tiny TOOLS™
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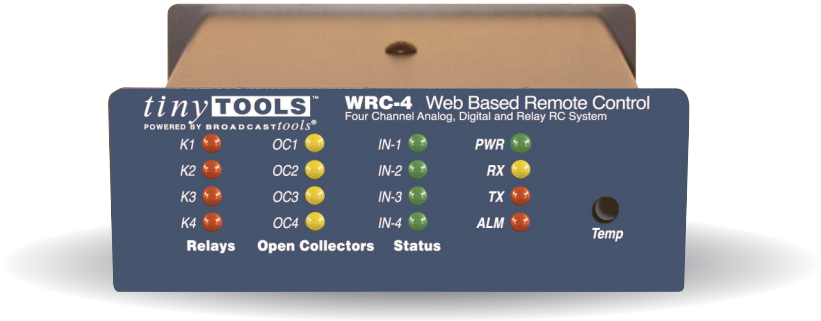
Installation and Operation Manual



WRC-4
Web Based Remote Control

Firmware PIC01.06/Xp1.11.001 and above

Manual update 11/19/2007

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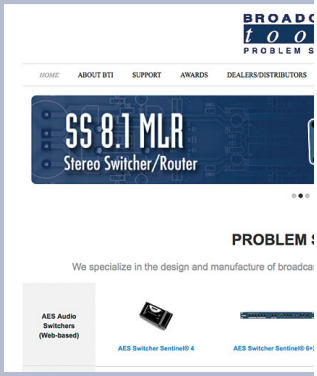

e-mail: support@broadcasttools.com **voice:** 360.854.9559 **fax:** 866.783.1742

INTRODUCTION

Thank you for your purchase of the tiny TOOLS™ WRC-4, Web-based Remote Control, which we will refer to throughout the manual as the WRC-4. We're confident this product will give you many years of dependable service. This manual is intended to give you all the information needed to install and operate the product.

SAFETY INFORMATION

Only qualified personnel should install Broadcast Tools® products. Incorrect or inappropriate use and/or installation could result in a hazardous condition.

Broadcast Tools, Inc., is unable to support NON-Broadcast Tools software, hardware or NON-Broadcast Tools computer/hardware/software problems. If you experience these problems, please research your hardware/software instruction manuals or contact the manufacturer's technical support department.

WHO TO CONTACT FOR HELP

If you have any questions regarding your product or you need assistance, please contact your distributor from whom you purchased this equipment.

If you would like more information about Broadcast Tools® products, you may reach us at:

Broadcast Tools, Inc.
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Broadcast Tools is a Veteran Owned Business

Designed, Assembled and Supported in WA State, USA

CAUTION!

Broadcast Tools® Products, as with any electronic device, can fail without warning. Do not use this product in applications where a life threatening condition could result due to failure.

NOTE:

This manual should be read thoroughly before installation and operation.

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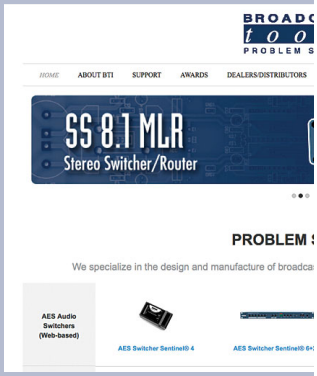

PRODUCT DESCRIPTION

The tiny TOOLS WRC-4 is a fresh approach to remote site monitoring and control, or providing an inexpensive solution to Internet enabling your present remote control system. The WRC-4, combined with web access and your favorite web browser, brings you the following features, all available in this small, but powerful tiny TOOL: A powerful built-in web-server with non-volatile memory; 10/100baseT Ethernet port; four channels each of high resolution analog inputs with a large monitoring range; TTL compatible digital (contact closures) inputs; SPST one amp relays; open collector outputs; front panel status indicators and a single front panel temperature sensor. The WRC-4 has carefully been RFI proofed, while including the accessories other manufactures consider optional. The WRC-4 is supplied with plug-in euroblock screw terminals and loaded with a generic web page that may be edited by the end user. The WRC-4 works with either dynamic or static IP addresses (when used with a dynamic IP, an inexpensive cable or DSL router may be required). Multiple WRC-4's may be used with a user provided Ethernet hub. The WRC-4 may be set on a desktop, mounted on a wall or up to four units mounted on the RA-1, Rack-Able mounting shelf.

Features

- 10/100 base-T Ethernet Web Server
- Four 10 bit analog inputs. Zero to 10-volt range
- Four optically isolated status inputs
- Four normally open dry contact one amp relays, may be configured for momentary or latching operation
- Four open collector outputs, may be configured for momentary or latching operation
- Front panel -40 to +190 degree F temperature sensor
- Four email alarm notification addresses
- Non-Volatile Memory
- Surge protected power supply
- 120 VAC (optional 240V CE) wall transformer
- Custom applications on request

Inspection

Please examine your WRC-4 carefully for any damage that may have been sustained during shipping. If any is noted, please notify the shipper immediately and retain the packaging for inspection by the shipper. The package should contain the WRC-4, this manual, 7 foot CAT 5 cable and the 9 VDC @ 1 amp wall transformer.

INSTALLATION

Web Interface

The WRC-4 firmware supports an HTTP (Web) interface on TCP port 80 and is user programmable. The default page contains a Java applet used to monitor and control the WRC-4.

Information you'll need to know

1 - An available Static IP address to assign to the WRC-4 if required.
2 - Your network's gateway address.
3 - The network's subnet mask.
4 - The IP address of the email server that supports the address to which the WRC-4 sends email alerts.
5 - The SMTP port used by your email server (usually 25).
6 - Up to four email addresses to which you want to send alarms.

The WRC-4's RJ-45 (iNet) is normally attached to a DSL/Cable router, Ethernet hub or switch. The supplied "Device Installer" software should be used to configure the IP address of your WRC-4. The "Device Installer" software is also available on our web site, www.broadcasttools.com, under WRC-4 or under downloads.

1 - Install the "Device Installer" software on the PC used for the WRC-4 setup.
2 - Connect the supplied straight-through CAT 5 cable to the RJ-45 connector on the WRC-4 labeled iNet and the other end to your hub or switch. NOTE: If you are attaching the WRC-4 directly to your computer, you MUST use a XOVER CAT 5 cable.
3 - Connect the supplied 9 VDC power supply to the WRC-4's power jack. Verify that the power LED and left "LINK" LED above the RJ-45 is lit.
4 - Start the "Device Installer" software.
a - Click on "SEARCH"
b - When the WRC-4 is found, click on the listed device. If more than one WRC-4 is found, refer to the MAC address label attached to the WRC-4 RJ-45 case and click on the desired WRC-4, which should be highlighted.
c - Click on the "ASSIGN IP" button, then follow the instructions for setting a static IP address, along with the subnet and gateway, if applicable.
d - After the WRC-4 has rebooted, click the "SEARCH" button, the configured WRC-4 should be listed.
NOTE: You may have to click the search button more than once after the reboot.
5 - If you are behind a firewall or router, you will need to port forward not only port 80, but also ports 3001 and 3002 and set the SUN Java to direct.
NOTE: To set up port forwarding, refer to the manual supplied with the firewall or router.

CAUTION!

Installation of the WRC-4 in high RF environments should be performed with care. Shielded cable is suggested for all control connections. All shields should be tied to the "CHASSIS GROUND" terminal. The station ground should be connected to the chassis ground screw located behind J4 as viewed from the rear. For lightning protection devices, check out www.polyphaser.com and www.itwlinx.com.

Assigning an IP address already in use by another device may cause problems with your network!

NOTE:

DHCP and Auto IP are enabled with the IP Address set at 0.0.0.0 by default. If you are not familiar with Ethernet enabled equipment, it may be useful to contact your IT department or network administrator.

6 - To change the WRC-4 from port 80 follow the steps below. If not, go to step 7.
a – Click on the "TELNET" button.
b - Verify that the port is set to 9999 and then press OK.
c - Press Enter within 5 seconds. The configuration settings will display, followed by the setup menu options.
d - From the Setup Menu Options, select 6,(Web Server Port) then the enter key.
e - Change the port to the desired address, then the enter key (we suggest port 4000).
f – Enter 99 to save your changes.
g - After the WRC-4 has rebooted, click the "SEARCH" button, the configured WRC-4 should be listed. NOTE: You may have to click the search button more than once.

7 - To access the WRC-4, open your browser and type in the assigned IP address in the "ADDRESS" area of your browser. Example: 192.168.1.101

8 - If things are working correctly, you should see the WRC-4 web page. NOTE: On some machines and browsers, this may take a few seconds.

9 - Log in using the default (owner) user name and password: wrc4 in lower case. NOTE: If you change the "OWNER" user name and password, be sure to write it down.

10 - Follow the descriptions on the following pages to set up the WRC-4.

Java Applet

The Java applet is the primary user interface. The following pages describe each of the items of each screen displayed by the applet:

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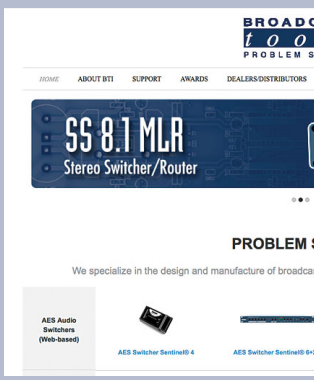

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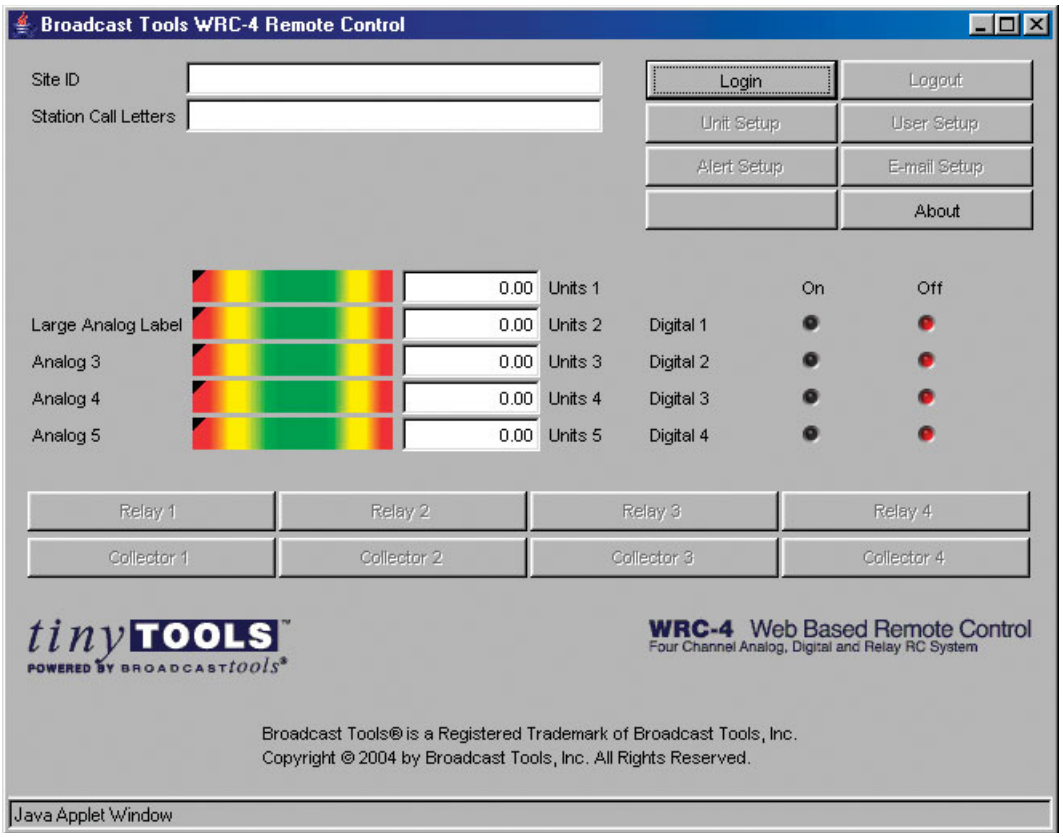
Main Screen

The main screen displays information identifying the site, gauges and LED's representing analog and digital values, buttons representing relays and open collector outputs, buttons to login, set up, and control the WRC-4.



Site ID	User defined identification
Station Call Letters	Call letter identification
Analog Labels	User defined labels for analog registers
Analog Gauges	Graphical representation of current analog values
Analog Text	Numeric representation of current analog values
Analog Unit Labels	User defined labels giving analog units of measure
Status/digital Labels	User defined labels for status/digital registers
Status/digital LED's	On/Off indicators showing current state of inputs
Relay Button Labels	User defined labels for relays
Relay Buttons	Buttons to activate relays
Relay LED's	On/Off indicators showing current state
Collector Button Labels	User defined labels for open collector
Collector Buttons	Buttons to activate open collectors
Open Collector LED's	On/Off indicators showing current state
Login Button	Displays the Login dialog described below
Logout	Logs the user out
Unit Setup	Displays the Unit Setup dialog described below
User Setup	Displays the User Setup dialog described below
Alert Setup	Displays the Alert Setup dialog described below
E-mail Setup	Displays the E-mail Setup dialog described below
User Defined Button	Displays a user-defined label and activates a user-defined URL when clicked
About Button	Displays the about dialog described below

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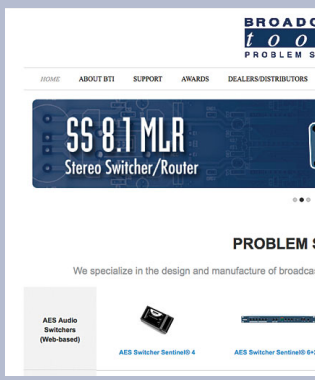
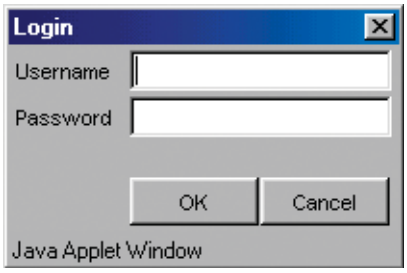
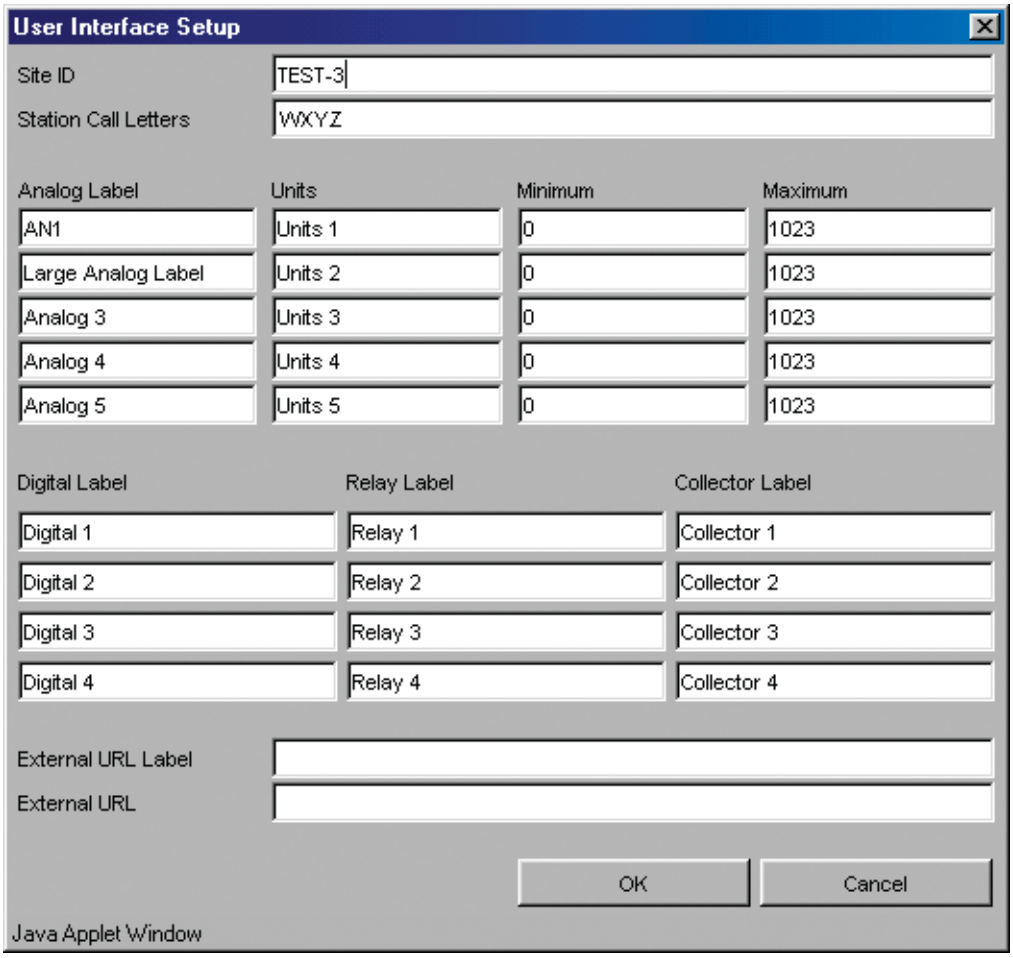


Login Dialog



The Login dialog asks the user for a username and password (Defaults are wrc4, lower case). This information is used to determine the user's privilege level and the commands the user can execute.

Unit Setup Dialog



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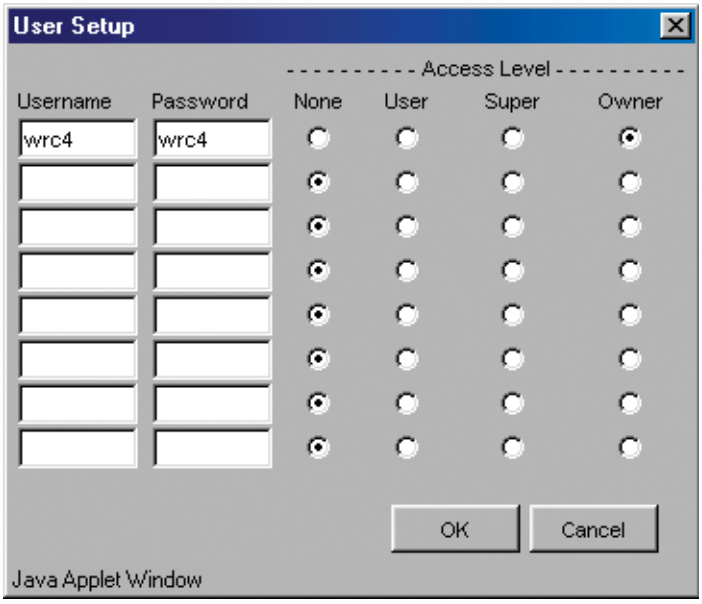
Unit Setup Dialog – cont'd

The Unit Setup dialog allows the user to set up operating characteristics of the WRC-4 firmware and applet.

Site ID	Changes the site ID displayed on the main page.
Station Call Letters	Changes the station call letters displayed on the main page.
Analog Label	Changes the label associated with any of the five analog registers.
Units	Changes the units label associated with any of the five analog registers.
Minimum	Sets the numeric value represented by the "zero" value of the 10-bit analog register. For example, if the register represents a temperature in the range -40 to 190.4, the user would enter -40 in this field. The applet automatically displays scaled values on the gauges and numeric representations on the main screen.
Maximum	Sets the numeric value represented by the "1023" value of the 10-bit analog register. For example, if the register represents a temperature in the range -40 to 190.4, the user would enter 190.4 in this field. The applet automatically displays scaled values on the gauges and numeric representations on the main screen.
Digital Label	Changes the label associated with any of the four digital inputs.
Relay Label	Changes the label displayed on any of the relay buttons.
Collector Label	Changes the label displayed on any of the open collector buttons.
External URL Label	Changes the label displayed on the user-defined button.
External URL	Defines the URL that is activated when the user-defined button is clicked.
OK	Saves the information and exits. NOTE: After changing labels and values, it is necessary to restart the applet to make these items appear and/or refresh the browser.
Cancel	Exit without saving values.

User Setup Dialog



The User Setup dialog is used to assign passwords and privilege levels for up to eight users. Privilege levels allow the following activities:

- None - Monitor analog and digital registers
- User - Monitor analog and digital registers, activate relays and open collectors
- Super - Monitor analog and digital registers, activate relays and open collectors and perform Unit Setup, Alert Setup, and E-mail Setup.
- Owner - Monitor analog and digital registers, activate relays and open collectors and perform Unit Setup, Alert Setup, E-mail Setup, and User Setup.

Username	Specifies a 15-character, case-sensitive username.
Password	Specifies a 15-character, case-sensitive password.
Buttons	Selects a privilege level.
OK	Saves the settings and exits.
Cancel	Exits without saving settings.

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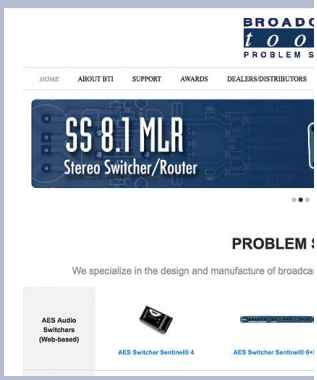

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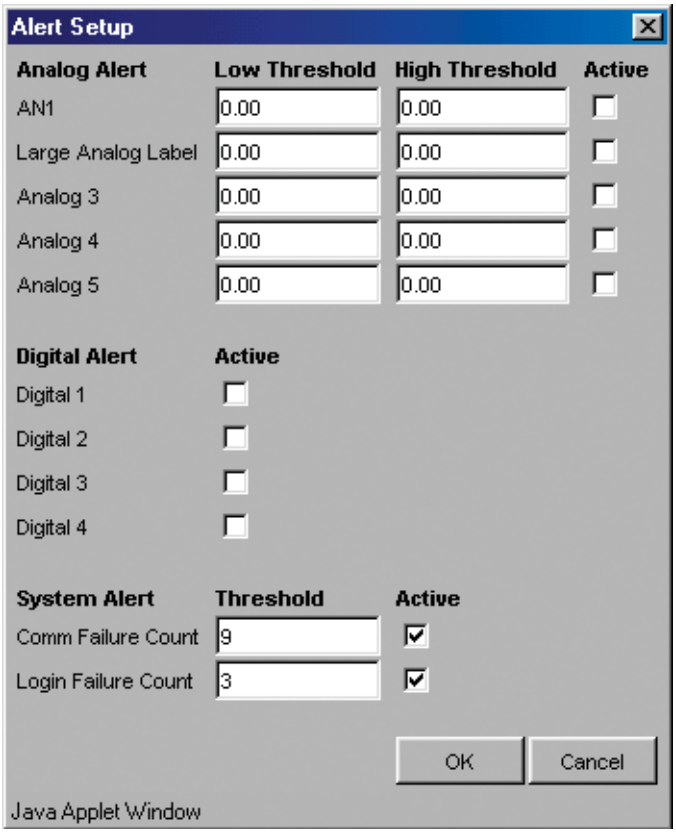
Alert Setup Dialog



The Alert Setup dialog specifies which alerts will be issued and the conditions that cause alerts. Alerts are sent to all registered SNMP trap recipients and all registered e-mail alert recipients.

Low Threshold	Sets the low analog threshold. If an analog value falls below this value, an alert will be issued. NOTE: This value represents the actual analog register value 0-1023, not the scaled value.
High Threshold	Sets the high analog threshold. If an analog value exceeds this value an alert will be issued. NOTE: This value represents the actual analog register value 0-1023, not the scaled value.
Active (Analog)	Activates/Deactivates the alert.
Active (Digital)	Activates/Deactivates the alert. Alerts are issued when the state of a digital input changes.
Com Fail Threshold	Sets the communication failure threshold. The firmware keeps track of communication failures between the on-board Web Server and microcontroller. If the number of sequential errors reaches the threshold, an alert is issued.
Active (Com Fail)	Activates/Deactivates the alert.
Login Fail Threshold	Sets the login failure threshold. This feature is turned OFF. The default is set to 0. The firmware keeps track of failed login attempts. If the number of sequential failures reaches the threshold, logins are suspended and an alert is issued. This condition may represent an attempt to breach the security of the system. Logins are re-enabled by restarting the firmware, either through a power-cycle reboot, or by rebooting via the Telnet setup menu at TCP port 9999.
OK	Save the settings and exit.
Cancel	Exit without saving settings.

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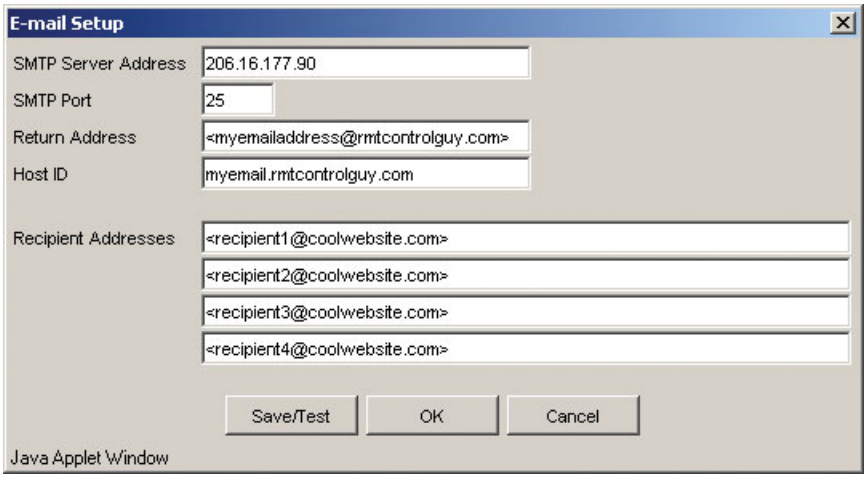
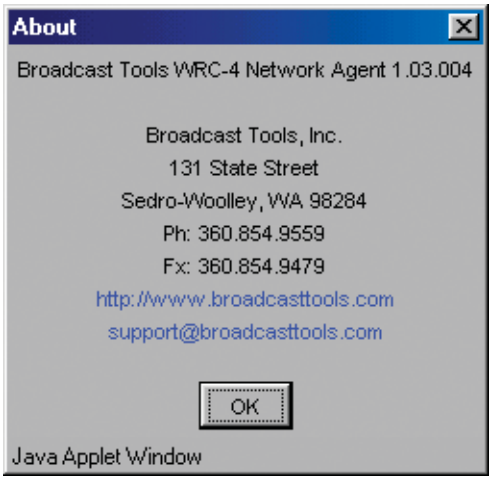
E-Mail Setup Dialog



The E-mail Setup dialog specifies settings necessary to send e-mail alerts from the WRC-4 using the SMTP protocol.

The email setup information needed below is best obtained from the IT department, but if that's not possible, try this. Open an email message and select View, then options on the selected email. The Internet header information is displayed, which shows all the information about the local mail server. Remember that with the current WRC-4, the mail server acts as a client. This means there has to be either a valid account that the email is validated against or email forwarding is left enabled. In most mail servers this feature is disabled to prevent being misused as a Spam server.

SMTP Server Address	IP address of the e-mail server.
SMPT Port	TCP port on the e-mail server (usually 25).
Return Address	Return e-mail address for alerts sent from the WRC-4 (Don't forget to put the (less then, greater then) "<" and ">" characters around the address).
Host ID	For most e-mail servers, this can be any string.
Recipient Addresses	E-mail addresses (four) of alert recipients (Don't forget to put the (less then, greater then) "<" and ">" characters around each address).
Save/Test	Saves the settings and sends test e-mails to each recipient.
OK	Saves the settings and exits.
Cancel	Exits without saving settings.



About Dialog

The "About" dialog displays the firmware version numbers; Broadcast Tools® contact information, Web link, and e-mail link.

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INTERFACING

A few precautions should be observed when interfacing to the WRC-4.

Analog input setup & connection

Each analog input may be configured an input range of 0 to 5 VDC or 0 to 10 VDC. Exceeding these limits may damage the WRC-4.
Determine each input,s voltage range and set DIP SW3 according to the chart below:

Analog Input	Range: 0 to + 5 VDC	Range: 0 to + 10 VDC
Input 1	SW3-1 OFF	SW3-1 ON
Input 2	SW3-2 OFF	SW3-2 ON
Input 3	SW3-3 OFF	SW3-3 ON
Input 4	SW3-4 OFF	SW3-4 ON

Each analog input is unbalanced. Connect the high side of the analog source to the desired input terminal labeled AN1, AN2, AN3 or AN4 and the groundside to the terminal labeled "GND". Tie the shields to the "CHS" terminal.

Status input setup and connection

The status inputs may be configured to accept closures to ground or a voltage from 5 to 24 VDC. Exceeding these values may damage the unit. The WRC-4 is shipped with the status inputs configured for closures to ground (JP5 = LOC). To configure for an external voltage, simply move jumper JP5 to the "EXT" position and supply any voltage from 5 to 24 VDC to the terminal labeled "EXT+V". The status inputs are labeled ST-1, ST-2, ST-3 and ST-4. The front panel LED's are illuminated when a status input is active.

Relay setup and connection

Each normally open dry contact relay is rated to 24 VDC at 1 amp. Exceeding these limits may damage the unit. When selected, each relay momentarily closes for 1-second. This may be changed to a latching operation by turning SW2-1 OFF. The normally open relays may be connected to terminals labeled K1 K1, K2 K2, K3 K3 and K4 K4. The front panel LED's are illuminated when a relay is energized.

Open collector setup and connection

Each open collector output is rated at 12 VDC at 100ma. Exceeding these limits may damage the unit. When selected, each open collector momentarily activates for 1-second. This may be changed to a latching operation by turning SW2-2 OFF. The open collector outputs may be tied to the terminals labeled OC1, OC2, OC3 and OC4. Use the terminal labeled "GND" (located on the status terminal) for the ground return. In some cases, a pull-up resistor may be needed. NOTE: The EMF diodes are tied to the 12 VDC supply. The front panel LED's are illuminated when an open collector is on.

NOTE:

Some configuration changes may require removing the cover of the WRC-4. To do so, use an Allen driver to remove the single top cover screw and lift off the cover. Configuration jumpers and DIP switches are plainly labeled on the PCB.

INTERFACING

Front/rear panel LED's and connectors

Pwr:	This LED indicates valid power.
Rx:	Active microcontroller receive data.
Tx:	Active microcontroller transmit data.
Alm:	Illuminated with an active alarm.
INet:	Refer to the grid at the top of page 6. RJ-45 connector.
Power:	9 volt DC ONLY @ 1 amp power transformer. 2.1mm coax connector.

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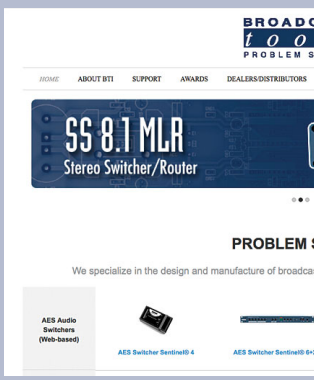

SPECIFICATIONS

Ethernet Interface:	RJ-45, 10Base-T or 100Base-TX, auto sensing with Link & activity indicator - Full/half duplex.
Control Logic:	2 - Microprocessor with non-volatile memory.
Relays:	Four – Normally open dry contacts, 24 VDC @ 1 Amp. May be configured for 1-second momentary or latching operation.
Open Collectors:	Four – Rated at 12 VDC @ 100 ma each. May be configured for 1-second momentary or latching operation.
Analog inputs:	Four – Single ended 0 to 5 and/or 10 Vdc input range. Internal DIPswitches. 10-bit resolution. RFI protection.
Status inputs:	Four - Optically Isolated, RFI protection. Internal jumper for external 5 to 24 Vdc or internal 5 VDC source. Open collector, contact closures to ground or external source.
Protocols:	TCP/IP, UDP/IP, ARP, ICMP, SNMP, TFTP, Telnet, DHCP, BOOTP, HTTP, and AutoIP.
Connectors:	Analog, Status, Relays and Open Collector - Plug-in euroblock screw terminals.
EMI Compliance:	Class B limits of EN 55022:1998
FCC Compliance:	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: 1) This device may not cause harmful interference, and 2) this device must accept any interference received, including that which may cause undesired operation.
Power:	9 VDC only @ 1 amp. 2.1mm coaxial connector. Surge protected. Transformer supplied. CE 220 VAC optional.
Operating Temperature:	-40°F to +185°F (-40°C to +85°C)
Size:	4.20” x 6.00” x 1.55”, Painted steel chassis w/ 4 – 6-32 mounting holes.
Weight:	2.0 lb.
Options:	RA-1, Rack Shelf. 1 RU. CE certified 240VAC power supply.

NOTE:

For safety, **NEVER** *connect 120 Vac circuits to these relays!*

LIMITED WARRANTY

The term "Buyer" as used in this document refers to and includes both (but only) (a) any person or entity who acquires such an item for the purpose of resale to others (i.e., a dealer or distributor of an item), and (b) the first person or entity who acquires such an item for such person's or entity's own use.

Broadcast Tools warrants to each Buyer of any item manufactured by Broadcast Tools that the item will be free from defects in materials and workmanship at the time it is shipped by Broadcast Tools if the item is properly installed, used and maintained.

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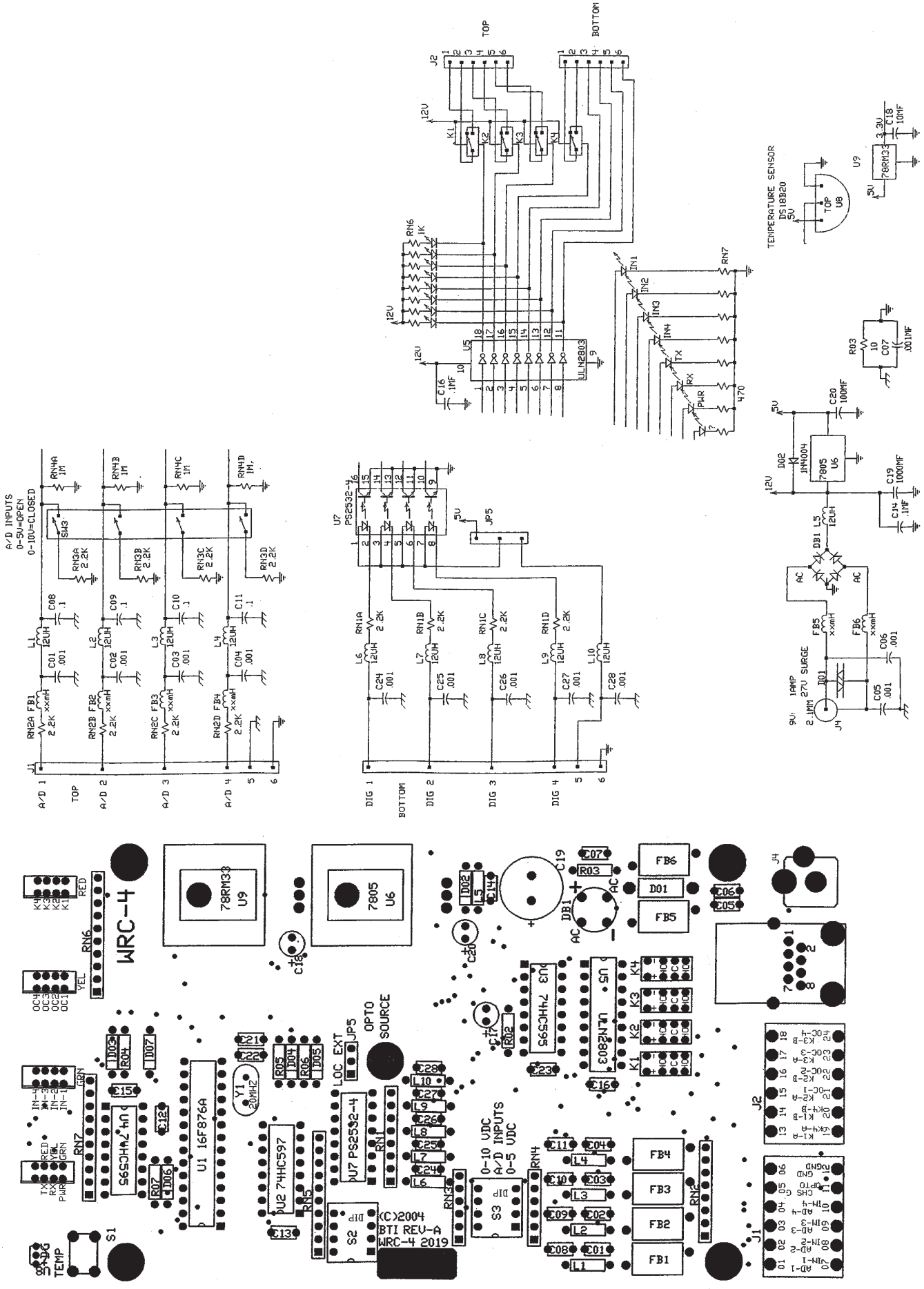
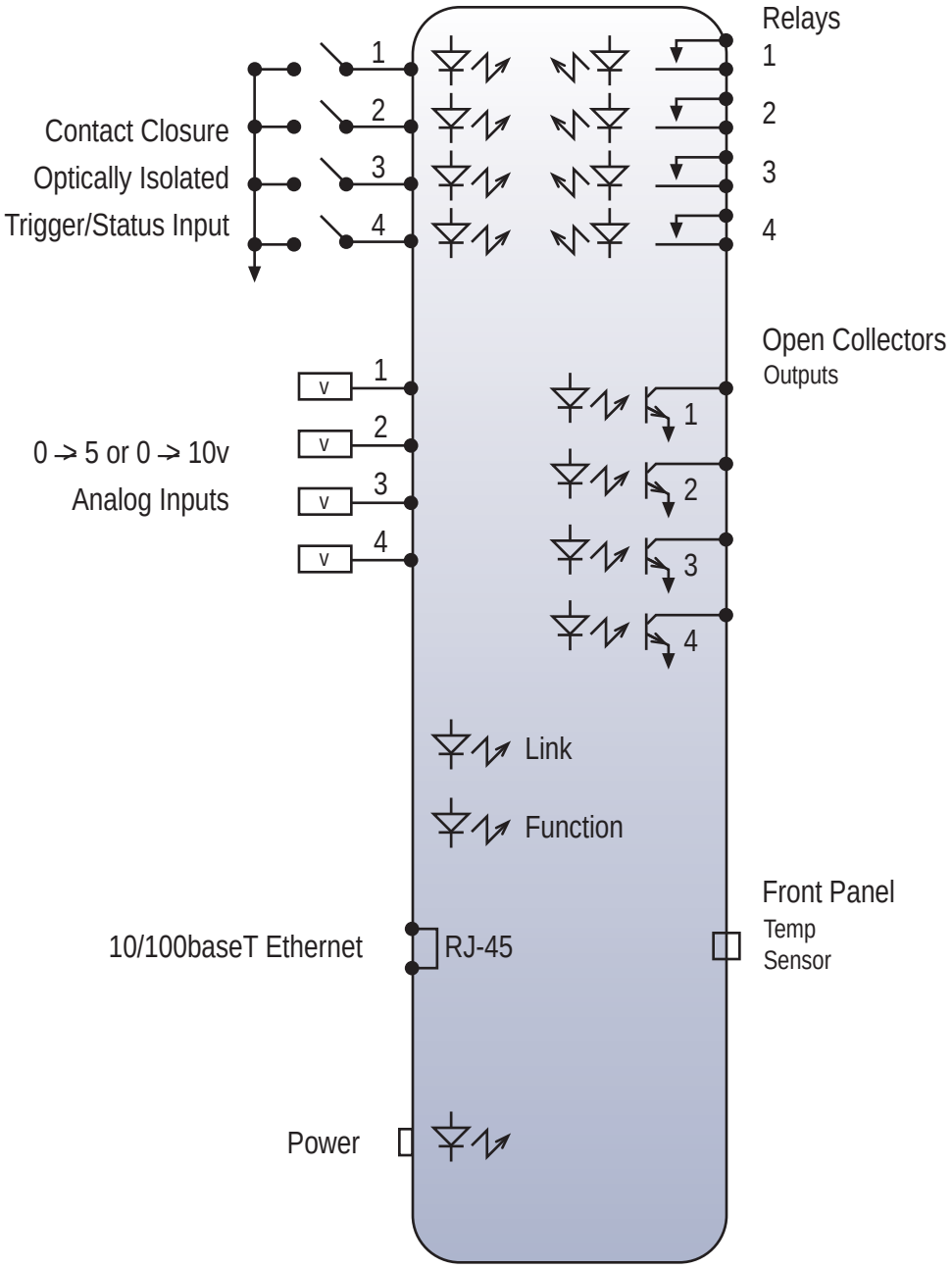


e-mail: support@broadcasttools.com **voice:** 360.854.9559 **fax:** 866.783.1742

APPENDIX B



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