Westronic

WS 1800

***994-T071 Rev* Q - January, 2016**

Technical Manual

Technical Manual

Westronic Systems, Inc.

NOTICE

WESTRONIC makes no warranties about this document. WESTRONIC reserves the right to make hardware and software changes to the product described within this document without prior notice and without obligation to notify any person of such revision or change.

REGULATORY INFORMATION

WARNING: This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the installation manual, may cause interference to radio communications. Operation of the equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

CAUTION: Changes or modifications not expressly approved by Westronic could void the user's authority to operate this equipment.

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Revision History

Rev Level	Issue Date	Reason for Reissue
A	February, 2004	Initial Release
B	July, 2004	Added TL-1, Modem and Passthrough
C	August, 2004	Added TBOS Reporting, RS-485 Option
D	October, 2004	Added 32 Point option and menu changes for Licensing
D1	November, 2004	Minor Updates
E	April, 2005	Added Analogs, TABSR and MPBM, Updated config menu layout to correspond with firmware version 1.04.05
F	June, 2005	Updated Address and Contact Information
G	January, 2006	Additions made for MPBM and Analog module Humidity Tolerances Clarified
H	April, 2006	Additions made for Serial Expansion board
I	December, 2006	New Menu System Detailed, Added Passthrough disclaimer for MDM/SER port
J	February, 2007	Updated MPBM inputs
K	November, 2007	Updated Menus
L	January, 2009	Updated Menus for Ver. 2.x.x firmware
M	June, 2009	Updated Analog Board Jumper Settings
N	June, 2015	Update to address new firmware, Dual power option
O	August, 2015	Add CBN/IBN and DC-I information per GR-1089
P	November, 2015	Add TL-1 Delay alarm, user level, new SNMP information, general updating.
Q	January, 2016	WS1800 Alarm Display list added, TL-1 field information corrected

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1 Introduction

Product Description

The WS1800 Remote Telemetry Unit (RTU) was designed to address the growing need for smaller and more flexible remote monitoring solutions. The WS1800 provides either sixteen (16) or thirty-two (32) discrete alarm input points, and either two (2) or four (4) control outputs, as well as an Ethernet interface capable of communicating to the host using either Simple Network Management Protocol (SNMP), TABS or TL-1. In conjunction with TL-1 reporting, the WS1800 also supports a dial-out modem. The WS1800 can also report TABS or TBOS protocols over a serial connection. The WS1800 is available in either a wallmount or rackmount chassis.

Figure 1 WS1800- Wallmount Version

Front-panel indicators instantly report active alarms and controls as well as the Microprocessor Unit (MPU) and Ethernet activity.

Overview of the WS1800 and SNMP

The WS1800 supports SNMP as defined in Request for Comment (RFC) 1157. SNMP is a manager/agent or server/client protocol. The agent runs on the WS1800 to monitor and report discrete and control status to the host manager. The Manager runs on the Network Management System (NMS).

SNMP is also a request/response protocol. In using SNMP, the Host Manager requests information from the WS1800 with GetRequest messages. The WS1800 agent responds with a GetResponse message. The Manager can also set variables, such as discrete point parameters, WS1800 network configuration with SetRequest messages. Under predefined circumstances, the agent automatically informs the manager of its status. The WS1800 can inform the NMS Host Manager of discrete point state changes, control point

actuation, and other important events using SNMP Traps (an autonomous response). Traps allow the Manager to be informed of events occurring at the agent in real time, and does not require a 'poll' from the host manager.

The WS1800 uses Enterprise Specific traps (vendor specific) to report alarms to the NMS. The WS1800 can be configured to generate a trap for each of the 16 (or 32) discrete points based on the state of the contact and system errors. Through configuration, the WS1800 can report traps to a maximum of five SNMP Host Managers. To generate traps, at least one Host Manager must be enabled in the WS1800.

Traps for discrete points and control points can be enabled or disabled through each point administration object. System traps cannot be disabled because they are critical to system operation. Traps are built and queued for output after being detected. The time required for the Manager to receive a trap is relative to the number of other traps in queue to be sent.

Overview of the WS1800 and TL-1

The WS1800 supports a subset of TL-1 (defined by Bellcore/Telcordia GR-833-CORE Issue 2). If TL-1 is enabled, when an alarm condition occurs, an autonomous TL-1 message is generated to an active incoming telnet session. TL-1 commands can also be used to operate the onboard Control Output/Relays.

Overview of the WS1800 and TBOS

The WS1800 supports TBOS reporting (defined by Bellcore/Telcordia CB-149 Issue 4) over serial connections. TBOS is a poll based "bitwise" protocol that responds to requests from the NMS for telemetry information. TBOS control requests can be issued by the NMS to operate the onboard Control Output/Relays.

Overview of the WS1800 and TABS

The WS1800 supports TABS reporting (defined by Bellcore/Telcordia CB-149 Issue 4) over Ethernet and serial connections. TABS is a poll based "bitwise" protocol that responds to requests from the NMS for telemetry information. TABS control requests can be issued by the NMS to operate the onboard Control Output/Relays.

Configuration of alarm parameters and format of messages is described in detail in following sections of the manual.

Overview of the WS1800 and Mid-Point Battery Monitoring (MPBM) Module

The WS1800 supports use of the MPBM module for monitoring battery availability. By taking mid-point measurements, as opposed to measuring the full battery array voltage,

the MPBM allows for early warning of battery failure. The WS1800 reports MPBM alarms as threshold crossing values based on the differential between the two mid-point measurements.

The MPBM Module can also be configured to allow 8 independent analog voltage inputs. The analog inputs can accept input voltages ranging from zero to sixty volts. Two of the inputs can also be configured for -100 to 100 mV operation.

Configuration of the MPBM/Analog values and threshold crossing alarms are described in detail in the following sections of the manual.

Other Products From Westronic

The remainder of this section provides information about other Westronic products that are available to meet alarm system needs. Contact a Westronic representative to learn more about these and other Westronic Systems, Inc. products.

C1000

The C1000 complements many operation support systems by providing an economical and flexible means of collecting small-to-large quantities (32 – 256 points) of discrete alarm and status data and converting them to simple, easy-to-handle TABS or TBOS interface.

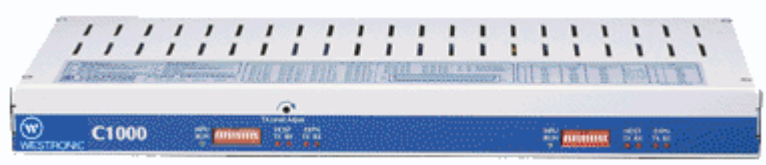

Figure 2 C1000

Different versions of the C1000 allow communications with either a TABS or TBOS host. The C1000 can pass-through polls for other addresses, permitting multiple chaining of C1000 units in larger configurations and permitting the C1000 and local Network Element (NE) telemetry data to combine into a single channel. In some cases, data can combine through a single modem.

The C1000 requires only one VU (1.75 inch) in either a 19-inch or 23-inch equipment rack, allowing location as close as possible to the source of discrete interfaces. The result is a large reduction in the amount of wiring required to pick up alarm and status data. Serial and discrete field connections are through standard 9-pin subminiature and 50-pin connectors, making installation and replacement exceptionally fast and simple.

The C1000 is equipped with two serial ports:

- The first, a host port, serves as a TABS or TBOS host communications interface that can be equipped with an optional 1,200-bps Bell 202T-compatible internal modem, allowing the C1000 to be located beyond the range of standard RS-422/RS-485 interfaces.
- The second, an expansion port, serves as a TABS or TBOS data collection interface.

The housing can accommodate a maximum of eight 50-pin discrete interface connectors. All the different configurations use this same housing.

WS1000

The WS1000 product line complements many operations and network management systems by providing an economical, flexible means of converting varying quantities of discrete (dry-contact) alarm, status, and control data into simple, easy-to-handle TABS or TBOS interface.

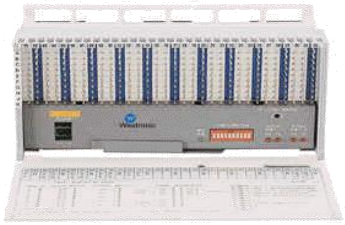

Figure 3 WS1000

Available configurations provide the flexibility to select the unit best suited for various applications. Choose 64/128 discrete inputs with 8/16 discrete outputs.

Small size and flexible mounting requirements allow placement of the unit close to the source of discrete interfaces. The WS1000 can mount in an equipment bay or on a distribution frame as the application demands. This flexibility results in considerable reduction in the amount of required wiring. The basic structure of a front-facing wire-wrap block, commonly found on distribution frames, provides a sturdy housing for the WS1000. All the active components are located on a quick release module contained within the housing for fast and easy servicing.

WS2000

The WS2000 product line offers the data collection and reporting capabilities necessary to make small RTUs more flexible and efficient. WS2000s combine compact design with the power to configure multiple serial and discrete interfaces in virtually any arrangement to

best serve the needs of the network. WS2000 units fit within 19-inch or 23-inch racks and occupy a single vertical space (1.75 inches). Other mountings are available.

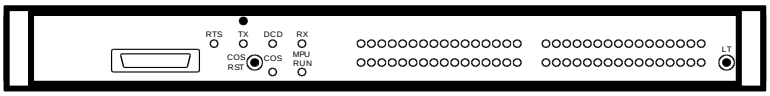

Figure 4 WS2000

A WS2000 remote can be equipped with the following:

- 4 or 8 serial ports supporting user-selectable RS-232, RS-422, and RS-485 interfaces at 1,200 or 2,400 bps
- 32 – 512 discrete alarm/status inputs and 8 – 128 discrete control outputs, expandable to 2,048 inputs and 512 outputs in some configurations
- Host port interface for RS-232, RS-422, and RS-485 at 1,200 or 2,400 bps. An optional internal 202T modem is available.

To support a broad range of equipment, the WS2000 can incorporate the following interface types:

- Asynchronous serial
- Discrete inputs and outputs

Some of the many types of available serial protocols include the following:

- E-Telemetry (E2A format)
- ASCII
- TABS
- TBOS

WS3500 Metago™

The WS3500 Metago™ augments the Westronic product line by adding a NEBS Level 3 certified product to collect a variety of serial and discrete telemetry information while interfacing with industry-standard management systems.

Figure 5 WS3500 Metago ™

The WS3500 is modular in design, allowing customers to configure a unit to their specific collection requirements. Available configurations include from 0 to 512 discrete inputs, and a maximum of 24 serial ports that can be configured as RS-422/485 or RS-232. Reporting to host management systems is accomplished using TCP/IP, RS-232 or dial-up modems. Front-panel visual indicators instantly report active controls, as well as MPU and network activity. Also, with an integrated web-server, alarm and control status can be viewed through any web browser. Compact in size, the WS3500 takes only two VU rack units and includes hardware for 19-inch and 23-inch mounting. Remote configuration and upgrade capabilities ensures that the WS3500 features evolve with market demands. Nonvolatile memory, which can be updated "on the fly," stores the configuration. Simplicity in configuration and ease of use means low cost to install and maintain.

Dual/Quad Modem

The Westronic Dual and Quad Modems are an effective way to connect telemetry equipment to analog facilities. Created specifically for central office telecommunications applications, the unit's simple, low-maintenance design ensures trouble-free operation.

Figure 6 Dual/Quad Modem

User-selectable digital interfaces configurable for RS-232, RS-422 or RS-485 separate the Westronic Dual/Quad Modem from its competitors in the telecommunications industry. The RS-485 option permits a single remote telemetry unit or collection port to connect to a maximum 32 modems. Such a configuration allows each remote site to operate in a point-to-point arrangement, thus eliminating troublesome analog bridges.

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2 Hardware Description

The WS1800 is available in a wall mount configuration with wire wrap or 50-pin Amphenol field connections and a rack mount configuration with a 50-pin Amphenol connector for field connections. It is designed to be compliant with international industry standards for network equipment, including Bellcore NEBS and the European Community (CE) standards. Designed for Electrostatic Discharge (ESD) resistance and use in telecommunication environments, the WS1800 is a rugged and dependable unit compatible with both Central Office (CO) and remote installations.

Figure 7 and Figure 8 display the WS1800 front panel showing the front panel indicators and wire-wrap connectors (for the wall mount).

Figure 7 WS1800 Wall Mount Front

Figure 8 WS1800 Rack Mount Front

Figure 9 WS1800 Wall Mount Connectors, 16 input wire wrap version shown

Front-Panel Indicators

PWR

Solid Green when power is correctly applied, **PWR** lights red when power connection polarity is reversed. The unit has reverse polarity protection.

RUN

The green **MPU** health monitor LED blinks On/Off to indicate normal Microprocessor Unit operation.

DISCRETE INPUTS

The LEDs illuminate to indicate which discrete input points are in alarm condition.

CONTROL OUTPUTS

The LEDs illuminate to indicate which control output relays are activated.

Front Panel Connections

Wire Wrap posts (optional, 16 point Wallmount only)

The wire wrap posts are used to connect to field equipment to discrete inputs and control outputs.

Rear Panel Connections

MDM/SER

Use this connector with optional dial-out modem or for additional serial communications. It can also be used as a ‘Passthrough’ port for speeds of up to 9600 baud.

SERIAL

Use this connector to perform basic Craft functions and define the database. Firmware upgrades can also be performed through this port.

Inputs/Controls (most models)

This connector is the standard interface for connecting discrete inputs and control points to the WS1800 using a 50 pin Amp Female termination.

Ethernet

This connector is used to connect to the Ethernet/IP network, used to report alarms to the host Management System. The connector has a built in Activity LED.

Power +/-

Use this quick-connect plug for input power connection. Dual power feed units have a 4 pin connector in the center bay of the rackmount chassis. The dual power option will be covered later in this document.

Grounding Stud

Use this 8-32 stud to connect the unit to ground per appropriate local practice. All versions of WS1800 can be installed in Common Bonded (CBN) or Isolated Bonding Networks (IBN) as may be appropriate for the local site requirements.

Interfaces

This section describes the following interfaces:

- Alarm/Status Inputs
- Control Outputs
- MDM/Ser Port
- Serial Port
- LAN Port

Notice: All serial and LAN ports are designed for intra-building usage only and should only be connected to non-exposed wiring. The modem line is designed to inter-building cabling.

Discrete Alarm/Status Inputs

Discrete inputs consist of discrete alarm/status inputs, which have an internal wetting voltage referenced to the negative battery input. They are single line inputs whereby an *off* condition exists when the input is open and an *on* condition exists when the input is switched to ground via the field wired devices. The input can be configured to indicate an alarm either in the *on* or *off* condition.

Discrete Control Outputs

Each output can be configured as a normally closed or normally open Single-Pole Double-Throw Form C contact. The wiper of each control output is connected to a control common reference.

The individual controls can operate in momentary or latched modes.

MDM/ SER Port

The MDM/ SER Port is used for the dial-out modem or for additional serial communication reporting protocols (i.e. TABS, TBOS). It can also be configured as a 'Passthrough' port up to a maximum of 9600 baud. The MDM/SER Port is factory configurable as an RS485, RS-232 or modem interface using an RJ11 connector.

NOTE: Due to hardware limitations the MDM/SER port may experience buffer overflow during burst transmissions in 'Passthrough' Mode.

If equipped with a modem, the optional expansion ports may be configured to perform a 'modem passthrough' mode.

Serial Port

The Serial Port is used to configure the WS1800, and can also be used as a **Craft** interface to monitor alarms.

The Serial Port is an RS-232 interface that uses an RJ45 connector (default communications parameters: 57600 baud, 8 data bits, No Parity, 1 Stop bit, no flow control). Refer to Table 3-3 for the pin out configuration.

Ethernet/LAN Port

The Ethernet Port interfaces to the Ethernet network through an RJ-45 connector wired for 10baseT operation. The connector physically includes an **ACTIVITY** LED built into the top left corner of the connector frame.

SNMP traps are issued through this interface, and it also supports the incoming Telnet connection for remote configuration and TL-1.

NOTE: The WS1800 will support a maximum of three concurrent Telnet sessions.

Specifications

This section provides electrical, environmental, and mechanical specifications for the WS1800 and various interface specifications.

Electrical

The following shows typical power and electrical requirements.

- Input power voltage: –48 Vdc -Nominal (–40 Vdc to –60 Vdc) or –24 Vdc (special order), Dual power input (optional)
- Maximum external fusing: 0.5 Amps (–48 Vdc) Type 70 or GMT, 0.75 Amps (for optional –24 Vdc units)
- Power dissipation: 1.5 - 2.0 Watts (no input sense currents, no relays on); 4.8 Watts maximum (all relays controls and discrete inputs active)
- NOTE: For all versions of the WS1800, the DC power battery return (BR) terminal(s) or positve terminal(s) must be grounded at the source end (power feed or DC mains power end). The DC power BR input terminal(s) is not connected to the chassis within the unit, so the WS1800 is configured as DC-I according to the GR1089 Issue 6 definitions (R9-15 [151]).

Environmental

- Ambient operating ambient temperature range: -40 °C to +70 °C
- Humidity: < 95% non-condensing @ 40 °C
  < 85% non-condensing @ 50 °C

Mechanical

Wallmount Dimensions

- Height: 6.8 inches (17.3 cm)
- Width: 8.9 inches (22.25 cm)/10.2 inches (25.5 cm) including mounting ears
- Depth: 1.4 inches (3.56 cm)

Rackmount Dimensions

- Height: 1.75 inches (4.4 cm)
- Width: 17.18 inches (43.6 cm)
- Depth: 8.0 inches (20.3 cm)

Mounting

- 19-inch (48.3 cm) Rackmount
- 23-inch (58.4 cm) Rackmount (with included adapters)
- Wallmount – Four screw holes, 9-5/8" x 4" c-c spacing

Wallmount Weight

- 2.6 lbs (1.2 kg)

Rackmount Weight

- 5.1 lbs (2.31 kg)

Connectors

- Power: two-position, compression mating plug that accepts #16-AWG through #24-AWG wire (plug included with unit – PN 640-T005) (Dual power units include a 4 pole plug, pn# 850-055 for use with #16 through #24 wire),
- Chassis ground: 1x 8-32 stud w/supplied nuts and locking washer.
- Serial: standard RJ45.
- Mdm/Ser: RJ11.
- LAN: RJ-45 connection wired according to standard 10baseT half-duplex specifications. **NOTE**: This unit is not POE Compatible.
- Discrete and Controls:
  - **Wallmount, 16-input** – wire wrap posts or 50 pin-F Amphenol connector
  - **Wallmount, 32-input** – 50 pin-F Amphenol connector
  - **Rackmount**, **all** – 50 pin-F Amphenol connector

Interfaces

The WS1800 contains discrete input and control output capabilities. The remainder of this section describes the interfaces used in the WS1800.

Discrete Interface

Internally, the WS1800 discrete alarm/status inputs reference the negative battery input (–48 VDC). When the contacts are closed, a current is passed through the optocouplers. Alarms can be configured to be generated either when the contacts are closed (Normally Open), or when the contacts are opened (Normally Closed).

Discrete control outputs use Form C contacts and operate in momentary or latching mode. The database configuration defines the mode of operation.

Each discrete output is a Single-Pole, Double Throw (SPDT) isolated contact with both the Normally Open (NO) and Normally Closed (NC) contact connections individually available to the user.

The following describes the discrete status/alarm inputs and control outputs:

Discrete Status/Alarm Inputs

- Number of inputs: 16 (with 32 input option)
- ESD Protection: maximum transient voltages of 15 kV
- Ground: common ground for all inputs

Current

- ~1.0mA for each active input at +Batt (–48 Vdc operation)
- ~0.5 mA for each active input at +Batt (Opt. –24 Vdc operation)

Discrete Control Outputs

- Number of relay control outputs: 2x (16 input units) or 4x (32 input units)
- Contact type: SPDT normally open, normally closed (Form C). All relays share a common reference to contact wiper.
- Operation: latched or momentary. Momentary duration is programmable from 400 through 999 ms
- Contact Ratings:
  - 0.5 Amps at 60 Vdc Maximum
  - 30 Watts (maximum) switching power

Serial Interfaces

The Serial (MDM/SER – RJ11) port can be factory configured either as a standard RS-232 interface or a standard RS-485 interface, both of which have configurable communications parameters. The Serial (MDM/SER) port can also be factory configured for use with the onboard dial-out modem.

The **Craft** (SERIAL – RJ45) port of the WS1800 is a standard RS-232 interface and has no configurable parameters. The WS1800 uses a main menu and a configuration menu accessed through the Craft port. The main menu displays current system aspects while the configuration menu alters the WS1800 database stored in flash memory.

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3 Hardware Installation

This section contains detailed installation instructions, tables, diagrams, special material handling considerations, and precautions.

Handling Considerations and Precautions

The WS1800 unit contains Complementary Metal-Oxide Semiconductor (CMOS) integrated circuits to maximize noise immunity and promote low power consumption. These components are Electro-Static Discharge (ESD) sensitive and can be damaged if subjected to high static voltage levels. Therefore ensure familiarity with the ESD procedures that follow. Packaging containing CMOS and NMOS components has a label as shown in Figure 10.

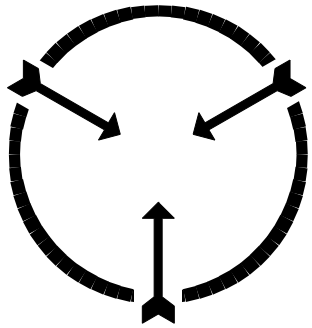

Figure 10 Electrostatic Discharge (ESD) Label

CMOS devices are equipped with protection diodes, but incorrect handling that allows excessive static energy to enter the devices can still cause device failure. These failures are not readily detected and, in time, can lead to premature device failure.

Adhering to the following guidelines significantly reduces the possibility of electrostatic damage on CMOS components, thus improving system reliability and keeping downtime to a minimum:

- Before opening the unit, always verify the workstation is an ESD compliant work area that is free of static charges. Always wear a personal grounding device, such as an ESD heel or wrist strap that is connected to the worksurface.
- Perform repair work on modules in an antistatic workstation. All personnel performing repair work must be grounded through wrist straps and antistatic matting in the workstation.

- Exercise extreme care when handling CMOS components. Do not touch the pins and always place components in antistatic foam for storage and transportation.

Component Substitution

The WS1800 does not contain any user-serviceable components. Equipment requiring repair must be returned to Westronic. When returning a faulty module, describe the suspected problem, fault, or symptom on the documentation that accompanies the module.

Installation Procedures

The following describes how to install the WS1800 into a permanent location. Refer to the checklist at the end of this section for a step-by-step WS1800 installation guide. After working through the installation steps, the WS1800 unit is ready for software configuration. Refer to the Section titled “Getting the WS1800 Up and Running” for these procedures.

Inspecting the WS1800

Remove the WS1800 from the packing carton and inspect the entire unit for possible damage that may have occurred in shipment and post-shipment handling. If visible damage is present, it may be necessary to return the unit to the factory.

Installing the WS1800

The WS1800 is designed for a wall mount or rack mount installation. The wall mount WS1800 has four mounting ears, two on each side, that can be used to secure the unit to a building or cabinet wall. If necessary, the mounting ears can also be used to secure the unit to a shelf, although in that configuration the status LEDs may not be visible.

The rack mount WS1800 mounts into a standard 19” telecom mounting rack (adapters are required for 23” racks, and are shipped with the unit). The chassis has two locations for the mounting brackets, either at the front or in the middle of the WS1800.

Wiring the Unit

Discrete inputs are either connected through the wire wrap posts on the ‘face’ of the unit or via the Amphenol 50 pin-F connector on the side of the unit. Power, Serial, and Ethernet/LAN connections are all located on the side of the unit.

Discrete and Control connections

Figure 11 shows the optional wire wrap post pin out for the discrete input/relay output connections. Table 3-1 lists the wire wrap pins, and their associated functions.

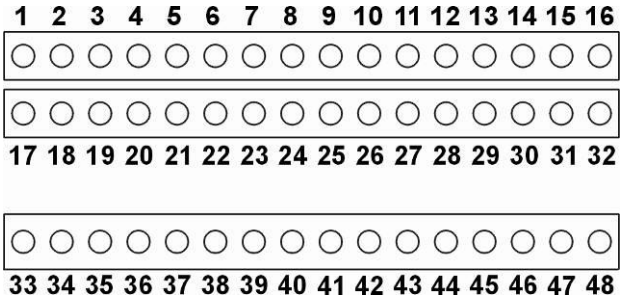

Figure 11 Wire Wrap (optional, 16 pt wallmount only)

Figure 12 shows the 50 pin (F) connector layout for the discrete input/relay output connections. Table 3-2 lists the pins and their associated functions.

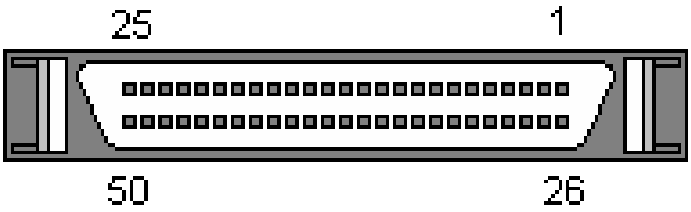

Figure 12 - 50 pin connector (standard, most units)

Table 3-1 Optional Wire Wrap Pinouts (16 point Wallmount units only)

Function	Pin		Function
Control Relay Common	1	25	Status/Alarm Input 9
Control Output 1, Normally Closed	2	26	Status/Alarm Input 10
Control Output 1, Normally Open	3	27	Status/Alarm Input 11
N/A	4	28	Status/Alarm Input 12
Control Output 2, Normally Closed	5	29	Status/Alarm Input 13
Control Output 2, Normally Open	6	30	Status/Alarm Input 14
N/A	7	31	Status/Alarm Input 15
N/A	8	32	Status/Alarm Input 16
N/A	9	33	Ground
N/A	10	34	Ground
N/A	11	35	Ground
N/A	12	36	Ground
N/A	13	37	Ground
N/A	14	38	Ground
N/A	15	39	Ground
N/A	16	40	Ground
Status/Alarm Input 1	17	41	Ground
Status/Alarm Input 2	18	42	Ground
Status/Alarm Input 3	19	43	Ground
Status/Alarm Input 4	20	44	Ground
Status/Alarm Input 5	21	45	Ground
Status/Alarm Input 6	22	46	Ground
Status/Alarm Input 7	23	47	Ground
Status/Alarm Input 8	24	48	Ground

Table 3-2 shows the pinout for the standard 50-pin AMP (F) connector. Controls 3 & 4 plus inputs 17-32 will be N/C for 16 point units.

Table 3-2 50-pin AMP connector pin-out (standard, all units)

Pin	Signal	Pin	Signal
1	Control Output 1 (Normally Closed)	**26**	Control Output 1 (Normally Open)
2	Control Output 2 (Normally Closed)	**27**	Control Output 2 (Normally Open)
3	Control Output 3 (Normally Closed)	**28**	Control Output 3 (Normally Open)
4	Control Output 4 (Normally Closed)	**29**	Control Output 4 (Normally Open)
5	N/C	**30**	N/C
6	N/C	**31**	N/C
7	N/C	**32**	N/C
8	N/C	**33**	N/C
9	Status Input Ground	**34**	Control Output Relay Common
10	Status/Alarm Input 1	**35**	Status/Alarm Input 2
11	Status/Alarm Input 3	**36**	Status/Alarm Input 4
12	Status/Alarm Input 5	**37**	Status/Alarm Input 6
13	Status/Alarm Input 7	**38**	Status/Alarm Input 8
14	Status/Alarm Input 9	**39**	Status/Alarm Input 10
15	Status/Alarm Input 11	**40**	Status/Alarm Input 12
16	Status/Alarm Input 13	**41**	Status/Alarm Input 14
17	Status/Alarm Input 15	**42**	Status/Alarm Input 16
18	Status/Alarm Input 17	**43**	Status/Alarm Input 18
19	Status/Alarm Input 19	**44**	Status/Alarm Input 20
20	Status/Alarm Input 21	**45**	Status/Alarm Input 22
21	Status/Alarm Input 23	**46**	Status/Alarm Input 24
22	Status/Alarm Input 25	**47**	Status/Alarm Input 26
23	Status/Alarm Input 27	**48**	Status/Alarm Input 28
24	Status/Alarm Input 29	**49**	Status/Alarm Input 30
25	Status/Alarm Input 31	**50**	Status/Alarm Input 32

Serial Port Connections

The WS1800 Craft Port uses a standard RJ45 Connector, shown in Figure 13. A typical DB9 serial port on a PC is shown in Figure 14. Table 3-3 shows the pin outs for a cable connecting the WS1800 to a PC Serial Port.

The WS1800 is shipped with a RJ45 to DB9 adaptor pn# 585-T093. By using this adapter, a straight-through cable with RJ45 connectors on each end may also be used when connecting to a PC.

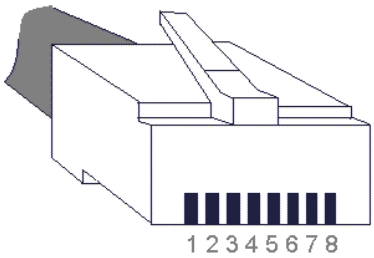

Figure 13 WS1800 RJ45 Serial Connector

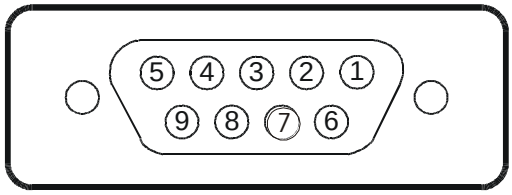

Figure 14 DB9F Connector

Table 3-3 WS1800 Serial Port RJ45 to RS-232 Pin Out

Signal	Function	
	RJ45 WS1800 Pin (DCE)	**DB9F Pin PC** (DTE)
TX	3	2
RX	6	3
GND	4,5	5
CTS	8	7
RTS	1	8

The WS1800 SER/MDM Port uses a standard RJ11 Connector, shown in Figure 15. A typical DB9 serial port on a PC is shown in Figure 14. Table 3-4 shows the pin outs for a cable connecting the WS1800 to a RS-232 serial port. Table 3-5 shows the pin outs for a cable connecting the WS1800 to a RS-485 serial port on a WS3500 collecting Serial TABS-R or TBOS data. Table 3-6 shows the pin outs for a cable connecting the WS1800 modem to a phone line.

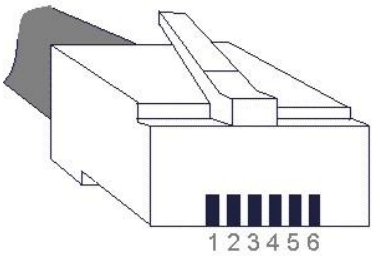

Figure 15 WS1800 RJ11 Serial Connector

Table 3-4 WS1800 RJ11 to RS-232 Pin Out

Signal	Function		
	RJ11 WS1800 Pin (DCE)	**DB9F Pin PC** (DCE)	**DB9M Pin PC** (DTE)
RTS	1	8	7
TX	2	2	3
GND	3,4	5	5
RX	5	3	2
CTS	6	7	8

Table 3-5 WS1800 RJ11 to RS-485 Pin Out

Signal	Function	
	RJ11 WS1800 Pin (DCE)	**DB9F WS3500 Pin** (DTE)
TX+	5	8
TX-	2	7
GND	1	5
RX+	3	2
RX-	4	3
VCC	6	N/C

Table 3-6 WS1800 Modem Line Pin Out

Signal	Function	
	RJ11 WS1800 Pin	**RJ11 Pin (Line)**
RING	3	4
TIP	4	3

Serial Port Expansion Module

The WS1800 has an optional serial port expansion module that will add four additional serial ports. These serial ports can be used for limited serial reachthrough capability and are noted as channels C through F in the serial port configuration menu outlined in Chapter 5. The serial expansion ports use a RJ45 connector as shown in Figure 13 and use the same pinouts described in Table 3-3 when set to RS-232 mode. When the expansion ports are configured for RS-485 the pinouts are as shown in Table 3-7 below.

Table 3-7 WS1800 Serial Port RJ45 to RS-485 Pin Out

Signal	Function	
	RJ45 WS1800 Pin (DCE)	**DB9F Pin PC** (DTE)
TX+	3	7
TX-	4	3
GND	7	5
RX+	5	2
RX-	6	8
Do Not Connect	1,2,8	1,4,9

The WS1800 serial expansion card can be configured for either RS-232 or RS-485 by changing the jumper configurations according to Table 3-8 as shown in Figure 16 below.

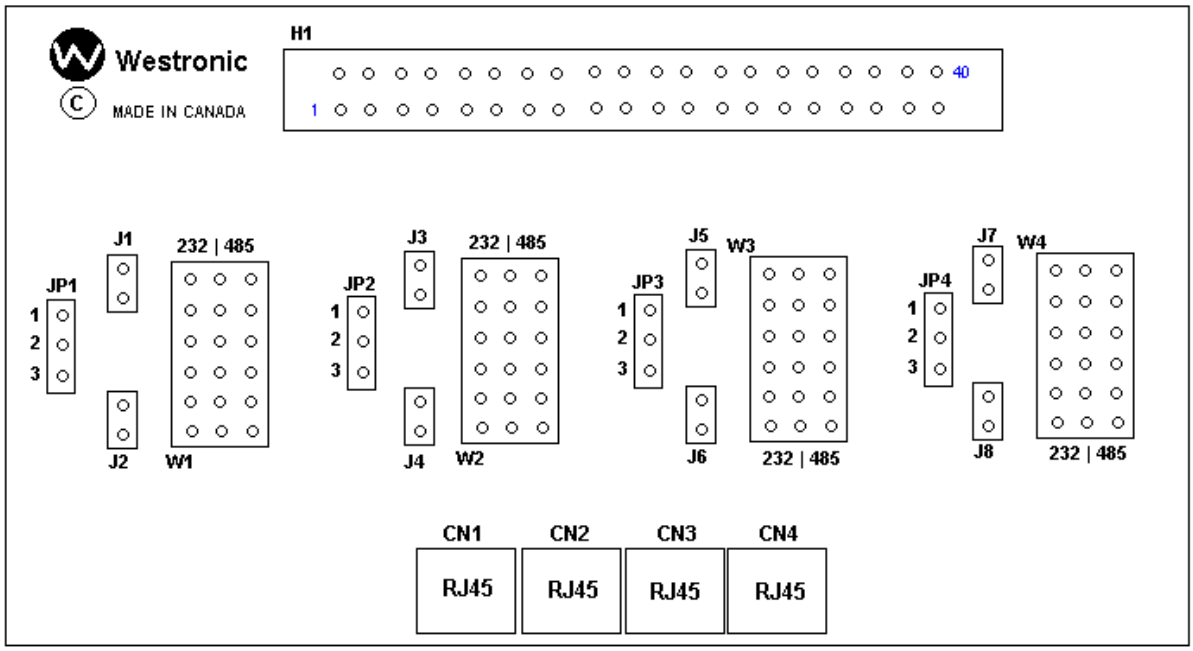

Figure 16 - WS1800 Serial Expansion Board

Table 3-8 - Serial Expansion Board Configuration

Channel	Function		
	RS-232	**RS-485** (Single)	**RS-485** (Multidrop)
CH1 "C" (CN1)	JP1: Across Pins 2 & 3 J1, J2: Open W1 Block: Towards '232'	JP1: Across Pins 2 & 3 J1, J2: Closed W1 Block: Towards '485	JP1: Across Pins 1 &2 J1, J2: Closed W1 Block: Towards '485'
CH2 "D" (CN2)	JP2: Across Pins 2 & 3 J3, J4: Open W2 Block: Towards '232'	JP2: Across Pins 2 & 3 J3, J4: Closed W2 Block: Towards '485	JP2: Across Pins 1 &2 J3, J4: Closed W2 Block: Towards '485'
CH3 "E" (CN3)	JP3: Across Pins 2 & 3 J5, J6: Open W3 Block: Towards '232'	JP3: Across Pins 2 & 3 J5, J6: Closed W3 Block: Towards '485	JP3: Across Pins 1 &2 J5, J6: Closed W3 Block: Towards '485'
CH4 "F" (CN4)	JP4: Across Pins 2 & 3 J7, J8: Open W4 Block: Towards '232'	JP4: Across Pins 2 & 3 J7, J8: Closed W4 Block: Towards '485	JP4: Across Pins 1 &2 J7, J8: Closed W4 Block: Towards '485'

Power Connector

Use #16 – #24 AWG wire to make power connections.
[**–** (*–24/ –48 Vdc*), **+** (*Ground or Return*)] at P5 as shown in Figure 17.
Note: For Dual power connections please see the end of this section.

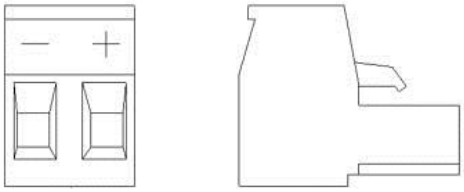

Figure 17 Input Power Connector

Ground Connection

All models of WS1800 can be installed in Common Bonded (CBN) or Isolated Bonding Networks (IBN) as may be appropriate for the local site requirements.

Use the appropriate compression connector and shelf ground cable of #6 AWG for grounding the WS1800. Remove the outer nut and locking washer from the WS1800 grounding stud (size 8-32). Place the equipment end of the connector between the nuts with locking washer towards the outer nut. Torque the outer nut 16-19 in/lb.

LAN Connection

The Ethernet LAN connection uses a RJ-45 connector (Figure 18) wired for standard 10baseT half-duplex interface.

Note: The WS1800 is not compatible with Power Over Ethernet (POE). Connecting the WS1800 to some variants of POE may cause permanent damage to the unit.

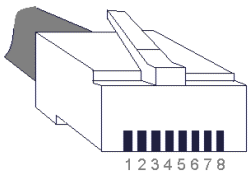

Figure 18 RJ45 10baseT Connector P4

Table 3-9 Ethernet RJ45 Pin Out

RJ-45	Circuit	Description
1	TxD +	Transmit Data +
2	TxD –	Transmit Data –
3	RxD +	Received Data +
4	–	–
5	–	–
6	RxD –	Received Data –
7	–	–
8	–	–

MPBM/Analog Configuration

The MPBM board can be configured to accept analog inputs (the software license key must also be configured correctly). Table 3-10 describes the jumper configuration for mid-point battery or analog functionality of the MPBM module.

Table 3-10 MPBM/Analog Jumper Configuration

Jumpers	MPBM		Analog Input Mode				
	CH1, CH3, CH5, CH7	CH2, CH4, CH6, CH8	CH1-CH6	CH7		CH8	
	0-60 VDC	0-30 VDC	0-60 VDC	0-60 VDC	+/- 100mV	0-60 VDC	+/- 100mV
J1 – J4	Jumper		No jumper	No jumper		No jumper	
JP3 – JP8	1 - 2		2 - 3	N/A		N/A	
JP1, JP2, JP9	1 - 2		N/A	1 - 2	2 - 3	N/A	
J9	No jumper		N/A	No Jumper	Jumper	N/A	
JP11	1 - 2		N/A	N/A		1 - 2	2 - 3
H4, H5	MPBM		N/A	N/A		0-60V	100mV
J10	No jumper		N/A	N/A		No Jumper	Jumper
JP10	1-2 (BRD1) for MPBM or Analog						

MPBM Connection

If the WS1800 contains a MPBM module the connections are as displayed in Table 3-11 below.

Table 3-11 MPBM Connector (H1) Pin Out

Top Connector	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
	Battery #1 -48V	Battery #1 Mid-point	Battery #2 -48V	Battery #2 Mid-point	Battery #3 -48V	Battery #3 Mid-point	Battery #4 -48V	Battery #4 Mid-point
Bottom Connector	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
	Battery #1 Ground	Battery #1 Ground	Battery #2 Ground	Battery #2 Ground	Battery #3 Ground	Battery #3 Ground	Battery #4 Ground	Battery #4 Ground

When connecting a MPBM module Figure 19 depicts the wiring connections required for a single battery string. NOTE: It is recommended that all connections to the MPBM make use of an inline 0.25 Amp fast-blow fuse.

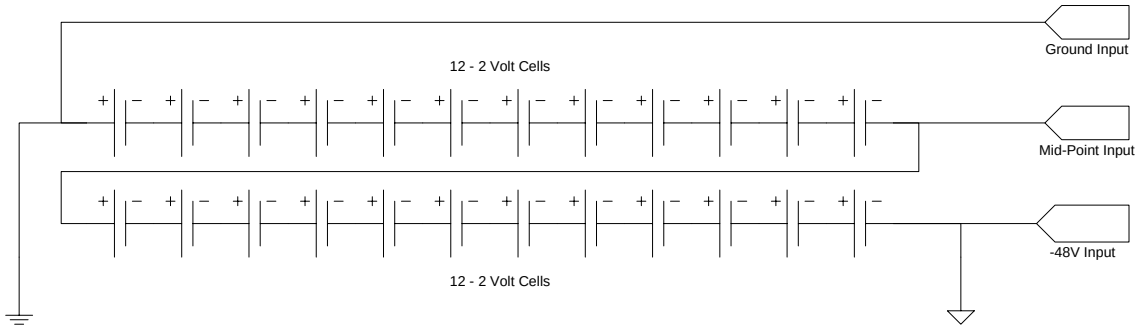

Figure 19 MPBM Single Battery String Connection

Analog Connection

If the WS1800 contains a MPBM module configured for analog input the connections are as displayed in Figure 3-12 below. Analog inputs 1-8 can all be used for input voltages ranging from 0 to 60 V. Alternatively, analog inputs 7 and 8 can be configured to accept input voltages ranging from -100 mV to 100 mV.

Table 3-12 Analog Connector (H1) Pin Out

Top Connector	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
	Analog #1 (negative)	Analog #2 (negative)	Analog #3 (negative)	Analog #4 (negative)	Analog #5 (negative)	Analog #6 (negative)	Analog #7 (negative)	Analog #8 (negative)
Bottom Connector	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
	Analog #1 (positive)	Analog #2 (positive)	Analog #3 (positive)	Analog #4 (positive)	Analog #5 (positive)	Analog #6 (positive)	Analog #7 (positive)	Analog #8 (positive)

Powering the WS1800

The WS1800 requires a 0.5A fuse when connected to a –48VDC Fuse Panel. Verify that power input leads are terminated correctly before inserting the fuse.

Each WS1800 unit consumes a maximum load of 7 Watts, assuming all discrete inputs and output relays are active, which results in all LEDs being lit.

Install the appropriate fuse at the power distribution panel to power the WS1800. The front-panel **PWR** LED lights solid *green* when polarity is correctly applied. For single power feed units, when polarity is reversed, the LED displays solid *red*.

Dual power Option

The WS1800 with dual power feed option requires two 0.5A fuses when connected to a –48VDC Fuse Panel(s).

With the Dual Power option the standard power entry is blocked and power enters at the connector and fuse panel in the center of the unit as shown below:

Figure 20 Rear Panel of WS1800 with Dual Power Feed Option

Figure 21 Close up of optional Dual Power entry showing fuses and polarity

Once the power wiring is correctly connected and verified, install the appropriate fuses at the power distribution panel(s) to power the WS1800. The front-panel **PWR** LED illuminates solid *green* when polarity is correctly applied. If polarity is reversed on a dual feed WS1800, the unit will not operate or be harmed and the red **PWR** LED will NOT illuminate.

Should replacement fuses be required, the Dual Power option of the WS1800 requires GMT fast-acting fuses with a 0.5 Amp rating.

Support and Routine Maintenance

The WS1800 in either Wallmount or Rackmount configuration does not require any preventative or routine maintenance. There are no fans to service or filters to change. All components within the unit are soldered directly to the main circuit board hence there are no user-serviceable parts inside the chassis.

Installation Check List

Use the following checklist when installing the WS1800 hardware:

- Mount the unit.
- Cable the unit
  - Verify the Ground connection
  - Verify discrete connections
  - Verify LAN connection and that POE is NOT present
  - Verify RJ-11 Modem or Serial Connection (if applicable)
  - Verify power connection(s)
  - Connect the PC to the RJ-45 Serial (Craft) Port.
  - Configure the PC serial port for communication (57600 bps; eight data bits; no parity; and one stop bit)
- Apply power to the unit
  - Apply power to the unit using the appropriate size fuse(s)

The unit is now ready for configuration.

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4 WS1800 Configuration

Three methods are available to configure the WS1800 as an alarm monitoring device.

- Local configuration from a PC connected to the Craft port using CLI commands
- Remote configuration using CLI commands via Telnet.
- Remote configuration from the SNMP host using SNMP commands

Serial and Telnet Configuration

Configuration via the Craft port is performed through a local serial connection from a PC COM port. This is done using a terminal emulation package, such as Microsoft's HyperTerminal, TeraTerm, or the equivalent. Not only does the craft interface offer configuration of the RTU, it also reports any trap configured discrete or control events and system error events.

Telnet Configuration or remote configuration consists of a user remotely accessing the WS1800 RTU over TCP/IP via Telnet application. The user simply connects to the WS1800 via the IP address of the RTU on port 23 (standard Telnet port). Only Level 5 users are allowed for configuration. The remote telnet connection initially will start up as a TL-1 session if TL-1 is enabled. To access the Configuration Menu, enter a '**?**'

SNMP Configuration

As an alternate to using telnet, configuration can also be done using an SNMP MIB Browser application, supplied by a third party. This method requires a more thorough knowledge of SNMP, and an understanding of the MIB structure, and as such is not the recommended method of configuration. Before any configuration via SNMP can occur, the WS1800's basic IP interface parameters and at least one host with a community name that has been changed from the default of "public" to a user defined value (ie. private).

The WS1800 has a maximum of 32 ASCII characters for the community name. After configuring the database in the WS1800, community names should be given to the appropriate NMSs. The default community names are "public" in the WS1800 database.

Note: A manager can have a configured community name and exercise SNMP commands on the WS1800 without having the manager IP address configured in the host list. To prevent unauthorized use of a community name, a user must log in to the WS1800 using SNMP before he can modify any of the MIB objects.

5 Using the Command Line Interface

Overview

The WS1800 provides a command line interface (CLI) that enables monitoring and configuration of the WS1800 over a Telnet or local console connection. A command line interface session can be opened by Telnet connection from a workstation on the network or by connecting a terminal to the craft port on the WS1800. A '**?**' must be entered to access the configuration menu.

Connecting to the Serial/Craft Port

To use the WS1800 Serial port, a serial cable and a terminal or terminal emulator (such as a laptop with a terminal emulation application that supports 57600-baud communication) is required. Use the following settings to configure the terminal emulation session:

Setting	Set To
Speed	57600 bps
Parity	None
Data bits	8
Stop bits	1
Flow Control	None

To enter into the CLI on the WS1800, enter the question mark "**?**". The WS1800 will respond with a "Username:" prompt to indicate the user is not logged in. The default username and password is set to "MTC" and "shipping" respectively (case sensitive). Once the user is logged in, the WS1800 will respond with the Main Menu.

When configuration is complete exit the CLI and return the WS1800 Serial/Craft session to Normal mode by entering "**0**" in the main menu. While the craft port is in Normal mode, events that are configured to generate traps will also output a notification in the terminal session. While in the CLI, these notifications are not displayed on the session.

If a configuration change has been made when you go to log out you will be given an opportunity to save the database. If you select 'S' to save at the prompt the flash programmer program will be started. Once the data has been saved to flash the system will reboot and start to use the new parameters.

Connecting via Telnet

To establish a connection via Telnet, appropriate network settings, including IP address, netmask, and router IP address must already be entered into the configuration. These parameters must be compatible with the users existing LAN/WAN network.

A Telnet session can be issued from the command line of a host that supports telnet, or by using a Terminal application that supports Telnet.

By default, the WS1800 is configured with IP 10.0.100.10. Once a connection has been established, the WS1800 prompt, "WS1800 Telnet Server" appears. To enter into the CLI of the WS1800 enter the question mark "?". The WS1800 will respond with "Username:" indicating the user is not logged in. The default username and password is set to "MTC" and "shipping" respectively. Once the user is logged in, the WS1800 will respond with the main menu.

When the Telnet session is disconnected, the user is automatically logged out.

Connecting via Dial-In

To establish a connection via dial-in, dial the appropriate phone number using a terminal program on a modem equipped PC, and standard modem commands. Connecting over a modem allows for all functionality available through an IP telnet client session. In addition to connecting to the menu system using the '?' character, the user may alternately connect to an expansion serial port configured for 'modem pass thru' by typing a '#' followed by a lower case c, d, e or f depending on which serial port you wish to connect to. To end a pass thru mode connection, hang up the modem connection.

Connections via Dial-Out

The WS1800 can be configured to dial-out any time a TL-1 message has been generated. The RTU will dial out to the configured number and establish a connection. Once the connection is established any messages in the TL-1 message buffer will be sent. The modem will remain connected for a short time waiting for further TL1 messages or allow the user to log into the menu system or initiate a modem pass thru session. In any event the WS1800 will then terminate the connection after a period of inactivity.

WS1800 CLI Commands

The Command line Interface (CLI) commands can be accessed from either the Craft port or remotely using Telnet. Accessing the WS1800 locally from the Craft or remotely will generate a trap event indicating the WS1800 has been accessed. This gives the SNMP Host a history of RTU local or remote access that otherwise may go undetected. Accessing the CLI requires the user to have a valid login ID. All parameter changes except for a user changing their own password are restricted to Level 5 users. Some basic maintenance activities are allowed for Level 1 and Level 3 users as noted.

CLI Main Menu Commands

Table 5-1 Main Menu Commands

Command	Usage
1. Current Status	Displays WS1800 CLI commands. Level 1.
2. Event Log	Displays the WS1800 Event Log. Level 1.
3. Configuration	Displays the WS1800 Configuration Menu. Level 1/3 restricted
4. Firmware Version	Displays the current firmware version. Level 1.
5. Send SNMP Trap	Sends an SNMP "warm start" trap to the configured host address and is primarily used to test application operability. Level 3.
6. Send Ping	Opens menu which enables the user to issue a TCP/IP ping command. Level 3.
7. IP Statistics	Displays TCP/IP interface statistics. Level 3.
8. Operate Controls	Outputs the complete database in ASCII-readable format. Level 3.
0. Logout	Logs user out of system. **Note:** User will be automatically logged out after 30 minutes of inactivity on the craft port or remote connection. Level 1.

1. Current Status

The **current status** menu allows Level 1 users to view the inputs and control output statuses. The user can select the following options:

```
Current Status Menu:
 1. Analog & Environmental Readings
 2. Alarm Status
 3. Control Status
<esc>Return to Main Menu
```

1. Analog & Environmental Readings

The analog data option in the current status menu displays the current status of all analog inputs of the WS1800. If the unit is not licensed for MPBM or Analog, only the temperature value (s) will be shown. The format is as follows:

```
Analog & Environmental Readings:

Onboard Sensor:
24.500 Celsius (76.100 Fahrenheit)    Alarm Status: Not Alarm

Analog Data:

Ana #1   CurrentValue:  0.000  AlarmState: Not_Alarmd
Ana #2   CurrentValue:  0.000  AlarmState: Not_Alarmd
Ana #3   CurrentValue:  0.000  AlarmState: Not_Alarmd
Ana #4   CurrentValue:  0.000  AlarmState: Not_Alarmd
Ana #5   CurrentValue:  0.000  AlarmState: Not_Alarmd
Ana #6   CurrentValue:  0.000  AlarmState: Not_Alarmd
Ana #7   CurrentValue:  0.000  AlarmState: Not_Alarmd
Ana #8   CurrentValue:  0.000  AlarmState: Not_Alarmd
```

Analog & Environmental Data Output

("CurrentValue" list shown here will only appear when an MPBM/Analog module is licensed)

2. Alarm Status

The alarm status option in the current status menu displays the current alarm status of the discrete and analog alarm points. The format is as follows:

```
Alarm Status:
PointAid          CurrentState AlarmSeverity LastAlarmTime        Description
DISCRETE-1-1        Alarmed    Routine       06-11-02 18:01:57   Discrete Point 01
DISCRETE-1-2        Alarmed    Routine       06-11-02 18:01:57   Discrete Point 02
DISCRETE-1-3        Alarmed    Routine       06-11-02 18:01:57   Discrete Point 03
DISCRETE-1-4        Alarmed    Routine       06-11-02 18:01:56   Discrete Point 04
DISCRETE-1-5        Alarmed    Routine       06-11-02 18:01:56   Discrete Point 05
DISCRETE-1-6        Alarmed    Routine       06-11-02 18:01:56   Discrete Point 06
DISCRETE-1-7        Alarmed    Routine       06-11-02 18:01:56   Discrete Point 07
DISCRETE-1-8        Alarmed    Routine       06-11-02 18:01:55   Discrete Point 08
ANAALM01            Alarmed    Routine       06-11-02 18:01:56   ANA Module Failure
```

Alarm Status Output

3. Control Status

The control status option in the current status menu displays the current status of the relay outputs of the WS1800.

```
Control Status:

Display: 1
Point: 1
ControlType: Continuous_On
Cntrl Status: Complete
Description: Control Point 01 not configured

Display: 1
Point: 2
ControlType: Continuous_Off
Cntrl Status: Complete
Description: Control Point 02 not configured

Display: 1
Point: 3
ControlType: Continuous_Off
Cntrl Status: Complete
Description: Control Point 03 not configured

Display: 1
Point: 4
ControlType: Continuous_Off
Cntrl Status: Complete
Description: Control Point 04 not configured
```

Control Status Output

2. Event Log

This command displays the event log, which can contain up to a maximum of 40 events. This circular history buffer only stores events that had reported traps. The event log contains events for discretes, controls, and systems errors. Retrieval of the buffer using the CLI and configurator labels the events as discretes, controls, or system. Note that traps generated for control events do not have an associated sequence number. Viewing the Event log is a Level 1 command.

```
Event Log:

Seq# Type      Status/Action   Severity  TimeofOccurrence  Description

  52 System    N/A             N/A       07-11-20 12:08:18 "Heart Beat Message."

  51 System    N/A             N/A       07-11-20 12:07:18 "Heart Beat Message."

  50 System    N/A             N/A       07-11-20 12:06:18 "Heart Beat Message."

  49 System    N/A             N/A       07-11-20 12:05:18 "Heart Beat Message."

  48 System    N/A             N/A       07-11-20 12:04:18 "Heart Beat Message."

  47 System    N/A             N/A       07-11-20 12:03:18 "Heart Beat Message."

  46 System    N/A             N/A       07-11-20 12:02:18 "Heart Beat Message."

  45 System    N/A             N/A       07-11-20 12:01:18 "Heart Beat Message."

  44 System    N/A             N/A       07-11-20 12:00:18 "Heart Beat Message."
```

Event Log Output

3. Configuration

This menu option is used to access the Configuration submenu. From this submenu the user can access all of the WS1800 configuration information. All menu items below are restricted to Level 5 users except for a user changing their own password. The options available are shown below:

```
Configuration Menu:

 1. Network
 2. SNMP Hosts
 3. Serial/Modem Ports
 4. Points
 5. User Accounts
 6. System
 7. TABS Over IP
 0. Configuration Dump
<esc>Return to Main Menu

Enter Selection:
```

Configuration Menu

1. Network Configuration

The Network configuration sub-menu allows the user to view and configure network properties. These properties include IP and Router Addresses, Netmask and ACL Configurations.

Note: IP Connection ACL (Active Control List) is a list of 'friendly' IP's which are the only ones allowed to communicate with the RTU. **Default setting** for ACL is with all 8 IP's at 0.0.0.0, which is **ACL-Disabled**. Carefully verify any entries prior to saving. It is strongly recommended to have more than one IP on the list. If a single incorrect IP is accidentally entered, network users will be locked out of the unit and local reconfiguration via the Craft port will be required.

The user can enter the option number to select the property to edit. Level 5 only. The options are shown below:

```
Network Configuration Menu:

MAC address: 00:50:C2:3A:90:F1
IP Address: 10.0.100.10
Router Address: 10.0.100.  1
Netmask: 255.255.0.0

Network Configuration Menu:

 1. IP Address
 2. Router Address
 3. Netmask
 4. IP Connection ACL
<esc>Return to Configuration Menu

Enter Selection:
```

Network Configuration Menu

2. SNMP Hosts Configuration

The SNMP Hosts Configuration sub-menu allows the user to view and configure SNMP trap hosts. The user can edit a host entry by entering the number associated with the host entry. Level 5 only. An example of the listing is shown below:

```
SNMP Hosts Configuration Menu:

Host   IP Address             TCP Port    Trap to host  Community Name
 1     [ 192.168.  1.109 ]      162       Disabled      "public"
 2     [ 192.168.  0.  1 ]      162       Disabled      "public"
 3     [ 192.168.  0.  1 ]      162       Disabled      "public"
 4     [ 192.168.  0.  1 ]      162       Disabled      "public"
 5     [ 192.168.  0.  1 ]      162       Disabled      "public"

Current host to edit = 1

SNMP Hosts Configuration Menu:

 1. IP Address
 2. TCP Port
 3. Community Name
 4. Trap to host
 5. Select Host to edit
 N. Next Host
<esc>Return to Configuration Menu

Enter Selection:
```

SNMP Hosts Configuration

When the user selects a menu option they will change the field on the "Current host to edit" display. Entering 'N' will change the "Current host to edit" to the next one in the list.

3. Serial/Modem Port Configuration

The Serial/Modem Port Configuration menu option brings up a list of all the serial ports and displays their current configuration. The user can then select one of the ports to modify the settings on. Level 5 only.

NOTE: Ports C – F are only available on units equipped with a Serial Expansion module and can only be used for serial or modem passthrough.

```
Serial/Modem Ports Configuration Menu:

Port A Configuration:
Mode: Console
Port Setting: 57600 8-N-1
Flow Control: None

Port B Configuration:
Mode: Dialup Modem
Port Setting: 19200 8-N-1
Flow Control: None
First Dialout phone number:
Second Dialout phone number:
Dialout connect wait timeout: 40 s
Dialout connect maximum retries: 3
Dialout connect retry interval: 20 s
Connection inactivity timeout: 5 m

Port C Configuration:
Mode: Disabled

Port D Configuration:
Mode: Disabled

Port E Configuration:
Mode: Disabled

Port F Configuration:
Mode: Disabled

Serial/Modem Ports Configuration Menu:

 1. Port B
 2. Port C
 3. Port D
 4. Port E
 5. Port F
<esc>Return to Configuration Menu

Enter Selection:
```

Serial/Modem Port Configuration

The Serial/Modem Port Configuration menu option brings up a list of all the serial ports and displays their current configuration. The user can then select one of the ports to modify the settings on, bringing up a menu similar to the following ones (depending on port mode). The user then selects a number from the list to alter the corresponding property.

NOTE: Depending on the individual unit license and options installed, not all menu items shown below may appear or be accessible.

```
Port B Configuration:
Mode: Dialup Modem
Port Setting: 19200 8-N-1
Flow Control: None
First Dialout phone number:
Second Dialout phone number:
Dialout connect wait timeout: 40 s
Dialout connect maximum retries: 3
Dialout connect retry interval: 20 s
Connection inactivity timeout: 5 m

Port B Configuration Menu:

 1. Mode
 2. Connection inactivity timeout
 3. First Dialout phone number
 4. Second Dialout phone number
 5. Dialout connect wait timeout
 6. Dialout connect maximum retries
 7. Dialout connect retry interval
 N. Next port
<esc>Return to Serial/Modem Ports Configuration Menu

Enter Selection:
```

Dialup Modem Port Configuration

```
Port B Configuration:
Mode: CDMA1x Modem
Port Setting: 57600 8-N-1
Flow Control: None
CDMA1x Modem IP Address:
CDMA1x Modem TCP Port: 52
Connection inactivity timeout: 5 m

Port B Configuration Menu:

 1. Mode
 2. Connection inactivity timeout
 3. TCP Port
 N. Next port
<esc>Return to Serial/Modem Ports Configuration Menu

Enter Selection:
```

CDMA Modem Port Configuration

```
Port B Configuration:
Mode: Serial TBOS
Port Setting: 2400 8-O-2
Flow Control: None
TBOS Start Display Number: 0

Port B Configuration Menu:

 1. Mode
 2. Baud Rate
 3. Data Bits
 4. Parity
 5. Stop Bits
 6. Flow Control
 7. TBOS Start Display Number
 N. Next port
<esc>Return to Serial/Modem Ports Configuration Menu

Enter Selection
```

TBOS Port Configuration

```
Port B Configuration:
Mode: Serial TABSR
Port Setting: 2400 8-O-1
Flow Control: None
TABS Address: 0
TABS Start Display Number: 0
TABS Number of Displays: 2

Port B Configuration Menu:

 1. Mode
 2. Baud Rate
 3. Data Bits
 4. Parity
 5. Stop Bits
 6. Flow Control
 7. TABS Address
 8. TABS Start Display Number
 9. TABS Number of Displays
 N. Next port
<esc>Return to Serial/Modem Ports Configuration Menu

Enter Selection:
```

TABS Port Configuration

```
Port C Configuration:
Mode: Serial Passthrough
Port Setting: 9600 8-N-1
Flow Control: None
TCP Port: 53

Port C Configuration Menu:

 1. Mode
 2. Baud Rate
 3. Data Bits
 4. Parity
 5. Stop Bits
 6. Flow Control
 7. TCP Port
 N. Next port
<esc>Return to Serial/Modem Ports Configuration Menu

Enter Selection:
```

Serial Passthrough Port Configuration

```
Port C Configuration:
Mode: Modem passthru
Port Setting: 9600 8-N-1
Flow Control: Hardware Flow Control

Port C Configuration Menu:
 1. Mode
 2. Baud Rate
 3. Data Bits
 4. Parity
 5. Stop Bits
 6. Flow Control
 7. TCP Port
 N. Next port
<esc>Return to Serial/Modem Ports Configuration Menu

Enter Selection:
```

Modem Passthrough Port Configuration

4. Point Configuration

The Point Configuration sub-menu allows the user to select the point list to edit. All Point Configuration items below are Level 5 user only.

```
Points Configuration Menu:

 1. Discrete Points
 2. Control Points
 3. Analog Points
 4. Analog Alarm Points
 5. Temp/Humi Points
 6. Temp/Humi Alarm Points
 7. LED Display Mode
<esc>Return to Configuration Menu

Enter Selection:
```

Point Configuration

1. Discrete Points

The Discrete Point list appears roughly as shown (units without TL-1 enabled will see less fields). From this list the user can select a point and field to edit.

```
Current point to edit = 1
Discrete Points.

 0. AlarmState = Closed
 1. Reporting = Enabled
 2. AlarmSeverity = Routine
 3. Description = Discrete Point 01
 4. AID = DISCRETE-1-1
 5. SID =
 6. AIDDET = EN
 7. AIDType = EQPT
 8. CondType = Type
 9. ServiceEffecting = NSA
10. Location =
11. Select Modem dial-up number = Both
12. Select point to edit
 N. Next point
<esc>Return to Points Configuration Menu
Enter Selection:
```

Current Discrete Points Configuration

2. Control Points

The Control Point list appears as shown. From this list the user can select a point and field to edit.

```
Current Control Points Configuration:

Cntl# Reporting   Duration  Type            Description
      Modem#
   1  Enabled        400    Continuous_On   "Control Point 01 not configured"
      Both
   2  Enabled        400    Continuous_Off  "Control Point 02 not configured"
      Both
   3  Enabled        400    Continuous_Off  "Control Point 03 not configured"
      Both
   4  Enabled        400    Continuous_Off  "Control Point 04 not configured"
      Both
Current point to edit = 1

Control Points Configuration Menu:

 1. Reporting
 2. Duration
 3. Type
 4. Description
 5. Select Modem dial-up number
 6. Select point to edit
 N. Next point
<esc>Return to Points Configuration Menu

Enter Selection:
```

Current Control Points Configuration

3. Analog Points

The Analog Point list appears as shown. From this list the user can select a point and field to edit.

```
Current point to edit = 1
Analog Points.

 1. RawZero =  0
 2. RawSpan =  4095
 3. EngZero =  0.000
 4. EngSpan =  60.000
 5. LOLO Threshold =  48.000
 6. LO Threshold =  50.000
 7. HI Threshold =  54.000
 8. HIHI Threshold =  56.000
 9. Deadband =  0.200
10. Units = Volt

11. Description = Analog #1
12. AID = ANA01
13. AIDDET = EQPT
14. Location = NEAR
15. SID =
16. AIDType = (null)
17. CondType = Type
18. Analog channel operation mode = MPBM
19. Analog channel input type = 0-30V
20. Select point to edit
 N. Next point
<esc>Return to Points Configuration Menu
Enter Selection:
```

Current Analog Points Configuration

4. Analog Alarm Points

The Analog Alarm Point list appears roughly as shown (units without TL-1 enabled will see less fields). From this list the user can select a point and field to edit.

```
Current point to edit = 1
Analog Alarm Points.

 1. Reporting = Enabled
 2. AlarmSeverity = Routine
 3. Description = Analog Module Failure
 4. AID = ANAALARM_2_1
 5. SID =
 6. AIDDET = EN
 7. AIDType = EQPT
 8. CondType = Type
 9. ServiceEffecting = NSA
10. Location = NEAR
11. Select Modem dial-up number = Both

12. Select point to edit
 N. Next point
<esc>Return to Points Configuration Menu
Enter Selection:
```

Current Analog Alarm Points Configuration

5. Temperature/Humidity Points

The Temperature/Humidity Point list appears roughly as shown (units without TL-1 enabled may see less fields). From this list the user can select a point and field to edit.

NOTE: TEMP-01 Thresholds and Alarm Points relate to the onboard temperature sensor which is installed on all WS1800 units. TEMP-02, TEMP-03, HUMI-01 and HUMI-02 all require optional interface and sensor components in order to be enabled.

```
Current point to edit = 1
Temp/Humi Points.

 1. LOLO Threshold = -10.000
 2. LO Threshold =  0.000
 3. HI Threshold =  50.000
 4. HIHI Threshold =  60.000
 5. Deadband =  0.100
 6. Units = DegreeCelsius

 7. Description = TEMPERATURE VALUE
 8. AID = TEMP-01
 9. AIDDET = EN
10. Location = NEAR
11. Select point to edit
 N. Next point
<esc>Return to Points Configuration Menu
Enter Selection:
```

Current Temperature/Humidity Points Configuration

4. Temperature/Humidity Alarm Points

The Temperature/Humidity Alarm Point list appears roughly as shown (units without TL-1 enabled may see less fields). From this list the user can select a point and field to edit.

```
Current point to edit = 1
Temp/Humi Alarm Points.

 1. Reporting = Enabled
 2. AlarmSeverity = Routine
 3. Description = Temperature #01 LOLO
 4. AID = T_H_ALARM_3_1
 5. SID =
 6. AIDDET = EN
 7. AIDType = EQPT
 8. CondType = Type
 9. ServiceEffecting = NSA
10. Location = NEAR
11. Select Modem dial-up number = Both

12. Select point to edit
 N. Next point
<esc>Return to Points Configuration Menu

Enter Selection:
```

Current Temperature/Humidity Alarm Points Configuration

5. LED Display Mode

The LED Display Mode list appears as shown. On 32 point units this changes the function of LEDs on the WS1800 front panel as the display consists of 16 LED's. With option ON, points 1-16 have a solid LED, 17-32 use a slow flash, and any LED showing two points simultaneously (eg 1 and 17 together) have a fast flash. DISABLED leaves all points showing a solid LED.

```
Temp/Humi Alarm Points Configuration:
LED Display Mode: Alarm flashing at 1 Hz, dual alarm at 5 Hz

LED Display Mode Configuration Menu:

 1. Change mode
<esc>Return to Points Configuration Menu

Enter Selection

Enter Selection:
```

LED Display Mode Configuration

5. User Accounts

The User Accounts sub-menu allows the user to view, add and edit user access to the WS1800. **Note:** At least one level 5 user must be added prior to removal of the default 'MTC/shipping login'. Level 1 – 4 users can access their own password to change it. All other activities are Level 5 only. An example of the listing is shown below:

```
User List:

 User        Level
 MTC         5

User Management Menu:
 1. Add User
 2. Change User Password & Level
 3. Delete User
<esc>Return to Configuration Menu

Enter Selection:
```

User Accounts

6. System Configuration

The System Configuration sub-menu allows the user to view and configure system parameters. The user can edit a host entry by entering the number associated with the host entry. All parts of this menu are Level 5 only. An example of the listing is shown below:

```
System Configuration Menu:
 1. System Information
 2. Date & Time
 3. Heartbeat Messages
 4. License
 5. Upgrade Firmware
 6. Manager Port
<esc>Return to Configuration Menu

Enter Selection:
```

System Configuration

1. System Information

The system information list allows the user to select the field they wish to edit.

```
System Information Configuration:

System Name: Westronic Systems Inc.
System SID: RTU68
System Location: #200, 550 71st St SE Calgary Alberta T2H 0S6
System Contact: Tel:403-250-8304
Last Technician Notes: Engineering

System Information Configuration Menu:

 1. System Name
 2. System SID
 3. System Location
 4. System Contact
 5. Last Technician Notes
<esc>Return to System Configuration Menu

Enter Selection:
```

System Information Configuration

2. Date & Time

The system date & time menu allows the user to edit the time currently stored on the RTU. Note that Date & Time is the *only* configuration item that does not require a reboot to enable & retain the change.

```
System Date & Time: 15-05-21 12:00:21

Date & Time Configuration Menu:

 1. Edit Date & Time
<esc>Return to System Configuration Menu

Enter Selection:
```

Date & Time Configuration

3. Heartbeat Messages

The heartbeat message menu allows the user to turn the heartbeat messages on and off as well as setting the interval time.

```
Heartbeat Message Configuration:

Heartbeat Message: ON
Heartbeat Message Period: 1 m

Heartbeat Message Configuration Menu:

 1. Disable/Enable heartbeat message
 2. Heartbeat Message Period
<esc>Return to System Configuration Menu

Enter Selection:
```

Heartbeat Messages Configuration

4. License

The license menu shows the user which features are currently enabled on the WS1800 and allows the input of a new license key.

```
License:

The Current License is:
  32/4 Point Capacity - Enabled
  TL-1                - Enabled
  SNMP                - Enabled
  TBOS Reporting      - Enabled
  TABS Reporting      - Enabled
  Modem               - Enabled
  Ethernet            - Enabled
  MPBM                - Disabled
  Analog Input Type 2 - Disabled
  Webserver           - Enabled
  OEM version         - Disabled
  Telnet Disabled     - Disabled
  Auto Ping Out       - Enabled
  Unused              - Disabled
  Delay Alarms        - Enabled

License Configuration Menu:
 1. Enter New License
<esc>Return to System Configuration Menu

Enter Selection:
```

License Menu

License Menu Additional Notes

General

WS1800 features are enabled or disabled via license key at the Westronic manufacturing facility, based on client requirements and any physical options installed in the unit. Most features above are self-explanatory and if enabled are noted on the part number decal affixed to every WS1800. Should additional/new features be required in your license, please contact Westronic Technical Support or Westronic Sales for more information.

Auto Ping Out

If enabled this causes the unit to ping the configured router to reset the ARP table following a cold start or reboot. This feature can speed network connectivity following a cold start or reboot with new IP.

Delay Alarms

When this feature is enabled, Delay Alarms allows the WS1800 to boot and ensure establish network connectivity prior to collecting or reporting any alarms. This delay is fixed at 90 seconds and affects TL-1, SNMP, TABS-IP, TBOS and Serial TABS-R as well as local alarm outputs at the Craft port.

5. Upgrade Firmware

This option allows the user to upload a firmware file provided by Westronic Systems Inc. **NOTE:** This menu requires the use of a loading program only available from Westronic Technical support and a firmware version explicitly for remote upgrades. Please contact Westronic Technical support for more details.

```
Upgrade Firmware:

 1. Begin Upgrade
<esc>Return to System Configuration Menu

Enter Selection:
```

Upgrade Firmware

6. Manager Port

This option allows the user to select a different TCP/IP port (default is port 24) to interface with the WS1800 Manager PC application. **Note:** Ports 23, 80, 161 and 162 must not be used. Also note, duplication of any serial passthrough TCP port or TABS-IP reporting port number may result in the inability to configure the unit via WS1800 Manager.

7. TABS over IP Configuration

The TABS over IP configuration allows the user to set the port through which TABS over IP reporting occurs. Level 5 only.

```
TABS Over IP Configuration:

TCP Port: 0

TABS Over IP Configuration Menu:

 1. TCP Port
 2. TABS Host Timeout
 3. TABS Address
 4. TABS Start Display Number
 5. TABS Number of Displays
<esc>Return to Configuration Menu

Enter Selection:
```

TABS over IP Configuration

8. Configuration Dump

The Configuration Dump menu allows the user to view the full configuration of the RTU. There are options to either see the configuration with screen breaks (shown below) or without screen breaks. Level 3.

```
Configuration Dump:
 1. Screen Breaks
 2. No Screen Breaks
<esc>Return to Configuration Menu

Enter Selection:
```

Configuration Dump Menu

```
WS1800 Configuration Dump:

                        Analog Points Configuration
Pt# AID                 Description                       RawZero   RawSpan
    EngZero             EngSpan                           LOLO      LO
    HI                  HIHI                    Deadband  Units
    SID                 AIDDET     AIDType   CondType     SA   LOCN
 1  ANA01               Analog #1                          0      4095
     0.000              60.000                           48.000    50.000
    54.000              56.000                            0.100    Volt
                        EN         EQPT      Type               NEAR
 2  ANA02               Analog #2                          0      4095
     0.000              60.000                            0.000     0.000
     0.500               0.800                            0.060    Volt
                        EN         EQPT      Type               NEAR
 3  ANA03               Analog #3                          0      4095
     0.000              60.000                           48.000    50.000
    54.000              56.000                            0.100    Volt
                        EN         EQPT      Type               NEAR
 4  ANA04               Analog #4                          0      4095
     0.000              60.000                            0.000     0.000
     0.500               0.800                            0.060    Volt
                        EN         EQPT      Type               NEAR
 5  ANA05               Analog #5                          0      4095
     0.000              60.000                           48.000    50.000
    54.000              56.000                            0.100    Volt
                        EN         EQPT      Type               NEAR
 6  ANA06               Analog #6                          0      4095
     0.000              60.000                            0.000     0.000
     0.500               0.800                            0.060    Volt
                        EN         EQPT      Type               NEAR
 7  ANA07               Analog #7                          0      4095
     0.000              60.000                           48.000    50.000
    54.000              56.000                            0.100    Volt
                        EN         EQPT      Type               NEAR
 8  ANA08               Analog #8                          0      4095
     0.000              60.000                            0.000     0.000
     0.500               0.800                            0.060    Volt
                        EN         EQPT      Type               NEAR

-- More (<esc> to exit) --
```

Configuration Dump (With Screen Break)

4. Firmware Version

This menu option displays the version of firmware currently running on the WS1800. Level 1.

```
Firmware Version: Ver 3.0.6


<esc>Return to Main Menu
```

Firmware Version

5. Send SNMP Trap

This menu option allows the user to send an SNMP warm start trap to all configured SNMP hosts. Level 3.

```
Send SNMP Trap:
 1. Send Warm Start Trap to All Configured SNMP Hosts
<esc>Return to Main Menu

Enter Selection:
```

Send SNMP Trap

6. Send Ping

This menu option allows the user to send a TCP/IP ping command to a selected IP address. Level 3.

```
TCP/IP Ping:
 1. Send Ping
<esc>Return to Main Menu

Enter Selection:
```

Send TCP/IP Ping

7. IP Statistics

This menu option allows the user to see the TCP/IP statistics accumulated during the RTU operation (reset on restart). Level 3.

```
TCP/IP Statistics:

RTL8019AS Ethernet Driver Statistics

  RX Statistical Data:
     Curr avail BDs   : 8
     Curr queued Pkts : 0
     Max # BDs Used   : 8
     No Rx    IRQs    : 859142
     No RxErr IRQs    : 0
     No Rcvd  PKTs    : 859269
     No Err   PKTs    : 0
     No RX Overrun    : 0
  TX Statistical Data:
     No Pkts Sent     : 1292
     No TxErr IRQs    : 0

TCP/IP Statistics Menu:
 1. Refresh
<esc>Return to Main Menu

Enter Selection:
```

IP Statistics

8. Operate Controls

This menu option allows the user to operate the onboard control points on the WS1800. This is a Level 3 command.

```
Current Point to control = 1
Control Type = Continuous_Off

Operate Controls Menu:

 1. Control Point Number
 2. Control Type
 3. Issue Control
<esc>Return to Main Menu

Enter Selection:
```

Operate Controls

0. Logout

This menu option logs the user out of the menu system with the following message. Level 1.

```
System logged out!
```

Logout

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6 Getting the WS1800 Up and Running

Use a terminal emulation package such as HyperTerm, TeraTerm or ProComm.

Connect a cable to the Craft Port and verify that the terminal emulation used has the port parameters set to 57600 baud eight data bits, no parity, one stop bit, (57600,8,N,1) and no flow control.

Once the IP address of the WS1800 has been configured, the CLI commands can also be accessed by connecting a telnet session to the RTU. Once the telnet connection is made the CLI is accessed in the same way as it is accessed through the Craft port.

Once initially set up via the CLI for IP, router and netmask, the WS1800 can also be fully configured using the optional WS1800 Manager Utility. This software application is sold for use with large install bases and makes it possible to 'template' and archive common configuration settings across large install bases.

Accessing the Craft Port Interface CLI Commands

The following is the list of CLI commands shown by the help command:

- If connecting via telnet a "**WS1800 Server**" prompt will appear.
- Press "**?"**. This will bring up the "**Username:**" prompt, enter the appropriate username (factory default username is 'MTC') and press **<enter>**.
- At the "**Password:**" prompt enter the appropriate password (factory default password is 'shipping') and press **<enter>**.
- The Main Menu will appear on the terminal session (shown below)

```
Main Menu:

System Date and Time: 15-05-21 10:44:51

 1. Current Status
 2. Event Log
 3. Configuration
 4. Firmware Version
 5. Send SNMP Trap
 6. Send Ping
 7. IP Statistics
 8. Operate Controls
 0. Logout


Enter Selection:
```

Main Menu

Editing the IP Address

- Type "**3**" and press **<enter>**. The Configuration Menu will come up.
- Type "**1**" and press **<enter>**. The Network Configuration Menu will come up displaying the current network information.
- If the displayed IP address is incorrect, then type "**1**" and press **<enter>**. Enter the new IP address and press **<enter>**.
- If the displayed Router address is incorrect, then type "**2**" and press **<enter>**. Enter the new Router address and press **<enter>**.
- If the displayed Subnet is incorrect, then type "**3**" and press **<enter>**. Enter the new Subnet and press **<enter>**.
- To continue with more configuration changes press **<esc>** once to return to the Configuration Menu.
- To stop making changes and restart the unit press **<esc>** twice and type "**S**" and press **<enter>** when prompted to save changes and restart the WS1800.

Editing the Host IP and Community Name

This procedure will only need to be done if the WS1800 is licensed for SNMP reporting.

- If the Main Menu is currently displayed type "**3**" and press **<enter>**. The Configuration Menu will come up.
- Type "**2**" and press **<enter>**. The SNMP Hosts Configuration Menu will appear listing the SNMP Host Entries.
- Type "**5**" and press **<enter>**. Now type the number associated with the SNMP Host Entry to edit and press **<enter>**. The SNMP Host Configuration menu is now configured for changing parameters of the desired host.
- To change the IP address of a host entry, type "**1**" and press **<enter>**. Enter the new IP address and press **<enter>**.
- If the TCP Port of the host entry is incorrect, type "**2**" and press **<enter>**. Enter the new TCP Port and press **<enter>**.
- To change the Community name of a host entry, type "**3**" and press **<enter>**. Enter the new Community name and press **<enter>**.
- To enable or disable Trap to Host, type "**3**" and press **<enter>**. Press **<tab>** to select the desired entry and press **<enter>**.
- To configure the next host in the list type "**N**" and press **<enter>**.
- To continue with configuration changes elsewhere in the menu press **<esc>** once to return to the Configuration Menu.

- To stop making changes and restart the unit press **<esc>** twice and type "**S**" and press **<enter>** when prompted to save changes and restart the WS1800.

Setting the Real Time Clock

- If the Main Menu is currently displayed type "**3**" and press **<enter>**. The Configuration Menu will come up.
- Type "**6**" and press **<enter>**. The System Configuration Menu will appear
- Type "**2**" and press **<enter>**. The System Time Menu will appear
- Type "**1**" and press **<enter>**.
- At the **hr:** prompt, enter the current hour
- At the **min:** prompt, enter the current minute
- At the **sec:** prompt, enter the current second
- At the **yr:** prompt, enter the 2 digit current year
- At the **mon:** prompt, enter the month
- At the **day:** prompt, enter the date
- At the **Use this time [y|n]?** prompt, type '**y**' and press enter (if the correct time is displayed).
- To continue with more configuration changes press **<esc>** twice to return to the Configuration Menu.
- To stop making changes and restart the unit press **<esc>** three times and type "**S**" and press **<enter>** when prompted to save changes and restart the WS1800.
- Note the year has been limited to 0 to 38. (2000 to 2038) The 32 bit UNIX time counter rolls over in that year. The 1800 does not support time beyond this point.

Configuring a Modem or Serial Reachthrough/TBOS/TABS Port

- If the Main Menu is currently displayed type "**3**" and press **<enter>**. The Configuration Menu will come up.
- Type "**3**" and press **<enter>**. The Serial/Modem Ports Configuration Menu.
- Type the number associated with the Port to reconfigure and press **<enter>**. The current configuration of the Port will appear.
- Select the field to edit on the Port, either enter the new value or use the **<tab>** key to change the field (changing the "**Mode:**" field will change the properties displayed) and press **<enter>**.

- When the Port is configured as desired type "**N**" and press **<enter>** to configure the next port in the list.
- To continue with more configuration changes press **<esc>** once to return to the Configuration Menu.
- To stop making changes and restart the unit press **<esc>** twice and type "**S**" and press **<enter>** when prompted to save changes and restart the WS1800.

Configuring a Heartbeat Message

The WS1800 can be configured to automatically send out heartbeat messages. These messages can act in place of the host system sending a RTRV-HDR message at regular intervals to show the WS1800 is connected to the network. The messages are sent out both via TL-1 and SNMP. The allowable heartbeat interval is from 1 to 65535 minutes.

- If the Main Menu is currently displayed type "**3**" and press **<enter>**. The Configuration Menu will come up.
- Type "**6**" and press **<enter>**. The System Configuration Menu will appear
- Type "**3**" and press **<enter>**. The Heartbeat Messages Menu will appear
- If the Heartbeat is not enabled/disabled as needed type "**1**" and press **<enter>**. Press **<tab>** until the desired state appears, then press **<enter>**.
  - At the **Heartbeat Message:** prompt us the **<tab>** key to select **ON** and press **<enter>**.
- If the Heartbeat is enabled and the interval is not correct type "**2**" and press **<enter>**. Input the desired interval in minutes and press **<enter>**.
  - At the **Heartbeat Period(minutes) (X):** prompt enter the desired duration between heartbeat message and press **<enter>**.
- To continue with more configuration changes press **<esc>** twice to return to the Configuration Menu.
- To stop making changes and restart the unit press **<esc>** three times and type "**S**" and press **<enter>** when prompted to save changes and restart the WS1800.

Configuring Discrete Inputs

- If the Main Menu is currently displayed type "**3**" and press **<enter>**. The Configuration Menu will come up.

- Type "**4**" and press **<enter>**. The Point Configuration Menu will appear
- Type "**1**" and press **<enter>**. The Current Discrete Points list will appear
- Type the number corresponding to the discrete point to edit and press **<enter>**. This will bring up the Discrete Point properties screen.
- Type the number associated with the Point to reconfigure and press **<enter>**. The current configuration of the Point will appear.
- Select the field to edit on the Point, either enter the new value or use the **<tab>** key to change the field and press **<enter>**.
- When the discrete point is configured as desired type "**N**" and press **<enter>** to configure the next point in the list.
- To continue with more configuration changes press **<esc>** three times to return to the Configuration Menu.
- To stop making changes and restart the unit press **<esc>** four times and type "**S**" and press **<enter>** when prompted to save changes and restart the WS1800.

Configuring Analog Points

- If the Main Menu is currently displayed type "**3**" and press **<enter>**. The Configuration Menu will come up.
- Type "**4**" and press **<enter>**. The Point Configuration Menu will appear
- Type "**3**" and press **<enter>**. The Current Analog Points list will appear
- Type the number corresponding to the analog point to edit and press **<enter>**. This will bring up the Analog Point properties screen.
- Type the number associated with the Point to reconfigure and press **<enter>**. The current configuration of the Point will appear.
- Select the field to edit on the Point, either enter the new value or use the **<tab>** key to change the field and press **<enter>**.
- When the analog point is configured as desired type "**N**" and press **<enter>** to configure the next port in the list.
- To continue with more configuration changes press **<esc>** twice to return to the Configuration Menu.
- To stop making changes and restart the unit press **<esc>** three times and type "**S**" and press **<enter>** when prompted to save changes and restart the WS1800.

Configuring Analog Alarm Points

- If the Main Menu is currently displayed type "**3**" and press **<enter>**. The Configuration Menu will come up.
- Type "**4**" and press **<enter>**. The Point Configuration Menu will appear
- Type "**4**" and press **<enter>**. The Current Analog Alarm Points list will appear
- Type the number corresponding to the Analog point to edit and press **<enter>**. This will bring up the Analog Alarm Point properties screen.
- Type the number associated with the Point to reconfigure and press **<enter>**. The current configuration of the Point will appear.
- Select the field to edit on the Point, either enter the new value or use the **<tab>** key to change the field and press **<enter>**.
- When the analog alarm point is configured as desired type "**N**" and press **<enter>** to configure the next point in the list.
- To continue with more configuration changes press **<esc>** three times to return to the Configuration Menu.
- To stop making changes and restart the unit press **<esc>** four times and type "**S**" and press **<enter>** when prompted to save changes and restart the WS1800.

Editing Control Outputs

- If the Main Menu is currently displayed type "**3**" and press **<enter>**. The Configuration Menu will come up.
- Type "**4**" and press **<enter>**. The Point Configuration Menu will appear
- Type "**2**" and press **<enter>**. The Current Control Points list will appear
- Type "**6**" and press **<enter>**.
- Type the number corresponding to the Conrtol Point for editing and press **<enter>**.
- This will refresh the Control Point Configuration Menu so the selected Control Point can be edited.
- Select the field to edit on the Conrtol Point, either enter the new value or use the **<tab>** key to change the field and press **<enter>**.
- When the control point is configured as desired type "**N**" and press **<enter>** to configure the next point in the list.

- To continue with other configuration changes press **<esc>** three times to return to the Configuration Menu.
- To stop making changes and restart the unit press **<esc>** four times and type "**S**" and press **<enter>** when prompted to save changes and restart the WS1800.

Testing Discrete Inputs

- Connect a terminal session to the Craft port as described earlier in the document. Verify that the Main Menu is not active (meaning there are no active prompts).
- Create an alarm on Discrete Input #1 by connecting the appropriate Discrete Input terminal to Status Input Ground. This can be done at the 50 pin connector (if unit so equipped), the wire wrap (if unit so equipped) or at a building wire wrap/alarm termination panel which the WS1800 is connected to. See figures 12 and 11 for WS1800 50 pin connector and wire wrap pinouts.
- Verify that Discrete Input #1 LED lights on the front of the WS1800 when the appropriate pin is connected to ground.
  - Verify that an ASCII message reports on the Craft port showing that Discrete Input #1 has been enabled.
  - Remove the alarm and verify that the LED clears and that another message displays on the Craft session indicating that the alarm has disabled.
- Repeat for all 16 (32) Discrete Inputs.

Testing Control Outputs

Connect a terminal session and enter the main menu as described previously in this document. Log into the WS1800.

- Type "**8**" and press **<enter>**.
  - Ensure that control point one is set for continuous on and execute the command
- Verify that the Control Output #1 LED lights up
  - Ensure that control point 1 is set for continuous off and execute the command
- Verify that the Control Output #1 LED clears.
- Repeat these steps for all Control Outputs.

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7 The WS1800 and SNMP

WS1800 and SNMP Overview

The WS1800 supports SNMP as defined in Request for Comment (RFC) 1157. SNMP is a manager/agent protocol. The agent runs on the WS1800 reporting discrete and control status to the manager. The manager is a Network Management System (NMS).

SNMP also uses request/response messages. The host manager requests information from the WS1800 with a GetRequest message and the WS1800 agent responds with a GetResponse message. The manager can also manipulate variables, such as discrete point parameters, the WS1800 network configuration, or the WS1800 password with SetRequest messages.

The WS1800 SNMP agent can also be configured to send unsolicited status messages, known as SNMP Traps. The WS1800 can inform the NMS host manager of discrete point state changes, control point actuation, and other events using Traps. Traps allow the manager to be informed in real time of events occurring at the agent and still maintain control over polling. Through configuration, the WS1800 can report traps to a maximum of five host managers.

SNMP uses User Datagram Protocol/Internet Protocol (UDP/IP) as a transport protocol. The manager sends requests (polls) to UDP Port 161 and the WS1800 agent sends responses and traps to UDP Port 162. Because UDP is not a guaranteed delivery protocol most managers retransmit a message when no response is received within a specified time.

An optional feature in the WS1800's license is to delay sending alarm traps for 90 seconds following initial power-up or a reboot. This feature causes the WS1800 to send a cold start message but to defer any alarm collection or sending of other traps for 90 seconds. After this interval all alarms will be reported normally. See Chapter 5 "License" to verify if this feature is enabled on your WS1800.

SNMP Trap Usage

Traps for discrete and control points are enabled or disabled through the WS1800 configuration. System traps cannot be disabled as they are considered critical to system operation. Traps are queued for output when an appropriate change of state is detected.

Discrete Point Traps

The discrete point traps are used to indicate when a WS1800 discrete input changes state. A trap is only sent if the point changing state has trapping enabled in the configuration. Discrete point traps contain the following fields detailed in the

ws1800RTUDiscInfo section:

- discreteDisplayIdIndex
- discretePointIdIndex
- discretePointSequenceTag
- discreteCurrentState
- discreteAlarmSeverity
- discreteLastEnabledTime
- discreteLastDisabledTime
- discreteDescription
- discreteAID
- discreteSID
- discreteAIDDet
- discreteAIDType
- discreteCondType
- discreteServAffType
- discreteLoc

Control Point Traps

The control point traps are used to indicate when a WS1800 control point is operated. A trap is only sent if the control point being enabled or disabled has trapping enabled in the configuration. Control point traps contain the following fields detailed in the ws1800RTUCntrlInfo section:

- controlDisplayIdIndex
- controlPointIdIndex
- controlType
- controlOperationDuration
- controlOperationTrigger
- controlDescription

System Point Traps

System traps show errors that occur within the RTU. System traps contain the following fields detailed in the ws1800SysErr section:

sysErrSeqTag

sysErrId

sysErrDescription

sysErrDateTime

sysErrSeqTagAck

SNMP Community Name

The WS1800 configuration contains a list of recognized host IP addresses and the community name associated with them. The WS1800 agent grants READ-ONLY access to anyone using the 'public' community name in their GET requests. In order to use a SNMP SET command on the WS1800 the manager issuing the command must have its IP address in the list of recognized hosts, and the associated community must not be 'public'. The SNMP SET request must be issued with the same community name. A SNMP SET command can only be issued on objects in the MIB that have READ-WRITE access associated with them. In order to use a SNMP SET on any variable on the WS1800, the ws1800Login field must first be set with the password of the WS1800.

Management Information Base

To provide SNMP management capability a database of variables called the Management Information Base (MIB) is used as defined in RFC 1213 and RFC 1155. Using Abstract Syntax Notation 1 (ASN.1), each variable has a globally unique Object Identifier (OID) that consists of a sequence of integers separated by decimal points which is referenced to a textual name. The number/name combination follows a tree structure called Structure of Management Information (SMI).

The WS1800 uses a private MIB (westvXX.mib [XX refers to version number). The MIB allows the NMS to access the WS1800 database and monitor the status of the discrete inputs and control outputs. The monitoring manager software must have compiled this MIB before it can manage the WS1800. Refer to the SNMP host management software documentation for details on how to compile the WS1800 MIB.

WS1800 MIB Structure Overview

This section does not discuss general MIB definitions for SNMP, interfaces, IP, and the like. The following focuses on the definitions from the WS1800 MIB.

The Westronic OID is found in the hierarchal structure under iso.org.dod.internet.private.enterprises (1.3.6.1.4.1). The enterprise number of Westronic Systems Inc. is 10385.

The following are the MIB branches of the WS1800 (found under westronic.products.ws1800):

- ws1800RTUinfo (system information)
- ws1800RTUDiscInfo (discrete point information/access)
- ws1800RTUCntrlInfo (control point information/access)
- ws1800RTUSysErr (system error information)
- ws1800TempHumInfo (temperature and humidty information)
- ws1800AnalogInfo (Analog and MPBM information)

Every OID in the WS1800 MIB begins with:
iso.org.dod.internet.private.enterprises.westronic.products.WS1800 (1.3.6.1.4.1.10385.2.3).

Thus, the six main branches are accessed through the following OID's:

- General System Information:
  iso.org.dod.internet.private.enterprises.westronic.products.WS1800.**ws1800RTUInfo**(1.3.6.1.4.1.10385.2.3.1)
- Discrete Point Information:
  iso.org.dod.internet.private.enterprises.westronic.products.WS1800.**ws1800RTUDiscInfo**
  (1.3.6.1.4.1.10385.2.3.2)
- Control Point Information:
  iso.org.dod.internet.private.enterprises.westronic.products.WS1800.**ws1800RTUCntrlInfo**
  (1.3.6.1.4.1.10385.2.3.3)
- System Errors:
  iso.org.dod.internet.private.enterprises.westronic.products.WS1800.**ws1800RTUSysErr**
  (1.3.6.1.4.1.10385.2.3.4)
- Temperature and Humidity Information:
  iso.org.dod.internet.private.enterprises.westronic.products.WS1800.**ws1800TempHumInfo**
  (1.3.6.1.4.1.10385.2.3.5)
- Analog (MPBM) Information:
  iso.org.dod.internet.private.enterprises.westronic.products.WS1800.**ws1800AnalogInfo**
  (1.3.6.1.4.1.10385.2.3.6)

ws1800RTUinfo

The wsi1800RTUinfo OID subtree contains the system information depository of the RTU, such as manufacturer, software version and checksum. Most values are hard-coded and cannot be changed.

ws1800RTUinfo Object Identifiers

ws1800RTUInfo contains the following OIDs:

ws1800Manufacturer (1.3.6.1.4.1.10385.2.3.1.1.0)	RTU manufacturer name, set by software updates – (32 characters).
ws1800Model (1.3.6.1.4.1.10385.2.3.1.2.0)	Model number, set by software updates – (32 characters).
ws1800FirmwareVersion (1.3.6.1.4.1.10385.2.3.1.3.0)	Firmware version installed on the RTU, set by software updates – (32 characters).
ws1800CS (1.3.6.1.4.1.10385.2.3.1.4.0)	Software checksum – (32 characters)
ws1800LastTech (1.3.6.1.4.1.10385.2.3.1.5.0)	Textual description of the last modification, configured by the user – (100 characters)
ws1800Date (1.3.6.1.4.1.10385.2.3.1.6.0)	The current date value stored on the RTU, in the form: YY-MM-DD (20 characters)
ws1800Time (1.3.6.1.4.1.10385.2.3.1.7.0)	The current time value stored in the RTU, in the form: HH:MM:SS (20 characters)
ws1800TrapEnable (1.3.6.1.4.1.10385.2.3.1.8.0)	Enable or disable the trap sending functionality of the RTU. If this is enabled then each point can be configured to send/not send trap events. If this is disabled no traps will be sent by the RTU.
ws1800SeqTag (1.3.6.1.4.1.10385.2.3.1.9.0)	This value contains the current sequence number being used by the RTU (1 – 120). Every trap sent by the RTU is assigned a unique incremental sequence number. This number can be used to check the expected current trap sequence number for outgoing messages.

ws1800Login (1.3.6.1.4.1.10385.2.3.1.10.0)	This value is used to login a host system to the RTU (20 characters). The SNMP *Get* command returns the string "[user]-[pass]" to keep the password hidden. When the SNMP Set command is sent to the RTU for this OID the RTU will return the input string. In order to use SNMP Set functionality, the host system must be logged into the RTU.
ws1800Logout (1.3.6.1.4.1.10385.2.3.1.11.0)	This is the OID used for logging out the SNMP user. The SNMP *Get* command retrieves one of following three states: - logout (0): when system is logged out - serlogin (1): for successful user password login - dlftusrlogin (2): for successful default user login. Use the SNMP *Set* command with the logout variable to log out of the system.
ws1800ModLogin (1.3.6.1.4.1.10385.2.3.1.12.0)	Field used for password alteration (41 characters). To use this field requires use of the following format "Old password:New password". The OID will return either a success or failure message.
ws1800IPAddr (1.3.6.1.4.1.10385.2.3.1.13.0)	View or modify the system IP address (15 characters maximum). The system requires restart for the IP address change to take effect. The IP address format is {xxx.xxx.xxx.xxx}.
ws1800RouterAddr (1.3.6.1.4.1.10385.2.3.1.14.0)	View or modify the system router address (15 characters maximum). The system requires restart for the router address change to take effect.
ws1800SubnetMask (1.3.6.1.4.1.10385.2.3.1.15.0)	View or modify the system subnet mask (15 characters maximum). The system requires restart for the subnet mask change to take effect.
ws1800SaveConfig (1.3.6.1.4.1.10385.2.3.1.16.0)	This command saves the current RTU configuration to Flash memory and reboots the system. When the string parameter "REBOOT" is Set to this variable the configuration is saved to flash and the RTU is restarted.
ws1800AlarmSummary (1.3.6.1.4.1.10385.2.3.1.18.0)	This field gives access to retrap all current alarm data.

ws1800HostTableEntry Object Identifiers

`ws1800HostTable.ws1800HostEntry` contains the following OIDs:

`ws1800HostEntry.hostIndex` (`1.3.6.1.4.1.10385.2.3.1.17.1.1.x`)	Unique ID of the host information (where "x" equals number of the host: 1 – 5)
`ws1800HostEntry.hostIPAddr` (`1.3.6.1.4.1.10385.2.3.1.17.1.2.x`)	View/modify the host IP address (15 characters maximum). This is the address of the SNMP Manager configured to receive the traps from the RTU. Changes to this variable take effect immediately.
`ws1800HostEntry.CommunityName` (`1.3.6.1.4.1.10385.2.3.1.17.1.3.x`)	View/modify the host community name (32 characters maximum). Changes to this variable take effect immediately. The community name from SNMP cannot be seen, instead has "**********" in the response string to keep other users from gaining access to Read/Write Community names.
`ws1800HostEntry.trapToHost` (`1.3.6.1.4.1.10385.2.3.1.17.1.4.x`)	This field enables/disables the RTU from sending trap events to the configured address.

ws1800RTUInfo OID Properties

The following table summarizes the access and object type properties for each `ws1800RTUInfo` OID:

Object	Access	Object Type
`ws1800Manufacturer`	Read	String
`ws1800Model`	Read	String
`ws1800FirmwareVersion`	Read	String
`ws1800CS`	Read	String
`ws1800LastTech`	Read/Write	String
`ws1800Date`	Read/Write	String

Object	Access	Object Type
ws1800Time	Read/Write	String
ws1800TrapEnable	Read/Write	Integer
ws1800SeqTag	Read/Write	Integer
ws1800Login	Read/Write	String
ws1800Logout	Read/Write	Integer
ws1800ModLogin	Read/Write	String
ws1800IPAddr	Read/Write	String
ws1800RouterAddr	Read/Write	String
ws1800SubnetMask	Read/Write	String
ws1800SaveCnfg	Read/Write	String
ws1800HostTable	N/A	N/A
ws1800AlarmSummary	Read	Integer

ws1800HostTableEntry Properties

The following table summarizes the access and object type properties for each wsiHostTableEntry OID:

Object	Access	Object Type
hostIndex	N/A	Integer
hostIPAddr	Read/Write	String
hostCommunityName	Read/Write	String
trapToHost	Read/Write	Integer

When referencing the hostIPAddr, hostCommunityName, and trapToHost objects the host index needs to be appended to the end of the OID.

ws1800RTUDiscInfo

The ws1800RTUDiscInfo OID is used to access all configured discrete point information.

ws1800RTUDiscInfo Object Identifiers

ws1800RTUDiscInfo contains the following OIDs where "x" is the Display AID of Alarm points ("1" =Discrete, "2" = Analog, "3" = Temp/Humidity) and "y" is the desired point number. See table in Chapter 9 for more information on these "x" and "y" values.

discreteDisplayIdIndex (1.3.6.1.4.1.10385.2.3.2.1.1.1.x.y)	The unique display number of the discrete point.
discretePointIdIndex (1.3.6.1.4.1.10385.2.3.2.1.1.2.x.y)	The unique point number of the discrete point.
discreteReportEnable (1.3.6.1.4.1.10385.2.3.2.1.1.3.x.y)	Enable/disable SNMP traps for the discrete point.
discreteCurrentState (1.3.6.1.4.1.10385.2.3.2.1.1.4.x.y)	This OID shows the current state of the discrete point. A value of 1 indicates open and a value of 2 indicates closed.
discreteAlarmSeverity (1.3.6.1.4.1.10385.2.3.2.1.1.5.x.y)	This OID indicates the severity of the point when it is in alarm. The severity values are as follows: - clear (1) - notAlarmed (2) - routine (3) - minor (4) - major (5) - critical (6)
discreteLastAlarmTime (1.3.6.1.4.1.10385.2.3.2.1.1.6.x.y)	This 20-character value indicates the last recorded time the discrete point changed from the Off to On state and has the "YY-MM-DD HH:MM:SS" format.
discreteLastClearTime (1.3.6.1.4.1.10385.2.3.2.1.1.7.x.y)	This 20-character value indicates the last recorded time the discrete point changed from the On to Off state and has the "YY-MM-DD HH:MM:SS" format.
discreteDescription (1.3.6.1.4.1.10385.2.3.2.1.1.8.x.y)	The 32-character textual description of the discrete point.
discreteSequenceTag (1.3.6.1.4.1.10385.2.3.2.1.1.9.x.y)	A unique correlation tag number to identify events as they happen.
discreteSeqTagAck (1.3.6.1.4.1.10385.2.3.2.1.1.10.x.y)	This flag will be set (unacknowledged) upon activation of a discrete alarm input. Flag will be cleared (acknowledged) upon receipt of a valid sequence.
discreteAlarmState (1.3.6.1.4.1.10385.2.3.2.1.1.11.x.y)	The condition when the discrete point goes into alarm: - open (1) - closed (2)

discreteAID (1.3.6.1.4.1.10385.2.3.2.1.1.12.x.y)	Alarm identifier for the point, 20 characters
discreteSID (1.3.6.1.4.1.10385.2.3.2.1.1.13.x.y)	Site identifier for the point, 20 characters
discreteAIDDet (1.3.6.1.4.1.10385.2.3.2.1.1.14.x.y)	Workgroup for the point, 3 characters
discreteAIDType (1.3.6.1.4.1.10385.2.3.2.1.1.15.x.y)	AID type for the point, 4 characters
discreteCondType (1.3.6.1.4.1.10385.2.3.2.1.1.16.x.y)	Condition type for the point, 10 characters
discreteServAffType (1.3.6.1.4.1.10385.2.3.2.1.1.17.x.y)	Service affecting (SA) or non service affecting (NSA), 3 characters.
discreteLoc (1.3.6.1.4.1.10385.2.3.2.1.1.18.x.y)	Location or CLLI, 10 characters

discreteTable Properties

The following table summarizes the access and object type properties for each discreteTable OID:

Object	Access	Object Type
discreteDisplayIdIndex	N/A	Integer
discretePointIdIndex	N/A	Integer
discreteReportEnable	Read/Write	Integer
discreteCurrentState	Read	Integer
discreteAlarmSeverity	Read/Write	Integer
discreteLastAlarmTime	Read	String
discreteLastClearTime	Read	String
discreteDescription	Read/Write	String
discreteSequenceTag	Read/Write	Integer
discreteSeqTagAck	Read/Write	Integer
discreteAlarmState	Read/Write	Integer
discreteAID	Read	String
discreteSID	Read	String
discreteAIDDet	Read	String

Object	Access	Object Type
discreteAIDType	Read	String
discreteCondType	Read	String
discreteServAffType	Read	String
discreteLoc	Read	String

Note: When referencing the discreteTable objects, the display and point index must be appended to the OID.

discreteLogEvents

The following section describes the *LogEventTable* OID. The *LogEventTable* OID allows the SNMP Manager to use the *Get* and *Getnext* commands to retrieve discrete alarm histories. Whenever an alarm state is reached by any point an entry is made in the event log. The event log can be accessed through the dlBufferIndex and discreteLogEvents subtree OIDs. Through SNMP, the *Getnext* command will retrieve each event in the log sequentially.

discreteLogEventTable Properties

The discreteLogEventTable OID is a circular buffer of discrete, control, and system events. The buffer records the circumstances of an event as a trap is generated. The following points can be considered to help determine what type of event is in the log:

- All fields are populated for a discrete event.
- The discreteLogSequenceTag is always null for a control event.
- The discreteLogLastDisabledTime is always a null string for system events.

The discreteLogEventTable contains the following OIDs:

discreteLogBufferIndex (1.3.6.1.4.1.10385.2.3.2.2.1.1.x)	This circular history buffer stores 40 events. The desiered dlBufferIndex number must be appended to reference data in the position "x".
discreteLogDisplayIdIndex (1.3.6.1.4.1.10385.2.3.2.2.1.2.x)	WS1800 has one display.
discretelLogPointIdIndex (1.3.6.1.4.1.10385.2.3.2.2.1.3.x)	The WS1800 has 16 discrete points.

discreteLogReportEnable (1.3.6.1.4.1.10385.2.3.2.2.1.4.x)	Displays if the WS1800 will send a trap when the point changes state.
discreteLogCurrentState (1.3.6.1.4.1.10385.2.3.2.2.1.5.x)	Displays the state the point went into to cause the alarm message.
discreteLogAlarmSeverity (1.3.6.1.4.1.10385.2.3.2.2.1.6.x)	Indicates alarm severity corresponding to one of the following values: - clear (1) - notAlarmed (2) - routine (3) - minor (4) - major (5) - critical (6)
discreteLogLastAlarmTime (1.3.6.1.4.1.10385.2.3.2.2.1.7.x)	Date-time of last change of states from not alarmed to in alarm. Format is "YY-MM-DD H:MM:SS"
discreteLogLastClearTime (1.3.6.1.4.1.10385.2.3.2.2.1.8.x)	Date-time of last change of states from in alarm to not alarmed. Format is "YY-MM-DD H:MM:SS"
discreteLogDescription (1.3.6.1.4.1.10385.2.3.2.2.1.9.x)	ASCII description of the discrete point. Max of 32 characters.
discreteLogSequenceTag (1.3.6.1.4.1.10385.2.3.2.2.1.10.x)	Unique sequence number to identify messages. A number (1 – 120) assigned by the RTU system.
discreteLogSeqTagAck (1.3.6.1.4.1.10385.2.3.2.2.1.11.x)	Reserved for future use
discreteLogAlarmState (1.3.6.1.4.1.10385.2.3.2.2.1.12.x)	Displays the state in which the discrete point is in alarm, either open (1) or closed (2)

ws1800RTUCntrlInfo

The wsiRTUCntrlInfo OID describes and allows control point actuation. Control point information can be retrieved and control points can be activated through the Craft, telnet or SNMP port. In the following table "y" is the control point number.

The wsiRTUCntrlInfo sub-tree contains the following OIDs:

controlDisplayIdIndex (1.3.6.1.4.1.10385.2.3.3.1.1.1.1.y)	The unique display number of the control point.
controlPointIdIndex (1.3.6.1.4.1.10385.2.3.3.1.1.2.1.y)	The unique point number of the control point.
controlReportEnable (1.3.6.1.4.1.10385.2.3.3.1.1.3.1.y)	Enable/Disable SNMP traps for the control point

controlType (1.3.6.1.4.1.10385.2.3.3.1.1.4.1.y)	This OID defines how to operate the control point. The three valid states are: - momentary (1) - continuousOn (2) - continuousOff (3)
controlOperationDuration (1.3.6.1.4.1.10385.2.3.3.1.1.5.1.y)	The duration of a momentary operation of the control. Possible durations are between 400 ms (default) and 999 ms.
controlOperationTrigger (1.3.6.1.4.1.10385.2.3.3.1.1.6.1.y)	This OID is used to instruct the RTU to execute the command selected by the controlType OID. Setting this OID to activate (1) causes the control to become operated.
controlLastOperateTime (1.3.6.1.4.1.10385.2.3.3.1.1.7.1.y)	This 20-character value indicates the last recorded time the control point changed from the Off to On state and has the "YY-MM-DD HH:MM:SS" format.
controlLastReleaseTime (1.3.6.1.4.1.10385.2.3.3.1.1.8.1.y)	This 20-character value indicates the last recorded time the control point changed from the On to Off state and has the "YY-MM-DD HH:MM:SS" format.
controlDescription (1.3.6.1.4.1.10385.2.3.3.1.1.9.1.y)	The 32-character textual description of the discrete point.

controlTable Properties

The following table summarizes the access and object type properties for each controlTable OID:

Object	Access	Object Type
controlDisplayIDIndex	Read	Integer
controlPointIDIndex	Read	Integer
controlReportEnable	Read/Write	Integer
controlType	Read/Write	Integer
controlOperationalDuration	Read/Write	Integer
controlOperationTrigger	Read/Write	Integer
controlLastOperateTime	Read	String
controlLastReleaseTime	Read	String
controlDescription	Read/Write	String

Note: When referencing the controlTable objects, the display and point index must be appended to the OID.

ws1800SysErr

The ws1800SysErr OID contains each of the system notifications with regard to the RTU. The information can be retrieveed through the Craft port or via SNMP.

ws1800RTUSysErr Object Identifiers

The ws1800RTUSysErr sub-tree contains the following OID's:

sysErrSegTag (1.3.6.1.4.1.10385.2.3.4.1)	The unique ID number of the system error .
sysErrId (1.3.6.1.4.1.10385.2.3.4.2)	System error ID number (1-14) as shown in Table 7-1 WS1800 SNMP Error Messages.
sysErrDescription (1.3.6.1.4.1.10385.2.3.4.3)	A 32-character description of the error corresponding to the sysErrId.
SysErrDateTime (1.3.6.1.4.1.10385.2.3.4.4)	A 20-character representation of the date and time error occurred.
sysErrSeq (1.3.6.1.4.1.10385.2.3.4.5)	Reserved for future use

Table 7-1 WS1800 SNMP Error Messages

SysErrId	Description	Occurrence
1	"System Error"	
2	"Login threshold exceeded"	After three failed login attempts
3	"System Out of service"	When entering Config Mode (v1.2)
4	"Memory Checksum Fail"	After power-up if calculation does not match stored checksum
5	"Disc./Cntrl HW busy_err"	When hardware driver sees that the application has not finished with last changes
6	"System In Service"	When exiting from Config Mode (v1.2)
7	"User Enter WS1800 Config-CRFT"	When entering Configuration Menu. (v2.0)
8	"User Exit WS1800 Config-CRFT"	When exiting Configuration Menu. (v2.0)
9	"Remote Access Connection"	Telnet access to RTU for remote configuration. (v2.0)
10	"Remote Access Disconnect"	Telnet access to RTU Terminated. (v2.0)
11	"User Enter WS1800 Config-RMT"	When entering Configuration Menu through Telnet access. (v2.0)

12	"User Exit WS1800 Config-RMT"	When exiting Configuration Menu through Telnet access. (v2.0)
13	"Craft Access Connection"	When entering WS1800 Menu. (v2.0)
14	"Craft Access Disconnect"	When exiting WS1800 Menu. (v2.0)

ws1800RTUSysErr Properties

The `ws1800RTUSysErr` portion of the WS1800 MIB contains the following objects. Unlike discrete and control traps, the ws1800TrapEnable parameter does not deactivate these traps.

Object	Access	Object Type
`sysErrSeqTag`	Read	Integer
`sysErrID`	Read	Integer
`sysErrDescription`	Read	String
`sysErrDateTime`	Read	String

ws1800TempHumInfo Object Identifiers

ws1800 TempHumInfo contains the following OIDs:

`temp1Value (1.3.6.1.4.1.10385.2.3.5.1.0)`	Display onboard temp sensor value in Celsius as a string.
`temp1FValue (1.3.6.1.4.1.10385.2.3.5.2.0)`	Display onboard temp sensor value in Fahrenheit as a string.
`temp2Value (1.3.6.1.4.1.10385.2.3.5.3.0)`	Display first expansion temp sensor value in Celsius as a string.
`temp2FValue (1.3.6.1.4.1.10385.2.3.5.4.0)`	Display first expansion temp sensor value in Fahrenheit as a string.
`hum1Value (1.3.6.1.4.1.10385.2.3.5.5.0)`	Display first expansion humidity sensor value in relative humidity % as a string.
`temp3Value (1.3.6.1.4.1.10385.2.3.5.6.0)`	Display second expansion temp sensor value in Celsius as a string.
`temp3FValue (1.3.6.1.4.1.10385.2.3.5.7.0)`	Display second expansion temp sensor value in Fahrenheit as a string.
`hum2Value (1.3.6.1.4.1.10385.2.3.5.8.0)`	Display second expansion humidity sensor value in relative humidity % as a string.

TempHum Table Properties

The following table summarizes the access and object type properties for each `TempHumInfo` OID:

Object	Access	Object Type
`temp1Value`	Read	String
`temp1FValue`	Read	String
`temp2Value`	Read	String
`temp2FValue`	Read	String
`hum1Value`	Read	String
`temp3Value`	Read	String
`temp3FValue`	Read	String
`hum2Value`	Read	String

Note: When referencing the `TempHumInfo` objects, the display and point index must be appended to the OID.

ws1800AnalogInfo Object Identifiers

ws1800AnalogInfo contains the following OIDs:

`anlg1Value (1.3.6.1.4.1.10385.2.3.6.1.0)`	Analog input 1 value as a string (0 - 60 volt)
`anlg2Value (1.3.6.1.4.1.10385.2.3.6.2.0)`	Analog input 2 value as a string (0 - 60 volt)
`anlg3Value (1.3.6.1.4.1.10385.2.3.6.3.0)`	Analog input 3 value as a string (0 - 60 volt)
`anlg4Value (1.3.6.1.4.1.10385.2.3.6.4.0)`	Analog input 4 value as a string (0 - 60 volt)
`anlg5Value (1.3.6.1.4.1.10385.2.3.6.5.0)`	Analog input 5 value as a string (0 - 60 volt)
`anlg6Value (1.3.6.1.4.1.10385.2.3.6.6.0)`	Analog input 6 value as a string (0 - 60 volt)
`anlg7Value (1.3.6.1.4.1.10385.2.3.6.7.0)`	Analog input 7 value as a string (0 - 60 volt or -100 – 100mV)

anlg8Value (1.3.6.1.4.1.10385.2.3.6.8.0)	Analog input 8 value as a string (0 - 60 volt or -100 – 100mV))

Ws1800AnalogInfo Table Properties

The following table summarizes the access and object type properties for each AnalogInfo OID:

Object	Access	Object Type
anlg1Value	Read	String
anlg2Value	Read	String
anlg3Value	Read	String
anlg4Value	Read	String
anlg5Value	Read	String
anlg6Value	Read	String
anlg7Value	Read	String
anlg8Value	Read	String

Note: When referencing the AnalogInfo objects, the display and point index must be appended to the OID.

Configuring the WS1800 via SNMP Interface

This section contains the basic concepts and operations that are required to configure and monitor the WS1800 via SNMP.

General

To view OIDs that make up the WS1800 database, use the SNMP *Get* command.

To view MIB objects, use the configured and enabled Community Name that is configured and enable at least one host with the "public" Community Name.

To modify leaf node values there must be one host Community Name configured and enabled with something other than "public".

Before viewing or modifying any of the parameters (except ws1800login), the user must login to the WS1800 using SNMP. To do this, perform a SNMP *Set* command on the OID ws1800Login (sub-tree under ws1800RTUinfo). Set the datatype to Octet String and enter the password to login. The default password is "shipping". To see if log in is successful, send the SNMP *Get* command on the ws1800Logout object. The response is "usrlogin" if the login is successful.

After logging into the WS1800, viewing or modifying parameters can be performed. Remember to add the index numbers to the OID when referencing objects in a table. These WS1800 tables require the following:

- ws1800HostTable requires a HostIndex number
- discreteTable requires the Display number (1) and Point number
- discreteLogEventTable requires Buffer index number
- controlTable requires Display number (1) and Point number

Modify the password Using SNMP

Perform a *Set* command on the ws1800ModLogin. Choose the datatype to be Octet String. The string sent must contain the current password followed by the new password separated by a colon.

Operate a control point Using SNMP

First perform *a Set* on the controlType and cOperationDuration (if momentary operational state). Refer to the WS1800 MIB section for valid values and the datatypes.

Next use the SNMP *Set* command on the controlOperationTrigger with an Integer value of 1 (activate).

Write the WS1800 database to FLASH Using SNMP

After making configuration changes to the WS1800 database, perform the SNMP *Set* command on the ws1800SaveCnfg object under ws1800RTUinfo. Set the datatype to Octet String and the value to "REBOOT". This causes the WS1800 to save the current configuration and restart.

How to set the Date and Time Using SNMP

Use the SNMP *Set* command on the ws1800Date object. Set the datatype to Octet String. Use the format YY-MM-DD for the date to set. Next use the *Set* command on the ws1800Time object. With a datatype of Octet String, use the format HH:MM:SS to set the time.

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8 The WS1800 and TL-1

WS1800 and TL-1 Overview

TL-1 is a communications protocol used to integrate alarm, status, control, performance, test, and provisioning information from a telecommunications network. TL-1 uses ASCII-style messages designed such that information is human readable as it transfers from a network element or mediation device to the host. TL-1, which is compliant with Bellcore specification GR-833-CORE Issue 2, runs on standard transport technologies.

The TL-1 protocol has structured fields and syntax, but uses different syntax structures based on the message type. The WS1800 makes use of a subset of this message protocol.

The TL-1 reporting protocol can be accessed on the WS1800 through both LAN and modem telnet connections and can be configured to send out a heartbeat message at a set interval time.

An optional feature in the WS1800's license is to delay the reporting of alarms following initial power-up or a reboot. This feature causes the WS1800 to immediately begin establishing Northbound connectivity but defer collecting or reporting any alarms for 90 seconds. After this interval all alarms will be reported normally. See Chapter 5 "License" to verify if this licensed feature is enabled on your WS1800.

TL-1 Parameter Definitions

The following are the definitions of the parameters found in most of the TL-1 messages. Parameters that are unique to a message will be defined under the description of that particular message.

`AID` Access Identifier (maximum of 20 characters) is used to identify the entity in the NE to which the message pertains. The AID consists of letters, digits, and hyphens. NOTE: This is a unique access identifier for each alarm and generally should NOT be changed from default. See chapter 9 of this manual for a list of WS1800 AID's.

`AIDTYPE` Access Identifier Type is used to categorize an alarm. It is NOT a free form text field it allows the user to choose from a list. (EQPT,T1, T3, OC3, LINK)

`ALMCDE` Alarm code (2 characters) which indicates the severity of the message. If multiple alarms are being reported, then the ALMCDE is the highest severity of the reported alarms. Valid values are shown in the following table.

Value	Meaning
*C	Critical Alarm
**	Major Alarm
*^	Minor Alarm
A^	Automatic Message

ATAG — Automatic message tag (5 characters) is a parameter that is used by the Operating System (OS) to determine if any autonomous messages were missed. The WS1800 uses whole numbers (1 - 65535) for this field.

CLLICODE — Common Language Location Identifier (10 characters) is a parameter that is used to identify the location of an alarm point.

CONDDESCR — Condition Description (31 characters) is a parameter that contains the detailed text description of the alarm or event. It is comprised of a maximum of 31 characters (use of punctuation characters is not recommended). This parameter is always enclosed with slash-quote (/") delimiters.

CONDTYPE — Condition Type (10 characters) is a parameter that identifies the type of event, condition or alarm indication being reported. Complete lists of valid values are found in *GR-833_CORE Appendix C*. Spaces and punctuation are not supported in this parameter.

ANALOG alarms will have one of the CONDTYPE values from the following table: Note: the *units* field in the following table is the textual representation of the engineering units for the monitored values, as configured in the database (i.e. °F).

Value	Description
T-HIHI-*units*	HIHI limit exceeded
T-HI-*units*	HI limit exceeded
T-LO-*units*	LO limit exceeded
T-LOLO-*units*	LOLO limit exceeded

CONTSTATE — Control State (4 characters)is a parameter that is used to indicate the state of an external control. The common values are in the following table.

Value	Description
OPER	Operated
RLS	Released
NA	Not Applicable (i.e. dur=MNTRY)

CTAG — Correlation Tag (maximum of 6 characters) is a parameter used to correlate the input and response messages. CTAG is assigned by the OS and is an alphanumeric identifier for the point.

DUR — Duration (5 characters) is a parameter that Indicates the duration of the external control operation. Valid values are shown in the following table:

Value	Description
CONTS	Continuous duration
MNTRY	Momentary duration

ERRCDE — Error Code (4 characters) is a parameter that describes why a command was rejected or failed.

Error Code	Description
ENRS	Equipage, Not equipped for Restoration.
FRNR	RTU Does Not Reply.
ICNV	Invalid Command Input. The command is not recognized or not supported.
IDNV	Invalid Data Parameter. The value of a data parameter is invalid or exceeds monitored range.
IDRG	Invalid Range. A parameter falls outside the allowable range.
IICT	Invalid CTAG input. The CTAG is blank.
IIFM	Input data format wrong.

Error Code	Description
IISP	Input syntax or punctuation wrong.
IITA	Invalid Target Identifier. The TID syntax is bad or the indicated TID is not monitored by the RTU.
INUP	Non-Null Unimplemented Parameter Input. A parameter which is not used by the RTU was input.
IPMS	Parameter Missing or too many parameters.
IPNV	Input parameter not valid
PLNA	Privilege, Login Not Active
SDNR	Status, Data Not Ready
SSRE	Status, System Resources Exceeded

NTFCNCDE — Notification code (2 characters) is the parameter indication the severity of the individual alarms or events in a response or autonomous message. Valid values are shown in the table below:

Value	Description
CR	Critical Alarm
MJ	Major Alarm
MN	Minor Alarm
RN	Routine Alarm
NA	Not Alarmed
CL	Clear Alarm

OCRDAT — Occurrence Date (5 characters) is the parameter that identifies the date when the specific event occurred. The form is MM-DD, where MM = month (1-12) and DD = day (1-31).

OCRTM — Occurrence Time (8 characters) is the parameter that identifies the time of day the specific event occurred. The form is HH-MM-SS, where HH=hour of day (0-23), MM=minute of hour (0-59), and SS=second of minute (0-59).

SID — Source identifier (20 characters) is the parameter that identifies the source of the TL-1 message. This parameter can be configured independently of the TID to give greater granularity with regards to alarms.

SRVEFF — Service Effecting (3 characters) is the parameter that identifies the effect on service caused by the standing or alarm condition. Valid values include the following:

SA =Service-effecting condition

NSA = Not service-effecting condition

TID — Target Identifier (20 characters) is the parameter that identifies the target NE to which a command is directed.

- The value of TID is limited to letters, digits, and hyphens.
- The value of TID may be null when the OS directly interfaces with the target NE.
- The recommended value for the TID, when it is used, is the target's CLLI code.

WG — Work Group (3 characters) is a three-character user definable field downloaded to the alarm point database.

Supported TL-1 Command/Responses Messages

This section describes the TL-1 messages supported by the WS1800. Each command description gives the command level, input format, normal and error responses, and in many cases, examples of input commands and normal responses.

Each message is assigned an access level. There are five levels (1, 2, 3, 4, and 5). Each user is assigned an access level that allows use of all commands with that level or lower. For example, a user with an access level of 4 can issue all the commands that have an access level of 1, 2, 3, or 4.

The notations used in this document correspond to those of the *GR-833-CORE Issue 2* and are as appear in table below:

<cr>	A carriage return character in American Standard Code for Information Interchange (ASCII).
<lf>	A line feed character in ASCII.
^	The ^ character indicates a blank (space character) that must appear in the message.
[ ]	One or more parameters (including delimiters) enclosed within brackets [ ] indicates that parameters are optional.
{ | | }	A list of two or more parameters enclosed within braces { } and separated by a pipe | indicates that one (and only one) of the parameters must be selected from the list.
( )	The parentheses are used to enclose a group of symbols for the following operators "*" and "+". The parentheses are not transmitted.
*	The asterisk is a post-fix operator that indicates the preceding symbol or group of symbols (enclosed in parentheses) may occur zero or more times.
+	The plus sign is a post-fix operator that indicates the preceding symbol or group of symbols (enclosed in parentheses) may occur one or more times.
UPPERCASE	Uppercase characters in format expression shall appear as they are in the message.
Italics	Italics are used to indicate parameters that are NOT defined in the parameter definitions section. These definitions will be defined below the input format of that message.

NOTE:

Backspace is not available when entering TL-1 commands. If a mistake is made while entering a TL-1 command, press the semi-colon key and start over.

ACT-USER (Activate User) (Level 1)

Activate User logs a user in to the WS1800. Each TL-1 command has an associated privilege level that is checked against the privilege level of the current user logged in before the command is executed. To execute a TL-1 command, a user with the appropriate privilege level must first use the ACT-USER command to log on. The password and username are case sensitive. The ACT-USER command leaves an entry in the TL-1 Operations Log every time it is performed successfully.

Note: CANC-USER (Cancel User) is used to log off the current user.

Input Format

```
ACT-USER:[tid]:uid:ctag::pid;
```

Example

```
ACT-USER::MTC:ct::shipping;
```

Normal Response

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^COMPLD<cr><lf>
;
```

Example

```
   RTU134 01-07-20 12:52:38
M  ct COMPLD
;
```

Error Response

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^DENY<cr><lf>
^^^errcde<cr><lf>
;
```

Example

```
   RTU134 01-09-20 09:40:54
M  ctag01 DENY
   IPNV
;
```

CANC-USER (Cancel User) (Level 1)

Cancel User is used to log the current user off of the RTU.

Input Format

```
CANC-USER:[tid]:uid:ctag;
```

Example

```
CANC-USER::MTC:ct;
```

Normal Response

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^COMPLD<cr><lf>
;
```

Example

```
   RTU134 01-07-24 14:45:58
M  ct COMPLD
;
```

Error Response

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^DENY<cr><lf>
^^^errcde<cr><lf>
;
```

Example

```
   RTU134 01-09-20 10:02:33
M  ct DENY
   IPMS
;
```

OPR-EXT-CONT (Operate External Control) (Level 3)

Operate External Control instructs the WS1800 to operate an external control, such as a relay activation. The control can be momentary (MNTRY) or latched (CONTS). The control can be released by using the RLS-EXT-CONT command. The OPR-EXT-CONT command inserts an entry in the TL-1 Operations Log every time it is performed successfully.

Input Format

```
OPR-EXT-CONT:[tid]:aid:ctag::,dur;
```

Where *dur* relates to the type of the control that is issued. The dur types are:

- CONTS the control is to remain on, until the control is released.
- MNTRY control is turned on for a specific amount of time, and then it is released.

Examples

```
OPR-EXT-CONT::DISCRETEC-1-1:ct::,CONTS;
OPR-EXT-CONT::DISCRETEC-1-8:ct::,MNTRY;
```

Normal Response

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^COMPLD<cr><lf>
;
```

Example

```
   RTU134 01-07-24 15:47:08
M  ct COMPLD
;
```

Error Response

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^DENY<cr><lf>
^^^errcde<cr><lf>
;
```

Example

```
   RTU134 01-09-20 10:55:24
M  ct DENY
   IIFM
;
```

RLS-EXT-CONT (Release External Control) (Level 3)

Release External Control instructs the WS1800 to release an external control, such as a relay deactivation. The control release can be momentary (MNTRY) or continuous (CONT). The RLS-EXT-CONT command inserts an entry in the TL-1 Operations Log every time it is performed successfully.

Input Format

```
RLS-EXT-CONT:[tid]:aid:ctag::,dur;
```

Where *dur* relates to the type of the control that is issued. The *dur* types are:

- CONTS the control is to remain on, until the control is released.
- MNTRY control is turned on for a specific amount of time, and then it is released.

Examples

```
RLS-EXT-CONT::DISCRETEC-1-1:ct::,CONTS;
RLS-EXT-CONT::DISCRETEC-1-4:ct::,MNTRY;
```

Normal Response

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^COMPLD<cr><lf>
;
```

Example

```
    RTU134 01-07-24 15:47:08
M  ct COMPLD
;
```

Error Response

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^DENY<cr><lf>
^^^errcde<cr><lf>
;
```

Example

```
   RTU134 01-09-20 10:55:24
M  ct DENY
   IIFM
;
```

RTRV-ALM (Retrieve Alarm) (Level 1)

Retrieve Alarm message requests that the WS1800 report a list of all standing alarms in the system, to the requesting TL-1 session. The returned alarms are sorted first by their SID and then sorted second according to their severity.

Input Format

```
RTRV-ALM[:[tid]:[aid]:ctag];
```

Examples

```
RTRV-ALM:::ct;
RTRV-ALM;
```

Normal Response (No Alarms)

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^COMPLD<cr><lf>
;
```

Example

```
   RTU134 01-07-24 15:51:56
M  ct COMPLD
;
```

Normal Response (One or More Alarms)

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^COMPLD<cr><lf>
(^^^"aid,aidtype:ntfcncde,condtype,srveff,ocrdat,ocrtm
,
cllicode,:conddescr,wg"<cr><lf>)
```

Example

```
   RTU134 01-07-24 15:55:12
M  ct COMPLD
   "DS5PA-2-1-1-1,DS5000-154:CR,FL,SA,03-10,10-44-
14,CLGRAB21,:\"Flood Room 13\",FC"
   "INACS-4-1-1-1,INACS12:CR,GP,SA,03-10,10-44-
14,CLGRAB41,:\"Smoke Alarm 12\",FR"
   "TBOS-6-1-1,WS2000-1564:MJ,GP,SA,03-10,10-44-
08,CLGRAB61,:\"Power Supply 132 Failure\",EN"
   "DISCRETE-1-1,WS1800-134:MN,GP,SA,03-10,10-44-
25,CLGRAB01,:\"Door Alarm 32\",FC"
;
```

Error Response

<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^DENY<cr><lf>
^^^errcde<cr><lf>
;

Example

```
   RTU134 01-09-20 10:59:07
M  ct DENY
   ICNV
;
```

RTRV-HDR (Retrieve Header) (Level 1)

Retrieve Header requests that the WS1800 reply with a normal response indicating COMPLD. The information of interest in the reply is the reply itself, along with information about the RTU, such as the sid, date and time. This message is commonly used as a heartbeat message to ensure that the RTU is still connected and responding.

Input Format

```
RTRV-HDR:::ctag;
```

Example

```
RTRV-HDR:::ct;
```

Normal Response

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^COMPLD<cr><lf>
;
```

Example

```
   RTU134 01-07-24 15:51:56
M  ct COMPLD
;
```

Error Response

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^DENY<cr><lf>
^^^errcde<cr><lf>
;
```

Example

```
   RTU134 01-09-20 10:59:07
M  ct DENY
   ICNV
;
```

RTRV-VAL (Retrieve Value) (Level 1)

Retrieve Value requests the WS1800 to reply with current temperature (TEMP) or humidity (HUMI) values for a given AID.

Input Format

```
RTRV-VAL::<valid parameter>:ct;
```

Examples of Valid Parameters

RTRV-VAL::TEMP-01:ct; (onboard temperature sensor of WS1800)

RTRV-VAL::TEMP-02:ct; (optional TEMP/HUM pod, using pod address CS1)

RTRV-VAL::HUMI-01:ct; (optional TEMP/HUM pod, using pod address CS1)

RTRV-VAL::TEMP-03:ct; (optional TEMP/HUM pod, using pod address CS3)

RTRV-VAL::HUMI-02:ct; (optional TEMP/HUM pod, using pod address CS3)

Normal Response, not in alarm

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^COMPLD<cr><lf>
"aid:ntfcncde,T-threshold-units,srveff,ocrdat,ocrtm,
cllicode,,curval,almthreshold:conddescr,wg"<cr><lf>)
;
```

Example

```
   WS1800 15-06-23 13:41:58
M  ct COMPLD
   "TEMP-01:CL,T-HI-DegreeCelsius,NSA,06-23,13-41-
58,NEAR,,25.812,50.000:TEMPERATURE VALUE,EN"
;
```

Normal Response, Value in alarm

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^COMPLD<cr><lf>
"aid:ntfcncde,T-threshold-units,srveff,ocrdat,ocrtm,
cllicode,,curval,almthreshold:conddescr,wg"<cr><lf>)
;
```

Example, in alarm

```
   WS1800 15-06-29 15:06:36

M  ct COMPLD

   "TEMP-02:RN,T-LO-DegreeCelsius,NSA,06-29,15-06-
36,NEAR,,24.240,25.000:TEMPERATURE VALUE,EN"

;
```

Error Response

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^DENY<cr><lf>
^^^errcde<cr><lf>
;
```

Example

```
   RTU134 01-09-20 10:59:07
M  ct DENY
   ICNV
;
```

Error Response – (No data in Parameter)

e.g. *Parameter requested is for pod, no pod present*

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
M^^ctag^DENY<cr><lf>
^^^errcde<cr><lf>
;
```

Example

```
   WS1800 15-06-29 12:50:47

M  ct DENY

   SDNR

;
```

Autonomous TL-1 Messages

REPT-ALM (Report Alarm)

Report Alarm is generated by the RTU to report the occurrence of alarmed events. In general, an alarmed event causes a standing condition that has immediate or potential impact on the operation or performance of the entity. Some form of maintenance effort is required to restore normal operation or performance of the entity after the event has occurred.

Message Format

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
almcde^atag^REPT^ALM^{EQPT|COM}<cr><lf>
(^^^"aid:ntfcncde,condtype,srveff,ocrdat,ocrtm,cllicode,[,[monval],[thlev]]:co
nddescr,wg"<cr><lf>);
```

Example

```
   RTU130 01-07-25 11:46:44
A   00040 REPT ALM AID1
   "DISCRETE-1-1:CL,GP,SA,03-15,14-03-14,CLGRAB01,:\"Flood Sensor\",EN"
;
```

REPT-EVT (Report Event)

Report Event is generated by the RTU to report the occurrence of non-alarmed events. The event being reported may be the change of a status or the occurrence of an irregularity, which by itself is not severe enough to warrant an alarm notification. An event is usually indicative of a maintenance condition, which does not require immediate attention.

The WS1800 can be configured to send a heartbeat event message. The heartbeat message is continuously sent at a configured time interval.

Message Format

```
<cr><lf><lf>
^^^sid^YY-MM-DD^HH:MM:SS<cr><lf>
A^^atag^REPT^EVT^{EQPT|COM}<cr><lf>
(^^^"aid:condtype,condeff,ocrdat,ocrtm,cllicode,/”conddescr/”,wg"<cr><lf>);
```

Example

```
   RTU17 02-05-28 08:49:45
A  00009 REPT EVT EQPT
   "DIAGS-6:GP,TC,10-23,00-34-48,CLLI,:12 m HEARTBEAT-STARTUP,WG"
```

9 Additional Product Information

This chapter offers additional information about the WS1800.

WS1800 Alarm Display List

To WS1800 Alarm Display list is shown below in a format which gives information which used to append specific SNMP OID fields with “x” and “y” information. The AIDs listed are the factory defaults for TL1 alarms followed by a description of the point information.

Table 9-1 Alarm Display and AID list

Display “x”	Point number “y”, AID, Description	Display “x”	Point number “y”, AID, Description
1	1, **DISCRETE-1-1, Discrete Point 01**	**2**	12**, ANAALARM_2_12, Analog #03 HI**
1	2, **DISCRETE-1-2, Discrete Point 02**	**2**	13**, ANAALARM_2_13, Analog #03 HIHI**
1	3, **DISCRETE-1-3, Discrete Point 03**	**2**	14**, ANAALARM_2_14, Analog #04 LOLO**
1	4, **DISCRETE-1-4, Discrete Point 04**	**2**	15**, ANAALARM_2_15, Analog #04 LO**
1	5, **DISCRETE-1-5, Discrete Point 05**	**2**	16**, ANAALARM_2_16, Analog #04 HI**
1	6, **DISCRETE-1-6, Discrete Point 06**	**2**	17**, ANAALARM_2_17, Analog #04 HIHI**
1	7, **DISCRETE-1-7, Discrete Point 07**	**2**	18**, ANAALARM_2_18, Analog #05 LOLO**
1	8, **DISCRETE-1-8, Discrete Point 08**	**2**	19**, ANAALARM_2_19, Analog #05 LO**
1	9, **DISCRETE-1-9, Discrete Point 09**	**2**	20**, ANAALARM_2_20, Analog #05 HI**
1	10, **DISCRETE-1-10, Discrete Point 10**	**2**	21**, ANAALARM_2_21, Analog #05 HIHI**
1	11, **DISCRETE-1-11, Discrete Point 11**	**2**	22**, ANAALARM_2_22, Analog #06 LOLO**
1	12, **DISCRETE-1-12, Discrete Point 12**	**2**	23**, ANAALARM_2_23, Analog #06 LO**

1	13, **DISCRETE-1-13, Discrete Point 13**	**2**	24**, ANAALARM_2_24, Analog #06 HI**
1	14, **DISCRETE-1-14, Discrete Point 14**	**2**	25**, ANAALARM_2_25, Analog #06 HIHI**
1	15, **DISCRETE-1-15, Discrete Point 15**	**2**	26**, ANAALARM_2_26, Analog #07 LOLO**
1	16, **DISCRETE-1-16, Discrete Point 16**	**2**	27**, ANAALARM_2_27, Analog #07 LO**
1	17, **DISCRETE-1-17, Discrete Point 17**	**2**	28**, ANAALARM_2_28, Analog #07 HI**
1	18, **DISCRETE-1-18, Discrete Point 18**	**2**	29**, ANAALARM_2_29, Analog #07 HIHI**
1	19, **DISCRETE-1-19, Discrete Point 19**	**2**	30**, ANAALARM_2_30, Analog #08 LOLO**
1	20, **DISCRETE-1-20, Discrete Point 20**	**2**	31**, ANAALARM_2_31, Analog #08 LO**
1	21, **DISCRETE-1-21, Discrete Point 21**	**2**	32**, ANAALARM_2_32, Analog #08 HI**
1	22, **DISCRETE-1-22, Discrete Point 22**	**2**	33**, ANAALARM_2_33 , Analog #08 HIHI**
1	23, **DISCRETE-1-23, Discrete Point 23**	**3**	1**, T_H_ALARM_3_1, Temperature #01 LOLO**
1	24, **DISCRETE-1-24, Discrete Point 24**	**3**	**2, T_H_ALARM_3_2, Temperature #01 LO**
1	25, **DISCRETE-1-25, Discrete Point 25**	**3**	**3, T_H_ALARM_3_3, Temperature #01 HI**
1	26, **DISCRETE-1-26, Discrete Point 26**	**3**	**4, T_H_ALARM_3_4, Temperature #01 HIHI**
1	27, **DISCRETE-1-27, Discrete Point 27**	**3**	**5, T_H_ALARM_3_5, Temperature #02 LOLO**
1	28, **DISCRETE-1-28, Discrete Point 28**	**3**	**6, T_H_ALARM_3_6, Temperature #02 LO**
1	29, **DISCRETE-1-29, Discrete Point 29**	**3**	**7, T_H_ALARM_3_7, Temperature #02 HI**
1	30, **DISCRETE-1-30, Discrete Point 30**	**3**	**8, T_H_ALARM_3_8, Temperature #02 HIHI**
1	31, **DISCRETE-1-31, Discrete Point 31**	**3**	**9, T_H_ALARM_3_9, Humidity #01 LOLO**
1	32, **DISCRETE-1-32, Discrete Point 32**	**3**	**10, T_H_ALARM_3_10, Humidity #01 LO**
2	1**, ANAALARM_2_1, Analog Module Failure**	**3**	**11, T_H_ALARM_3_11, Humidity #01 HI**
2	2**, ANAALARM_2_2, Analog #01 LOLO**	**3**	**12, T_H_ALARM_3_12, Humidity #01 HIHI**

2	3**, ANAALARM_2_3, Analog #01 LO**	**3**	**13, T_H_ALARM_3_13, Temperature #02 LOLO**
2	4**, ANAALARM_2_4, Analog #01 HI**	**3**	**14, T_H_ALARM_3_14, Temperature #03 LO**
2	5**, ANAALARM_2_5, Analog #01 HIHI**	**3**	**15, T_H_ALARM_3_15, Temperature #03 HI**
2	6**, ANAALARM_2_6, Analog #02 LOLO**	**3**	**16, T_H_ALARM_3_16, Temperature #03 HIHI**
2	7**, ANAALARM_2_7, Analog #02 LO**	**3**	**17, T_H_ALARM_3_17, Humidity #02 LOLO**
2	8**, ANAALARM_2_8, Analog #02 HI**	**3**	**18, T_H_ALARM_3_18, Humidity #02 LO**
2	9**, ANAALARM_2_9, Analog #02 HIHI**	**3**	**19, T_H_ALARM_3_19, Humidity #02 HI**
2	10**, ANAALARM_2_10, Analog #03 LOLO**	**3**	**20, T_H_ALARM_3_20, Humidity #02 HIHI**
2	11**, ANAALARM_2_11, Analog #03 LO**	**-**	---

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