

Appendix 1**Program used to acquire wide-line NMR signal through an ADC (p 43).**

```
1 CLS
2 SCREEN 9: KEY OFF: CLS
20 INPUT "ENTER FILENAME FOR FORWARD SCAN:", F$
21 INPUT "ENTER SCAN TIME:", ST
30 OPEN F$ FOR OUTPUT AS #1
40 BASE% = &H200
50 OUT BASE% + 10, 0
70 OUT BASE% + 12, 0
80 HI = INP(BASE% + 5)
90 IF HI >= 16 THEN 80
100 LO = INP (BASE% + 4)
110 XVOLT = (HI * 256 + LO - 2048)* 10/4096
120 H = XVOLT
130 H= HOLD
131 Y=0
135 TIM=TIMER
140 WHILE (TIMER-TIM)=< ST
143 IF TIMER > (TIM+(Y*(ST/640))) GOTO 150 ELSE 143
150 OUT BASE% + 10, 2
160 OUT BASE% + 12, 0
170 HI = INP(BASE% + 5)
180 IF HI >= 16 THEN 170
185 LO = INP(BASE% + 4)
190 XVOLT = (HI * 256 + LO - 2048) * 10/4096
200 H = XVOLT * 711.4
210 IF H = HOLD THEN GOTO 320
211 PSET(Y,175+((-INTENSITY*50)+40))
216 Y=Y+1
220 HOLD = H
222 I = 0
230 OUT BASE% + 10,1
240 OUT BASE% + 12,0
250 GI = INP(BASE% + 5)
260 IF GI >= 16 THEN 250
270 GO = INP(BASE% + 4)
280 I= I + (GI * 256 + GO - 2048) * 10/4096
285 INTENSITY = I
290 PRINT #1, H , " ", INTENSITY
300 LOCATE 23, 1
310 PRINT H , " ", INTENSITY
320 WEND
330 CLOSE #1
730 INPUT "DO YOU WANT TO CONTINUE?", ST$
740 IF ST$ = "y" GOTO 2
741 IF ST$ = "Y" GOTO 2
750 END
```

Appendix 2

Program used to generate pulse sequences using PCI DIOT (p 50).

```
#include<dos.h>
#include<stdio.h>
#include<conio.h>
#include<dos.h>
#include<process.h>
# define tim1 0xb400
void singlepulse(void)
{
    int ton1,toff;
    register short ton,tp;
    clrscr();
    gotoxy(20,5);
    printf("Single Pulse Generation Mode");
    gotoxy(20,8);
    printf("Enter ON Time of the Pulse (micro seconds):");
    scanf("%d",&ton1);
    ton=ton1;
    tp=ton1*2;
    gotoxy(20,10);
    printf("Enter OFF time of the Pulse (Milli seconds):");
    scanf("%d",&toff);
    outportb(tim1+3,0x10);
    outportb(tim1+3,0x50);
    gotoxy(20,15);
    printf(" Press any key Quit");
    while(!kbhit())
    {
        outportb(tim1+1,tp);
        outportb(tim1,ton);
        delay(toff);
    }
    getch();
    return;
}
void doublepulse(void)
{
    int t11,t31,t2,t4;
    register short t1,t3,t3t;
    clrscr();
    gotoxy(20,5);
    printf("Double Pulse Generation Mode");
    gotoxy(20,8);
    printf("Enter T1on Time of the Pulse (micro seconds):");
    scanf("%d",&t11);
    t1=t11;
```

```
    gotoxy(20,10);
    printf("Enter T2on Time of the Pulse (micro seconds:");
    scanf("%d",&t31);
    t3=t31;
    t3t=t31*2;
    gotoxy(20,12);
    printf("Enter T1off tim of the Pulse (Milli seconds:");
    scanf("%d",&t2);
    gotoxy(20,14);
    printf("Enter T2off tim of the Pulse (Milli seconds:");
    scanf("%d",&t4);
    outportb(tim1+3,0x10);
    outportb(tim1+3,0x50);
    gotoxy(20,20);
    printf(" Press any key Quit");
    while(!kbhit())
    {
        outportb(tim1,t1);
        delay(t2);
        outportb(tim1+1,t3t);
        outportb(tim1,t3);
        delay(t4);
    }
    getch();
    return;
}
void tribblepulse(void)
{
    int t11,t31,t51,t2,t4,t6;
    register short t1,t3,t5,tp;
    clrscr();
    gotoxy(20,5);
    printf("Tripple Pulse Generation Mode");
    gotoxy(20,8);
    printf("Enter T1on Time of the Pulse (micro seconds:");
    scanf("%d",&t11);
    t1=t11;
    gotoxy(20,10);
    printf("Enter T2on Time of the Pulse (micro seconds:");
    scanf("%d",&t31);
    t3=t31;
    gotoxy(20,12);
    printf("Enter T3on Time of the Pulse (micro seconds:");
    scanf("%d",&t51);
    t5=t51;
    tp=t51*2;
    gotoxy(20,14);
    printf("Enter T1off tim of the Pulse (Milli seconds:");
```

```
scanf("%d",&t2);
gotoxy(20,16);
printf("Enter T2off tim of the Pulse (Milli seconds):");
scanf("%d",&t4);
gotoxy(20,18);
printf("Enter T3off tim of the Pulse (Milli seconds):");
scanf("%d",&t6);
gotoxy(20,22);
printf(" Press any key Quit");

outportb(tim1+3,0x10);
outportb(tim1+3,0x50);
while(!kbhit())
{
    outportb(tim1,t1);
    delay(t2);
    outportb(tim1,t3);
    delay(t4);
    outportb(tim1+1,tp);
    outportb(tim1,t5);
    delay(t6);
}
getch();
return;
}
void pulsetrain(void)
{
int ton1,toff,tp,count;
register short ton,i;
clrscr();
gotoxy(20,5);
printf("Single Pulse Train Generation Mode");
gotoxy(20,8);
printf("Enter ON Time of the Pulse (micro seconds)  :");
scanf("%d",&ton1);
ton=ton1;
gotoxy(20,10);
printf("Enter OFF tim of the Pulse (Milli seconds)  :");
scanf("%d",&toff);
gotoxy(20,12);
printf("Enter Time b/w Two Pulse Trains (Milli seconds):");
scanf("%d",&tp);
gotoxy(20,14);
printf("Enter Number of Pulses in the Train      :");
scanf("%d",&count);
gotoxy(20,18);
printf(" Press any key Quit");
outportb(tim1+3,0x10);
```

```
while(!kbhit())
{
    for(i=1;i<=count;i++)
    {
        outportb(tim1,ton);
        delay(toff);
    }
    delay(tp);
}
getch();
return;
}

void main()
{
int choice,i=1;
while(i)
{
    clrscr();
    gotoxy(20,7);
    printf("1. Single Pulse Generation");
    gotoxy(20,9);
    printf("2. Double Pulse Generation");
    gotoxy(20,11);
    printf("3. Tripple Pulse Generation ");
    gotoxy(20,13);
    printf("4. Single Pulse Train Generation Mode ");
    gotoxy(20,15);
    printf("5. Quit");
    gotoxy(20,17);
    printf(" Enter The Choice:");
    gotoxy(40,17);
    scanf("%d",&choice);

    switch(choice)
    {
        case 1:singlepulse();           break;
        case 2:doublepulse();           break;
        case 3:tribblepulse();           break;
        case 4:pulsetrain();             break;
        case 5: exit(0);

        default:
            printf("\n\nEnter the correct choice");
            getch();
    }
}
}
```