FB-14 Mk2

Discrete Inductive Fixed Filter Bank

SND

User manual

www.s-n-d.com

Note: The circuit and thus the sound of the machine is an accurate replica of the first production run from 20 years ago. The Mk2 refers to only minute changes in the outer design

Introduction

Operation of the FB-14 is simple and straightforward. None the less we recommend even to experienced users to quickly browse through these notes, in order to achieve optimum results.

When choosing a place for the FB-14, two aspects should be taken into consideration. First - although it may seem obvious - we strongly recommend a place at which the machine can be operated without leaving the preferred listening position (i.e. not in a rack just above the floor) in order to be able to objectively judge all the sonic nuances. Also one should avoid to mount the FB-14 in a rack immediately above or below gear with strong power supplies (and thus strong electromagnetic fields). Because of the coils used in the FB-14's filters this could cause audible hum.

The external power supply is a special AC type. Connecting other standard DC power supplies should not damage the FB-14, but it also won't work.

Audio connections

Fig. 1 shows the simplest and most common way to connect the FB-14. When connecting it using a mixers insert point (Fig. 2), the signal can amplified before getting to the filter. When using a mixer with switchable subgroups a convenient method of sending different signals through the FB-14 without re-patching, is to connect the filter to an unused subgroups insert point and route the desired input to that subgroup (and turn off the inputs master routing).

Fig. 3 is normally used only with reverb or echo devices, but they also make sense with filters. Mixing the dry and the filtered signal not only allows crossfades. Using the various phase shiftings produced by the mixers internal eq's and the phase-reverse switch (found at least on studio consoles) it is possible to create all kinds of interesting cancellations.

Should groundloops occur when mounting the FB-14 into a rack, it is possible to separate the machine's audio ground from its chassis. Remove the 6 Philips-head screws and the 2 audio jack plastic nuts and take off the back cover. Viewed from the front, there is a jumper at the very left end of the printed circuit board (marked ***groundlift***). Remove the jumper. In order to save it for future uses, “store” it on one of its posts. Put the cover back on.

Fig. 4-6 show some unusual interfacing with studio effects devices. Experiment !

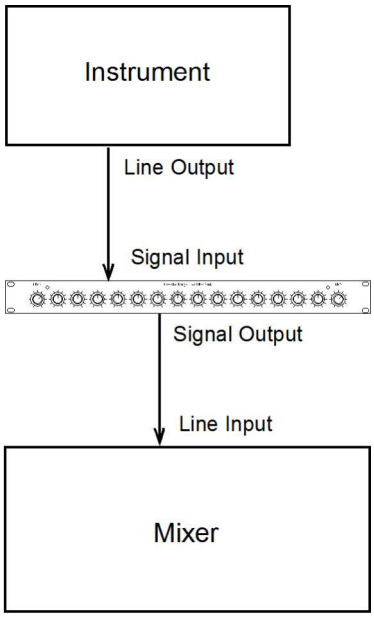

Fig.1

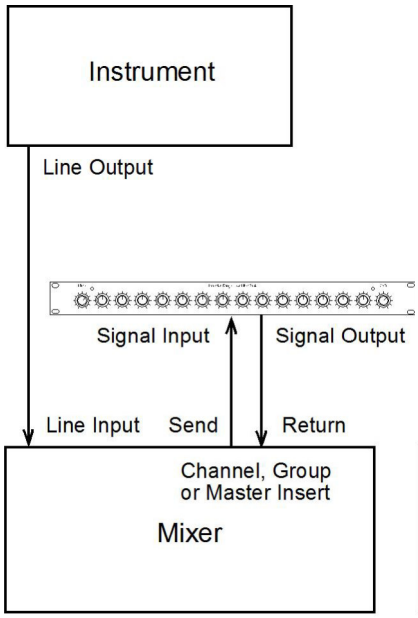

Fig.2

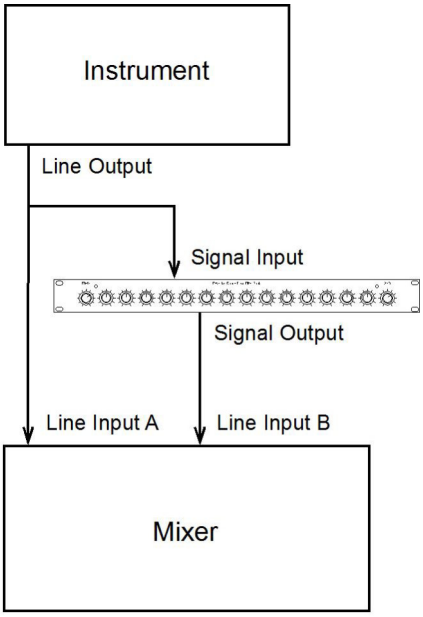

Fig.3

Special interfacing with studio effects:

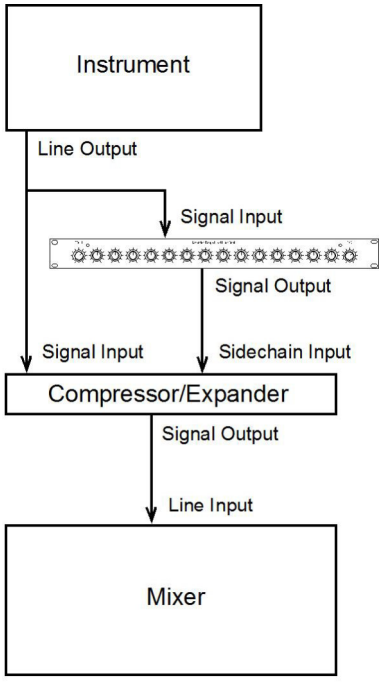

Fig. 4

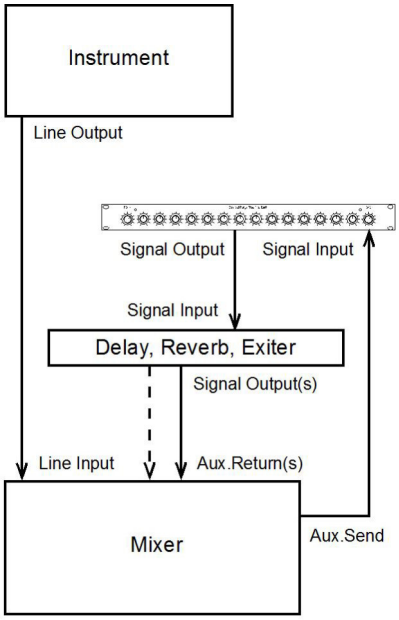

Fig. 5

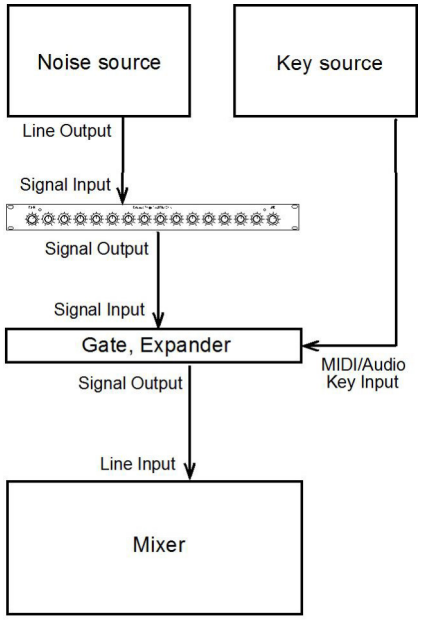

Fig. 6

Bypass

Without power applied the FB-14 automatically feeds the input signal to the output completely unaltered (*hard wire bypass*). After applying power the device is activated (LED hell). By pressing the *Bypass*-Button the device is completely removed from the signal pass (LED dimmied). Note: due to its circuitry the reponse will not be perfectly flat even with all filter controls set to 0.

Level settings

The *Input Gain*-Control at the very left allows the input gain to be set between-18dB to +18dB. The *Output Level*-Control at the very right controls the output signal from -∞ to 0db. ***Fig.5*** shows the setting for 0dB overall gain (*unity gain*). ***Fig.6*** shows the amplification/attenuation for settings of individual filters.

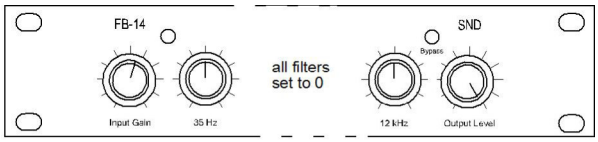

Fig. 7 Settings for unity gain

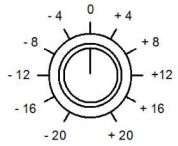

Fig. 8 Filter controls (dB)

The Filters

Between -12 and +12dB the filters act fairly broadband and without audible coloring, while they become more and more narrow at more extreme settings. This resonance is most pronounced in the middle bands, while the highest two and the lowest three bands remain broader. This has proven to be the best combination in multiple listening tests. (***Fig. 7***).

When multiple adjacent bands are cranked up towards maximum, cross-coupling between them will cause dips of 2 - 8dBs. (***Fig. 8***). Since this design will overdrive the individual filters, the sonic character of this overdrive can be influenced over a wide range. Depending on the input signal and the gain setting it can range from soft tube-like sounds all the way to broken speakers. To use the full +20-dB range of each filter, it may be necessary to reduce the input signal or the input gain.

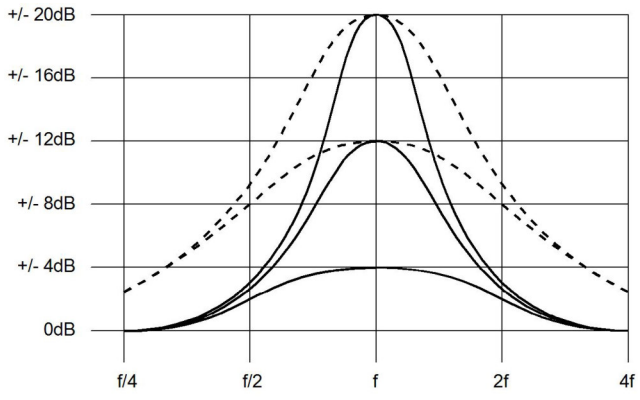

Fig. 9 Single filter curves (----- = 35 / 65 Hz)

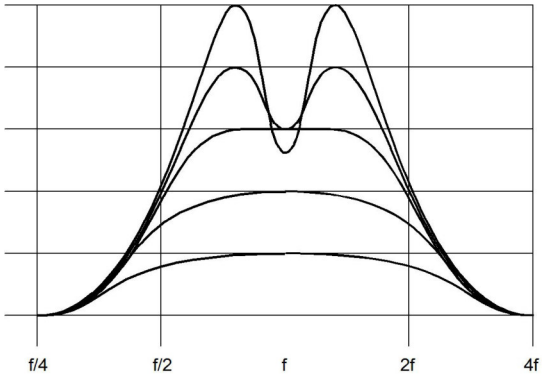

Fig. 10 Curves of two adjacent filters

Why:

Why rotary pots and no faders ?

Although faders may have their special advantages (simultaneous operation of multiple bands, visibility) a important argument against using them in the FB-14 is the non-linear curve of the circuit used (meaning all audible changes happen only near either end of the faders travel). Since this circuit is an important part the FB-14s special sound, we had to find another solution, which is to get pots with a special curve (custom made by reputed manufacturer Alps). These are not available as faders. Also, faders would have increased the overall size of the case by at least factor 3.

Why no overload LED ?

Due to the wide control range of the individual filters measuring the level at all relevant points would have been rather involved. Since overdriving the unit creates some of the most interesting sounds the FB-14 can produce, we didn't bother.

Why the choice of these frequencies ?

14 filters seemed like a good compromise between size and component count, as well as under musical considerations. By placing the bands about one fifth apart, a false tonality (an unwanted emphasis of the same musical note in different octaves) is avoided. Widening the bands towards the outer limits of the audible spectrum was determined to be useful in many listing tests.

Why an external power supply ?

Even though we normally dislike "wall warts" just like everybody else, there are several reasons why we decided to use on. Firstly the use of coils in the FB-14s circuitry would have forced us to move any internal power transformer far away from them to avoid magnetic hum, and thus increased the overall size significantly. Secondly, external power supplies allow simple adaptation to the various mains voltage used worldwide.

Technical Data:

Input Impedance	47 kOhm
Output Impedance	150 Ohm
Recommended Load	> 10 kOhm
Max. Input-Level	22 Vpp (+26 dBv)
Input Gain	+/-18 dB
Max. Output Level	
all filters set to 0	3.5 Vpp (+10 dBv)
all filters set to max.	7.5 Vpp (+17 dBv)
Control Range per Filter	+/-20 dB
Frequency Range	
All Filters set to 0	+/-1.5 dB @ 20-50000 Hz
Dynamics	> 90 dB
Power supply	12-15 Vac @ 100 mA