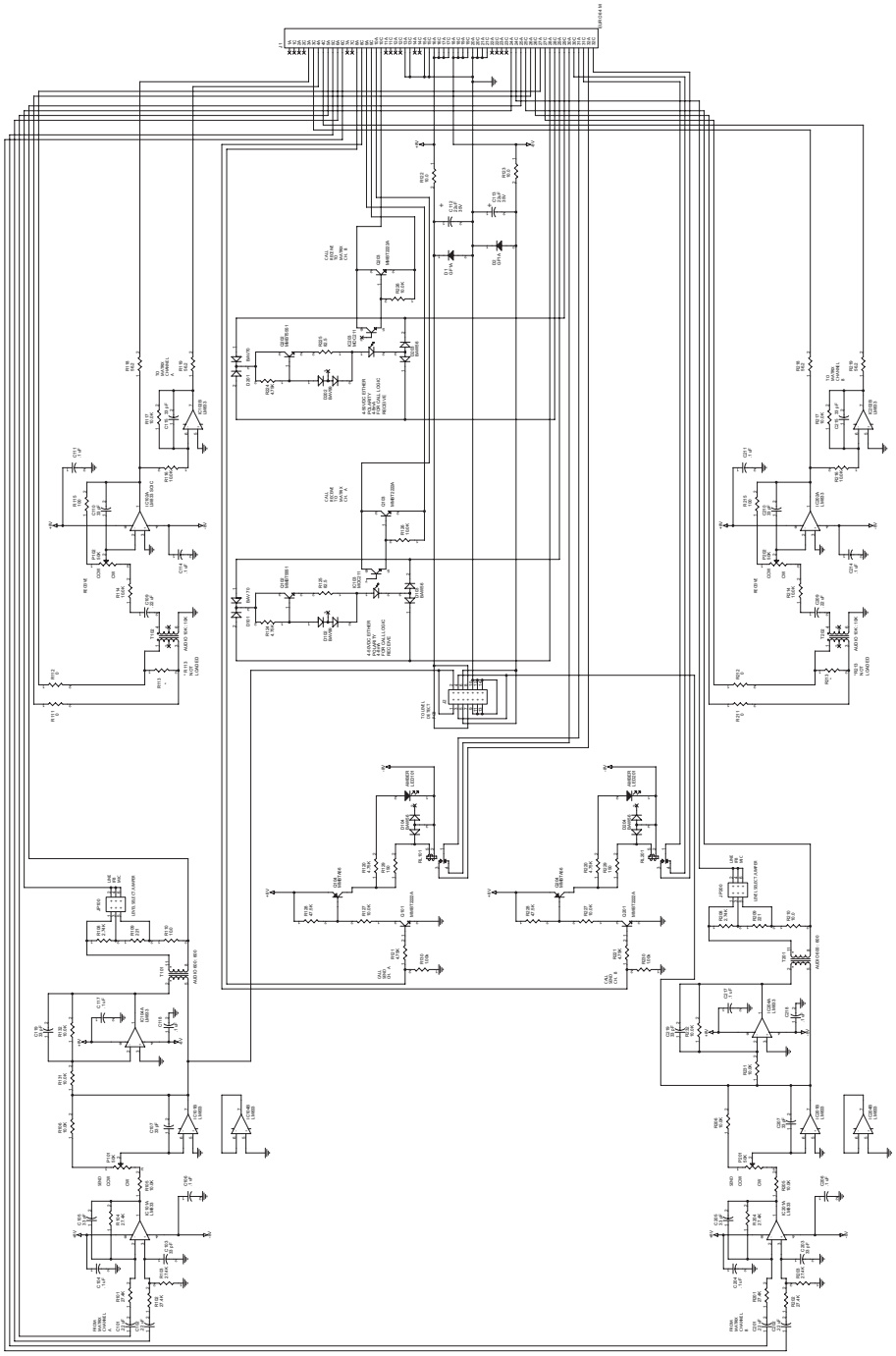


Figure 3-2: Schematic for FOR-22 Main Board PCB (Part No. 710572)

ASSEMBLY DRAWING FOR FOR-22 LEVEL DETECT PCB

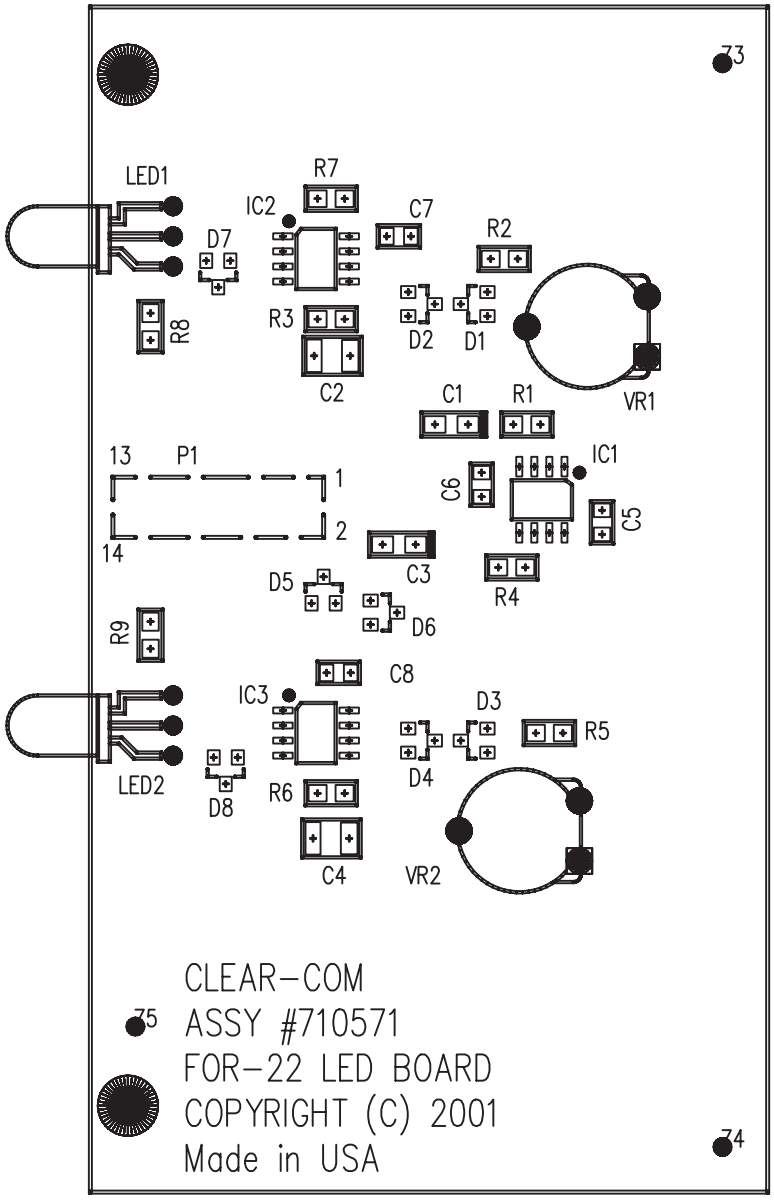


Figure 3-3: Assembly Drawing for FOR-22 Level Detect PCB (Part No. 710571)

BILL OF MATERIALS FOR FOR-22 LEVEL DETECT PCB

Designator	Component Description	Qty Per
C5,C6,C7,C8	.1UF 50V 10% X7R SMD 0805	4
C4,C2	.22UF 50V 10% X7R SMD 1210	2
C1,C3	.47UF TAN 35V 10% SMT A	2
	FOR-22 LED SMT PCB FAB	1
P1	DUAL ROW HEADER 7 POS. .320IN	1
LED2,LED1	BI-COLOR RED/GREEN 3 LEAD	2
R9,R8	475 1/10W 1% SMD 0805	2
R2,R5	23.7K 1/10W 1% SMD 0805	2
R1,R4,R7	47.5K 1/10W 1% SMD 0805	3
R3,R6	332K 1/10W 1% SMD 0805	2
VR2,VR1	100K TRIM POT V.ADJ PIHER#10V1	2
IC1	833 DUAL OPAMP... SOIC8	1
D1,D2,D3,D4,D5,D6,D7,D8	BAV99 DUAL DIODE... SOT23	8
IC2,IC3	358 DUAL OPAMP GROUND SENSING.	2

SCHEMATIC FOR LEVEL DETECT PCB

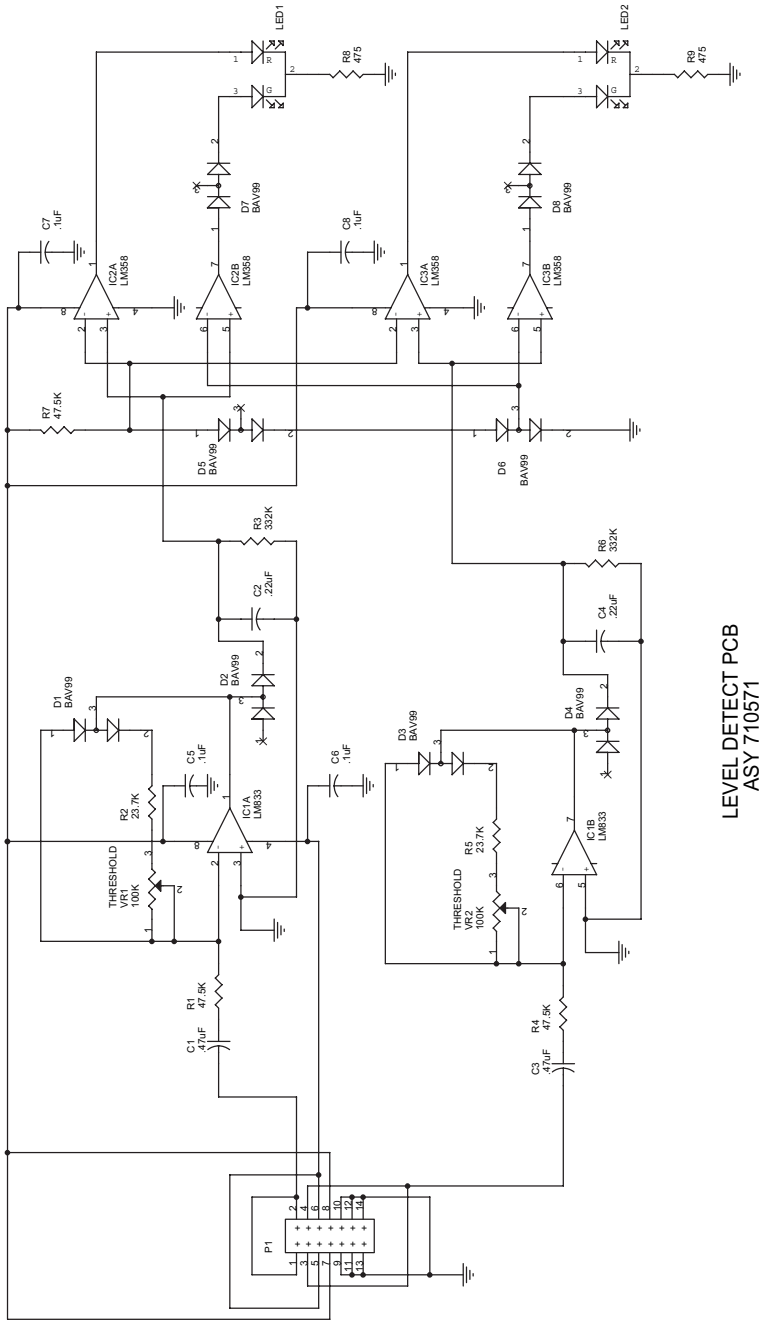


Figure 3-4: Schematic for Level Detect PCB (Part No. 710571)

4 SPECIFICATIONS

Note: 0 dBu is Referenced to 0.775 Volts RMS

Audio Output

Nominal Output Level	Selectable by Jumper Between 0 dBu -15 dBu, or -55 dBu
Impedance	600 ohms at 0 dBu 200 ohms at -15 dBu 20 ohms at -55 dBu
Frequency Response	200-10k Hz, ±3 dB
Maximum Output Level	+20 dBu

Audio Input

Level	0 dBu nominal
Impedance	>10K ohms (bridging)
Frequency Response	200-10k Hz, ±3 dB

Call Signal Input

Threshold	4 volts DC, Positive or Negative Polarity
Maximum Input Voltage	50 volts

Relay Contacts

Contact Type	1 pair SPDT (single form C)
Contact Voltage Rating	24 volts DC
Contact Current Rating	1 A continuous, 2 A peak at 24 volts DC

DC Isolation

Greater than 10 mega-ohms.

Power Supply

Supplied by	PSU-101 power supply
Voltage Required	± 8 volts DC Unregulated
Current Required	30 milliamps (per supply, no LEDs or relays active) 160 milliamps (positive supply, LEDs and relays active) 140 milliamps (negative supply, all LEDs and relays active)

Connectors (on rear of IMF-3 frame)

RJ-45 "To Matrix" Connectors 2
DB-9M "Interface I/O" Connectors2

Operating Environment

Temperature	Between 0ºC and 70°C (32ºF -150°F)

Package Dimensions

Frame Slot Usage	1 slot of IMF-3 or IMF-102 frame
Weight	0.54 lb (0.22 kg)

Notice About Specifications

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

LIMITED WARRANTY

Vitec Group Communications (VGC) warrants that at the time of purchase, the equipment supplied complies with any specification in the order confirmation when used under normal conditions, and is free from defects in workmanship and materials during the warranty period.

During the warranty period VGC, or any service company authorized by VGC, will in a commercially reasonable time remedy defects in materials, design, and workmanship free of charge by repairing, or should VGC in its discretion deem it necessary, replacing the product in accordance with this limited warranty. In no event will VGC be responsible for incidental, consequential, or special loss or damage, however caused.

WARRANTY PERIOD

Return Material Authorization (RMA) numbers are required for all returns.

Both warranty and non-warranty repairs are available.

The product may consist of several parts, each covered by a different warranty period. The warranty periods are:

- Cables, accessories, components, and consumable items have a limited warranty of 90 days.
- Headsets, handsets, microphones, and spare parts have a limited warranty of one year.
- UHF wireless IFB products have a limited warranty of one year.
- UHF wireless intercom systems have a limited warranty of three years.
- All other Clear-Com and Drake brand systems and products, including beltpacks, have a limited warranty of two years.

The warranty starts at the time of the product's original purchase. The warranty start date for contracts which include installation and commissioning will commence from the earlier of date of the Site Acceptance Test or three months from purchase.

TECHNICAL SUPPORT

To ensure complete and timely support to its customers, VGC's User Support Center is staffed by qualified technical personnel. Telephone and email technical support is offered worldwide by the User Support Center.

The User Support Center is available to VGC's customers during the full course of their warranty period.

Instructions for reaching VGC's User Support Centers are given below.

Telephone for Europe, Middle East and Africa: +49 40 6688 4040 or +44 1223 815000

Telephone for the Americas and Asia: +1 510 337 6600

Email: vitec.support@AVC.de

Once the standard warranty period has expired, the User Support Center will continue to provide telephone support if you have purchased an Extended Warranty.

For latest contact information please refer to the Service and Support section at www.clearcom.com.

WARRANTY REPAIRS AND RETURNS

Before returning equipment for repair, contact a User Support Center to obtain a Return Material Authorization (RMA). VGC representatives will give you instructions and addresses for returning your equipment. You must ship the equipment at your expense, and the support center will return the equipment at VGC's expense.

For out-of-box failures, use the following contact information:

Europe, Middle East and Africa

Tel: +44 1223 815000 Email: SalesSupportEMEA@vitecgroup.com

North America, Canada, Mexico, Caribbean & US Military

Tel: +1 510 337 6600 Email: SalesSupportUSA@vitecgroup.com

Asia Pacific & South America

Tel: +1 510 337 6600 Email: SalesSupportAPAC@vitecgroup.com

VGC has the right to inspect the equipment and/or installation or relevant packaging.

For latest contact information please refer to the Service and Support section at www.clearcom.com.

NON-WARRANTY REPAIRS AND RETURNS

For items not under warranty, you must obtain an RMA by contacting the User Support Center. VGC representatives will give you instructions and addresses for returning your equipment.

You must pay all charges to have the equipment shipped to the support center and returned to you, in addition to the costs of the repair.

EXTENDED WARRANTY

You can purchase an extended warranty at the time of purchase or at any time during the first two years of ownership of the product. The

purchase of an extended warranty extends to five years the warranty of any product offered with a standard two-year warranty. The total warranty period will not extend beyond five years.

Note: VGC does not offer warranty extensions on UHF wireless intercom systems, or on any product with a 1-year or 90-day warranty.

LIABILITY

THE FOREGOING WARRANTY IS VGC'S SOLE AND EXCLUSIVE WARRANTY. THE IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ANY OTHER REQUIRED IMPLIED WARRANTY SHALL EXPIRE AT THE END OF THE WARRANTY PERIOD. THERE ARE NO OTHER WARRANTIES (INCLUDING WITHOUT LIMITATION WARRANTIES FOR CONSUMABLES AND OTHER SUPPLIES) OF ANY NATURE WHATSOEVER, WHETHER ARISING IN CONTRACT, TORT, NEGLIGENCE OF ANY DEGREE, STRICT LIABILITY OR OTHERWISE, WITH RESPECT TO THE PRODUCTS OR ANY PART THEREOF DELIVERED HEREUNDER, OR FOR ANY DAMAGES AND/OR LOSSES (INCLUDING LOSS OF USE, REVENUE, AND/OR PROFITS). SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES OR THE LIMITATION ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU. IN ANY EVENT, TO THE MAXIMUM EXTENT PERMITTED UNDER APPLICABLE LAW, VGC'S LIABILITY TO CUSTOMER HEREUNDER SHALL NOT UNDER ANY CIRCUMSTANCES EXCEED THE COST OF REPAIRING OR REPLACING ANY PART(S) FOUND TO BE DEFECTIVE WITHIN THE WARRANTY PERIOD AS AFORESAID.

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

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

This limited warranty is not transferable and cannot be enforced by anyone other than the original consumer purchaser.

This warranty gives you specific legal rights and you may have other rights which vary from country to country.