

Chapter 9

Discussion and Summary

In this chapter, the programmable pulse generator that consists of the pulse programmer and the pulse shaping unit is discussed and, finally, summarized.

Discussion

In building the programmable pulse generator, many problems arise - such as noises occur in the power supply, noise occur in GPIB bus, switching transistors do not work at high frequency, memory (RAM 32K) did not register, commands error in the purchased GPIB card when it was used on IBM PC AT (no commands error when it was used on IBM PC XT),..., etc. At the present, those problems have been overcome and the final result of the programmable pulse generator was shown in this thesis.

To consider the pulse programmer, it gives the precise pulse sequence and give interval time of the two adjacent pulses at least about 100 ns. So the time base, the input of the pulse programmer, should be used at maximum frequency about 10 MHz. This pulse programmer is built with TTL IC that can be workable at maximum frequency of about 10 - 20 MHz. It will give the precise pulse sequence depending upon frequency that used for timebase. The more accurate this frequency is, the more pulse sequence has precision. The time of pulse sequence can be varied by changing the frequency of the timebase - high frequency will yield short pulses and low frequency will yield longer pulses.

To consider the pulse shaping, it will give the good pulse shape depending upon frequency that used for timebase also. The maximum value of this frequency is 500 KHz, because this value is the maximum

frequency of IC D/A (digital to analog) that is workable. The more accurate this frequency is, the better the pulse shape is. The time of pulse shapes can be varied by changing frequency that used for timebase - it will be compressed when timebase is at high frequency and it will be extended when timebase is at low frequency.

Summary

This thesis gives the satisfactory result. It will be useful for NMR imaging development or the another research that requires programmable pulse generator. Programmable pulse generator is the instrument that consists of the pulse programmer and the pulse shaping. It can give signals that their shapes do not normally occur in the nature and can control the time sequence of signals. The shapes and the release times of signals are assigned by software on the computer (IBM PC) and control them by the computer or manual by at the front panel switches.

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