



Technical Documentation

FC-4 4 Wires Adapter

1- General

The 4 Wires Adapter CS - FC-4 is an accessory of CS8014 Automatic F.F.T. Telephone Tester System designed for receiving and transmitting measures on 4 wires telephone devices, that is not provided with hybrid transformer for a direct link to PSTN telephone lines. Such devices may be a simple handset, with the outputs of the microphone and the inputs of the receiver, up to GSM, with independent analogue inputs and outputs.

CS - FC-4, connected to the Telephone Tester Mod. CS8014, is able for a wide spectrum of applications by its capability to have two independent ways of communication, without alter the frequency response of original devices.

Terminations of the input circuit (microphone) and output circuit (receiver) may be defined, connecting resistances or complex dipoles, to the binding posts on the front panel, so to reproduce the real conditions of use of the devices during measure.

By a specific test programming of CS8014, you can make measures of sensitivity and frequency response, according to different Standard Rules.

It's necessary remind that ALL the tests that use Adapter FC-4 must be programmed without feeding bridge, choosing option "no feeding". Terminals of "HANDSET" connector, Receiver and Microphone, are each other completely insulated, also from circuit of CS8014, avoiding so every problem of different electrical reference.

Can be an exception the microphone section, if necessary to dispose of a bias circuit .

The ±15V power, is supplied from CS8014 connected by a cable to the free connector din1 or din 2.



CS FC-4
4 Wires Adapter

2 - Receiver Section

Task of this Section is to transfer the signal generated by CS8014 to the receiving circuit, working like active circuit or simple receiver.

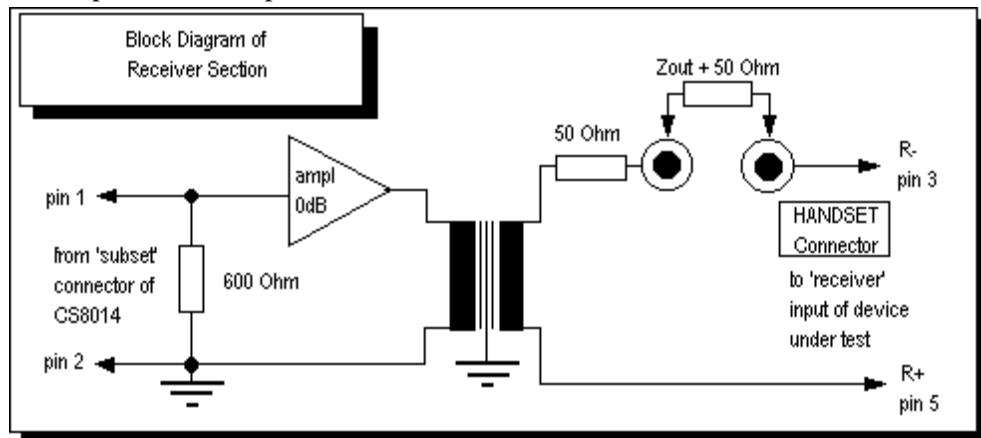


fig.1

The resistance or complex impedance connected to the "Zout+50" binding posts determine the driving impedance of the receiving circuit during measure and it will have to be of the same value of the real use condition.

The receiving section circuit, shown in fig.1, is composed by:

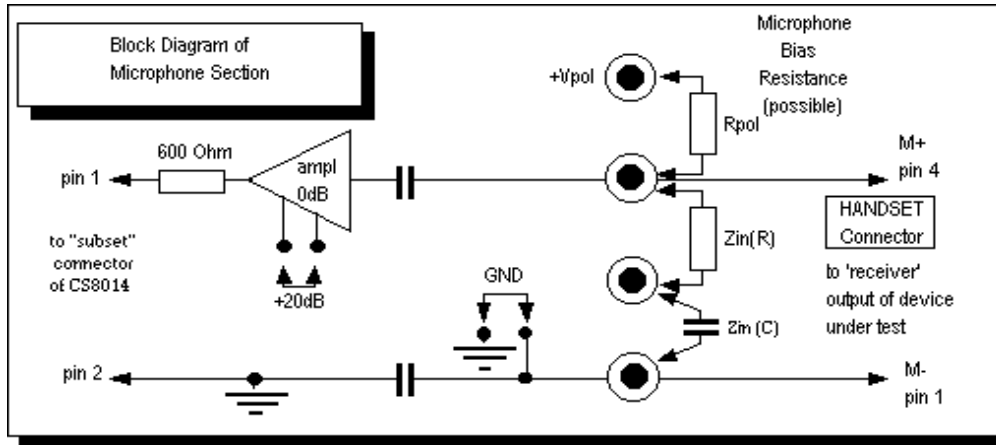


fig.2

- 1) An amplifier receives the test signal from CS8014 by *subset* connector and drives an output transformer compensating its impedance. So the output group impedance is equal to 50Ω.
- 2) An output group, composed by external resistance or complex dipole “Z_{out}+50”, set the driving impedance value of the receiving circuit. The impedance value to set must result

3 - Microphone Section

Purpose of the *Microphone* Section is to receive the generated signal by microphonic circuit during measure, active or simple capsule, and carry it to the measure input of CS8014, by the *subset* connector.

The Microphone section circuit, shown in fig.2, is composed by:

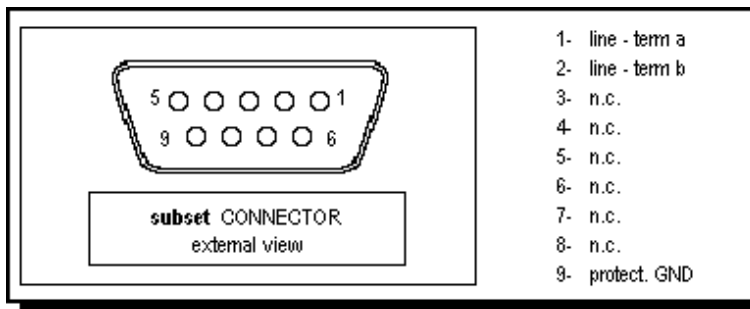


fig.3

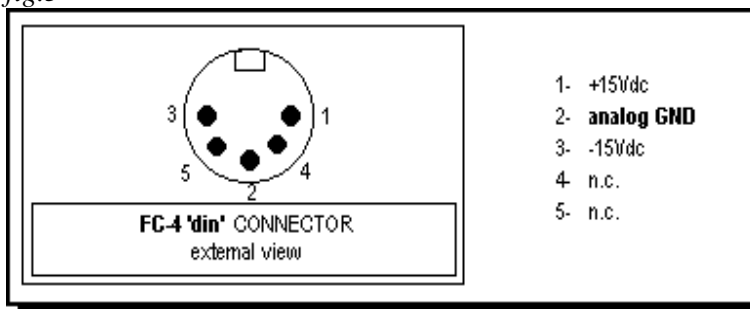


fig.4

from this relation:

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

where 50Ω is the output residual resistance of the receiver Section.

- 1) A pre-setting group of the load impedance for the microphone during test. The real load must be put between the binding posts “Z_{in}(R)”, while the possible de coupling capacitor for DC current, must be put between the binding posts ”Z_{in}(C)”. If no de coupling is necessary, these binding posts must be short circuited. The load impedance to predispose between the binding posts “Z_{in}(R)”, must have the module resulting from this relation, calculated for 600Hz:

$$Z_{ext} = \frac{(Z_r \times 100.000\Omega)}{(100.000\Omega - Z_r)}$$

- 2) A bias group, to use for capacitor or electret microphone, set the bias voltage on the binding post “R pol.”. The current is determined by the external resistance. In such case the negative terminal of the microphone must be connected to ground by the “GND” jumper. See fig.7 and Tab.1 for set the bias voltage and grounding.

- 3) An amplifier compensates the losses of input group and adapts the output impedance to **CS8014** at 600Ω.

The signal level seen from **CS8014** is so equal to the signal present on terminals of the resistances of the input group.

- 4) If the generated signal by the microphone is too low and it can't be measured with the necessary accuracy, it is possible to increase the amplifier gain of 20dB, inserting the jumper "+20dB" (see fig.7).

4 - Use

For the correcting use, proceed as follows:

- Link the *subset* connector of **CS8014** with that of **FC-4**, by the 9 poles cable **X110** supplied.

Link the "din" connector of **FC-4** with one of the *din1* or *din2* connectors of **CS8014**, by **X107-4** cable.

- Link to the "HANDSET" connector of **FC-4** the terminals of telephone circuit under test, as indicated in fig.5. Therefore the transmitter capsule will be linked to terminals 4 and 1 of the "HANDSET" connector; the receiving capsule must be connected to 5 and 3 terminals.

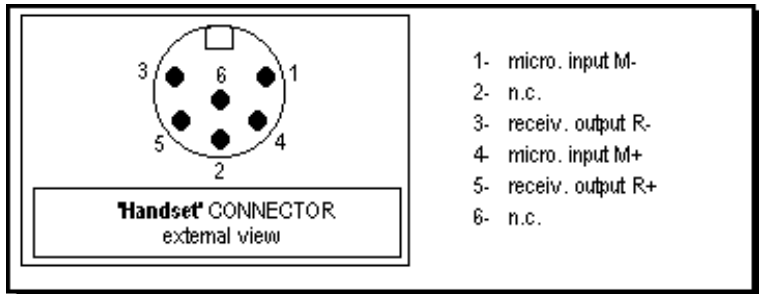


fig.5

- Set the impedances of the *Receiver* and *Microphone* Sections like shown in the respective paragraphs.

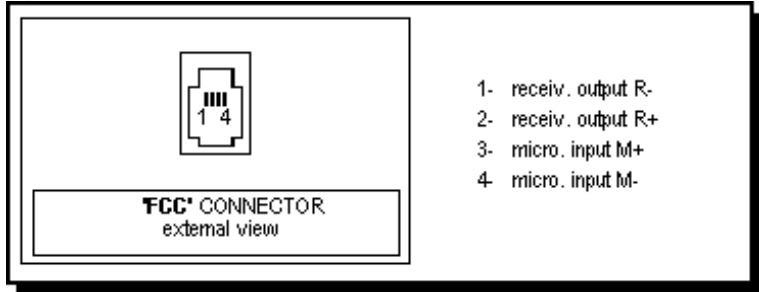


fig.6

- The **FC-4** is ready for the acoustic evaluation on 4 wires devices. Remind that for the tests using **FC-4**, you **MUST NOT** program any artificial bridge or telephonic feeding voltage. Select "no feeding" option.

Tab.1

Voltage	jump. +1	jump. +2	jump. +4
1,5	-	-	-
2,5	X	-	-
3,5	-	X	-
4,5	X	X	-
5,5	-	-	X
6,5	X	-	X
7,5	-	X	X
8,5	X	X	X

5 - Characteristics

5.1 - Main characteristics

Supply:	$\pm 15V, \pm 5\%$
current	$\pm 10\text{ mA standby}$ $\pm 30\text{ mA with load and max signal}$
Size:	h=45 mm l= 155 mm p= 80 mm
Weight:	400 gr.

**5.2 - Electric characteristics
Receiver Section**

Input:	
impedance	600 Ω
return loss	>40dB relative to 600 Ω
max. level	+0 dB _V
Balanced Output:	
response lev/freq	$\pm 0.2\text{ dB}$ from 300 to 3400 Hz with load 600 Ω
impedance	50 Ω + impedance put on binding posts
symmetry	"Z _{out} +50" >30dB from 300 to 3400Hz @600 Ω
noise	relative to ground < -60 dB _m with short circuited input

**5.3 - Electric characteristics
Microphone Section**

Output:	
impedance	600 Ω
response lev/freq	$\pm 0,2\text{ dB}$ from 200 to 4000Hz with load 600 Ω >40 dB relative to 600 Ω
return loss	< -60 dB _m with short circuited input
noise	
Input:	
impedance	100K Ω in parallel with impedance put on the binding posts "Z _{in} (C)" and "Z _{in} (R)"
max. level	+ 9 dB _V
Bias:	
voltage	from +1,5V to 8,5V step 1V
resistance	external resistance put on the binding posts "R pol."

6 - Pre-setting FCC connector

Like shown in figure 7, section FCC SET, every terminal (1÷4) of the FCC connector (fig.6) can be associated to anyone of the input/output **FC-4** signals.

With the jumpers set like in figure, you obtain the

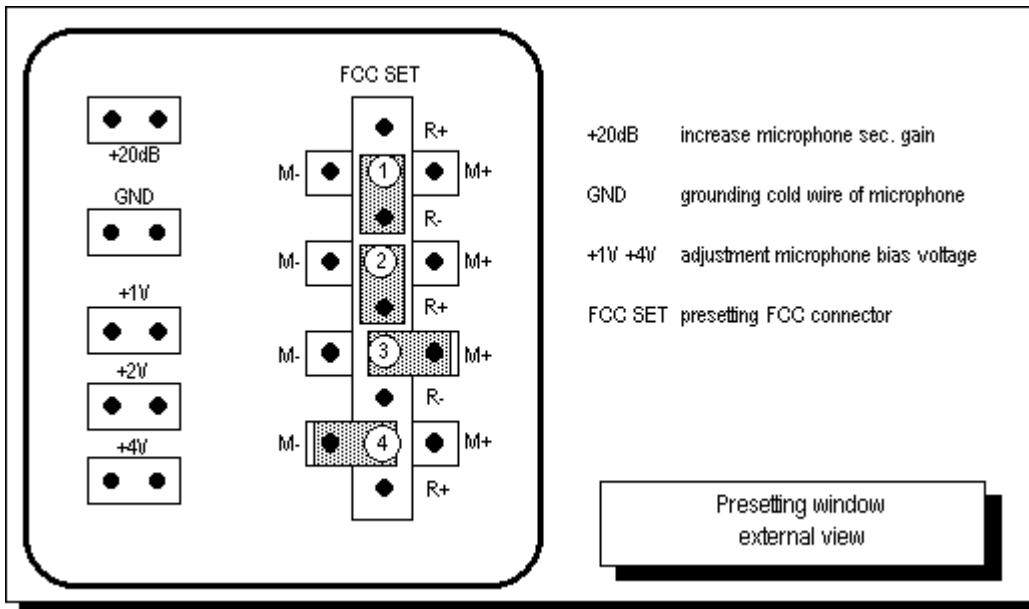


fig.7 - Pre-setting synoptic scheme

pins association shown in fig.6. Other associations can be set with different positions of the jumpers, reminding that is not possible to pre-set the same signal to more than one terminal.