



MICROMEGA

CD10

The heritage of CD

CD10 is the CD successor whose sound qualities and exemplary reliability made of this product a best seller in its category. MICROMEGA had in heart to develop a CD player whose performances would be exceptional while preserving a quality-price ratio without equivalent.

The chassis

Entirely metal, the frame has the role to bring a stable and rigid base to the CD mechanism and to protect its electronic circuits against the external disturbances as well electromagnetic as high frequency of which we today are largely surrounded. The aluminum front panel gives to this unit and all those of the range a class impressed of sobriety where minimalism and user-friendliness cohabit harmoniously. The blue 10 characters dot matrix display, driven by MICROMEGA software, gives access to all information necessary in real time. The aluminum anodized top cover and whose color Black or Silver and finish harmonizes themselves perfectly with the brushing of the front panel gives to the product an incomparable distinction.

The power supply

Like all the players, CD10 depends for his supply on the user's mains source. This source is polluted unfortunately more and more in particular since the advent of switching mode supplies which feeds the computers but also considerable consumer electronics like the television sets, the DVD players, the video tape recorders, and the set top boxes among so much of others. All these power supplies, even if they are supposed, according to CE standard, to prevent any entering or outgoing disturbance, emits towards the mains high frequencies signals likely to disturb the reproduction of the units, and this more especially as the latter are powerful. If that can seem paradoxical, it is advisable to recall that the maximum signal of exit of a Cd player is of 2V RMS thus that the weakest signal that must be capable to reproduce a player is about 30microvolts. That gives a good idea of the scale of the things about which we speak. The CD10 transformer is of R-Core type. These very particular models show very interesting characteristics in comparison with the filtering of the mains disturbances bus contrary to the toroidal transformers whose band-width is very broad, the R-Core transformers have, by construction, a very narrow band-width making their use ideal when the request for current is moderate. CD10 is equipped with a linear power supply made up of several sections distinct to avoid the problems of cross talk from power supply in particular between the digital and analog sections. The digital power supply provides the current necessary to the mechanism, the feedback circuits and all the section of the user interface. In addition, of the linear regulators with strong rejection guarantee to the whole of the numerical elements a power supply perfectly free from noise. The analog section as for it, called upon a very different technique. After rectification and filtering, the regulation as of the this analog power supply is entrusted to a very sophisticated circuit implementing power sources to very high impedance and very low noise, associated tracking regulators. The rejection of this power supply is higher than 100dB and this from 20Hz to 20kHz. The digital section of the digital-analog converter is ensured by a constant power source and a regulator of the shunt type very low noise.

The drive mechanism

The MICROMEGA did wish to innovate in this field and this for good reasons. With the success of DVD, DVD mechanism are produced in very large quantities and with extreme quality control inherent to mass production. It is thus the wisdom which prevailed and CD10 is equipped with last generation DVD mechanism SONY KHM313 or SANYO SFH850. The control of mechanism is entrusted to a circuit Philips SAA78247 controlled by a MICROMEGA software program whose particularly neat errors correction algorithms were dedicated to the audio reproduction whereas many Cd players are optimized at the present time for the Cd rom reading. Indeed, the audio Cd reading is done at the nominal speed whereas in the case of Cd rom one sees players active until 52x nominal speed. It is a different aspect but it is not most significant. During the Cd rom reading, it is possible, if a train of data contains errors, to retrogress and to read again the passage then to choose the best strategy of interpolation of the errors which remain. This solution is absolutely unimaginable in audio because one tries in the event of errors to privilege the continuity of the musical message so that the listener does not realize that the player is correcting erroneous data. It is not obviously possible to stop the reading and to take again a passage several times to free itself from a stripe, of a any other element or finger mark having activated the system of errors correction. One thus sees at which point it is significant to adopt a strategy specific to the audio reading and why the MICROMEGA team invested as much energy and time in the development of the solution most appropriate to the musical reproduction.

The Digital to Analogue conversion: AD1853

CD10 calls upon the one of the best dedicated digital-analog converters currently existing. The choice was made on the Analog Devices AD1853 whose price ratio remains unequalled. This converter with its dynamics of 110dB, his signal to noise ratio of 112dB and its THD+Noise figure $< -100\text{dB}$ is the ideal converter to treat most accurately possible the signals coming from the SAA7824. The power supply with constant current source and shunt regulators ensures a total immunity the external disturbances. The local decoupling carried out starting from capacitors with very low inductance and very low series resistance guarantee the integrity of the data for the analog stages. The signals resulting from the SAA7824 enter the AD1853 at 44.1kHz. They are internally converted and oversampled 8 times in a digital filter whose out of band rejection is higher than 115 dB pushing back very far from the audio band the first images of the digital filters. That makes it possible to have analog filters of a relatively low order while minimizing the energy transmitted out of the band. The design of the printed circuit is of primary importance and the Micromega team put all her know-how in this design which represented a challenge in more than one way. The circuit, carried out with the means of the most modern software is optimized to take into account the extraordinary possibilities of the components chosen for which the least error of design is paid cash as well on the level measurements as of listening.

The current outputs in differential mode of the AD1853 make it possible to preserve the intrinsic dynamics of the signal and to reject in common mode the disturbing signals which could have affected the signal. Despite everything the precautions taken on the level of the layout, it may be that at certain times of the external phenomena come to influence the signal and the differential mode proves at this time there of a rare effectiveness. Indeed, the principle of the differential mode consists in conveying a signal in two separate branches of which one is in opposition of phase with the other. If a disturbance comes to affect the signal it will affect in phase the two branches simultaneously. When the differentiation comes to make the difference between the two signals, this disturbance will be cancelled in fact. It is what it is agreed to call in technical jargon the common mode. One can thus affirm that a differential signal saves 6dB of dynamics and rejects completely, in the measurement of the factor of rejection of common mode of the differentiator, any signal in common mode. One often speaks about symmetrical connections which were invented in the past in the professional field to transmit low level signals such as for example the signals of the microphones and to free itself from the ambient disturbances and in particular from the radiation of the mains cables at 50Hz.

The analogue stages

In the spirit by what precedes, the differentiating stages were to be within the performances of the other components. The choice was difficult because, the specialists know it well, measurements and listening always do not go hand in hand and there remains an empirical part where the experiment in the audio field is essential. Although smd components often rejected by the most extreme purists, once again the experiment proved that it is not also simple and that it is advisable to be wary of short cuts often very reducing. Each technology has its advantages and disadvantages but it is clear that when one operates with signals of very low amplitude, the shortest way is often the best and smd components allow a substantial saving in space which in our case proves to be essential. Lastly, the type of alignment of the analog filters of output does not owe anything randomly and the use of filter of third order Bessel appeared that giving the best results. The frequency cut-off was placed at 75kHz well beyond the audio band guaranteeing a perfectly linear phase from 20Hz to 20kHz and a constant group delay on the full audio band. The last pole of this alignment was voluntarily selected as passive element in series with the signal in order to reject all the high frequency residues which could have passed through the net however quite narrow. The output signal is free from any DC component by adoption of a specific circuit allowing a low impedance connection without having recourse to a coupling capacitor which very often must be electrolytic to be freed from the low impedances of load that the inputs of certain amplifiers can represent. Finally a high-speed detection circuit of presence or absence of ac power supply, avoids CD10 to emit dc bursts with the powering on or in the event of abrupt mains interruption.

Conclusion: Challenge reached

To carry out a Cd player at a reasonable price is not easy thing when one aspires to address the tops of the musical reproduction most faithful and most transparent possible. CD10 reaches that point admirably and the thousands of owners of this model do not tare praises in its connection. For once one can appreciate rightly, a positive effect of the rumor. CD10 will make you love music.

TECHNICAL CHARACTERISTICS

Drive mechanism	SONY KHM 313 ou SANYO SFH 850
Servo IC	SAA7824
Servo technology	Digital
Native sampling frequency	44.1kHz
Native resolution	16 bits
Digital to analogue converter IC	AD1853
Digital filter	Internal to AD1853
Oversampling factor	8x
Digital to analogue conversion type	Multibit $\Sigma \Delta$
Bandwidth ($\pm 0.1\text{dB}$)	DC – 20kHz
Linearity at -100dB	$< 0.5\text{dB}$
Signal to Noise ratio + THD	$< -100\text{dB}$ à 1kHz
Crosstalk	$> 100\text{dB}$ à 1kHz
Output impedance	$< 600 \Omega$
Output level	2V RMS / 0dB

Power supply

Power consumption	11 W
Fuse	T 160mA / 250V (Slow blow) T 315mA / 130V (Slow blow)

Dimensions : (L x P x H mm)430 x 265 x 69

Weight3.5 kg

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