

Remote-Controlled Ten-Input Line Preamp

In need of more inputs? Try this line amp, courtesy of the author, Borbely Audio, and Velleman.

These days, with all the possible sources of sounds and music, a preamp with five or six inputs cannot handle them all. My Yamaha C-80 preamp had five line inputs and I badly needed more. As a first approach, I was considering building a passive preamp and selecting all inputs via rotary switch—a simple, cost-effective solution.

Further considerations led me to believe that the best choice was to place a buffer between sources and the final amplifier. As I got to that point, I believed I needed to add a remote-controlled circuit to select all inputs and to adjust the volume control.

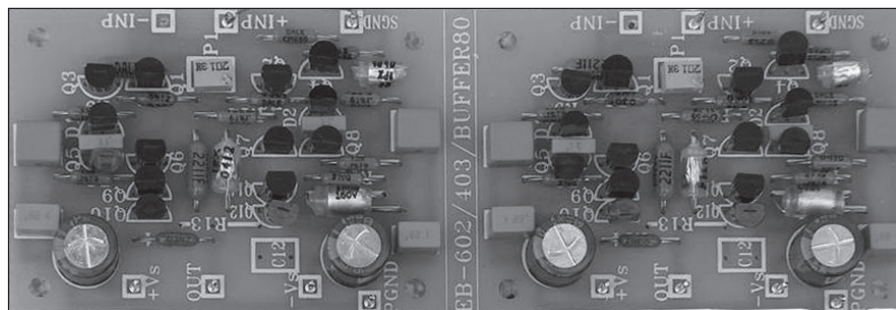


PHOTO 1: The Super Buffer circuit.

CIRCUIT SELECTION

In the May 2005 issue of *audioXpress*, I found the answer to my first point: an all FET Super Buffer and related power supply kits by Erno Borbely (www.

borbelyaudio.com), while from other sources I have found an infrared transmitter/receiver Velleman kit.

The all FET Super Buffer is a simple circuit to build (Photo 1) with excellent specifications and great performance

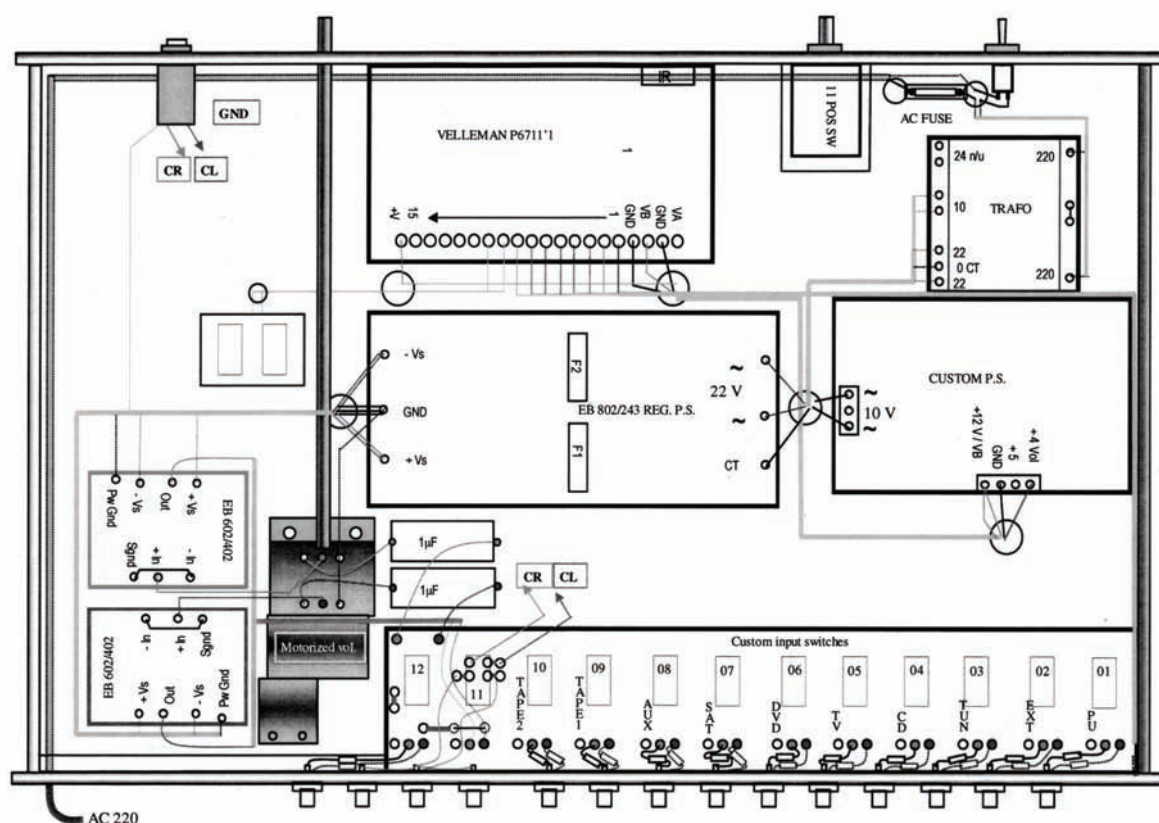


FIGURE 1: The final chassis layout.

such as:

Gain (choice of)	0 or 6dB (2×)
Freq response	> 1MHz (with unity gain)
Input impedance	1MΩ
Output impedance	< 50Ω
Min load impedance	1kΩ
Distortion (6dB gain)	unmeasurable (0.00XX)
Power requirements	±24V 25mA

The Erno Borbely regulated power supply kit was even easier to build and required a single adjustment to set the correct output voltage.

Both circuits worked fine with the first attempt. The Velleman IR transmitter/receiver (**Photos 2 and 3**) also came in the kit. Their assembly was very neat and did not require any adjustments.

With all these basic functional units on hand, I needed to draw a schematic to put them together. The final circuit (**Fig. 2**) includes the option of selecting all inputs via relays which you could activate either manually (rotary switch) or from a remote control.

I could not find any ready-made input switches, so I designed my own, including the printed circuit (both a joy and a pain for a hobbyist like me). The actual version (**Photo 4**) has the advantage of being very compact, thus minimizing the wire lengths from the RCA input connectors to the actual relay switching point and so being very close to the volume control and super buffer input points (**Photo 5**).

OPERATION

Each input selection relay performs a double function: to connect selected inputs to the bus, when energized; or short-circuit



PHOTO 2: Velleman's remote control.

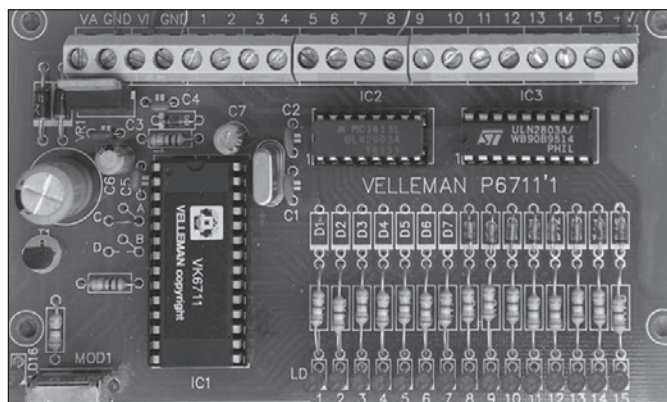
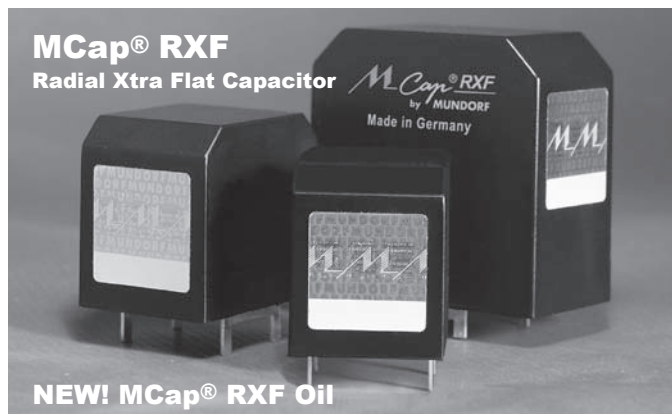


PHOTO 3: Receiver circuit.



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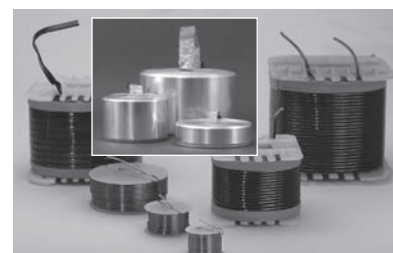
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to ground unused inputs via 1Ω resistors when in a normal position. This arrangement prevents stray capacitance

to pick up signals from unselected input and mix them with the active one.

Due to the limitation of the Velle-

man receiver, you can remotely control only eight inputs (relays Ry 3 through 10); you must manually activate via ro-

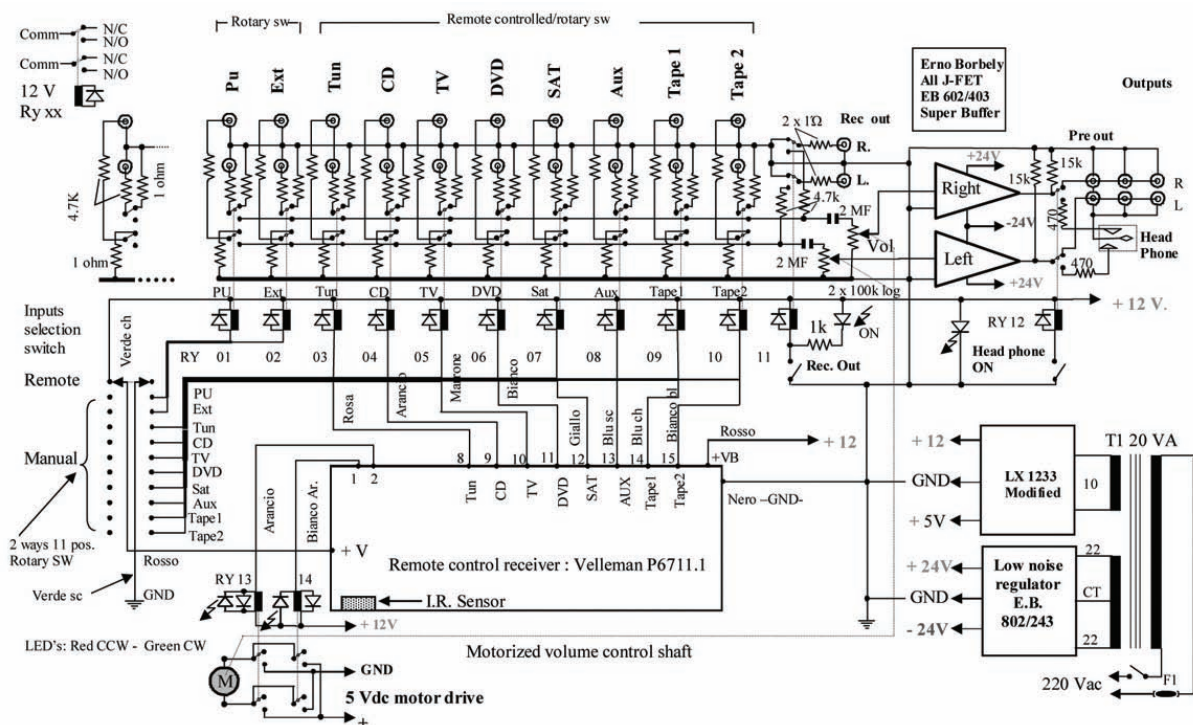


FIGURE 2: Circuit sketch.

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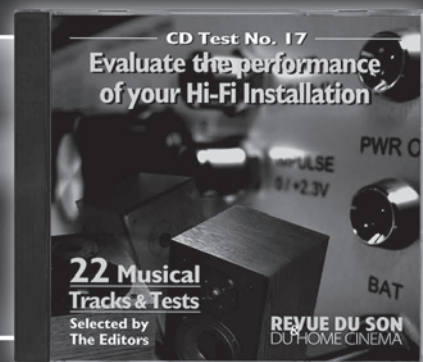


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tary switch the other two inputs (relays Ry 1 and 2).

Each relay, when energized, sends the stereo signal to a bus which feeds the super buffer through two high-quality 2MF Infinity capacitors and a motorized stereo Alps volume control.

You can adjust the latter via remote control by means of channel 1 or 2 outputs; these outputs energize momentarily either Ry 13 or Ry 14 to provide a clockwise (CW) or counterclockwise (CCW) rotation. I have built a small handmade wired board to provide this simple function.

Super Buffer output feeds three RCA connectors, via Ry 12 n/o contacts, which can be hooked up to an equal number of final amplifiers if required; this thanks to its very low output impedance of the Super Buffer.

Ry 12 connects Super Buffer output to the headphone when the related switch is "on"; outputs to power amp RCA connectors are disconnected and you can use a high impedance ($> 600\Omega$) headphone instead.

Similarly, the *rec out* RCA connec-

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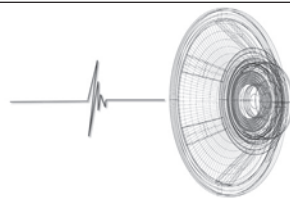
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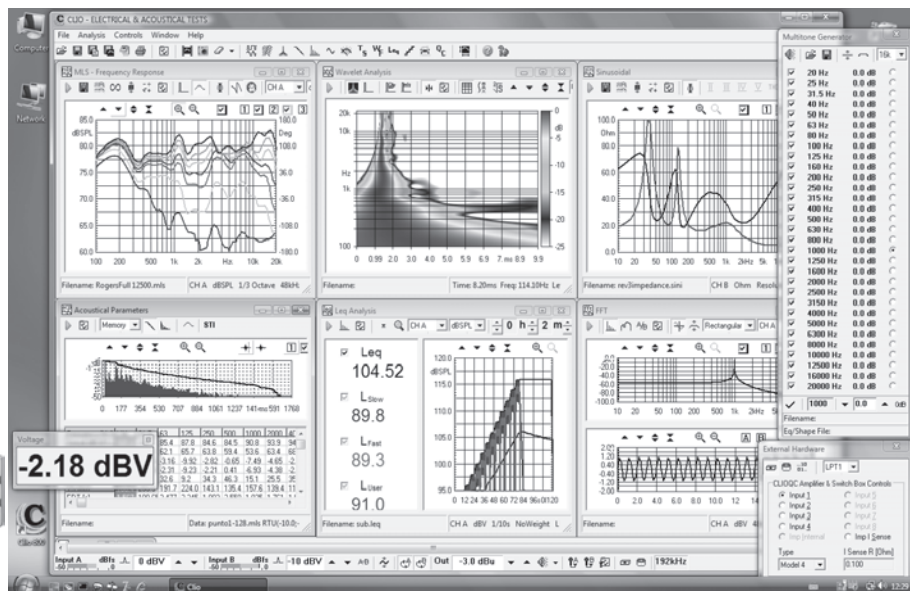
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PHOTO 4: Input PC board.

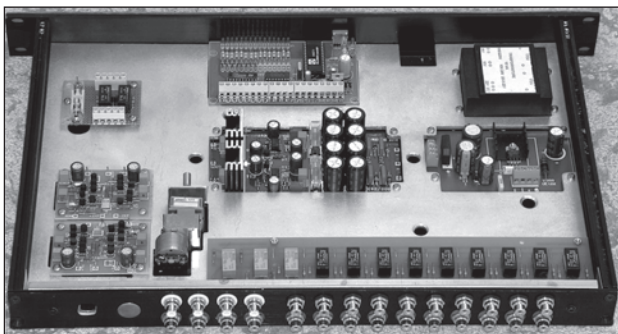


PHOTO 5: Supporting panel layout.

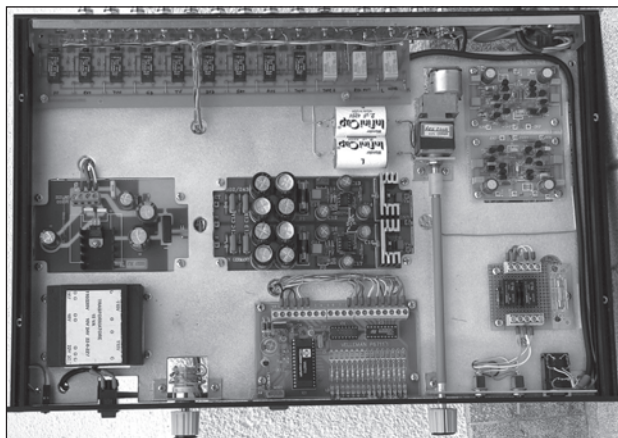


PHOTO 6: Wiring.

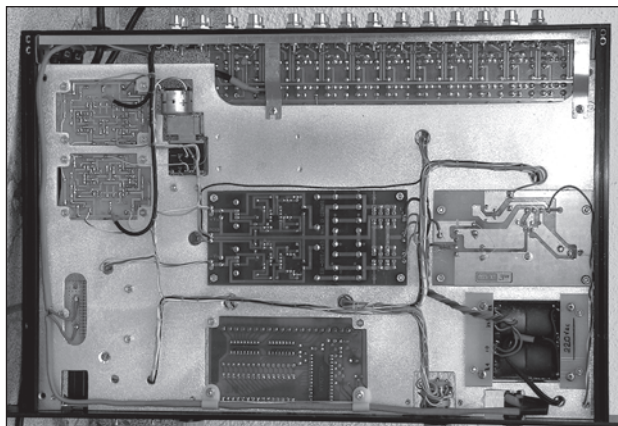


PHOTO 7: Bottom view of wiring.

tors become live when you activate the “*rec out*” switch. The Velleman IR receiver, to function, requires +12V, which is supplied by a “nuova elettronica” modified kit. This power supply also provides +5V to drive the volume control motor.

When you activate an IR receiver output (say, to select tuner, “Tun” 1 input via Ry3), the level at pin 8 goes down and Ry3 is energized.

Similarly, when you move manual switch to the Tun position (for example), it takes away +12 to the +V input to disable Velleman relay drivers and ground pin 8 to energize Ry3 to perform its required function. For some reason, however, Velleman relay drivers are not de-energized when +V is removed, and the remote control continues—unexpectedly—to function. I believe this is due to a +12 voltage internal return path (but perhaps a Velleman engineer could provide an answer and a fix to this inconvenience). However, by pressing

the “Clear” key on the remote control, I can achieve the expected result.

ASSEMBLY

The major task was the physical location of all sub-assemblies in a 4cm (a bit more than 1½”) height chassis. This, in fact, required extensive work to provide a cutaway to properly fit all parts in the supporting panel (Photo 5). I recommend using a higher profile chassis.

After subassembly, I began wiring with the help of a sketch prepared under Fig. 2. Photos 6 and 7 highlight this last phase of my work, while Photo 8 shows a front view of it.

As I powered up, everything worked properly, with the exception of what I described previously in relation to the +12 Velleman receiver. I now have ten inputs to play with, and I definitely resolved my input availability problem. The Super Buffer performs very well.

I have hooked up my Suisse Revox CD directly to the power amp and compared its sound when fed through the Super Buffer. Apart from the 6dB gain (2×), I could not detect any difference; Super Buffer does nothing to the sound, it is not there—and this, to me, is a clear sign that its performance is top notch.

Tests with other sources, however, did not manifest the same behavior; the presence of Super Buffer made a significant improvement to the sound, which appeared more natural, smooth, and dynamic. Probably the optimization of various input/output impedances performed by the Super Buffers is what makes the difference. *ax*

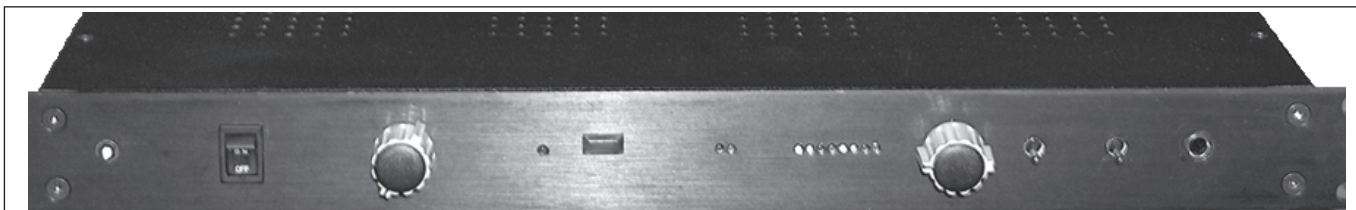


PHOTO 8: Front view.