

Instruction Manual **New AE-1** **Electrical Coupler** **Accoppiatore elettrico**

The *Receiver* and *Microphone* Sections impedance are step settable, and present the impedance values of the most used electro-acoustical devices.

Anyway, it is possible to set-up the AE-1 with external impedance values not scheduled.

The power supply of $\pm 15V$ is supplied by the

1- General

Our **CS-AE-1** Electrical Coupler was designed to simulate the electro-acoustical devices of telephone subsets. It allows the functional measurements, either receiving, sending and sidetone, over printed board assemblies without handsets, using **CS8014 - Automatic F.F.T. Telephone Test System**.

When connected to the **CS8014**, it becomes very useful, thanks to its capability to simulate electrically a handset (microphone and receiver), loading the circuit under test with the same impedance of the real electro-acoustics devices. By an appropriate programming of test parameters of **CS8014**, it can simulate also the same sensitivity.

Both the Sections, *Receiver* and *Microphone* are mutually insulated and they are insulated also from the **CS8014** circuits.

That avoids all problems related to different ground references.



same **CS8014** test equipment, at which the AE-1 is normally connected, instead of the **AC-3** Test Head.

2 - Receiver (Ricevitore) Section

The function of this Section is to translate to the measurement circuits of CS8014 the same signal of the receiving capsule and loading the circuit under test with the same impedance of the simulated receiving capsule.

The *Receiver* Section has:

- 1) Input circuit constituted of resistors and a switch to select the impedance value to connect to the telephone circuit.

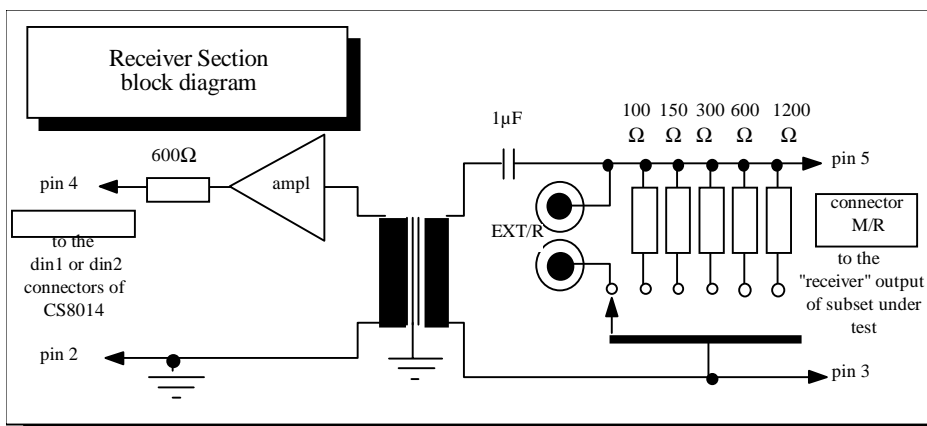


fig.1

If the needed impedance value is not directly selectable, set the switch "Ricevitore" on Ext and connect to binding posts *Ricevitore - Ext* an impedance (at 600 Hz) equal to:

$$Z_{ext} = \frac{Z_r \times 55.000\Omega}{55.000\Omega - Z_r}$$

2) Input circuit, balanced and high impedance, with a series capacitor to block direct currents that can saturate the input translator.

3) Amplifier, to compensate the input loss and to adapt the output impedance (side **CS8014**) to 600Ω. By that the signal routed to **CS8014** is equal to the signal at pins 3 and 5.

The block diagram of *Receiver Section* is indicated in fig 1.

3 - Microphone (Microfono) Section

The purpose of this Section is to apply at the input circuit of the telephone under test, a test signal from

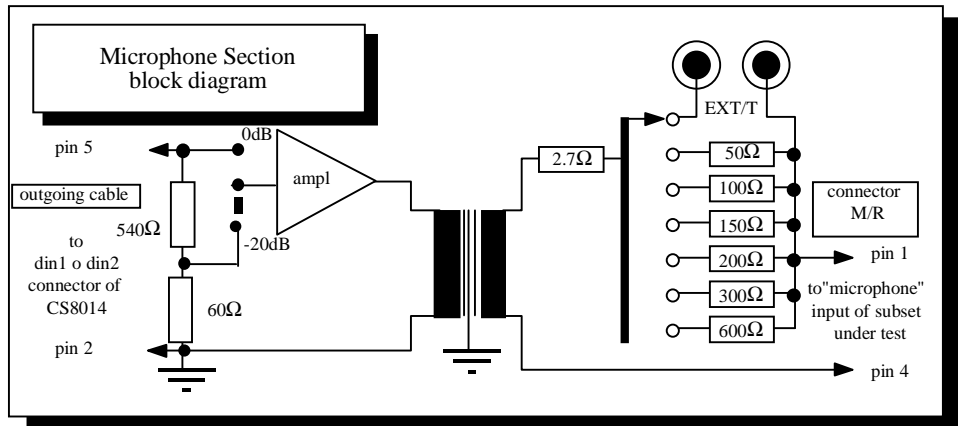


fig.2

The *Microphone Section* has:

1) Input amplifier, with impedance compensation, which routes the test signal of **CS8014** output translator; by that the output impedance is approximately zero.

To simulate the use of electret microphones it is necessary to reduce of 20dB the level sent to the input microphone of the circuit under test.

On the printed circuit of **AE-1** there is a jumper to select the gain of this section, 0dB or -20dB (normally set to -20dB).

2) Output circuit, with rotary switch, to select the impedance value to connect in series to the signal output.

If the needed impedance value is not directly selectable, set the switch *Microfono* on *Ext* and connect to the binding posts *Microfono - Ext* impedance equal to:

$$Z_{ext} = Z_t - 50\Omega$$

The block diagram of *Microphone (Microfono) Section* is indicated in fig 2.

4 - Use

To use correctly, do as follow:

- Connect the output cable from **AE-1** to *din1* or *din2* connector of **CS8014** Test System. When programming speech tests that use the device **AE-1**, you must program the using connector (*din1* or *din2*).

- Connect to M/R of **AE-1** the telephone circuit as specified in fig.4. For that where the microphone capsule is normally

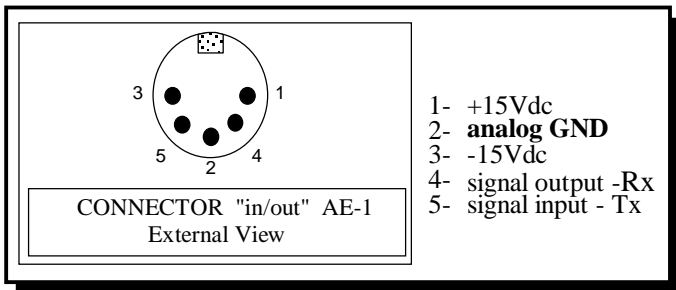


fig.3

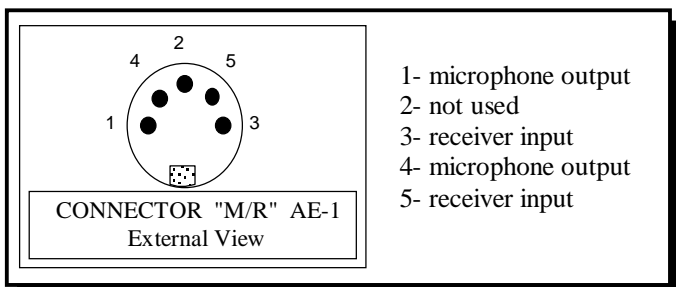


fig.4

CS8014 of amplitude and impedance equal to the signal generated by the capsule normally used.

connected you must connect the pins 1 and 4 of M/R.

Where the receiving capsule is normally connected you must connect the pins 3 and 5 of M/R.

- Set the impedance values of *Ricevitore* and *Microfono* Sections as above specified.
- Make the tests, as the telephone set under test is complete of handset and the System complete of Artificial Head¹.
- All the Speech tests must programmed as “electrical type”.
- With the internal jumper switch on -20dB position the sending and side-tone tests must be programmed on **CS8014**, with a level (“*excit. level*”) equal to the needed value, increased of 20dB.
For Loudness Rating measurements the “*measure offset*” is:

+20dB for **CS8014**

For OREM measurements the “*measure offset*” remain to 0dB.

Example:

If a -40dBV load level needs to the microphone input of the circuit under test, the programming is:

for **CS8014** -14dBV(e.m.f.)

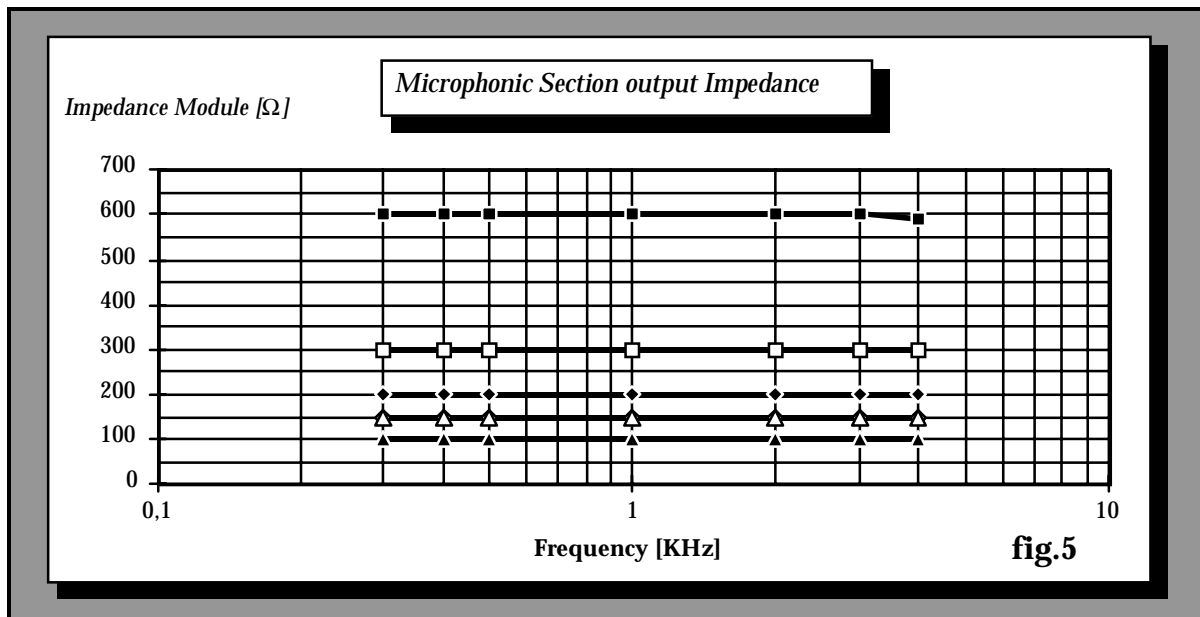
For Loudness Rating measurements the “*measure offset*” is:

for **CS8014** +20dB

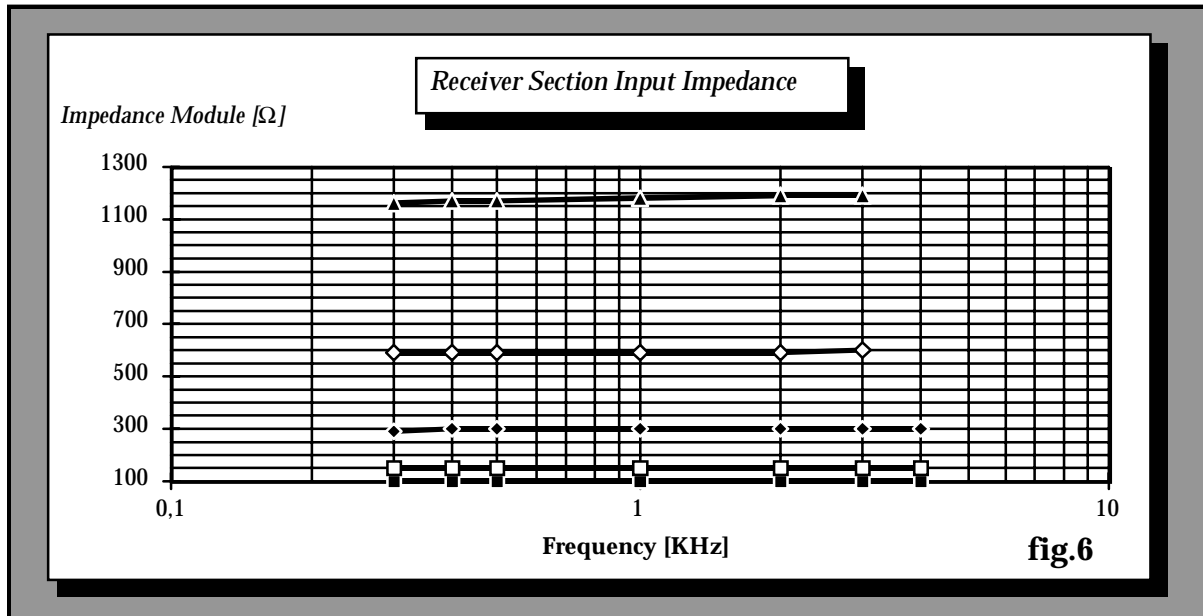
Note:

The CS AE-1 is shipped with the internal bridge switched on -20dB.

To change position (0dB gain) open the bottom panel by the four screws.



¹ TAKE CARE! - Evaluating the results or during the limits programming, remember that with AE-1 coupler, the acoustic response can be different than the complete telephone set, due to electroacustical devices response.
For that, the evaluation will be correlated only with the data of design of the telephone circuit and not with the Country or International Rules.



5 - Characteristics

5.1 - Generals

Supply voltage current	± 15V , ±20% ± 2,5 mA stand-by ± 10 mA full load, max signal
Dimensions	h=45 mm w= 155 mm d= 80 mm
Weight	about 500 gr

**5.2 - Electrical Characteristics
Microphone Section**

Input return loss	>55dB @ 600Ω
max. level	+12dB _m
Output balanced	
response	±0.2dB from 300 to 3400 Hz load 600Ω
impedance	50, 100, 150, 200, 300, 600 Ω and Ext. (see fig.5)
ground balance	>30dB from 300 to 3400Hz @600Ω ground ref.
noise	< -60dB _m with input short-circuited

**5.3 - Electrical Characteristics
Receiver Section**

Output response	±0.2dB from 300 to 3400 Hz load 600Ω
return loss	>45dB from 300 to 3400Hz @600Ω
noise	< -65dB _m with input short-circuited
Input balanced	
impedance	100, 150, 300, 600, 1200Ω and Ext. (see fig.6)
ground bal.	>25dB from 300 to 3400Hz @600Ω ground ref.
CMRR @600•	>65dB from 300 to 3400Hz
max. level	+12dB _m