

CHAPTER 1

INTRODUCTION

The watch dog timer adapter is your systems and peripheral applications protector! Watch dog timer adapter provides user selectable refresh timer to be used inside your PC, which prevents the computer to hang by automatically resetting the system of your computer. When the watch dog timer adapter is enable, the system software or application program must refresh watch dog before selected time slice is reached, otherwise the computer will be reset.

There are two kinds of watch dog timer adapter, watch dog I and watch dog II. The watch dog I is used to prevent the computer to hang by automatically resetting the system. The watch dog II likes watch dog I, it can be used to prevent the computer hang and reset the power of power control box that connects to peripheral devices.

To order watch dog timer adapter, user must specify watch dog I or watch dog II.

In the distribution diskette, we provide software for MS/DOS, OS/2, Windows/95, Windows/3.xx, Windows/NT4.0 workstation, SCO UNIX/XENIX, and Interactive UNIX operating systems.

The features of the watch dog I timer adapter are:

- Provides user selectable refresh timer from 62.5ms up to 64 sec.
- When the application program or computer system does not generate refresh signal, the computer will be reset automatically.
- I/O address selectable from 0000 to 3FFF.

- PC/386, PC/486, Pentium hardware compatibles.
- Suitable for MS/DOS, OS/2, Windows 3.1, Windows 95, Windows NT, SCO UNIX/XENIX, Interactive UNIX operating systems.

The features of the watch dog II timer adapter are:

- Provides user selectable refresh timer from 62.5 ms up to 64 sec.
- When the application program or computer system does not generate refresh signal, the computer will be reset automatically.
- The maximum distance of RG59 cable from card to power control box is up to 500m.
- Available with 110V and 240V (10A) Plug type UK, Europe, USA and Austria type selectable for extension power control box.
- I/O address selectable from 0000 to 3FFFF.
- PC/386, PC/486, Pentium hardware compatibles.
- Suitable for MS/DOS, OS/2, Windows 3.1, Windows 95, Windows NT, SCO UNIX/XENIX, Interactive UNIX operating systems.

1.1 Applications

On industrial application, lots of computers are automatically operating itself once the power turns on. In case the application got hang surely the computer and its operation hang also. If you don't boot your computer again it will not go back to its regular operation, but not with the watchdog! Because once the watchdog was not refresh, it will reset the computer automatically!

While using your computer, unexpectedly your modem got hang.

One way of connecting it again is to switch off then turn on your modem to continue on working. But now, it's the new way around, watch dog II will be automatically reset the modem power. It will protect your application software system.


1.2 The Difference between Watch Dog I and II

The advantage of watch dog II over the watch dog I is that the watch dog II has an expansion power control box that can control external component. When reset signal activate of the watch dog II, it will also reset the power of power control box.

User can also reset the power of power control box by watch dog II directly, without reset whole the computer system.

CHAPTER 2

UNPACKING INFORMATION

 **Check that your watch dog package includes one of the following items:**

WATCHDOG I

- Watch dog I timer adapter.
- User manual.
- Reset cable.
- Utility software.

WATCHDOG II

- Watch dog II timer adapter.
- Watch dog expansion power control box.
- User manual.
- Power cable.
- RG59AU Connection cable (1.5m).
- Reset cable.
- Utility software.

CHAPTER 3

HARDWARE INSTALLAATION

To install the watch dog timer adapter, user have to specify the refresh time slice and I/O address. The steps for installation are shown as follows:

1. Select the appropriate refresh time slice and I/O address for the adapter card. Make sure that I/O address does not conflict with other devices.
2. Turn off your system.
3. Place your watch dog card into your system.
4. Connect the switch (MS RST) to the reset switch of mother board.
5. Connect the switch (SW RST) to the reset switch of PC panel.
6. If your adapter is watch dog II, please connect RG59AU connector to expansion power control box, and then connect the power control box to the power plug. Also connect peripheral power to power control box if necessary.
7. Turn on your system.

CHAPTER 4

HARDWARE CONFIGURATION

4.1 Jumper Settings

Be sure to set correct I/O address and refresh timer, then connect JP3 and JP4 to reset signal of main board and reset push button. The jumper settings are:

1. JP1 (I/O address selection)

A	A	A	A	A	A	A	A	A	A	A
11	10	9	8	7	6	5	4	3	2	1
:		:	:	:		:	:	:	:	

ADDRESS	SPECIFICATION
Base + 00H	Enable or Refresh Watch Dog (READ)
Base + 01H	Disable Watch Dog (READ)
Base + 01H	Turn ON/OFF power control box (WRITE)

The JP1 is used to select I/O address, Each JP contains A11 to A1 jumper pins. The A11 to A1 are used to set I/O port address, when the corresponding pin is short means 0, otherwise no pin short means 1. The base address of above is BBCH. It is easily to read the corresponding address to trigger the enable (refresh) or disable watch dog adapter. To turn OFF power control box, just write "1" to (Base + 01H), to turn ON power control box, write "0" to (Base + 01H).

2. JP5 (select refresh timer)

Pin	1	2	3	4	5	6
Timer	62.5ms	125ms	250ms	500ms	1sec	2sec
Pin	7	8	9	10	11	
Timer	4sec	8sec	16sec	32sec	64sec	

The JP5 is used to select refresh time slice.

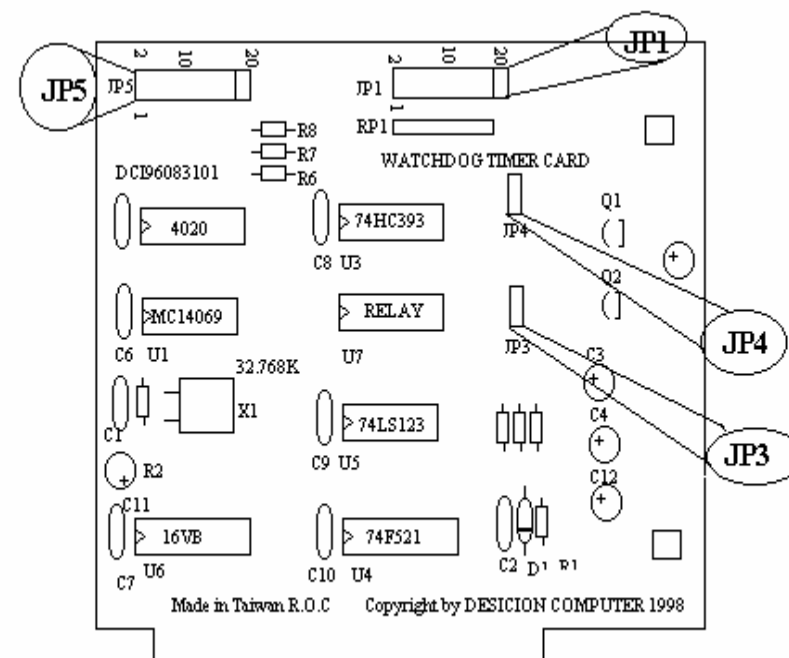
3. JP3 and JP4 (Connector 1)

Please connect JP3 to reset connector of your CPU main board, and connect JP4 to reset push button on the front panel of your PC. Please refer section 4.2 for more details.

4. RG59AU Connector

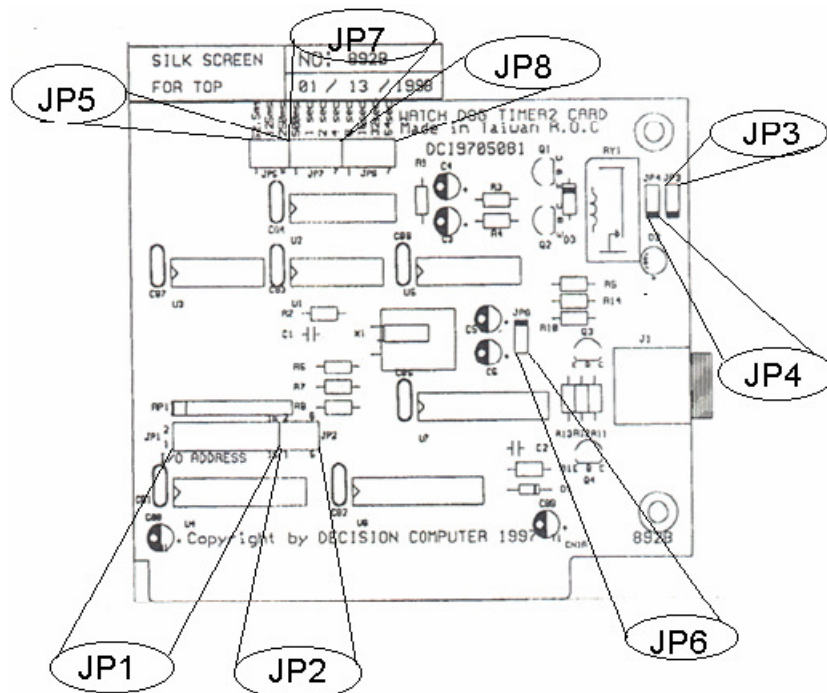
The RG59AU connector of watch dog II is used to connect to expansion power control box. Please refer section 4.2 for more details.

WATCH DOG I



Vmax: 5.5V
Vmin: 4.8V
I: 600mA
JP1: I/O address selection
JP3: Connector 1
JP4: Connector 2
JP5: Select refresh timer

WATCH DOG II



Size: 107 * 92 mm

Vmax: 5.5V

Vmin: 4.8V

I: 600mA

JP1: I/O address selection

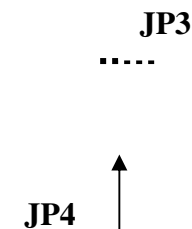
JP3: Connector 1

JP4: Connector 2

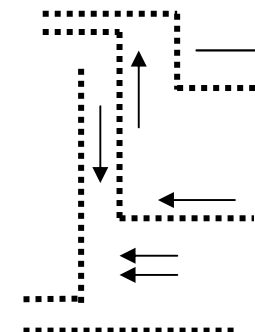
JP5: Select refresh timer

4.2 Hardware Configurations

JP3 and JP4 Connection for watch dog I



JP3 and JP4 Connection for watch dog II



$$\begin{array}{cccccccccccc} A_{11} & A_{10} & A_9 & A_8 & A_7 & A_6 & A_5 & A_4 & A_3 & A_2 & A_1 \\ | & | & | & : & : & | & | & | & | & | & | \end{array}$$
$$\begin{array}{cccccccccccc} A_{11} & A_{10} & A_9 & A_8 & A_7 & A_6 & A_5 & A_4 & A_3 & A_2 & A_1 \\ | & | & \vdots & | & | & | & | & | & | & | & | \end{array}$$
$$\begin{array}{cccccccccccc} A & A & A & A & A & A & A & A & A & A & A \\ 11 & 10 & 9 & 8 & 7 & 6 & 5 & 4 & 3 & 2 & 1 \\ | & | & \vdots & | & | & \vdots & | & | & | & | & | \end{array}$$
$$\begin{array}{cccccccccccc} A_{11} & A_{10} & A_9 & A_8 & A_7 & A_6 & A_5 & A_4 & A_3 & A_2 & A_1 \\ | & | & : & | & | & : & : & : & | & | & | \end{array}$$
$$\begin{array}{cccccccccccc} A & A & A & A & A & A & A & A & A & A & A \\ 11 & 10 & 9 & 8 & 7 & 6 & 5 & 4 & 3 & 2 & 1 \\ | & | & : & | & : & | & | & | & | & | & | \end{array}$$
$$\begin{array}{cccccccccccc} A_{11} & A_{10} & A_9 & A_8 & A_7 & A_6 & A_5 & A_4 & A_3 & A_2 & A_1 \\ | & | & \vdots & | & \vdots & \vdots & | & | & | & | & | \end{array}$$
$$\begin{array}{cccccccccccc} A_{11} & A_{10} & A_9 & A_8 & A_7 & A_6 & A_5 & A_4 & A_3 & A_2 & A_1 \\ | & | & : & : & | & : & | & | & | & | & | \end{array}$$
$$\begin{array}{cccccccccccc} A_{11} & A_{10} & A_9 & A_8 & A_7 & A_6 & A_5 & A_4 & A_3 & A_2 & A_1 \\ | & | & : & : & : & | & | & | & | & | & | \end{array}$$
$$\begin{array}{cccccccccccc} A_{11} & A_{10} & A_9 & A_8 & A_7 & A_6 & A_5 & A_4 & A_3 & A_2 & A_1 \\ | & | & : & : & : & : & | & | & | & | & | \end{array}$$

CHAPTER 5

SOFTWARE

In the distribution diskette, we support the library and examples for MS/DOS, Windows/3.xx, and Windows/95 to access adapter. For Windows/NT4.0 workstation, OS/2, SCO UNIX/XENIX, and Interactive UNIX, the device driver is supported for auto or manual refresh control.

When watch dog software is installed, user may select auto refresh or manual refresh mechanism. To select auto refresh, the watch dog software will refresh watch dog timer adapter automatically, except the system hang (when system hang, the watch dog adapter will reset the computer system). To select manual refresh, user must refresh watch dog adapter by application program on time; otherwise the system will be reset. Under multitasking (multiprogramming, multithread, ... etc.) operating system, the time schedule can not control accuracy by application program, so that if you use manual refresh, please refresh the watch dog more quicker than selected time slice.

After watch dog software is installed and set to manual mode, user need enable watch dog timer, then refresh it, or disable the watch dog timer. The enhanced functions of watch dog II will be used to turn OFF/ON power control box.

5.1 Developing Software

Developing software on watch dog is very simple. Below are the sample programs under different programming languages:

1. EXAMPLE PROGRAM USING BASIC:

```

REM
REM  WDSIMPLE.BAS -> Simple Program for Watchdog (I and
II)
REM  Program by Edgardo A Regodon Jr(SrSE)
REM  of Decision Asia Inc. (Phil.)
REM

DIM UserChoice AS STRING * 1      ' Variable Declaration
DIM WAddress AS INTEGER
DIM status AS STRING * 1
DIM Feedback AS STRING * 1
DIM Counter1 AS INTEGER
DIM counter2 AS INTEGER

status = "F"

CLS                                ' Get The Watch Dog Address
PRINT "Please Enter the address of Watch Dog Card (I/II) in
decimal"
PRINT "Address Range from 0 to 4094"
INPUT "Watch Dog address is: ", WAddress

Inquire:
CLS                                ' Main Menu
PRINT ("Menu Choices")
PRINT ("1] Enable/Disable")
PRINT ("2] Refresh")
PRINT ("3] Exit")
INPUT "Please enter your choices: ", UserChoice

```

```

SELECT CASE UserChoice
CASE "1"                                ' Enable Disable Watch Dog
    IF status = "F" THEN
        status = "T"
        value = INP(WDAddress)
        PRINT "The Watch Dog has been enabled. . ."
    ELSE
        status = "F"
        value = INP(WDAddress + 1)
        PRINT "The Watch Dog has been disabled. . ."
    END IF
    INPUT "Press ENTER key to continue", temp
    GOTO Inquire
CASE "2"                                ' Refresh Watch Dog
    IF status = "T" THEN
        value = INP(WDAddress + 1)
        value = INP(WDAddress)
        PRINT "Watch Dog Refresh"
    ELSE
        PRINT "The Watch Dog is currently not enable. . ."
        PRINT "You have to enable the Watch Dog first to refresh it"
    END IF
    INPUT "Press ENTER key to continue", temp
    GOTO Inquire
CASE "3"                                ' QUIT Watch Dog
    value = INP(WDAddress + 1)
    END
CASE ELSE                                ' Wrong selection
    PRINT "Please select 1, 2 or 3 only"
    INPUT "Press ENTER key to continue", temp
    GOTO Inquire
END SELECT

```

2. EXAMPLE PROGRAM USING PASCAL

```
{
WDSimple.PAS -> Simple Program for Watchdog (I and II)
Program by Edgardo A Regodon Jr (SrSE) of Decision Asia Inc.
(Phil.)
Jan 1998
}

uses crt,dos;

label
Inquire;

var
UserChoice,ans:char;
WDAddress,Value:integer;
Status:Boolean;

BEGIN
Status := FALSE;
clrscr;
writeln('Please Enter the address of Watch Dog Card (I/II) in
hexadecimal');
writeln('Address Range from 0 decimal to 4094 decimal');
write('Wathc Dog address is: ');
read(WDAddress);

Repeat
clrscr;
writeln('Menu Choices');
writeln("");
writeln('1] Enable/Disable');
```




3. EXAMPLE PROGRAM USING C++

```

/*
WDSIMPLE.CPP -> Simple Program for Watchdog (I and II)
Program by Edgardo A Regodon Jr(SrSE)
of Decision Asia Inc. (Phil.)
*/

#include <stdio.h>           /* Headers Declaration */
#include <conio.h>
#include <dos.h>
#include <string.h>

void main()
{
    char UserChoice;         /* Variable Declaration */
    unsigned int WDAAddress;
    char Boolean;
    Boolean = 'F';

    clrscr();                /* Inquire for the Address */
    printf("Please Enter the address of Watch Dog Card (I/II) in\nhexadecimal\n");
    printf("Address Range from 0 Hex to 0FFE Hex\n");
    printf("Wathc Dog address is: ");
    scanf("%X", &WDAAddress);

    Inquire:
    clrscr();                /* Main menu */
    printf("Menu Choices\n\n");
    printf("1] Enable/Disable\n");
    printf("2] Refresh\n");
    printf("3] Exit\n\n");
}

```

```
printf("Please enter your choices: ");

UserChoice = getch();
delay(70);

switch(UserChoice) {          /* Action to do based on choices */
case '1':                     /* Enable Disable function */
    if (Boolean == 'F')
    {
        Boolean = 'T';        /* Enable Watch Dog */
        inportb((unsigned int)WDAddress);
        printf("\nThe Watch Dog has been enabled. . .");
        getch();
    }
else                           /* Disable Watch Dog */
    {
        Boolean = 'F';
        inportb((unsigned int)WDAddress+1);
        printf("\nThe Watch Dog has been disabled. . .");
        getch();
    }
    goto Inquire;
case '2':                     /* Refresh function */
    if (Boolean == 'T')
    {
        /* If Watch Dog is enabled */
        inportb((unsigned int)WDAddress+1);
        inportb((unsigned int)WDAddress);
        printf("\nWatch Dog Refresh");delay(500);
    }
else                           /* If Watch Dog is disabled */
    {
        printf("\nThe Watch Dog is currently not enable. . \n");
        printf("You have to enable the Watch Dog first to refresh it");
```

```

    getch();
}
    goto Inquire;
case '3':                                /* Quit the program */
    inportb((unsigned int)WDAddress+1);
    break;
default:                                /* error in selection */
    printf("\nPlease select 1, 2 or 3 only");
    getch();
    goto Inquire;
}
}

```

5.2 Files on MS/DOS

WATCHDOG.C : The sample file to test watch dog card.
WATCHDOG.EXE : The test program for watch dog.

To run WATCHDOG.EXE, the syntax is:

WATCHDOG [auto] [I/O address] [time]

Where the input parameters are:

auto = 1	auto refresh
auto = 0	manual refresh
I/O address	card I/O address
time	time selection(1-11, 1=62.5ms, 2=125ms, ... 11=64secs)

5.3 Files on OS/2

WATCHDOG.C : The sample file to test watch dog card

WATCHDOG.EXE : The test program for watch dog card
WATCHDOG.SYS : The device driver for watch dog card

To install the driver into OS/2, please follow the steps listed below:

1. Add the driver into X:\CONFIG.SYS, where X is the boot disk of OS/2. The options are shown in the next paragraph.
2. Copy the driver to X:\
3. Reboot the system. The installation message will show in the screen while OS/2 booting up.

Option for driver:

```
- /Axxx      :card I/O address
-/Tmm       :Time Selection (1-11, 1=62.5ms., 2=125ms., ...
             11=64s)
-/M         :Manual refresh (if there is no this option, it is auto
             refresh)
```

Example:

```

DEVICE=C:\\WATCHDOG.SYS /A2a0 /T5 /M
(Manual refresh, 1 seconds)
DEVICE=C:\\WATCHDOG.SYS /Abbc /T7
(Auto refresh, 4 seconds)

```

When you use the manual refresh mode, OS/2 will not enable the card after boot-up. You have to use test program to test it or use program to enable/disable it. The device name of OS/2 is \$WDGDEV\$. You can use OS/2 API open/read/close to enable/refresh/disable it. When you use the auto refresh mode, the OS/2 will periodically refresh the watch dog timer card. if OS/2 hanged, the system will auto-reboot. In auto mode, when user access the timer, it will change to manual mode automatically.

5.4 Files on Windows 3.XX

WATCHDOG.C	: The sample file to test watch dog card
WATCHDOG.EXE	: The test program for watch dog card
WATCHDOG.H	: The include file for test program
WATCHDOG.RC	: The program resource
WDGDll16.DLL	: The DLL for development
WDGDll16.LIB	: The LIB for development
WDGWIN31.C	: The example file for DLL

5.5 Files on Windows 95

WATCHDOG.C	: The sample file to test watch dog card
WATCHDOG.EXE	: The test program for watch dog card
WATCHDOG.H	: The include file for test program
WATCHDOG.RC	: The example file for DLL
WDGWIN95.C	: The example file for DLL
WDGWIN95.DLL	: The DLL for development
WATCHDOG.DLL	: The additional DLL for development
WDGWIN95.H	: The include file for DLL
WDGWIN95.LIB	: The LIB for development

EXAMPLE OF USING WATCHDOG.DLL

1. Under Visual Basic 5.0

Module Declaration under VB

Option Explicit

```

Declare Function WDEnable Lib "WATCHDOG.DLL" (ByVal
Addr As Integer) As Integer
Declare Function WDDisable Lib "WATCHDOG.DLL" (ByVal
Addr As Integer) As Integer
Declare Function WDRefresh Lib "WATCHDOG.DLL" (ByVal
Addr As Integer) As Integer

```

Inside the form in VB with 3 Command named cmdDisable, cmdEnable and cmdRefresh

```
Private Sub cmdDisable_Click()
Dim FeedBack As Integer
    FeedBack = WDDisable(&H240) ' Disable Watch Dog
End Sub
```

```
Private Sub cmdEnable_Click()  
Dim FeedBack As Integer  
    FeedBack = WDEnable(&H240) 'Enable Watch Dog  
End Sub
```

```
Private Sub cmdRefresh_Click()
Dim FeedBack As Integer
    FeedBack = WRefresh(&H240) ' Refresh Watch Dog
End Sub
```

2. Under Visual C++ 5.0

Under initialization:

```

BOOL CWDTestDlg::OnInitDialog()
{
    CDialog::OnInitDialog();
    ....
    ....
    // TODO: Add extra initialization here
    // initialization goes here
    // if watchdog.dll is already been loaded, terminate this
function
    if (gLibMyDLL != NULL)
    {
        MessageBox("The WatchDog.DLL dll has already been
loaded.");
        return(0);
    }
    // Load the WatchDog.DLL dll.
    gLibMyDLL = LoadLibrary("WATCHDOG.DLL");
    // if the DLL was not loaded successfully
    if (gLibMyDLL == NULL)
    {
        char msg[300];
        strcpy(msg,"Cannot load the WATCHDOG.DLL DLL.");
        strcat(msg,"Make sure that the file WATCHDOG.DLL");
        strcat(msg,"is in your \\WINDOWS\\SYSTEM directory");
        MessageBox( msg );
    }
    // Get the address of the functions on the DLL
    WDEnable = (WDENABLE)GetProcAddress(gLibMyDLL,

```

```
"WDEnable");
    WDDisable = (WDDISABLE)GetProcAddress(gLibMyDLL,
"WDDisable");
    WDRefresh = (WDREFRESH)GetProcAddress(gLibMyDLL,
"WDRefresh");
    // end of (loading) initialization
    return TRUE; // return TRUE unless you set the focus to
a control
}
```

Codes on Buttons:

```
void CWCTestDlg::OnButtonEnable()
{
    // TODO: Add your control notification handler code here
    if (gLibMyDLL == NULL)
    {
        MessageBox("WATCHDOG.DLL NOT LOADED.");
        return;
    }
    WDEnable(0x240); // Enable Watchdog with 240 hex address
}

void CWCTestDlg::OnButtonDisable()
{
    // TODO: Add your control notification handler code here
    if (gLibMyDLL == NULL)
    {
        MessageBox("WATCHDOG.DLL NOT LOADED.");
        return;
    }
    WDDisable(0x240); // Disable Watchdog with 240 hex
address
```

```

    }

void CWDTestDlg::OnButtonRefresh()
{
    // TODO: Add your control notification handler code here
    if (gLibMyDLL == NULL)
    {
        MessageBox("WATCHDOG.DLL NOT LOADED.");
        return;
    }
    WDRefresh(0x240);    // Refresh Watchdog with 240 hex
    address
}

```

5.6 Files on Windows NT 4.0

WATCHDOG.C	: The sample file to test watch dog card
WATCHDOG.EXE	: The test program for watch dog card
WATCHDOG.SYS	: The device driver for watch dog card
WATCHDOG.INI	: The install file for watch dog card
WDGIOCTL.H	: The include file for watch dog card

To install the driver into Windows NT 4.0, please follow the steps listed below:

1. Copy the driver into X:\NT40\SYSTEM32\DRIVERS, where X:\NT40 is the system directory of NT.
2. Add IoPortAddress and AutoMode parameters to WATCHDOG.INI file. Where AutoMode=0 means manual refresh and AutoMode=1 means auto refresh.
3. In CmdTools windows, execute [RegIni WatchDog.ini]
4. Reboot the system.

5.7 Files on SCO UNIX/XENIX, Interactive UNIX

Install Decision watch dog driver to UNIX

1. Login as a root user.,
2. Install all relative files
cd /
doscp a:whdg.tz ./whdg.tar.Z ["dosget" in interactive Unix]
zcat whdg.tar | tar xvf -
3. # cd /usr/sys/watchdog
4. Install the watch dog driver to the kernel.
./install

While installing watch dog device driver, user need specify I/O port address, auto refresh timer, and application refresh timer.

Remove Decision watch dog driver from UNIX

1. Login as a root user
2. `# cd /usr/sys/watchdog`
3. Remove the watch dog driver from the kernel
`# ./remove`

Default hardware configuration of Decision watch dog card

```

I/O port address      : BBCH
Refresh time          : 4 sec

```

The watch dog device driver will refresh watch dog card automatically after enable watch dog for system. If user enable watch dog for application, user must refresh watch dog card manually (by program).

Default device name to the watch dog driver

/dev/whdg

Enclosed utilities for the watch dog driver

1. To enable the watch dog
/etc/whdg_on
2. To disable the watch dog
/etc/whdg_off

Programming Examples

```
int whdg_h; /* file handle to the watch dog device */
```

1. To enable the watch dog for system

```
if ((whdg_h = open("/dev/whdg", O_WRONLY))== -1)
{
    printf("There is no Watch Dog device %s\n",
WATCH_DOG_DEV);
    return FALSE;
}
```

2. To enable the watch dog for application program

```
if ((whdg_h = open("/dev/whdg", O_RDWR))== -1)
{
    printf("There is no Watch Dog device %s\n",
WATCH_DOG_DEV);
    return FALSE;
}
```

- ### 3. Disable the watch dog

```
if (close(whdg_h)==-1)
{
    printf("It is failed to stop Watch Dog \n");
    return FALSE;
}
```

- #### 4. Refresh watch dog for application program itself

```
char c;
read(whdg_h,&c,1);
```

5. Turn ON/OFF power control box

```
#define MCPWEROFF (('M'<<8 |0xf8)
#define MCPWEROFF (('M'<<8 |0xf9)
ioctl(whdg_h, MCPWEROFF, NULL); /*power ON */
ioctl(whdg_h, MCPWEROFF, NULL); /*power OFF */
```

CHAPTER 6

EXTENSION POWER CONTROL BOX

6.1 Features

1. Miniature high power designed for mounting on P.C. Board.
2. High contact rating (10 - 30A), high shock / vibration resistance.
3. High reliability and long life.
4. High temperature design, "F" class + 155 degree C is available.

6.2 Specification

COIL RATING

RATE VOLTAGE (VDC)	COI RESISTANCE	RATED CURRENT
--------------------------	-------------------	------------------

5	27	185
6	40	93
12	155	77
18	380	47
24	660	36
46	2300	21
110	13400	

CONTINUATION OF THE CHART:

RATE VOLTAGE (VDC)	MUST OPERATIVE VOLATGE	MUST DROPOUT VOLTAGE	MAX. VOLT	POWER COMSUMPTION (W)
% OF RATE VOLTAGE (A1 + 20C) (20C)				

5	75 Max	10 Min	120 Max	0.9 Approx.
6				
12				
18				
24				
46				
110				

6.3 Characteristics

Contact Arrangement	SPST(1 Form A), SPDT(1 Form 0)
Contact Material	AGODO
Contact Resistance	50 m ohm Max
Switching Voltage	DC 125V Max. AC 250 V Max.
Operate Time	<= 10 ms.
Release Time	<= 8 ms.
Insulation Resistance	1000M ohm min (500V DC)
Dielectric Strength	1400 VAC 60 Hz, 1 min. between open contact 2800 VAC 50 Hz, 1 min. between coil and contact. "H" type 2500 VAC
Shock Resistance	10g Approx
Vibration Resistance	1.65 mm, excursions from 10 - 55Hz. 10 - 55 Hz
Ambient Temperature	Storage: -55°C to + 130°C Operating: -55°C to + 85°C
Humidity	220 to 85% R.H
Operation Life	Mechanical: 10 ⁷ Electrical: 10 ⁵ (at rated load)
Weight	22 gr. Approx(Open Type) 28 gr. Approx(Sealed Type)

Note: Specifications are subject to change without notice

UL/CSA RATING TYPE:

	Form A	Form B	Form C	
	50/60 Hz	50/60 Hz	50/60 Hz	
	NO	NC	NO	NC
Resistive	10A, 240V AC	5A, 240 V AC	10A, 240V AC	5A, 240V AC
Tungsten	5A, 240V AC	3A, 240V AC	5A, 240V AC	3A, 240V AC
HP	1HP, 125V AC, 2HP, 240V AC		1/2HP, 125V AC, 1HP, 240 VAC	
Coil Rating: 5-120V DC				

	Form A	Form B	Form C		Cycles
	50/60 Hz	50/60 Hz	50/60 Hz		
	NO	NC	NO	NC	
Resi stive	30 A, 14 VDC / 240V AC	20 A, 14VDC / 240VAC	30A, 14VDC / 240 VAC	30A, 14VDC , 20A / 240VA C	100k
HP	1 HP/ 16 FLLA/ 120V	30 LRA / 10FLA/12 0V 30	1hp/ 16FLA/ 120V	30LRA / 10FLA/ 120V	
	2 HP/ 12 FLA 240V	LRA/ 10FLA/24 0V	2hp/ 12FLA/ 240V	30LRA / 10FLA/ 240V	
Coil Ratings: 5 – 120VDC					

WARRANTY INFORMATION

DECISION warrants that for a period of one year from the date of purchase (unless otherwise specified in the warranty card) that the goods supplied will perform according to the specifications defined in the user manual. Furthermore that the WATCH DOG product will be supplied free from defects in materials and workmanship and be fully functional under normal usage.

Return Authorization: It is necessary that any returned goods are clearly marked with an RA number that has been issued by DECISION. Goods returned without this authorization will not be attended to.