SDI-12 Monitor – User Guide

1. Installation

Two options exist for installing the SDI-12 Monitor

1.   Running Setup.exe from the CD

2.   Downloading the program from 'http://www.ahaelectreonics.com/downloads'

This location is updated with the most recent version of the SDI-12 Monitor program.

The installation process is simple; just follow the installation steps after executing setup.exe

1.1.   Software Installation

The default installation directory is 'Program Files\AHAELECTRONICS\SDI '. The following files will be copied to the installation directory after running setup.exe:

SDI-12_Monitor.exe	The SDI-12 Monitor Executable program
SDI-12_version_3_2002.pdf	The SDI-12 Standard
SDI-12_Monitor_User_Guide.pdf	The SDI-12 Monitor User Guide
mfc70.dll, mfc70u.dll, msvcr70.dll, unins000	Several required runtime dynamic link library files.

Another device driver file: 'UserPort.sys' is added to the 'WINDOWS\system32\drives' directory. The start menu is also updated with the SDI-12 Monitor shortcut.

The SDI-12 Monitor software requires about 4 Mbytes of the disk space and the Windows operating system.

1.2.   Software Requirements

The SDI-12 Monitor program uses a parallel port known as the LPT or Printer Port. During execution, it is absolutely necessary that the SDI-12 Monitor has full control over this port. The program may not function correctly if another program attempts to read or write to the same port at the same time. This scenario may occur if an improperly written printer/fax driver does not relinquish control over the LPT port once the printer or fax machine is disconnected. You cannot normally use the SDI-12 Monitor and a printer at the same time. When the SDI-12 Monitor program is running, it requires full sole access to the port. After you close the SDI-12 program, it

relinquishes the control over the LPT port.

1.3.　Hardware Installation

For proper operation please use the supplied hardware.

There are two main reasons that it is required:

1. It insulates the PC from the SDI-12 network or from the sensor.

2. The supplied hardware adds extra functionality not found on a simple parallel port and it provides electrical characteristic as required by the SDI-12 standard.

To connect the hardware, please connect the SDI dongle to a parallel port on the computer. Now the three wires marked as +12V, GND, D can be connected to a sensor or SDI network.

1.4.　Hardware Requirements

Supply Voltage	+8V to +30V
Current Drawn (max)	10mA
Power Consumed (max)	0.3W
Temperature Operating Range	-20C +50C

1.5.　Uninstalling the SDI-12 Monitor

To uninstall the SDI-12 Monitor, use Add/Remove Programs in the Control Panel and remove SDI-12 Monitor. All files and icons will be removed from your computer.

2. Using SDI-12 Monitor

2.1. Starting the program and opening files

To run the SDI-12 Monitor click the SDI icon in the START menu, or if you have already saved an SDI file, you can double click it and the program will start and open the selected file. At this stage you can open and examine the previously saved SDI files, and when the SDI-12 program is running you can also drag and drop SDI documents into the program window.

2.2. Connecting to SDI-12 devices

Press the 'Connect' button and the SDI-12 Monitor will search your computer for the first available LPT port. When the port is found the program will perform an internal test.

In some situations one of the debugging messages might be generated during the connect phase.

Diagnostic Message	Correcting Action
OS version not recognized	The program cannot determine operating system. Ensure that the installation is performed on Windows platform.
Driver does not exist or unable to start driver	The SDI-12 Monitor was incorrectly installed or it has no access to the printer port. Re-install and ensure that the printer port is available solely for the SDI-12 Monitor.
Driver already started	Occurs when a previously running SDI-12 program was abnormally terminated. Just click OK in this case, otherwise close the other instance of the SDI-12 Monitor program
Hardware not installed	Connect SDI dongle

After the Connect command is successfully executed, all the menu commands are activated, and a toolbar with shortcuts to the commands is displayed.

2.3.   Executing Standard SDI-12 Commands

You can execute any SDI-12 command by either selecting it from the menu or clicking the proper button on the toolbar. The command is displayed in black text on the screen, while the response is written directly below in either blue (normal operations) or red (error) text. Additionally, both the menu and toolbar will change in appearance to allow you to execute the next logical command. For example, after executing 'D0!' the button and menu change to reflect 'D1!'. 'RST' resets all toolbar buttons and menu to the initial state. Alternatively, 'D0!' may be sent using the extended command procedure. For a complete description of every command please refer to the SDI-12 standard document.

Figure 2.3.1: Example of the SDI-12 Monitor Interface
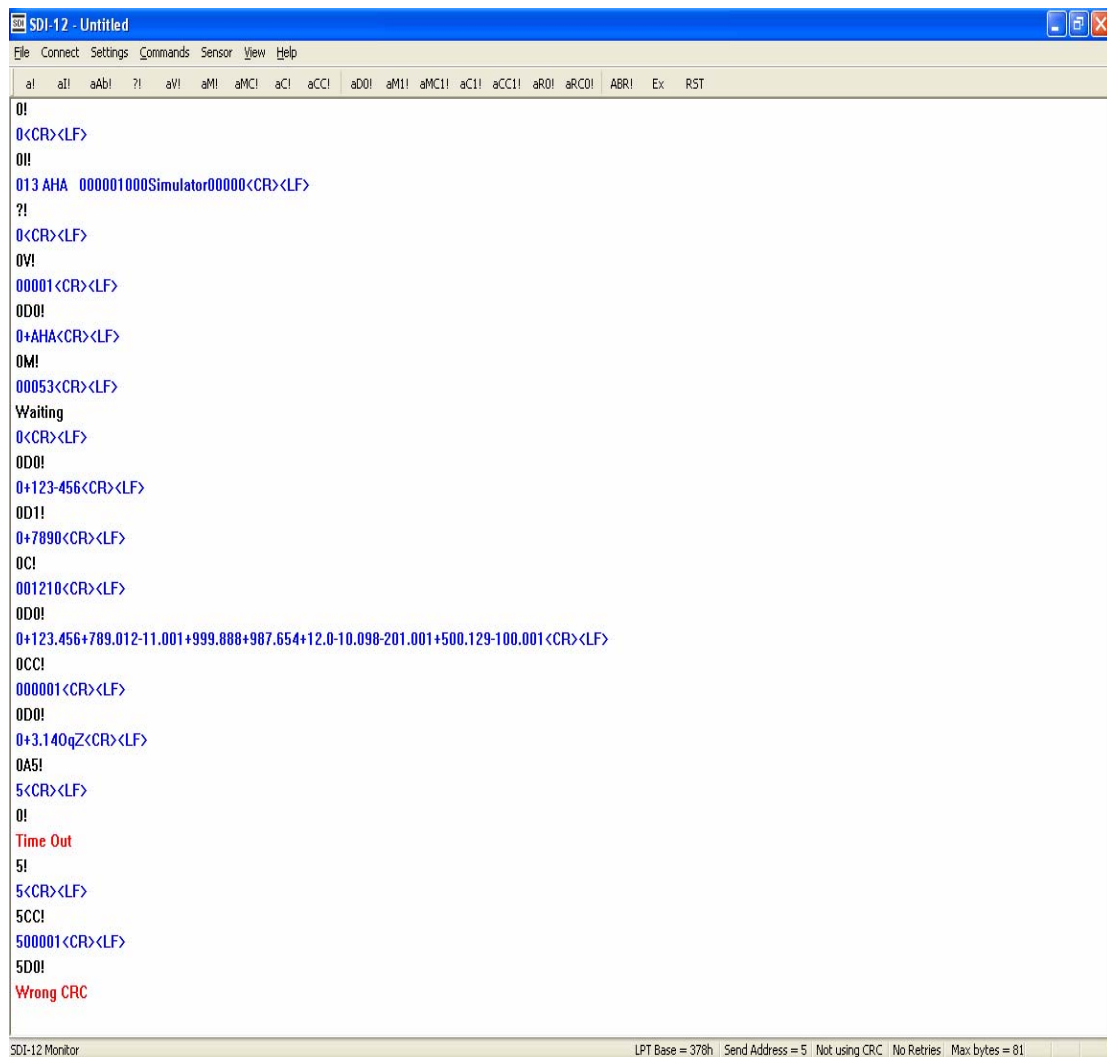
Some commands can cause an automatic execution of a chain of SDI-12 commands. For instance, when the Measure command gets an answer from the sensor it sends as many commands as needed to receive the data. In addition, it will wait for the data as requested by the sensor.

Every response is validated as required by the SDI-12 standard. The following errors can occur:
If detected, error conditions are displayed instead of a sensor response.

Error Message	Diagnosis
Time out	No response within 17ms
Frame error	No stop bit received in the frame
Parity error	Frame with incorrect parity
Too many bytes in response	Too many bytes before <CR><LF>
No <CR><LF> Sequence	Response without <CR><LF>
Wrong CRC.	Incorrect CRC in response

2.4.   Executing Extended SDI-12 Commands

When executing Ex (extended) commands, an arbitrary string of characters representing an SDI command may be sent. Each response will be validated according to the user-defined settings. Extended commands cannot initiate automatic sequences of communication. For example, sending 'M!' (Measure) as an extended command will only wait for one response from the sensor, it will not attempt to read data from it.

It should be noted that when sending extended commands, the SDI-12 Monitor automatically adds an address and exclamation sign to every command it sends. The default value for the address is '0', and it can be changed to any printable character. This is accomplished by clicking on 'Settings' in the menu bar, and in the dialog box beside the send address entering the new address to be used. The address is altered using the change address (aAb!) command. The dialog box also allows you to use retries when executing SDI commands. Furthermore, if you select or deselect 'Use CRC' it will only affect the execution of external commands. For example, the program automatically checks CRC when required by SDI standard (example: during the execution of an 'aMC!' command).
The Figure 2.4.1 below presents the SDI-12 Monitor Setting Parameter Dialog GUI window..
The information about the current settings is displayed in the status bar at the bottom of the screen. When the program is waiting for the response, the remaining time in seconds is also displayed.
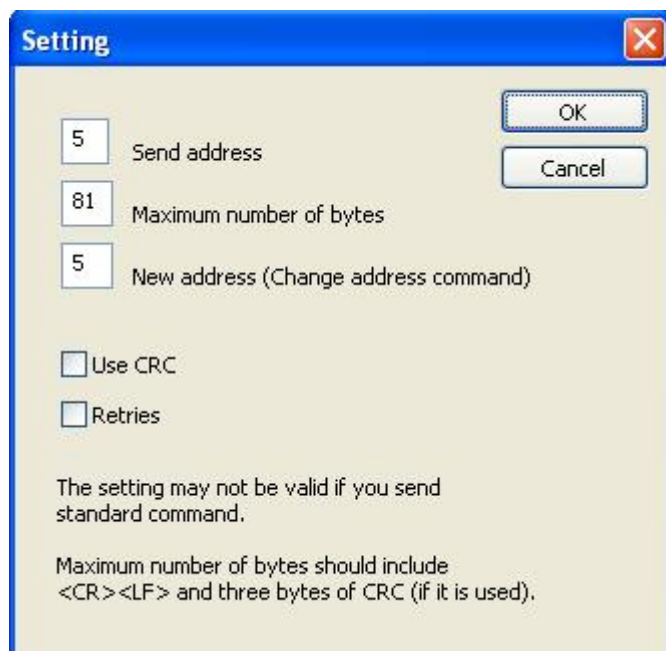
Figure 2.4.1: SDI-12 Monitor Setting Parameter Dialog

2.5.   The SDI-12 Monitor as a Sensor Simulator

The SDI Monitor can be used as a sensor simulator. Before entering the sensor mode the user has the opportunity to set several parameters. The first and the most important is setting up the waiting time (in seconds). The waiting time is the time during which the SDI-12 Monitor will watch the SDI data line. After detecting activity on the SDI data line, the waiting time is reset. This means that the program will relinquish control and exit sensor mode after it detects no activity on the SDI line during the specified waiting time.
When SDI-12 Monitor program is waiting for command or a response from the computer it will not react to mouse movement or keyboard activity. We recommend that you do not press any buttons during this brief time. The keystrokes are buffered and the accumulated commands can be executed when the program relinquishes the control to the operating system.
There are two additional parameters that the user can set: the identification string, and CRC bytes.They both determine how the sensor responds to the commands. When changing the CRC bytes, please keep in mind that they depend on the actual sensor address and the response.

Figure 2.5.1: SDI-12 Sensor Setting Parameter Dialog

All of the available commands to which the sensor responds are listed in the dialog box before entering the sensor mode. The other commands not listed in this dialog box are ignored in sensor mode.

The program will write the received command in black and the response in green. If the sensor is going not to respond to the received command, the text 'not responding' is displayed. The Figure 2.5.2 presents an example of the SDI-12 Monitor GUI window.

Figure 2.5.2: Example of the SDI-12 Monitor Interface