FWT-200 OPTI-CHROMIC READER SYSTEM

User's Manual

Covers Installation and Windows software for ISA and PCI cards

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INTRODUCTION

The FWT-200 Opti-Chromic Reader is a computer controlled densitometer designed to read FWT-70 Opti-Chromic Detectors. The complete reader system consists of a computer (IBM PC\XT\AT compatible), the reader head, an ADC card for the computer (ISA and PCI versions available), a cable to connect the head to the card, and software.

HARDWARE INSTALLATION

Dedicated Computer

We recommend that you use a dedicated computer for the Model 200. We have found that users who network, run multiple programs, or use inexpensive computers often have poor results with the Model 200. If you do have problems, stop multitasking, shut down all concurrent programs, remove the network connection, remove excess hardware and/or try a better quality computer.

ADC Board (ISA Version)

Before installing the ADC board in the computer you need to note the base address of the board. If you have other expansion cards in the computer you should also check that the base address does not conflict with the address of the other cards. If necessary, the base address may be altered by changing the DIP switch on the ADC card.

To determine the base address of the card examine the DIP switch settings and the numbers printed on the printed circuit board (not the numbers on the DIP switch housing). The card is originally set up with an address of 0x300, which has switches 3 and 4 off and switches 5-9 on. The base address of the ADC card may be changed to provide a range of selections to the user. Table 1 gives the decimal and hexadecimal values and the position of each switch. Note the base address of the card so that this may be specified in the configuration file (DOS software version 1.x) or in the setup dialog box (version 2.x). The windows version allows you to specify the base address by showing how the DIP switches are set. Consult your computer manual for details on installing an expansion card in your computer.

Most installations are as follows:

First make sure that the computer is turned off and unplugged. Next open the case to allow access to the expansion slots. Choose an appropriate empty slot for the card. Remove the retaining bracket, being careful not to drop the screw in the computer. Firmly insert the card in the slot and screw the bracket to the chassis. Replace the case.

ADC Board (PCI Version)

See the PCI-DAS08 User's Manual for installation instructions for the PCI version of the ADC card. **IMPORTANT**: The PCI Board and supporting software should be installed before the FWT200 software is installed. Then the InstaCal program should be run and the PCI-DAS08 board added to the list of recognized boards.

Connecting the Head to the Card

Before connecting the head to the card you should make sure that the computer is turned off. Connect one end of the supplied cable to the card and the other end to the reader head (the two ends are interchangeable for the ISA card; the cable for connecting to a PCI card has different connectors on the two ends and is

different than the PCI cable for the FWT-100). Securely fasten them by tightening the screws on the connectors.

Table 1 - FWT-300 Computer ADC Card Base Address Selection
NOTE: Addresses 000 to 0FF hex used by internal I/O

Address		**DIP Switch Settings**						
Dec	Hex	9	8	7	6	5	4	3
256	100	on	on	on	on	on	off	on
264	108	off	on	on	on	on	off	on
272	110	on	off	on	on	on	off	on
280	118	off	off	on	on	on	off	on
288	120	on	on	off	on	on	off	on
296	128	off	on	off	on	on	off	on
304	130	on	off	off	on	on	off	on
312	138	off	off	off	on	on	off	on
320	140	on	on	on	off	on	off	on
328	148	off	on	on	off	on	off	on
336	150	on	off	on	off	on	off	on
344	158	off	off	on	off	on	off	on
352	160	on	on	off	off	on	off	on
360	168	off	on	off	off	on	off	on
368	170	on	off	off	off	on	off	on
376	178	off	off	off	off	on	off	on
384	180	on	on	on	on	off	off	on
392	188	off	on	on	on	off	off	on
400	190	on	off	on	on	off	off	on
408	198	off	off	on	on	off	off	on
416	1A0	on	on	off	on	off	off	on
424	1A8	off	on	off	on	off	off	on
432	1B0	on	off	off	on	off	off	on
440	1B8	off	off	off	on	off	off	on
448	1C0	on	on	on	off	off	off	on
456	1C8	off	on	on	off	off	off	on
464	1D0	on	off	on	off	off	off	on
472	1D8	off	off	on	off	off	off	on
480	1E0	on	on	off	off	off	off	on
488	1E8	off	on	off	off	off	off	on
496	1F0	on	off	off	off	off	off	on
504	1F8	off	off	off	off	off	off	on
512	200	Do not use - Reserved for system						
520	208	Do not use - Reserved for system						
528	210	on	off	on	on	on	on	off
536	218	off	off	on	on	on	on	off
544	220	on	on	off	on	on	on	off
552	228	off	on	off	on	on	on	off
560	230	on	off	off	on	on	on	off
568	238	off	off	off	on	on	on	off
576	240	on	on	on	off	on	on	off
584	248	off	on	on	off	on	on	off
592	250	on	off	on	off	on	on	off
600	258	off	off	on	off	on	on	off
608	260	on	on	off	off	on	on	off
616	268	off	on	off	off	on	on	off
624	270	on	off	off	off	on	on	off

Address		DIP Switch Settings						
Dec	Hex	9	8	7	6	5	4	3
632	278	Do not use - Reserved for system						
640	280	on	on	on	on	off	on	off
648	288	off	on	on	on	off	on	off
656	290	on	off	on	on	off	on	off
664	298	off	off	on	on	off	on	off
672	2A0	on	on	off	on	off	on	off
680	2A8	off	on	off	on	off	on	off
688	2B0	on	off	off	on	off	on	off
696	2B8	off	off	off	on	off	on	off
704	2C0	on	on	on	off	off	on	off
712	2C8	off	on	on	off	off	on	off
720	2D0	on	off	on	off	off	on	off
728	2D8	off	off	on	off	off	on	off
736	2E0	on	on	off	off	off	on	off
744	2E8	off	on	off	off	off	on	off
752	2F0	on	off	off	off	off	on	off
760	2F8	Do not use - Reserved for system						
768	300 DEFAULT SETTING	on	on	on	on	on	off	off
776	308	off	on	on	on	on	off	off
784	310	on	off	on	on	on	off	off
792	318	off	off	on	on	on	off	off
800	320	Do not use - Reserved for system						
808	328	Do not use - Reserved for system						
816	330	on	off	off	on	on	off	off
824	338	off	off	off	on	on	off	off
832	340	on	on	on	off	on	off	off
840	348	off	on	on	off	on	off	off
848	350	on	off	on	off	on	off	off
856	358	off	off	on	off	on	off	off
864	360	on	on	off	off	on	off	off
872	368	off	on	off	off	on	off	off
880	370	on	off	off	off	on	off	off
888	378	Do not use - Reserved for system						
896	380	on	on	on	on	off	off	off
904	388	off	on	on	on	off	off	off
912	390	on	off	on	on	off	off	off
920	398	off	off	on	on	off	off	off
928	3A0	on	on	off	on	off	off	off
936	3A8	off	on	off	on	off	off	off
944	3B0	Do not use - Reserved for system						
952	3B8	Do not use - Reserved for system						
960	3C0	on	on	on	off	off	off	off
968	3C8	off	on	on	off	off	off	off
976	3D0	on	off	on	off	off	off	off
984	3D8	off	off	on	off	off	off	off
992	3E0	on	on	off	off	off	off	off
1000	3E8	Do not use - Reserved for system						
1008	3F0	Do not use - Reserved for system						
1016	3F8	Do not use - Reserved for system						

Lamp Replacement

The FWT-200 comes with a lamp installed and one spare lamp taped to the inside of the lamp access cover. When the lamp burns out or becomes too dim you should replace it. To replace the lamp first remove the access cover by unscrewing the black thumb screw on the back of the reader head. Remove the access cover and, from the bottom of the reader, unscrew the black thumb screw which holds the lamp in place. Disconnect the lamp from the circuit board by pulling the connector off the board. Remove the lamp and discard it. Insert the new lamp into the holder as far as it will go and tighten the thumb screw just enough to prevent the lamp from moving. Do not over tighten the screw or you may damage the lamp's housing. Attach the lamp's connector to the circuit board. Replace the access cover.

Dosimeter Well

The FWT-200 has a dosimeter well that accepts FWT-70 Opti-Chromic dosimeters and FWT-160 Neutral Density filters. The lid to the well should be closed whenever you take a reading (zero, dosimeter or filter). Dosimeters are placed in the light path, which is parallel to the front of the reader. A neutral density filter is inserted in the slot on the right side of the well. Drape the filter’s identification tab to the right so it will lay between the top of the reader housing and the well lid rather than being draped into the well.

Software Version 1.x (for DOS)

This software is located in the DOS folder on the CD-ROM. Information on the nstallation and use of the FWT-200 software, v.1.x for DOS may be found in the file MANUAL1.DOC or Manual.pdf in that folder.

Software version 2.x (for Windows)

Version 2.x of the FWT-200 software is an applet that communicates with other programs (such as a spreadsheet, database, or word processor) through dynamic data exchange (DDE) links. The applet displays the absorbance, wavelength and any error message, and makes these available to other programs.

Installation

Insert the CD-ROM into your computer. Use Windows Explorer (or similar) to navigate to the appropriate ISA or PCI directory on the CD-ROM drive. Double-click the setup.exe file to run the setup. Follow the instructions in the setup program to install the software.

Running the Software

From Window’s Start | Program menu select FWT200 or FWT200PCI to run the appropriate software for your card. The file will be in the Far West Technology folder if you accepted the default folder during installation.

The first time the software is run on a computer it will display the Port Address Setup (or PCI Card Setup) dialog box. In the PCI software select the PCI-DAS08 card from the pull-down list and click the accept button. In the ISA software specify the port address either by entering the address (in hexadecimal) into the address box or by clicking the DIP switch display to indicate how the switches are set on the card. You may then test the address before accepting it.

The main display for the software is a box with the menus, wavelength being analyzed and absorbance reading. The only option on the File menu allows you to Exit the program. The only active option on the Help menu will give you information About the software, including the version number.

The **Setup** menu has five options.

Shut Motor Off or **Turn Motor On** – In order to increase the life of the motor you may shut the motor off if you do not plan to use the reader for an extended period of time. Once you shut the motor off the menu option changes so you may turn the motor on and continue reading. NOTE: the motor should automatically stop anytime you exit the program.

Neutral Density Filter Check allows you to verify reader performance by analyzing neutral density filters (NDF). When you select this option a dialog box will appear. With the dosimeter well empty and the lid closed, you should click on the zero button. Zeroing will enable the three filter buttons. You may then place any filter into the reader and click the appropriate button to take readings of that filter. Do this for one or more of the filters. The absorbances will display on the screen and are available through a DDE link (see DDE Links section below). The software uses a calibration factor to adjust the ADC readings to absorbance readings. This check will give you the information you need to adjust this calibration factor, if desired (you may also treat the difference between the observed NDF values and the certified values as a bias of the reader). The default calibration factor is 1.9. The calibration factor may be changed using the fwtgain.exe program in the support directory of the CD-ROM. Start the program, enter the reader's serial number. The program will display the current (or default) value for the reader. You may change the value or exit the program without changing the value. Decreasing the gain will decrease the absorbance readings; thus if your NDF readings average about 2% high you would adjust the gain down 2%.

Zero allows you to zero the absorbance reading. The reading may change over time—a slow drift in zero is normal.

Wavelength allows you to select for which wavelength(s) to display absorbance data.

Port brings up the Port Address Setup dialog box, discussed above.

DDE Links

Dynamic Data Exchange (DDE) links allow data to be transferred from one program to another. The FWT200 program allows other programs to access the absorbance reading for a wavelength. The communication is established with a link source of **fwt200** (for the ISA version of the program) or **fwt200pci** (for the PCI version), a topic of **data**, and an items of

a1, **a2** and **a3** for absorbance at the primary (typically 600 nm), secondary (typically 656 nm) and reference (typically 750 nm) wavelengths, respectively;

lblA1, **lblA2** and **lblA3** are the primary, secondary and reference wavelengths, respectively (for example, "600 nm", "656 nm" and "750 nm");

nA1, **nA2**, **nA3**, for the absorbances of neutral density filter A (the light filter) at the primary, secondary and reference wavelengths, respectively;

nB1, **nB2**, **nB3**, for the absorbances of neutral density filter B (the medium filter) at the primary, secondary and reference wavelengths, respectively;

nC1, **nC2**, **nC3**, for the absorbances of neutral density filter C (the dark filter) at the primary, secondary and reference wavelengths, respectively;

wl, for the wavelength; wl is 1 if only the primary wavelength is displayed, it is 2 if only the secondary wavelength is displayed, and it is 3 if both wavelengths are displayed.

Consult the software manual for your spreadsheet, database or word processor to determine its capabilities for DDE communication and the appropriate syntax. In Microsoft Excel the syntax is:

=fwt200|data!a1

to have the cell's contents reflect the absorbance reading at the primary wavelength using an ISA card. The pipe character, |, separates the program name and topic; an exclamation point, !, separates the topic and item. The fwt200.xls spreadsheet in the support directory on the distribution CD-ROM illustrates how the data may be accessed, how a dose may be determined from default initial absorbance and a lookup table, and how to copy the information as data (rather than links) into another area of the spreadsheet.

Troubleshooting

If you are having problems with the FWT200 reader or software please check the following:

1. Reader is securely fastened to the ADC card using the cable supplied by Far West Technology.

2. Computer is connected to an appropriate stable power supply and is turned on. We encourage the use of a quality computer, surge protection and any line filter needed to provide the computer with a stable voltage input.

3. The lamp is on. If there is no light first check items 1 and 2 above, then try replacing the lamp, per the directions in the Lamp Replacement section above.

4. The reader's optical path is clear. Be sure there are no dosimeters in the reader.

If the above actions do not solve your problem you may check our website (www.fwt.com) for additional information on troubleshooting or contact us at:

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When contacting us, please indicate the following:

1. The version of the FWT200 software you are using (see the Help | About dialog box) and whether you are using a PCI or ISA card.

2. The version of Windows you are using.

3. The serial number of your reader.

4. Contact information, including contact name, company, location (include country if outside the USA) fax number and e-mail address.

5. A complete description of the problem you are experiencing.