RPSC GUV Monitor

(98, NT, ME, 2000, XP)

A utility for streaming serial data from a GUV UV Radiometer controlled by LOGGER.EXE

Software User's Manual

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1

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Introduction

Research-quality UV measurements can be acquired using a Biospherical Instruments Inc. GUV ultraviolet radiometer coupled with "LOGGER.EXE." LOG-GER automatically saves measurements from the GUV into Microsoft Access database (MDB) files. However, to simplify integrating GUV-class instruments with other Raytheon Polar Services Company (RPSC) systems, Biospherical Instruments Inc. has created a special application designed to repackage GUV measurements and make them available at a specified serial data port. This specialized application is called "RPSC GUV Monitor" ("**MONITOR**" for short). To make ASCII format, calibrated data available at the computer serial port re-



quires two independently operating programs: 1) LOGGER.EXE to control the GUV, acquire the readings, and apply calibration constants; and 2) MONI-TOR.EXE to repackage a GUV data frame from LOGGER and make it available at the serial data port of a computer. Note that although LOGGER can be configured to store these data, MONITOR does not store data – they must be harvested from the serial port by another application to be useful after the fact.

MONITOR uses Transmission Control Protocol (TCP) to request measurements from the LOGGER program. Thus, MONITOR will operate across a local area network (LAN), making the data available on a separate computer from the LOGGER computer. The PC running LOGGER and the PC running MONITOR may be the same PC, or may be different PCs located on the same network. They may even be PCs connected via the Internet assuming that firewalls are properly configured to route the traffic over the requested port.

Hardware Requirements

Monitor software is designed to run under a Windows NT[®], Windows 98[®], Windows 2000[®] OR Windows XP[®], environment. We recommend that you use at least a 200-MHz Pentium[®] computer with 64 Megabytes of RAM.

MONITOR is designed to be operated with only a GUV connected. If a submersible PUV is added to the instrument configuration, channel assignments may change unexpectedly, as will the resulting data! The software will operate on lesser computers, but you may find that software performance is degraded. Some old computers may also prevent the software from setting component parameters. Before purchasing a new computer, test the software on the computers you have available to determine if software performance is satisfactory. We strongly suggest that you record data and play it

back with the software and computer you plan deploying your system.

It is imperative that this instruction manual is read carefully so that the user can properly install the software and understand its full potential.

Configuring LOGGER

MONITOR requests data from LOGGER.EXE, so the first step is to configure LOGGER to operate with MONITOR. To set up the monitoring option, it is necessary to first configure the Logger program to make its data available over a TCP/IP connection, and to choose a TCP port to monitor for requests of data.

| 📯 Options | × |
|--|--|
| System Variables Data Rep | presentation Files |
| Computer ComPort Baud Rate COM1: 57600 COM11: COM12: COM13: | Sensor(s) System 25110203113 Sample Rate slow 1min fast |
| Tag Search from 0 to F | ✓ Averaging Mode |
| Internet Communciations ▼ TCP/IP Enabled | TCP Port 2121 |
| SAVE | Cancel |

Figure 1. Logger Options Menu. Do not connect to the GUV during this portion of setup. In this example, the TCP/IP checkbox is checked and 2121 is being used as the TCP port assignment.

To accomplish this, start LOGGER -- you should NOT be connected to an instrument -- and select the Options window (Figure 1). Check the checkbox "TCP/IP Enabled" and assign a port number. Port assignments should avoid commonly used ports (table 1). We normally choose port 2121.

The software default value is port 2121, which matches the default for MONI-TOR. Note that these settings will be entered into the system registry of the computer. The next time the software is started, these settings will be applied and the software should automatically collect data without the need to change configuration.

Table 1. To avoid collisions when assigning port number, do not use the listed values. Do not be surprised it there are others specific to your computer system.

| Port | Keyword | Protocol | |
|------|---------|----------|--|
| 7 | ЕСНО | Echo | |
| 9 | DISCARD | Discard | |

| 11 | USERS | Active Users | |
|----|----------|------------------------------|--|
| 13 | DAYTIME | Daytime | |
| 17 | QUOTE | Quote of the Day | |
| 19 | CHARGEN | Character Generator | |
| 20 | FTP-DATA | File Transfer (Default Data) | |
| 21 | FTP | File Transfer (Control) | |
| 23 | TELNET | Telnet | |
| 25 | SMTP | Simple Mail Transfer | |
| 37 | TIME | Time | |
| 43 | NICNAME | Who Is | |
| 53 | DOMAIN | Domain Name Server | |
| 79 | FINGER | Finger | |



Figure 2. Logger main screen. Note the new window titled "Winsock Activity" which records connections from remote programs such as MONITOR. The connection is also referenced in the title of the system connections window (in this case, "System on COM1 with 2 internet connections"). In this example, "System on COM1" refers to the GUV connnected to serial COM1, and "2 internet connections" is the TCP/IP connectivity.

Installing and Configuring MONITOR:

Installation. The installation of MONITOR is straightforward – double click on setup.exe to launch to the setup wizard (Figure 3).

| RPSC_GUV_Interface | RPSC_GUV_Interface |
|--|--|
| Welcome to the RPSC_GUV_Interface Setup Wizard | Select Installation Folder |
| The installer will guide you through the steps required to install RPSC_GUV_Interface on yo computer. Click "Next" to continue. | ur The installer will install RPSC_GUV_Interface in the following folder. To install in this folder, click "Next". To install to a different new or existing folder, enter one below or click "Browse". <u>Folder: CVProgram Files\Biospherical\</u> <u>Browse</u> You can install the software on the following drives: |
| WARNING: This computer program is protected by copyright law and international treates. Unauthorized duplication or distribution of this program, or any portion of it, may result in sev civil or criminal penalties, and will be prosecuted to the maximum extent possible under the I | ere ew. |
| Cancel Brevious New | t <u>Cancel Previous</u> |

Figure 3. Setup is predictable and straightforward using the Setup Wizard. The only input required is to specify the target folder for the installation.

Configuration. MONITOR uses TCP to connect the datastream from LOGGER to MONITOR. Thus, using the correct TCP/IP settings is essential to trouble-free communications between the two programs. The use of TCP between the two programs allows communications across a network, but it is used even when LOGGER and MONITOR are resident on the same PC.

When MONITOR is first installed, it will default to a host address of "127.0.0.1", which is known as the local "Loopback" address. Use this setting when both Logger and Monitor are operating on the same PC. The software will also default to

See Figure 4 for TCP/IP settings if you are running MONITOR on a computer different from LOGGER.

port 2121, which is the same default as the default for LOGGER. The default serial communications port where the data will be made available is COM2. The output data rate description is 9600 baud, 8 bits, 1 stop bit, and no parity bit (9600 N81). Note that all these settings will be entered into the system registry of the computer. The next time the software is started, these settings will be applied and the software should automatically collect data without the need to change configuration.

| C:\WINNT\System32\cmd.exe | _ 🗆 🗵 |
|---|-------|
| Microsoft Windows 2000 [Version 5.00.2195] (C) Copyright 1985-2000 Microsoft Corp. | |
| C:∖>ipconfig | |
| Windows 2000 IP Configuration | |
| Ethernet adapter Local Area Connection: | |
| Connection-specific DNS Suffix .: IP Address | |

Figure 4. Identifing the IP address of the computer running Logger, uses the common utility "Ipconfig". Some operating systems use "WINipcfg" for a similar purpose. Ask you network administrator for help if this does not work.

Remote Settings. An unusually powerful feature of MONITOR is remote connectivity. A PC running LOGGER can be used to control the GUV and a different PC running MONITOR can sample that data over a LAN or the even the internet. In the case of a LAN, the local computer TCP/IP settings can be revealed using a common DOS utility called IPCONFIG (Figure 4). An equivalent Win9X program is WINIPCFG.EXE. Only the IP Address is required by MONI-TOR.

When you launch MONITOR for the first time, the default settings may be incorrect for your system. In this case, the software will not "see" LOGGER and the initial screen will contain no GUV data (Figure 5):

| RPSC GUV Monitor | |
|--|----------------------|
| Socket error _exporting to COM 1 | Details Connect Exit |
| Sending to remote; Latency | |
| Status | |
| Host Address 127.0.0.1 Host Port 2121 | |
| Looking for 127.0.0.1 | |
| 7/1/2003 10:18:35 AMConnection requested to 127.0.0.1 on port 2121 | |
| Export on COM 1 | |

Figure 5. The default settings may not be optimized for your arrangement the first time you launch MONITOR.

To make a connection, you must first ensure that:

- 1) LOGGER is configured properly and currently connected to a GUV;
- 2) That the TCP host address is correct (see Figure 4);
- 3) That the host port of MONITOR and LOGGER are identical and do not conflict with another use (Table 1).

Simply edit the values for host address and host port. If these assignments are correct and LOGGER is running, MONITOR should automatically connect to LOGGER and start displaying data in a window (Figure 6). Note that these settings will be entered into the system registry of the computer. The next time the software is started, these settings will be applied and the software should automatically collect data without the need to change configuration.

| RPSC GUV Monitor | | | | |
|--|--|-----------------------------|-------------------------------|--|
| Connected _exporting to COM 9 | ✓ Details | D | isconne | ct Exit |
| Requesting Data: | Latency 0.00sec | Channels : Ed0Gnd | Data : .000023 | Units : V |
| Data :, .000023, 3.439E1, 6.28E1 7.923E1, 1.902E-1, 8.167E1, 39.9 | :, .000023, 3.439E1, 6.28E1, 2.103E1, 5.928E0, WE1, 1.902E-1, 8.167E1, 39.904 | | 3.439E1 6.28E1 2.103E1 | μW/(cm²nm) μW/(cm²nm) μW/(cm²nm) |
| Status - CalFile:\\Bsi\Production\Instruments\Instrument Test Data\GUV2511 | | Ed0305 Ed0380 | 5.928E0 7.923E1 | μW/(cm²nm) μW/(cm²nm) |
| Update at 1sec. Host Address Host Port 2121 | | Ed0PAR Ed0395 Ed0Temp | 1.902E-1 8.167E1 39.904 | μE/(cm²sec) μW/(cm²nm) C |
| IP Requested: 192.168.1.101 | | | | |
| Export on COM 9 | ited to 192.168.1.101 on port 2121 | | | |

Figure 6. The RPSC GUV Monitor window when configured properly for operation across a LAN.



Figure 7. The "Details" checkbox determines whether or not the entire window is displayed. When unchecked, dialog, data, and configuration settings are not displayed.

Regular Operation. MONITOR was designed to begin working painlessly and unattended once installed and properly configured. The MONITOR window is colorful and all configuration settings are available with little or no user interaction. The "Details" checkbox determines whether or not the entire window is displayed (Figure 7). A slide bar allows the user to select the poling interval for updating the data. Regions of the window will change color (Figures 6 and 7) depending on what is happening: yellow means a data request has been made by

MONITOR; green means that requested data has been received; and red means that data has not been received and the system has timed out (e.g. Figure 5).

Results. It is important to understand the difference between data stored by LOGGER in Microsoft Access databases and data appearing at the serial port via MONITOR. LOGGER collects and averages GUV data frames over a time interval that is selected by the user and writes this information to disk. In contrast, when MONITOR requests data from LOGGER, the returned values include only the latest GUV data frame (NOT the current average for the interval). This is easily seen using a serial communications program such as HyperTerminal, to display data appearing at the serial port (Figure 8).

| 🎨 P1_9600 - HyperTerminal |
|--|
| File Edit View Call Transfer Help |
| |
| I I @ |
| 9.88 |
| 063003 113733 .000021 3.446E1 6.292E1 2.107E1 5.943E0 7.936E1 1.905E-1 8.179E1 3 |
| 9.88 |
| 063003 113733 .000021 3.446E1 6.292E1 2.107E1 5.943E0 7.936E1 1.905E-1 8.179E1 3 |
| |
| 0.63003 113737 .000021 3.448E1 6.299E1 2.109E1 5.949E0 7.944E1 1.907E-1 8.188E1 3 |
| 7.077 063003 113738 000001 3 668E1 6 206E1 2 108E1 5 068E0 7 062E1 1 007E_1 8 185E1 3 |
| 9 871 |
| 063003 113739 .00002 3.448E1 6.296E1 2.108E1 5.948E0 7.942E1 1.907E-1 8.185E1 39 |
| .871 |
| 063003 113740 .00002 3.448E1 6.296E1 2.108E1 5.948E0 7.942E1 1.907E-1 8.185E1 39 |
| .871 |
| 063003 113741 .00002 3.45E1 6.3E1 2.109E1 5.952E0 7.947E1 1.908E-1 8.191E1 39.87 |
| 063003 113743 .000021 3.447E1 6.296E1 2.108E1 5.948E0 7.94E1 1.906E-1 8.183E1 39 |
| 000 |
| 864 |
| 063003 113746 00002 3 449E1 6 297E1 2 109E1 5 95E0 7 943E1 1 907E-1 8 187E1 39 |
| 863 |
| 063003 113748 .00002 3.45E1 6.3E1 2.109E1 5.953E0 7.947E1 1.908E-1 8.191E1 39.86 |
| 063003 113750 .000019 3.451E1 6.304E1 2.11E1 5.955E0 7.95E1 1.909E-1 8.194E1 39. |
| 857 |
| |
| |
| Connected 0:11:48 VT100 9600 8-N-1 SCROLL CARS NUM Capture Print echo |

Figure 8. HyperTerminal window display. This program is connected to the communications port where data from MONITOR is streaming.

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