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Feature article: McIntosh C41 + MC202

"A beautiful pair" is the least that one could exclaim. These electronics from the great American manufacturer are refined, elegant and powerful, and express a versatility usually unknown in equipment dedicated "only" to good listening.

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After having given the MC2000, the massive celebration of the valve, the coverage that it well merited in edition number 320 (April 2000), we return to speak of the products of the historic American manufacturer, presenting two pieces which are more "standard," so to speak, however poorly that adjective describes anything that comes out of the McIntosh house. Already, it has been some time since McIntosh re-modernized the whole line of its equipment, not so much from the aesthetic aspect, but more from a technological point of view. The aesthetic, in fact, has remained substantially the same, and it is this which has made McIntosh products so unmistakable, even in the middle of all of the hundreds of brands today available on the market. They are characterized by a black, crystal front panel, with the words written in green, illuminated from behind, while the amplifier, of course, has its power indicators with the traditional VU-Meter in sky-blue, lit from the back as well (the famous big blue eyes of McIntosh). The affection of so many passionate supporters for this brand is understandable: they admire its elegance, the care that goes into construction, and the guarantee that for decades has resided within the name McIntosh. It is a mark that, we must say, has continued in every sense to evolve rather than rest on its merits; it has put all of the experience gained with time to good use, especially concerning its output transformer (the McIntosh forte). It has applied the new technology of control to its new products, both for digital and for analogue, which has given this company the ability to remain even now at the top, considered by many as the "mark to meet." To further confirm this assertion, it is enough to simply observe the way in which they package their equipment: double boxes (one inside the other with anti-shock material between the two pieces), rigid wooden base fixed with three screws and washers in order to further protect the equipment, spaced from the bottom by little plastic feet. In addition, the documentation they furnish is well written and clear, reporting and explaining all the technical data and the various functions, even though, for these two models, the manuals are written only in English.

The C41

Since we have planned a "technical" treatment of McIntosh in this article, let us now move on to see how the two pieces of equipment are made. Beginning with the C41 control center, we take notice that the front panel is subdivided into two blocks. The left part is dedicated to the controls for bass and treble tones, the

choice of the recording source (tape monitor output), the control of the Loudness function, the choice of processor for external signals, and finally the Mono function. The right part consists of a control which manages input choices, the balance control, the regulation of volume, the Mute button, and the activation of the two supplementary outputs (pre out 1 and 2) of the control center. Finally, the last remaining controls are the On button and the Stand-by function. As for the controls, they are either push buttons (of which there are quite a few on the bottom of the panel) or rotating dials. The central part, in addition to the brand name and the name of the model, provides also a headphone output (made, curiously enough, for a little jack). All of the controls can be operated either locally or with a remote control, and choices are indicated by a red LED. The back panel provides an abundance of inputs and outputs, among which we point out an input balanced at high level (CDI), and a balanced output (pre out). The total configuration of the two pieces of equipment is somewhat unbalanced, and some operations must be used to obtain balanced functions, and vice versa. Furthermore, three pre out outputs are provided, effected with pin-jack RCA. The first output, called Main, is a permanent output (the signal is always present), while the other two, called Out 1 and Out 2, are selected by the front panel, and can be linked by an external processor or even by additional amplifiers. Also standard is the Phono input, which has a corresponding circuit card, also standard to the equipment, but which can be deactivated through a switch, making the input even more high-level (for this reason the input is denoted as Phono/Aux). This possibility can be useful in case the Phono input is not of interest to the user. To note, there are also three outputs that control the on and off switches of the amplifier, or similar equipment. The first two, called Main and ACC, serve to turn on equipment, such as for example the MC202, while those called "power control" 1 and 2 are paired with the outputs pre out 1 and 2. Another particularity which denotes the versatility of the control center is the presence of plugs called Data Point, which when connected allow control by way of the remote unit that links to the control center. There is also an Ext. Sensor input which allows the control of other connected units via the same remote control.

MC202

The MC202 amplifier comes in full McIntosh style. Under the timeless analogue VU-Meters (graduated in dB and in Watts), there are two identical dials with diverse functions. The one on the left chooses the mode of function of the indicators (cut-off; indication of the RMS power; maintenance of the highest value reached), while the one on the right selects the type of on/off function ("remote," which is through the control center, or immediate as with the normal push button). Masked in the black of the front panel there are also two LED displays which indicate the reaching of clipping level, with the intervention of the Power Guard circuit, which we will later describe. The back panel provides both balanced and unbalanced input. A switch allows the amplifier to work in normal stereo or bridged, which means monophonic. As there are the traditional output

transformers, the connections for the speakers are differentiated by the values of 2, 4 and 8 ohms, with the negative in common.

The amplifier has a single rectifier bridge while the filtering of tension is obtained by way of two electrolytic capacitors (signed McIntosh), each one of 15,000 nano-F. Further filtrations are locally present, all along the various routes of the power supply lines. The power supply transformer is completely shielded, as are the two output transformers placed on the sides of it, in the vicinity of the front panel. The connections between the different sections are created by several swift, gold-plated couplings. The different circuit cards are placed in such a way to allow a relatively comfortable intervention, in case of necessity. Every amplifier section uses 3+3 power transistors (BJT) assembled next to the heat sinks (dissipaters).

Internals and Technology

We can ask ourselves: what would be the advantage of having an output transformer in a transistorized amplifier, when many manufacturers obtain results with even greater power without having to use one? The answer may be above all philosophical, that is, relative to the general typology chosen for the project, or perhaps simply linked to tradition, or a question of sound. As far as I'm concerned, two aspects seem particularly interesting. The first relates to the Power Guard protection circuit which we'll discuss later, while the second concerns consideration of the constant impedance which presents itself at the final stage during the operation. Considering that the transformer used is an "autoformer" (that is, the intermediate outputs are taken from the same coil or by adding coils to preexisting ones), the final stage always receives a steady load, independently of the actual load of the diffuser. With this system a double advantage is obtained; the first, as mentioned before, is the steady load seen by the amplifier (and by the Power Guard circuit), while the second advantage is the constancy of the flow of power for whatever type of load. It seems strange, but it is true. As already mentioned, the final stage operates with a well-defined load when for that specific load a very precise power can be emitted. The task of the output transformer is just that: to adapt the different impedances which reach the amplifier to the specific value for which the final stage has been designed. This is not surprising, as devices of this type have been used in the audio field for more than half a century (and thus there must be something good about them, right?). Once this adaptation is explained, I believe it is sufficiently clear that the power will be steady for whatever type of load. This flow is further evident with the graph of impulse power, where it can be noted that the same is true for all types of loads, varying slightly only because of little impedance mismatches, or for internal losses to the transformer. The differences, however, are so minimal that they are not worth speaking about. A further important aspect in the use of the output transformer is that in cases of malfunction of the power section (amplifiers in short circuit, etc.) it becomes very difficult to damage the speakers, as the electric circuitry closes itself still by means of the primary output transformer.

Now we turn to the discussion of the Power Guard circuit. This circuit, simply stated, is a device which controls clipping distortion, not allowing it to go above a certain level. The Power Guard steadily controls the signal coming out from the final stage, comparing it continuously with the one coming in. Having reached a certain distortion in output, normally near clipping tension, the circuit begins to realize that there is a difference in distortion between the signal going out and the signal coming in. At this point, the device regulating the amplitude begins to intervene for the signal going out, not allowing further gain, especially if saturation zone has already been reached. This device does not affect in any way the dynamics, which is verifiable also by way of the graph of impulse power (and which seems to me important to mention, seeing that there have been not just a few detractors in past years).

For reasons of space, we mention only briefly the control center. All the commutations, or in other terms the choices of input, are given to relay reeds which serve to make connections with the pre-chosen source. Furthermore, the commutations are controlled by muting relay, a function which activates itself for a short period, impeding any undesirable effects on the speakers. Furthermore of note is the presence of tone control, a McIntosh tradition. The control center's versatility is significant.

The control center has only one power supply transformer, completely shielded. The input of the electric current is filtered with a specific filter, located on the back side. The tensions are rectified, and then filtered with three electrolytic capacitors of 3,300 nano-F, regulated by way of specific tension regulators. After these there are further filters to obtain the maximum decoupling between the different sections. The various connections between the control cards, obviously including those in analogue, are done with gold-plated flexible cables. Worthy of mention, also, is the usage of very fast operational amplifiers for the different stages, including also the Phono input. The different active sections which compose this control center are located in the immediate vicinity of the functions they control, in such a way as to reduce the cable length, and the route of the signals on the printed circuit board, to their minimum. Some of the integrated circuits used are "customized" for McIntosh.

Comments on the Measures

Starting with the C41 control center, we can affirm that the data results obtained during testing are within the norm, and moreover, even though this is an expensive piece of equipment, that is not to say that from tests we should expect data that is stratospherically different from equipment which costs less (several of which, in any case, have made giant steps forward). The Phono sensitivity certainly has a very good reading, requiring just 1 mV for the output tension of 1 volt. This is surely a very low value, easily adaptable by the heads, which don't have a very high tension. The maximum acceptance is of 100 mV, a good number if we consider the significant sensitivity of this stage. Also the S/R ratio for this input is good, still in view of considerations linked to the presence of a

high sensitivity. Regarding the output section, the impedance is low, offering a value of 240 ohms, while the maximum tension reachable in the outputs is 9.7 volts. The frequency response is very extended, beginning with 10 Hz in low range (a value probably chosen specifically because of the subsonic sounds that can come from a head), and reaching 110 kHz in high range. The frequency response decreases in the high end to a value of 30 kHz, moving the manual volume dial to the position of -6 dB of the nominal outgoing value. The total data is very good, not creating any difficulties for eventual pairing with other equipment.

The MC202 amplifier emits power with a certain ease, tranquilly reaching the rated power for 2, 4 and 8 ohms. If one pays attention to the limit load, one notices a certain flexion toward the low modules. This phenomenon has been verified exclusively for the 8 ohms output, chosen as a reference point for this measure. To compensate, one can note that, in reality, the same output of 8 ohms bears loads much lower with ease, decreasing almost to 3.5 ohms. This happens also with the outputs for lower loads, even if it does not make sense to publish graphs in which the unit of measurement is completely different. An analogous phenomenon occurs with the behavior of the non-resistive load, where the diminishment of power emitted is due simply to the steady power furnished for the load of 2, 4 and 8 ohms. In order to reach the rated power, an incoming tension of 1.4 volts is necessary; the frequency response is very extended, beginning with 3.5 Hz and reaching at the most 130 kHz. The pulse power has an analogous behavior for all the impedance of load, offering 1 dB more of the rated power; we mention that which pleasantly surprised us in a McIntosh, considering that the designers of this company had previously little believed in the increase of the flow in pulsed service (and perhaps without being wrong, considering that the McIntoshes are usually very powerful already in continuous service). This behavior, identical for the impedance of loads of 2, 4 and 8 ohms, is explained, as already mentioned, by the presence of an output transformer, which allows the final section to have a steady load, independently of the one applied. The data gained for the final section is to be considered very good, allowing for the management of very difficult loads without much difficulty.

Conclusion

The McIntosh products, as always, have shown themselves to be suitable for a demanding public. The amplifier does not betray the fame of the "power" of this equipment, and the control center, other than being very well manufactured, allows a versatility truly out of the ordinary. Very robust construction, fascinating aesthetics, and sound at the same high quality of the name McIntosh in any situation. A guarantee like that which accompanies every McIntosh.