



## Installation Information for the WebXL

### IMPORTANT NOTICE

**THIS INFORMATION SHEET CONTAINS INSTRUCTIONS FOR INSTALLING A WEBXL. FAILURE TO COMPLY WITH THESE MAY RESULT IN EQUIPMENT DAMAGE AND MAY PREJUDICE WARRANTY PROTECTION.**

**IT IS ESSENTIAL TO INSTALL THE GROUND CONNECTIONS AS DESCRIBED. FAILURE TO CONNECT THE GROUND SYSTEM CAN RESULT IN AN UNSAFE SITUATION, DAMAGE TO SENSORS, ACTUATORS AND ELECTRONIC SYSTEMS AND IMPROPER SYSTEM OPERATION.**

**SPHERE SYSTEMS PTY LTD CANNOT ACCEPT RESPONSIBILITY FOR INCORRECTLY INSTALLED EQUIPMENT AND MAY, AT ITS OPTION, CHARGE A SERVICE FEE FOR PROBLEMS RELATED TO INCORRECT INSTALLATIONS.**

### 1. Mechanical & Environmental

The WebXL system is to be installed on DIN rail fixed inside metal enclosures. Individual modules are snapped into place and can be removed by pushing the unit down and then pulling the bottom out. To snap a unit into place, reverse this procedure. All wiring must be kept away from the components on the board and it is recommended that wiring be installed in conduits located parallel to each row of DIN rail.

The allowable operating temperature range is from -10C to +45C, non-condensing.

### 2. Power Supply

The WebXL controller is designed to be powered by 24 Volt AC. It can also be powered from a 12V DC battery connected to the DC and G terminals on the Controller. A 12V lead-acid battery can also be connected across these terminals while the system is powered from a 24V AC source. The Controller contains circuitry to charge a 7AH battery. This 12 Volt DC power is also used to supply power for the I/O interfaces. All power must be removed from the system during field wiring connections. This includes power to the WebXL, I/O cards, sensors, actuators and other power which could cause damage due to inadvertent shorts from loose wiring.

### 3. Communication cables

The WebXL communication interfaces operate via CAT5 network cabling and RS485 cable. The system uses the CAT5 cable as a standard communications to the IP network, while the RS485 is to talk to input/output cards.

#### 3.1 RS232

The RS232 mode allows the WebXL to be connected to a PC for configuration of the IP parameters. The communication

parameters are 9600 baud, 8 data bits, one stop bit and no parity. The RS232 connection is via a 10 pin ribbon cable. It is pin compatible with a PC 9 pin COM1 connector. The matching connector is a female type allowing the use of standard extension cables.

When wishing to configure the WebXL controller, attach the WebXL RS232 connection cable and connect the other end to your computer's serial port. Open HyperTerminal or Terminal and configure a session with 9600 baud, 8 data bits, one stop bit and no parity.

When this has been achieved, reset the power to the WebXL controller. The WebXL has a startup initialisation that can be accessed by pressing the ESC key in the Terminal or HyperTerminal program. If the ESC key is not pressed within 5 seconds of powering the controller up it will resume normal operation.

If connected, you should see the following:

```
Terminal - (Untitled)
File Edit Settings Phone Transfers Help
Firmware: Sphere 1.4 (Apr 28 2005) S/N: 0090-C2C5-B303
MAC address: 00:90:c2:c5:b0:03

Command mode
Ip address: 192.168.1.100
Netuk mask: 255.255.255.0
Gateway: 192.168.1.1
Port: 14215
Quit: 0
```

You must press the Enter key to synchronise communications.

To change the network addresses, type in the capital letter of what you wish to edit, followed by the desired change. For example, if the current Gateway is set to 192.168.1.1 and you wish to set it to 203.224.197.24. You would type the following command:

*G203.224.197.24*

followed by the Enter key. Note that no spaces are permitted in a command. If correct, the system will display a message notifying you of the change. If no key is pressed for 10 seconds while in configuration mode, the configuration mode will end and normal operation will resume.

The RS232 port is also used to connect an optional WebXL LCD. Note that all power for the WebXL LCD is via the RS232 port.

#### 3.2 RS485

RS485 is used for communication to the I/O modules. The network cable must be a constant impedance, shielded, twisted pair meeting the EIA485 standard. It should have a characteristic impedance of nominally 120 ohms. There are cables on the market which purport to be RS485 compliant but have characteristic impedances well below 120 ohms. These are inferior grade cables and are not suitable for use with the WebXL

system. They often have very thin wires which are unsuitable for power distribution. Sphere Systems Pty Ltd accepts no responsibility for communication problems associated with their use. The cable must be installed as a single run with no stubs or tees and must be terminated by resistors at each end. The resistors must match the characteristic impedance of the cable. For connections between the WebXL controller and the WebXL I/O interfaces a two pair cable is required, the first connected to the COM+ and COM- terminals while the second to the DC and G terminals. For long cable runs the voltage drop along the cable for power distribution can be quite large. It is permissible to use the cable shield as the ground conductor and parallel one pair for power. If the voltage at the I/O module falls below 12Volts then an external power cable will need to be used or a communication cable with extra pairs can be used and the pairs paralleled.

The cable must be installed according to the Austel Customer Premises Wiring Standard. RS485 cabling is vulnerable to electrical noise. This may be caused by high currents or spikes on power wiring. This can damage network components. Keep data cabling well clear of all power wiring. The correct installation is for all network nodes and their power supplies to be isolated from the building ground. The required ground reference between network nodes is provided through the communication cable shield or ground connection. **At one and only one point in the network is the shield tied to ground for safety.**

### 4. Field Wiring – WebXL I/O

#### 4.1 Outputs

The WebXL I/O has 16 output channels. Eight channels are binary outputs and eight channels are analogue outputs which can be configured as quasi-binary outputs through software manipulation.

##### 4.1.1 Connections for analogue outputs

An analogue output supplies a 0 to 10V DC actuator drive signal. This form of drive is compatible with most 0 to 10 volt valve and damper motors. This voltage is referenced to the WebXL I/O ground (G) and **it is essential to provide a two wire connection (both output and ground return) from the WebXL I/O to the actuator.** Motor power, often 24V AC, can either be fed from a daisy-chained single wire from the transformer, with the 24V AC return from the transformer connected to a ground terminal on the WebXL I/O or a 3 wire connection can be made to the motor with the 24V AC being connected to a common tie point near the WebXL I/O. The latter is recommended for best noise immunity.

**If the ground reference to the motor is not maintained (by using a floating transformer) then motor power would be applied to the analogue output and the WebXL I/O may be damaged. This would not be covered by warranty.**

The analogue outputs are current limited to about 20mA. They are designed to source current and will NOT sink current.

##### 4.1.2 Connections for binary outputs

The digital outputs are driven by Form A relays which switch to a common which is isolated from ground. All relay commons are joined together. The relays are designed to switch low voltage relay coils. If the total switched current for all relays is in excess

of 2A then multiple wires are required for the common connection. If you are driving external DC relays with the outputs of the WebXL, then you MUST include inductive kick-back diodes across all relay coils.

#### 4.2 Inputs

The WebXL I/O has eight binary inputs and eight analogue inputs. The analogue inputs can be configured as binary inputs through software manipulation.

##### 4.2.1 Connections for binary inputs

Binary inputs require a dry contact closure to ground. When the input is pulled to ground the input is recognised as ON. When open circuit it is OFF. The polarity may be reversed through programming.

Mechanical switches do not have polarity associated with them. Electronic switches do require correct polarity and colour-coded wire may assist in maintaining polarity. The negative of an electronic switch should be connected to the G terminal. It is not recommended to use a thin single strand cable where there is any chance of movement in the cable as repeated flexure of such cable can result in a fracture.

##### 4.2.2 Connections for analogue inputs.

The allowable voltage range for inputs is 0 to 10 volts referenced to the WebXL I/O ground. The ground is externally accessed at connections labeled G. The wiring to an analogue input sensor should be shielded to prevent noise pick-up unless the sensor source impedance is very low or a current source sensor is used with a low load impedance. It is not necessary to use a twisted pair although this is recommended. For an active sensor (one requiring a power supply) a shielded twisted pair cable may be used with the shield of the cable providing the ground reference for the sensor, one wire of the pair providing the power and the other wire for the sensor output. This convention should not be used where noise on the power supply may cause interference with the signal.

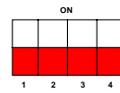
Where active sensors are used there must be a physical connection between the input terminal on the WebXL I/O and the output terminal on the sensor as well as a physical connection between the ground terminal on the WebXL I/O and the ground terminal on the sensor. The 24V AC power source for the sensor can be daisy-chained from sensor to sensor with the 24V AC return for the sensors being terminated at a WebXL I/O ground terminal. Alternatively the 24V AC power for each sensor can be fed from a common tie-point near the WebXL I/O.

To disconnect a sensor you must not remove the ground wire, only the signal and 24V AC lines can be disconnected. Always turn off the power before disconnecting or reconnecting motors or sensors.

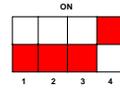
#### 5. I/O Addressing

Each I/O card has a DIP Switch box located in the bottom right of the board, and only read on power up. This is used to specify the address of the WebXL I/O. Use the following table to configure the WebXL I/O:

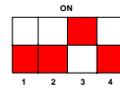
#### I/O Boards DIP Switches



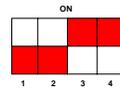
I/O Board 1



I/O Board 2

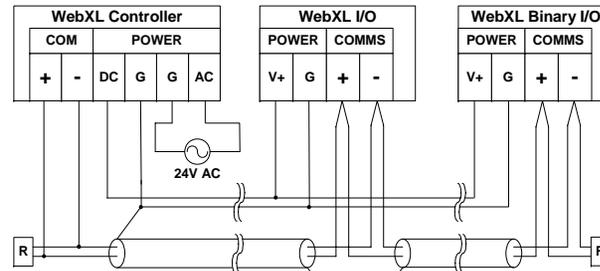


I/O Board 3

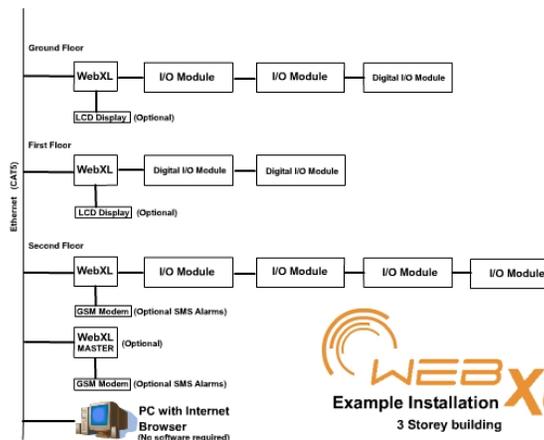


I/O Board 4

#### Wiring Diagram for the WebXL System



#### Example Network Layout



#### QUICK REFERENCE GUIDE

The unit is powered by a 24 Volt AC power supply, connected in the AC Ports of the controller	
The I/O Board is powered through the RS485 Comms. The Comms are connected using the 'COM +' and 'COM -'. These are connected to the corresponding inputs on the I/O Controller.	
The Controller Input/Output is for planned expansion of the WebXL. This will be used typically as an alarm output and acknowledge input.	
The AUX port is an auxiliary RS485 port for future high level interfaces.	
The serial port has multiple uses, it is used for initial programming of the WebXL Controller and it is also used by the WebXL LCD display. Note that the WebXL Display is powered through this port.	
This is the CAT5 port. Please ensure that the cable is standard CAT5 and not crossover cable.	
This is an Analogue Input. These are located on the bottom left of the I/O interface and are 0-10 Volts DC in.	
This is a Binary Input. These are located on the bottom right of the I/O interface and provide a voltage-free output contact closure.	
This is a Binary Output. These are located on the top right of the I/O interface and provide a voltage-free contact closure.	
This is an Analogue Output. These are located on the top left of the I/O interface and are 0-10 Volts DC out.	

#### Questions

If you are unsure about the compatibility or the connection details of any field equipment with the WebXL I/O, contact Sphere Systems prior to risking damage to any equipment.

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