AEV ITB 302

Dual Digital Telephone Hybrid

ITB 302

Guarantee

The equipment is warranted for a period of 2 years from the date of invoice (ex-works). The warranty does not cover faults provoked by carelessness, natural causes and parts subject to wear. In addition, the cost of labour and shipment is not covered. The warranty will be voided if the equipment is mishandled.
AEV VIA DELLA TECNICA N.33 I-40050 ARGELATO BOLOGNA ITALY WWW.AEV.eu WWW. E-MAIL: INFO@AEV.EU

Feedback

AEV welcomes your comments on our products. Your suggestions may be extremely useful to develop new equipment and manuals and this will be of benefit to you too! Let us have your comments on our products and we will be pleased to read them.
S e n d your information by e-mail to the following address: service@aev.eu, or send a letter to the AEV SERVICE Department.

Technical Support

If you require technical support, contact AEV SERVICE giving a clear and concise account of your specific problem. Quote the serial number of your equipment by referring to the AEV nameplate attached to the equipment itself as this is the most important piece of information to be provided.

Factory Service and Repairs

If problems arise while the equipment is being installed, consult this manual and check that the
installation is being carried out properly. If the problems still cannot be solved, call the AEV SERVICE Department for further information. If the problem is a minor one we can a telephone call will probably suffice. If, on the other hand, the equipment is to be shipped to AEV for service or repairs.
No repairs will be made if the cost of shipment is charged to AEV. In this case, we will not accept the delivery.

Shipping Instruction

When shipping the equipment to AEV, use the original package in order to be certain that it will be fully protected during handling. If you need the original package, call us for a new one.
If you ship the equipment in a different packing container, take care to provide a double package
by interposing padding material between the two containers in order to fully protect the equipment during shipment. The package should be marked "FRAGILE" in red.
Remember that the RMA number must be clearly visible on the package. If it is not, the equipment will not be accepted.

SAFETY PRECAUTIONS

IMPORTANT: Carefully read this paragraph as it contains important instructions concerning operator safety and directions regarding the installation, operation and maintenance of the equipment.
Failure to observe the safety instructions and information given in this manual **constitutes an infringement of the safety rules and design specifications provided for this piece of equipment**.
Futurcom declines all responsibility if any one of the safety rules given herein is not observed.
Futurcom declines all responsibility if the end-user resells the product.

The equipment is to be used by people capable of operating it in a trouble-free manner and **it is assumed that they are aware of the following safety rules.**

• Keep this manual with the utmost care and close at hand so that it can be consulted whenever needed
• After unpacking the equipment, check it for condition.
• Avoid banging the equipment.
• The packing material (plastic bags, polystyrene, nails, etc.) must never be left within the reach of the children, as **these items are potential sources of danger**.
• Do not use the equipment in places where the temperature is not within the recommended range, as specified by the manufacturer.
• Before connecting the equipment, make sure the nameplate specifications correspond to the mains electricity supply (the nameplate is located on the equipment enclosure).
• Do not remove the sticker from the equipment as it contains important specifications and the relevant serial number.
• To join the equipment to the mains supply, use the power cord purchased with the equipment.
• The equipment must be used only for the purpose it was designed for.
• Abuse or misuse of the equipment is **extremely dangerous** for people, pets and property. The manufacturer declines all responsibility for damage and injury resulting from **improper use** and **mishandling**.
• Certain basic safety rules must be observed when using electrical equipment, in particular:
- Never touch the equipment with wet and/or damp hands or other parts of the body.
- Keep the equipment away from drops of water or sprinkling systems.
- Never use the equipment near high heat sources or explosive material.
- Do not introduce any extraneous matter into the equipment.
- Do not allow children or untrained people to use the equipment.
• Before cleaning or servicing the equipment outside, disconnect it from the supply and wait at least 2 seconds before working on it, as recommended by current safety regulations.
• In the event of faults and/or improper operation, turn off the equipment, shut off the electrical power and call your dealer.
covers/guards or circuit boards are to be removed.
• Blown fuses inside the power supply indicate that there may be a fault in the power supply itself. The fuses must be replaced by qualified and authorised persons. It is advisable to call your nearest dealer.
• Call your dealer for any repairs and be certain original spare parts are used. **Failure to observe this rule may adversely affect the safety level of your equipment**.
• The equipment is to be connected to the mains supply and provided with adequate and efficient earth conductors.
• The electrical wiring must be done in compliance with current electrical codes CEI 64-8 "Electrical specification for domestic buildings".
• When installing, leave a clearance of at least 1 cm around the equipment to allow air to pass freely.

NOTE. This piece of equipment has been manufactured to the highest standards of workmanship. It must be used properly and serviced as recommended to ensure long-term dependable operation.

The installation must be done in order to be able to guarantee an easy access to the cable of feeding.
The device of dissection of the equipment is the cable of feeding, so it must be unconnected from the equipment every time it is ecessary to do any type of maintenance.

Contents

Telephone hybrids

A telephone hybrid is a system that is able to make an audio connection between a telephone line and low frequency equipment. In practice this connection is by no means simple since the characteristics of the telephone line require the equipment to employ a series of techniques to ensure good audio quality and immunity to interference.
The bandwidth of a normal telephone line is compressed from about 100 Hz to 3-4 KHz in order to guarantee a good reproduction of the human voice. A telephone hybrid must have a wide frequency response in order to adapt to the quality of any line and to avoid adding further limitations to the system. Unfortunately telephone lines are often sources of intense disturbances, noise, crackling, fading etc. Furthermore they are often sources or conductors of static charge and overvoltage, able to destroy circuits which have been imprudently connected to them. Add the fact that the resistive and capacitative behaviours of line are not uniform, and thus barely repeatable, and clearly the transmitted audio quality will vary with time.
It is therefore necessary to take particular care in the design of line-audio interfaces in order to avoid significant degradation of the bandwidth or re-injection of induced interference. The interface must also ensure complete electrical isolation between the line section and that connecting to the audio equipment.
Another problem arises during a telephone connection between a remote correspondent and an interviewer or DJ; the DJ's voice will be transmitted down the telephone line and, since the same line is used for transmission and reception, received again with a delay with respect to the original. It will be re-amplified and looped back resulting in whistles and Larsen effects. Usually, antilocal circuits are designed to solve this matter by identifying those audio components which tend to enter into the loop and eliminating only the part which re-enters. This is indispensable for Audioconferences.
The new Digital Hybrid features with an electronic echo canceller, that allows to reduce drastically or even eliminate the feedback. In this way the diaphony is improved thanks to the use of a DSP.
Audioconferencing allows simultaneous communication between remote correspondents that are interconnected through telephone lines and the hybrid, which interconnects them without introducing distortions or noise. It allows also to the DJ to participate in the conference. The DJ, as "manager" of the conference, is able to include or exclude each correspondent from the conference and can also speak privately to each of them for instance to prepare the interview.

Features of AEV I TB-302

AEV ITB-302 is a telephone hybrid that satisfies all today's demands for studio and broadcast telephony allowing total management of telephone lines. It is designed in a 19", 1 unit, rackmounting container, housing 1 or 2 telephone hybrids. Units may be interconnected to allow expansion to "n" lines whilst maintaining simplicity of use and the possibility of remote control.
The telephone lines, appropriately filtered and isolated, allow Audioconferencing between them and the DJ. An internal microprocessor provides a range of functions that, until now, have been difficult to provide in the same unit. All potentiometers were eliminated in order to solve wear problems. It is also available a socket on the rear panel to connect a headset.

Installation

AEV ITB-302 telephone hybrid has been designed and manufactured to conform to current safety standards. The unit should only be installed by competent personnel and in compliance with operator safety requirements and environmental specification. Great care should be taken in making earth and ground connections to the unit and associated equipment. As for any electronic equipment, adequate ventilation for cooling must be ensured in order to guarantee operating temperatures within the limits defined in the Technical Specifications section. This is particularly important in case of rack mounting or installation in confined or poorly ventilated locations. It is advisable to leave a space between each unit and adjacent units (above and below) even if mounted in a ventilated rack. If well connected to the rack's ground and earth connections, the unit will be immune to interference including RF, as long as the high frequency units have been correctly connected. AEV ITB-302 is anyhow fitted with RF filters on

its input in order to eliminate annoying interference. Gas discharge tubes are fitted to the telephone lines to guarantee immunity from static charges or over-voltages.

General Description

The front panel

The front panel of AEV ITB-302 is divided into 4 sections.
The first 2 sections from the left are identical and allow control over the telephone hybrids.
Four switches with associated LED indicators perform the following functions:
1) 2 WIRE / 4 WIRE Switches the hybrid of the section in use from 4 - wire to 2 - wire operation
2) MEETING Puts the line into conference mode
3) OFF HOOK Hangs-on the line (equivalent to picking up the handset)
4) 1 KHz SEND Generates a 1 KHz note at 0 dBm for local and remote adjustment
5) Two level controls are situated on the input section which allow adjustment of the receive and send transmission levels; each one fitted with a LED level display (DOT mode), and a trimmer to adjust line levels.
The following controls are located in the third section:
6) BUZZER ON / AUTOLOCK SWITCH
When turning the equipment on the buzzer will be enabled alone (incoming).
Pressing the switch successively: first it enables the Autolock and Hang-up; second it disables the buzzer but not the Autolock and Hang-up; third it disables the Buzzer, the Autolock and Hang-up; fourth it returns to the initial position.
7) PANEL/ REMOTE SWITCH Switches between panel control or remote control.
8) MEETING LEVEL Adjusts the level during conference
The line power indicator lamp is situated in the fourth section.

The rear panel

The rear panel contains all the connectors required to connect to the outside world

1 Switch POWER	Switch On/Off
2 AC POWER	Line power socket
3 REMOTE	25-way Cannon connector for remote control
4 EXPANDER 1	9-way Cannon connector for expansion
5 EXPANDER 2	9-way Cannon connector for expansion

Plus two identical sections for the two lines, comprising:

6 4 WIRE RX TX	4-wire line connection
7 SEND	Line input (from Mixer)
8 RECEIVE	Line signal output
9 INSERT	9-way Cannon connector for insert connection to the reception circuit and head.
10 TEL SET	Line telephone connection
11 TEL LI NE	Line connection for 2-wire lines

The remote control

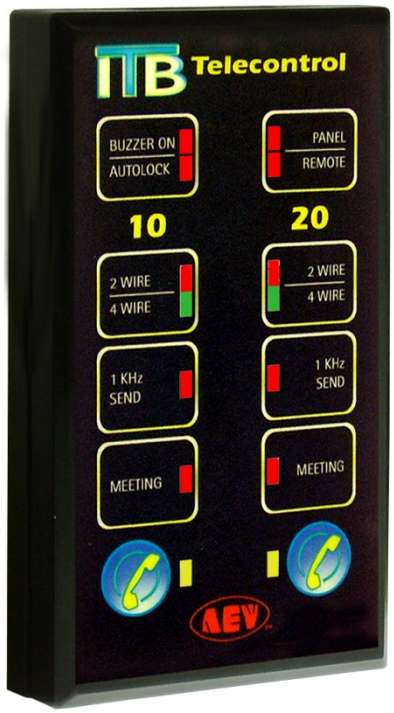
AEV ITB-302 can be fitted with an optional remote control, allowing control of the hybrid and its functions. The remote control reproduces the front panel functions of the unit for the sections related to the two lines and to the general one.

Two buttons are located on the upper part:
BUZZER ON/ AUTOLOCK SWI TCH
Successively pressed it enables or disables the incoming call buzzer and Autolock with Hang-up
functions together. Indicator leds facilitate programming of these functions.

PANEL/ REMOTE BUTTON
Switches between panel control and remote control.
On the lower part, two identical sections relating to lines 1 and 2, allow control of:

2 WIRE / 4 WIRE Switches the hybrid of the section in use from 4-wire to 2-wire operation

MEETI NG Puts the line into conference mode
OFF HOOK Hangs-on the line (equivalent to picking up the handset)
1 KHz SEND Generates a 1 KHz note at 0 dBm for local and remote adjustment



On telephone lines

Connections to mixer and lines

The connection of AEV ITB-302 to 2-wire telephone lines is made by inserting the telephone cable into the corresponding socket on the ITB-302 using a standard telephone line connector. Other telephonic equipment may be connected by inserting a standard connector in the appropriate ITB-302 socket. This is useful for making calls and checking the line. Its onnection is optional.
For connection to 4-wire lines it is advisable to check input and output connections.
The mixer output should be connected (balanced or unbalanced) to the hybrid's SEND input, whilst the feedback (RECEIVE) can be connected to the cue input of the same mixer.

WARNING: TAKE GREAT CARE I N CONNECTI NG LOOP- BACKS TO THE MI XER. FAI LURE TO DO SO CAN GENERATE HUM, ECHOES AND "TUBE" EFFECTS.

Hanging-on a line

To hang-on a line, simply press the (OFF HOOK) button located on the front panel, or on the remote control. If the autolock function has been enabled, the unit will automatically hang-on the line after a few rings.

Adjusting levels

Once the line has been seized, adjust the send and receive levels by injecting the 1 KHz test signal with the corresponding button, or with a standard signal, and calibrate the levels for a near zero reading on the LED meters.

Conference mode

Once the line has been hang-on connection is made and maintained. The MEETING button connects the line to the meeting circuit. In this configuration, the lines that have the relevant MEETING button pressed, will be connected to each other enabling an audioconference.

Releasing a line

Pressing the OFF HOOK button a second time, on the front panel or on the remote control, it releases the line. It is equivalent to putting the handset on-hook.

Remote control operation of mixer

The remote control allows the AEV ITB-302 to be installed in a conveniently located rack near the telephone line sockets. Once the levels have been adjusted on AEV ITB-302 , the remote control allows control of the following functions: on-hook, off-hook, conference mode etc., directly from the mixer or from the remote telephone location, for simple and rapid operation.

Expansions

MORE THAN 2 LI NES

AEV ITB-302 is expandible, allowing connection of more than one unit in cascade, all remotely controllable and able to perform audioconferencing. No modifications are necessary, except for the addition of further units and their corresponding cables.

4 -wire lines

AEV ITB-302 features an interface for normal 2-wire lines and, as an option, for 4-wire lines. This allows, amongst other things, connection to cellular telephones.

Technical Data

AUDIO LEVELS

Input level (SEND 1/2)	± 12 dBm
Input impedance	>10 KΩ Electronically Balanced
Connector	XLR female
Output level (RECEIVE 1/2)	0 dBm
Output impedance	100 Ω Electronically Balanced (max load 600 Ω)

INSERT

Input level	0 dB
Input impedance	>10 KΩ
Insert Output level	0 dB
Head Output level	+10 dB
Head Output impedance	10 Ω
Head Commentator	50 Ω Unbalanced
Connector	Cannon 9 pole female

HYBRID CIRCUIT

Input/output balanced and floating.

Impedance	600 Ω
RX Level	- 20 ÷ 0 dBm
TX Level	- 8 dBm
Hybrid null	- 40 dB Full Band (on urban telephon line)
Frequency response	230 ÷ 3400 Hz
Distortion	0.8 %

4 WIRE SECTION

Impedance	600 Ω
RX Level	- 12 ÷ + 12 dBm
TX Level	0 dBm
Frequency responce	50 ÷ 20000 Hz (-1 dB)
Distorsion	0.8 %
Noise	≥ 74 dB (DIN Noise)
Crosstalk	≥ 75 dB (1KHz 0dBm)

MEETING SECTION

Connector	9-contact subminiature Cannon female
Input meeting	± 12 dBm
Input meeting impedance	>10 KΩ Electronically Balanced
Connector	9-contact subminiature Cannon female
Output meeting	0 dB
Output meeting	impedance 100 Ω Electronically Balanced (max load 600 Ω)

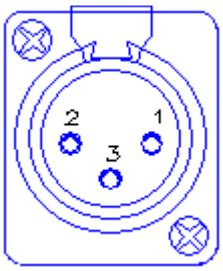
GENERAL DATA

Power supply	87 to 254 V 50/60 Hz 10 VA
Dimension	19" Rackmount 1 Unity
Weight	4.0 Kg

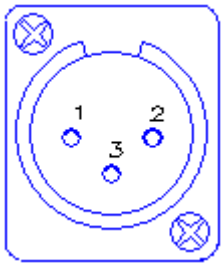
Attention: All cables should not be more than 3 meters length.

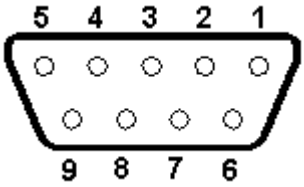
Connections

SEND: 1-GROUND
2-INPHASE
3-RETURN

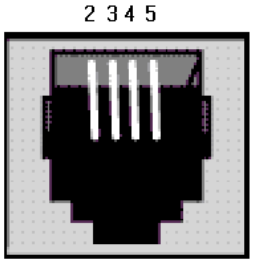


RECEIVE: 1-GROUND
2-INPHASE
3-RETURN

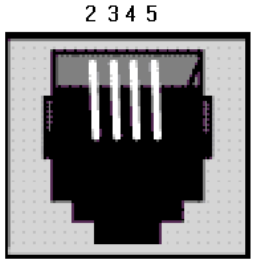




(option)
INSERT: 1-MIC +
2-GND
3-IN SIGNAL (Insert)
4-GND
5-OUT SIGNAL +10 dB (Head)
6-MIC -
7-GND
8-GND
9-OUT SIGNAL 0 dB (Insert)

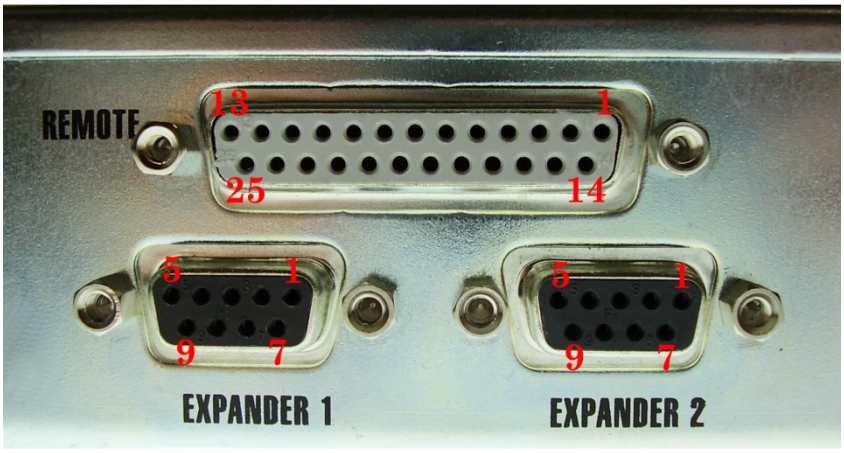


2 WIRE: 2-N.C.
3-TEL. SET / TEL. LINE
4-TEL. SET / TEL. LINE
5-N.C.



4 WIRE: 2-OUTPUT INPHASE
3-OUTPUT RETURN
4-INPUT INPHASE
5-INPUT RETURN

Connections EXPANDERS / REMOTE



Expander 1
1- INPUT +
2- GND
3- INPUT -
4- OUTPUT +
5- GND
6- OUTPUT -
7- EXPANDER INPUT
8- GND
9- EXPANDER OUTPUT

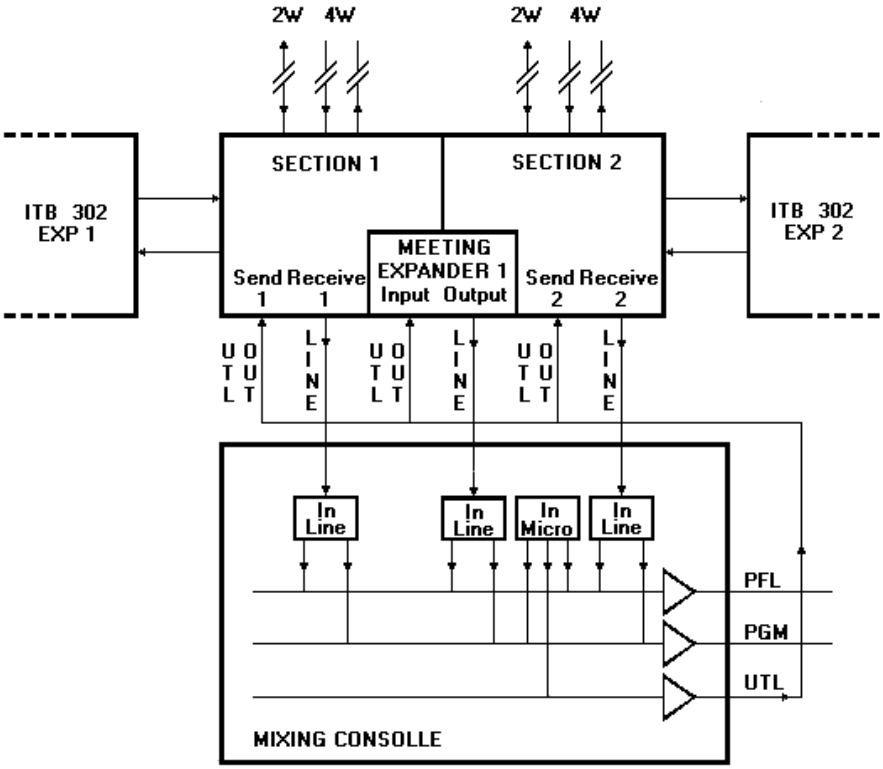
Expander 2
1- N.C.
2- GND
3- N.C.
4- N.C.
5- GND
6- N.C.
7- EXPANDER INPUT
8- GND
9- EXPANDER OUTPUT

Remote

4 - Hook 2	(active low TTL input : internal pull-up 4K7)
16-Meeting 2	(active low TTL input : internal pull-up 4K7)
18-Hook 1	(active low TTL input : internal pull-up 4K7)
17-Meeting 1	(active low TTL input : internal pull-up 4K7)
12-Hook 2	(active low TTL output : 20 mA max)
11-Meeting 2	(active low TTL output : 20 mA max)
13-Hook 1	(active low TTL output : 20 mA max)
25-Meeting 1	(active low TTL output : 20 mA max)

6 - + 5 Volt (50 mA max)
19- + 5 Volt (50 mA max)
7 - + 5 Volt (50 mA max)
20- + 5 Volt (50 mA max)

21- GND
9- GND
22- GND
8- GND


2W 4W
2W 4W
ITB 302
EXP 1
SECTION 1
SECTION 2
ITB 302
EXP 2
MEETING
EXPANDER 1
Input Output
Send Receive
1 1
Send Receive
2 2
OUTL
LINE
OUTL
LINE
OUTL
LINE
In Line
In Line
In Micro
In Line
PFL
PGM
UTL
MIXING CONSOLLE