Westronic

WS2000 E2A Telemetry Remote

SPEC-0017 Rev I August 2007

Technical Manual

Technical Manual

Westronic Systems, Inc.
a Mediation Technology company

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. It has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15, Subpart J of the FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. 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.

The FCC label can be found on the right side of the shelf assembly. The label includes the following information:

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

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Revision History

Rev Level	Issue Date	Reason for Reissue
A	January, 1990	First Release
B	May, 1990	Corrections
C	February, 1991	Incorporate Wesmaint Software Information
D	November, 1995	Format Update and Additional Corrections
E	October, 1999	Conversion to FrameMaker, Update Logo
F	July, 2001	Logo Update
G	July, 2001	Minor corrections to auto para numbering
H	June, 2005	Updated address and fax
I	August, 2007	Updated address

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1 Product Description

1.1 Overview

The WS2000 E-Telemetry Remote is the solution for economically expanding the capabilities of any Operations Support System that collects E-Telemetry information. Its ability to combine multiple TBOS serial ports and discrete I/O logic into one E-Telemetry serial output allows it to:

- Collect TBOS serial and discrete I/O logic data at sites remote from a variety of host management systems and mediation devices, including AT&T TASC and TCAS systems, Bellcore's NMA system, and Northern Telecom's 7025 mediation device.
- Extend the coverage range of the network.

The WS2000 E-Telemetry Remote is a one rack-increment high unit, that interfaces with network elements and general station equipment, via multiple TBOS serial and discrete I/O logic interfaces. These interfaces are used to collect alarm and status information from, as well as pass control information to, various types of equipment at the site. A single E-Telemetry serial interface provides communications with the next higher level of the network management system.

It is made up of a Bin and Back Plane Assembly, Motherboard and E2A Mediation and Serial Port Expansion Board. Several optional boards including a 202T Modem, VFCT Modem, RS-232 Annunciator and Discrete Expansion Board, are available as plug-in Daughter boards for the Mother board.

WS2000 E-Telemetry Remote units are connected to the host management system via a direct connection or modem (built-in or external). This simplifies and lowers the cost of collecting alarm/surveillance and control data from remote sites. Due to the WS2000's high degree of data concentration and economical cost, sites that were previously thought uneconomical to monitor, can now be included in an alarm telemetry network.

The WS2000 E-Telemetry Remote is available in many different configurations.

1.2 Features

1.2.1 Front Panel Controls and Indicators

Figure 1-1 is an illustration of the WS2000 front panel.

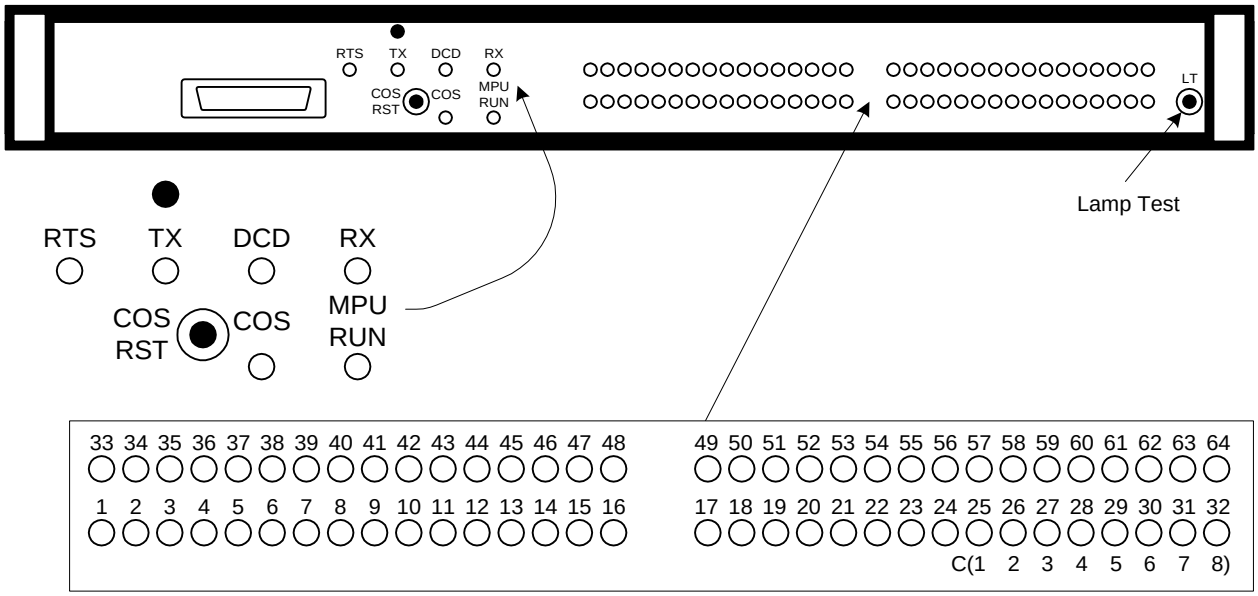

Figure 1-1 WS2000 Front Panel

1.2.1.1 Indicators

Table 1-1 defines the purpose and functions of all front panel indicators.

Table 1-1 Front Panel Indicators

Indicator	Title	Function
MPU RUN	Microprocessor Run LED	Indicates proper initialization and operation of microcomputer and real-time operating system software. Failure indicated if "Off"
COS	Change-of-State LED	Indicates input (serial/discrete) change-of-state (alarm)
STATUS/ALARM LED (**1-32**)	Input Indications	Alarm present on point (1-32). LED's 25-32 are indications for control outputs 1-8 if backplane jumper Z7 is installed
STATUS/ALARM LED (**33-64**)	Input Indications	Alarm present on point (33-64). LED's 57-64 are indications for control outputs 9-16 if backplane jumper Z9 is installed
* **RTS**	Request-To-Send	Carrier Output
* **TX**	Transmit	Transmit data indication
* **DCD**	Data Carrier Detect	Carrier Frequency Received
* **RX**	Receive	Receive data indication

* If the WS2000 E-Telemetry Remote unit is equipped with an optional 202T Modem or Annunciator.

1.2.1.2 Pushbuttons

Table 1-2 defines the purpose and functions of the front panel pushbuttons.

Table 1-2 Front Panel Pushbuttons

Button	Title	Function
COS RST	Change-of-State Reset	Reset COS LED and central office alarm annunciator (ACO)
LT	Lamp Test	Lights all Status/Alarm LEDs

1.2.1.3 Modem Output Level Adjustment

If the optional WS2000 E-Telemetry Remote 202T/V. 23 modem is installed, its transmit output level can be adjusted with a front panel adjustment. The adjusting screw is located at the top of the front panel, above the TX LED. Turn the adjusting screw clockwise to increase the output level, and counter-clockwise to decrease it.

1.2.2 Expansion Capability

The WS2000 E-Telemetry Remote's capabilities can be increased with the addition of up to 3 Serial Expansion Units (Slaves). Each slave unit provides an additional capacity of up to 8 TBOS serial interfaces, 64 discrete inputs, and 16 discrete outputs. Each master and each slave can be connected to up to 7 discrete expanders. Each discrete expander unit can provide up to an additional 64 discrete inputs and 16 discrete outputs.

A fully expanded WS2000 E-Telemetry Remote system can provide 31 TBOS serial interfaces, 2048 discrete inputs,and 512 discrete outputs.

1.2.3 Discrete Interfaces

The WS2000 E-Telemetry Remote master, slave, and discrete expander units each handle 32 status/alarm inputs with an on-board expansion capability of up to 64 inputs each. They provide 8 relay control outputs with an expansion capability of up to 16 outputs each. LED indications are provided for status/alarm inputs and control outputs.

Discrete logic inputs must be referenced to either + or - battery as desired. These inputs require "wetting" current to operate. WS2000 E-Telemetry Remotes and Discrete Expanders derive their wetting current from the power input.

The discrete logic outputs (control points) utilize either magnetically latched Form C (SPDT) or Form A (SPST) relay contacts. They may be individually operated in either momentary or latched modes. In latched mode, the last output is magnetically held, to ensure that the output will remain during power outages. Control output type (Form A or C) is determined by backplane jumper connections (Refer to Figure 2-12). Form A outputs are normally open contacts. Form C outputs are provided as both normally open and normally closed. The wiper of each Form C relay is connected to a common control voltage. Figure 1-2 shows Form A and Form C configuration.

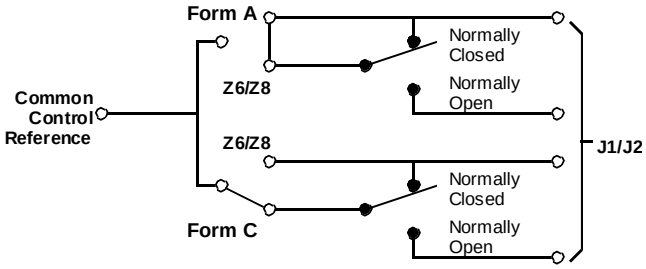

Figure 1-2 Form A and Form C Control Output Configuration

Groups of 8 relay outputs may be strapped directly as status inputs, through jumper strap selections (backplane jumper Z7 for outputs 1-8 and jumper Z9 for outputs 9-16). This allows status monitoring of control outputs. Outputs 1-8 are routed to input points 25 - 32, and outputs 9-16 are routed to input points 57-64. If either or both of these options is used, the discrete point input capability is reduced from 32 to 24 or 64 to 48 inputs.

1.2.4 Serial Interfaces

A fully loaded WS2000 E-Telemetry Remote master or slave unit comes equipped with 10 serial ports. Channel 1 of a master unit supports E-Telemetry host communications, and can use either RS-232, RS-422 or RS-485 interface. Channel 1 of a slave unit is for communications with the master unit. Channels 2-5 are for TBOS data collection and can also use either RS-232, RS-422 or RS-485 interface. Channels 6 - 9 are for TBOS data collection, but can only use RS-422 interface. All TBOS collection channels on a master unit can also be used for interface with a WS2000 slave unit. Channel 10 is an RS-232, 9600 bps port used for CRAFT interface. The host communications interface (Channel 1) can also have an optional internally mounted BELL 202T/CCITT V. 23 modem that provides two or four wire (jumper strap selectable) voice frequency interface. Front panel LEDs indicate transmit data,receive data, request-to-send and carrier detection activity. Transmit output level adjustments can be made via an access hole in the front panel. The master unit's TBOS serial port capability

can be expanded, via up to three slaves, using one of its TBOS serial ports for master/slave(s) interface. The master/slave configuration uses an internal Westronic Asynchronous Protocol (WAP).

Each slave unit provides serial ports that are identical to those in a Master unit, with the slave's host port communicating with one of the master's serial ports. If using RS-485 communications, all 3 slaves may be connected to the same master unit port.

1.2.5 Configuration and Diagnostics

A maintenance port (CRAFT port) is accessible via connectors on both the front and rear of the master and slave units. They are used to perform configuration and diagnostics. The input data to the unit and the data as it is to be reported to the host, can be viewed from either of these ports. Major functions accessible at these ports are:

- Configure custom or standard data point process lists.
- Assign process lists to the available data collection inputs (discrete or TBOS serial ports).
- Configure and map the data collection displays into the 60 displays available on the E-Telemetry host communications port. The E-Telemetry protocol defines the first four displays and does not allow user configuration.

Most of the configuration data required by the slave units is programmed and stored in the master unit, and downloaded automatically to the slave units at power-up time. This communication is done through the WAP interface and is selectable at 1200, 2400, 4800 or 9600 bps. A new slave unit can be installed with minimal reconfiguration effort. Localization of configuration data also allows data transfer between the master and slave units to be relatively transparent, thus simplifying the WS2000 E-Telemetry Remote configuration set-up.

Optional four digit hexadecimal password control can be set into the Master and/or Slave units. The password resides on the 1k EPROM located on the WS2000 shelf, thus the password is retained, even if the plug-in is removed or replaced.

1.2.6 Power and Support Design

A watchdog/power supply monitor circuit is used to facilitate power-up and power-down. It also provides an automatic initialize reset/restart capability. An MPU RUN indication is provided by a front panel LED and a rear panel relay output contact. Event change-of-state (COS) conditions are indicated by a front panel COS LED and a rear panel relay

output. A COS RESET front panel pushbutton is provided for local COS reset. COS can also be reset remotely via a rear panel connection.

The WS2000 operates on either -24 or -48 Vdc power. Master and slave units have their own integral power supply for meeting on-board logic supply requirements and for powering Discrete Expander units. Wetting current to the Discrete Expanders is provided by their own power inputs.

The rear panel of the WS2000 has a terminal block for input site battery power connections, four-wire modem lines, COS reset and MPU RUN output contacts. It also has two 50 position delta-type connectors for discrete I/O, and ten 8-pin connectors for the 10 serial channels.

The WS2000 E-Telemetry Remote has a metal enclosure for shielding and support, and compact mechanical packaging for easy rack mounting.

1.2.7 Rack Mount Modem

Rack mount modem panels allow a WS2000 data collection serial port to operate on a 2 or 4 wire FSK circuit. Two types of modem are available; 1) 0 - 4kHz 202T/CCITT V. 23 modem (P/N 520-T001) and 2) 4 - 8kHz VFCT modem (P/N 590-T238). They each require only 1 vertical space (1.75") in a standard 19" equipment rack. Rack mount adapters are included for mounting in a 23" rack.

The front of the panels have four LED indicators to annunciate RTS, TX, DCD, and RXD. Strap Z1 on the circuit board assemblies select normal RTS or continuous carrier operation. Continuous carrier operation allows the Craft technician to align the transmit output of the modem module.

1.2.8 WESMAINT and PC-WESMAINT

The WS2000 uses the WESMAINT to enter and view its configuration information. WESMAINT information and operating procedures are located in Sections 4 and 5. The PC-Wesmaint package (P/N 567-T007) provides a Wesmaint interface using a PC as the Wesmaint unit. It can also retrieve, view, and download WS2000 E-Telemetry Remote configuration information.

1.2.9 Wire-Wrap Interface Options

Three wire wrap interface options are available for use with the WS2000. They are:

- Telzon Interface Assembly
- Rear Access Wire Wrap Assembly
- Front Access Wire Wrap Assembly

Each provides a method for wiring discrete and/or serial connections via wire wrap pins.

1.2.9.1 Telzon Interface Assembly

The Telzon termination panel is a standard "Type 89 Block". It provides front panel wire-wrap access to all discrete and serial connections. Up to two blocks can be mounted on the same mounting bar. Interconnecting cables are provided to accommodate all wire wrap interfaces. Refer to Section 2 of this guide for more detailed information on the Telzon assemblies.

The Telzon Interface Assembly is ideally suited for central office installations, where 4 vertical rack spaces are available for the WS2000 unit and interface assembly. Features of this unit include:

- 64 discrete alarm inputs (status input and status input return)
- 16 discrete control outputs (form A only)
- 8 serial collection ports
- Host communications port

Part numbers for this unit are 533-T011 (23" mounting) and 533-T030 (19" mounting).

1.2.9.2 Rear Access Interface Assembly

The Rear Access Interface Assembly is ideally suited for installations where only 1 vertical rack space (1.75") is available for all alarm equipment. It preserves the 1 increment space for each WS2000 unit. The Rear Access Interface Assembly mounts onto the WS2000 back plane connectors and provides the capability to make all rear panel connections via wire wraps on the front of the rack. The assembly allows connection of up to 64 discrete inputs, 16 control outputs (form A or C), 8 serial input ports, 1 E2A host port and 1 CRAFT port.

1.2.9.3 Front Access Interface Assembly

The Front Access Interface Assembly is suitable for controlled environment vault (CEV) installations, where there is limited rack space and front access to all connections is required. It requires 1 vertical rack increment in addition to the one used by the WS2000. It provides wire wrap access to all discrete, serial, and power connections on the

WS2000. Interconnecting cables are supplied with the unit to accommodate the wire wrap interfaces.

Features of this unit include:

- 64 discrete alarm inputs (status input and status input return)
- 16 discrete control outputs (form A)
- 8 serial collection ports
- 1 serial host port
- Power input
- Frame ground
- Local MPU RUN relay and audible alarm relay
- External ACO reset input

The part number for this unit is 533-T032 for the 19" or 23" mounting.

1.3 Specifications

1.3.1 Electrical

- Input Voltage Range: -20 to -60 Vdc

1.3.1.1 Typical Power Requirements

- No input sense currents: 5 W
- 64 inputs sense currents: 24 W
- Fusing: 1.3 A (GMT or Type 70) with -24Vdc input

  0.75 A (GMT or Type 70) with -48 Vdc input

1.3.1.2 Switching Power

External power is available from the E-Telemetry Remote unit.

- Supply Outputs: +5. 0 Vdc ± 5% @ 1. 5 A (Max.)

  ±12. 0 Vdc ± 10% @ 400 mA ea. (Max.)

  12. 0 W Total output power

1.3.2 Interfaces

1.3.2.1 Parallel Interface

- WPIB (Westronic Peripheral Interface Bus)
- 8 WPIB Addresses assigned to WS2000 E-Telemetry Remote for use by Discrete Expanders

1.3.2.2 Serial Ports

1.3.2.2.1 Channel 1 (Master unit)

- E-Telemetry protocol
- RS-232/RS-422/RS-485 Selectable
- Optional: Westronic 202T / V. 23 MODEM, 1200 baud, Bell 202T/CCITT V. 23 compliant, FSK, TX Output: +1 dBm (Max), RX sensitivity: -6 to -42 dBm, 2-Wire or 4-Wire modem
- Connectors: TB1 (with internal modem), P6 or P12

1.3.2.2.2 Channel 1 (Slave unit)

- WAP protocol, Asynchronous, 8 data bit characters, No Parity, 1 Stop Bit, 1200/2400/4800/9600 bps selectable
- RS-232/RS-422/RS-485 Selectable
- Optional: Westronic 202T/V. 23 MODEM, 1200 baud, Bell 202T/CCITT V. 23 compliant, FSK, TX Output: +1 dBm (Max.), RX Sensitivity: -6 to -42 dBm, 2-Wire or 4-Wire modem
- Connectors: P6, P12 or TB1

1.3.2.2.3 Channels 2 - 5 (Data Collection Ports)

- TBOS protocol, Asynchronous, 8 bit characters, Odd Parity, 2 Stop Bits, 1200 or 2400 bps
- RS-232/RS-422/RS-485 Selectable
- Connectors: CH2 = P4, CH3 = P11, CH4 = P3, CH5 = P10

1.3.2.2.4 Channels 6 - 9 (Data Collection Ports)

- TBOS protocol, Asynchronous, 8 bit characters, Odd Parity, 2 Stop Bits, 1200 or 2400 bps
- RS-422
- Connectors: CH6 = P8, CH7 = P1, CH8 = P9, CH9 = P2

1.3.2.2.5 WESMAINT (Maintenance Port)

- Asynchronous, 7-bit character, Even Parity, 1 Stop Bit, 9600 bps
- RS-232C
- +5 Vdc, +12 Vdc, -12 Vdc
- PROGEN (Program Enable/EEPROM Write Enable)
- Connectors: P5 or front access DB25

Note: Any one of Master unit channels 2 through 9, can be set to interface with the slave units as follows:

- WAP Protocol, Asynchronous, 8 bit characters, No parity, 1 stop bit, 1200/2400/4800/9600 bps selectable
- RS-422 (channels 2 through 9)
- RS-232/RS-485/RS-422 selectable (channels 2 through 5 ONLY)

1.3.2.2.6 Status/Alarm Inputs

- 32 or 64 photo-coupled inputs arranged in groups of 8, with a single common for all inputs.
- + Battery (Common) , - Battery (-48 Vdc/-24 Vdc)
- Input current: 3 to 5 mA per point
- Logic level input voltage for the following options:
  - -24 Vdc

    -18 to -30 Vdc for point OFF (Open)

    > -8 Vdc for point ON
  - -48 Vdc

    -40 to -60 Vdc for point OFF (Open)

    > -12 Vdc for point ON
- Logic level sensing may be inverted through maintenance port configuration setup.

1.3.2.2.7 Control Outputs

- 8 or 16 relay control outputs (Latched available on displays 5 - 12 only).
- Momentary/latched control points can be operated via either the CRAFT port or E2A Host.
- Contact Arrangement (Selectable per output):
- SPST Normally Open (Form A) or SPDT (Form C) with common control voltage applied to common contact wiper.

- Contact Ratings:
  - 2A @ 30 Vdc
  - 0. 6A @ 110 Vdc
  - 60W (Max.) Switching Power

1.3.2.2.8 Auxiliary Outputs

- MPU RUN Relay Output: SPDT (FORM C).
- COS Relay Output: SPDT (FORM C).
- Contact Ratings:
  - 2A @ 30 Vdc
  - 0. 6A @ 110 Vdc
  - 60W (MAX.) Switching Power

1.3.2.2.9 Auxiliary Input

- COS RESET input (+ battery pulse)

1.3.2.3 Environmental

- Operating ambient temperature range: 0°C to +55°C
- Humidity: < 95% non-condensing.

1.3.2.4 Mechanical

- Dimensions:
  - Width = 17. 375" (44. 13 cm)
  - Height = 1. 75" (4. 4 cm)
  - Depth = 8. 0" (20. 3 cm)
  - Weight = 5. 3 lbs. (2. 4 Kg). Max.
- Mounting: 19" (48. 26 cm) Rack mount, or 23" (58. 42 cm) Rack mount (with optional adapters)
- Connectors:
  - **TB1 -** 14 position, Dual Level, compression terminal block, accepts #14 to #24 AWG.
  - **P1-P6, P8-P13 -** 8 position, header terminal connectors. Mating connectors manufactured by Methode (P/N 300-108-424; Westronic P/N 620-0077).

- **P7 -** 34 position, ribbon cable header. Mating connector manufactured by AMP (housing P/N 499977-8; pins P/N 499141-8; Westronic P/N 610-T002).
- **J1, J2 -** 50 position, female, Delta-type connectors. Mating connector manufactured by TRW (P/N 97-12500-180; Westronic P/N 620-0078).

1.4 Unit Identification and Expansion Information

Figure 1-3 through Figure 1-5 illustrate the maximum expansion capabilities of the WS2000 E-Telemetry Remote.

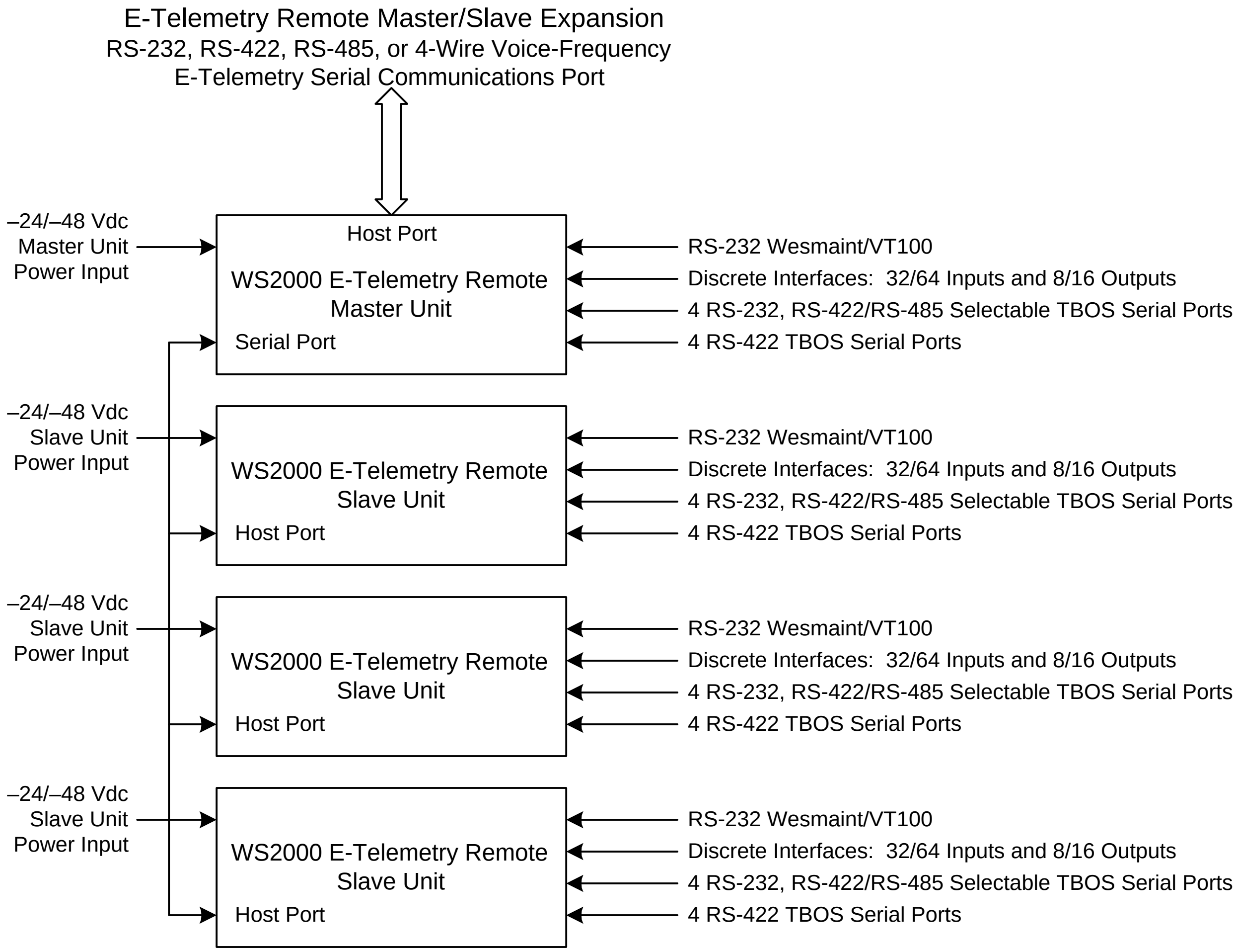

Figure 1-3 Maximum Master/Slave Expansion

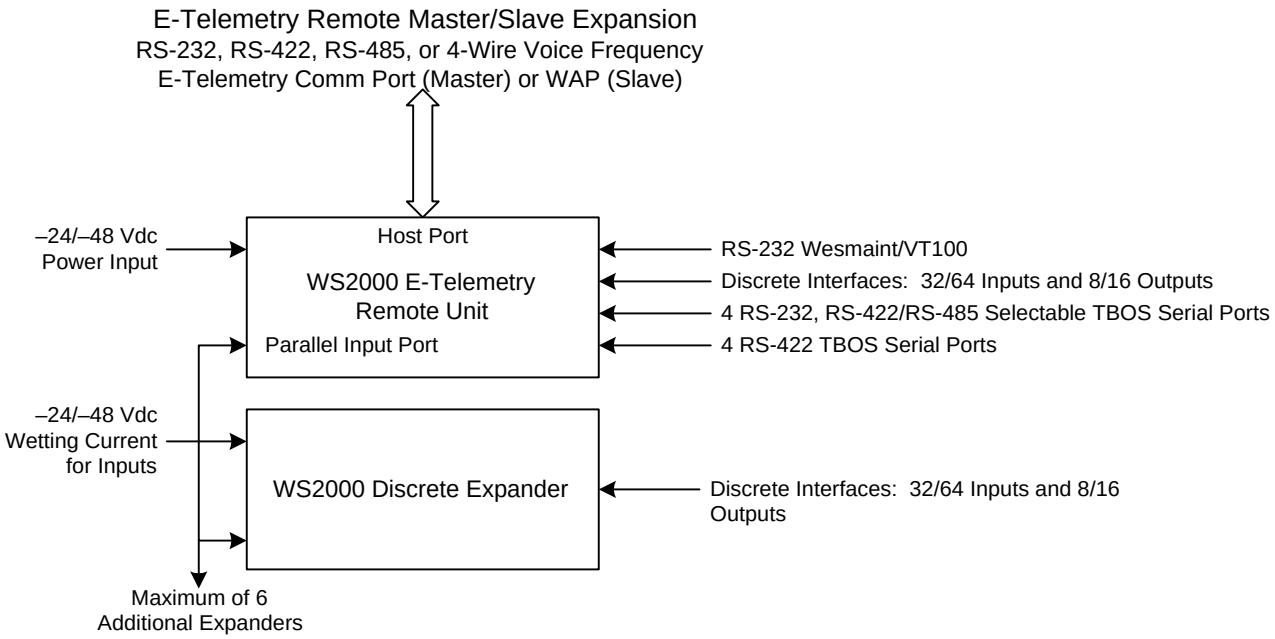

Figure 1-4 Maximum Discrete Expansion

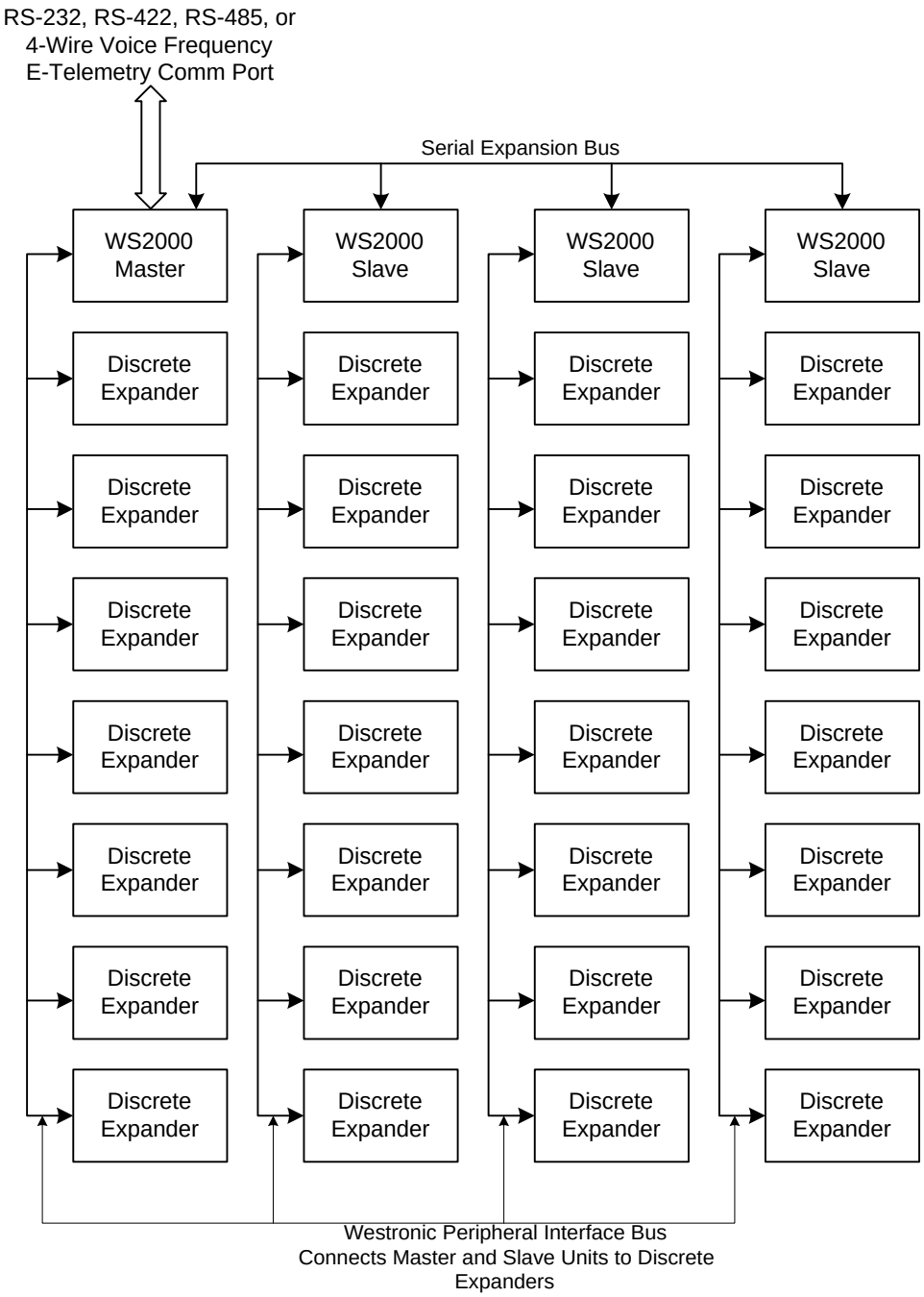

Figure 1-5 Maximum WS2000 Expansion Capability

1.5 Other Products from Westronic Systems

The following information is provided about other Westronic products which are available to meet alarm system needs. Call **972-235-5292** and talk with a Westronic representative to learn more about these and other Westronic Systems Products.

1.5.1 C1000

C1000 Centurion 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.

Different versions of the C1000 allow communications with either a TABS or TBOS host. The C1000 can pass through polls for other addresses. This permits C1000 units to be daisy-chained for larger configurations, and permits the C1000 and local network elements telemetry data to be combined into a single channel. In some cases, data can be combined through a single modem.

The C1000 requires only 1 vertical space (1.75")in either a 19" or 23" equipment rack, allowing it to be located 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. This reduction in wiring eliminates the possibility of losing data through unknown disconnected, moved or cut wiring. Serial and discrete interface are via standard DE9 and 50-Pin connectors, making installation and replacement exceptionally fast and simple.

The C1000 is equipped with two serial ports. The Host Port serves as a TABS or TBOS host communications interface and can be equipped with an optional 1200 baud Bell 202T compatible internal modem, allowing the C1000 to be located beyond the range of standard RS-422/RS-485 interfaces. The Expansion Port serves as a TABS or TBOS data collection interface. The housing can also accommodate up to eight 50 pin discrete interface connectors. This same housing is used with all of the different configurations.

1.5.2 WS1000

The Terminator 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 to a simple, easy-to-handle TABS or TBOS interface.

Available configurations provide the flexibility to select the unit best suited for various applications. Choose from 64 to 128 discrete inputs and from 8 to 40 discrete outputs.

Small size and flexible mounting requirements allow placement of the unit close to the source of discrete interfaces. It may be mounted 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 Terminator. All active components are located on the easily removable module contained within the housing. The WS1000 is the ideal way to collect discrete alarms throughout a site or service area with feedback to a WS2000 or WS3000 hub.

1.5.3 WS2000

The SmartScanner product line offers the data collection and reporting capabilities necessary to make small remote telemetry units more flexible and efficient. SmartScanners 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. A single-rack-increment high unit fits within 19" or 23" racks. Other mountings are available.

A WS2000 Remote can be equipped with:

- 4 or 8 serial ports supporting user-selectable RS-232, RS-422, and RS-485 interfaces at 1200 and 2400 bps.
- 32 to 512 discrete alarm/status inputs and 8 to 128 discrete control outputs; expandable to 2,048 inputs and 512 outputs in some configurations.
- 8 Pulse accumulator inputs (optional)
- 8 Analog inputs (optional), expandable to 24 analog inputs.
- Host port interface at RS-232, RS-422, and RS-485 at 1200 2400, and 9600 bps. An optional internal modem is available.

To support a broad range of equipment, the SmartScanner can incorporate many interface types:

- Asynchronous and Synchronous serial
- Discrete inputs and outputs
- Analog and Pulse inputs

Some of the many types of serial protocols available include:

- E-Telemetry (E2A format)
- TABS
- TBOS
- MCS-11

1.5.4 WS3000

The WS3000 is a powerful telemetry unit that combines the most useful functions of discrete and serial alarm collection, mediation and access with a high-speed processor and large data base capacity. It is the ideal bridge between today's telemetry networks and the advanced protocols now appearing. With Ethernet and X. 25 connectivity, data base capacity to over 30,000 data points, and the power to handle advanced ASN. 1 and Q. 3 protocols, the WS3000 is the choice of quality telecommunications carriers. WS3000 Remote features include:

- 8 serial ports supporting user-selectable RS-232, RS-422, and RS-485 interfaces from 1200 to 9600 bps.
- 32 to 512 discrete alarm/status inputs and 8 to 128 discrete control outputs. Can support up to 30,000 serial-based, discrete, control and analog points.
- Synchronous or asynchronous host port with DMA and host port interface at RS-232, RS-422 or RS-485 at up to 64000 bps. An optional 202T-compliant modem is also available.
- 8 Analog inputs. Cover up to 24 analog inputs with expanders.
- Modular software written in C
- Available suite of protocols includes TABS, TBOS, E2A, TEL-TRAC and TL1
- Custom protocols are available on a special assembly basis
- Host interfaces include X.25, CLNP, OSI 7 layer stack, Q-LAN, SONET-LAN and TCP/IP

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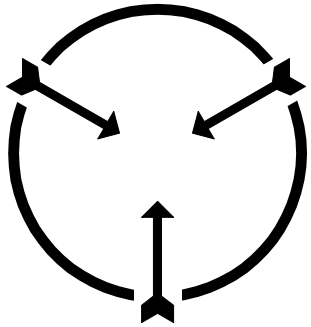
2 Installation

2.1 General

This section describes installation and hardware configuration of the WS2000 E-Telemetry Remote. The first paragraph describes handling considerations and precautions. The final paragraphs describe the physical layout of the unit.

2.2 Handling Considerations/Precautions

CAUTION is necessary when handling WS2000 E-Telemetry Remote modules because they contain CMOS and NMOS integrated circuits. These components provide maximize noise immunity and promote low power consumption. CMOS and NMOS integrated circuits can become damaged if subjected to high static voltage levels. These devices are equipped with protection diodes, however incorrect handling can allow static energy to enter the devices that may still cause device failure. Failure may not be readily detected and could lead to premature device failure over a period of time. Figure 2-1 shows the label that appears on packaging for these components.



Static Sensitive
Maintain Antistatic Protection

Figure 2-1 Electrostatic Discharge (ESD) Label

The following points are worth noting as they will significantly reduce static damage to CMOS or NMOS components, improving system reliability and keeping downtime to a minimum.

- Before removing or inserting WS2000 E-Telemetry Remote modules, ensure they are not carrying static charges. The proper use of heel or wrist ESD straps, and contacting system racks which are earth grounded, will prevent damage to sensitive components.

- After a WS2000 E-Telemetry Remote module is extracted, it must always be placed into an anti-static bag or covering for transportation and storage.
- Repair work on WS2000 E-Telemetry Remote modules should be carried out on an anti-static work station with personnel grounded (i.e., wrist-straps and anti-static matting in work station).
- Exercise extreme care when handling CMOS/NMOS components. Do NOT to touch their pins, and always place them in anti-static foam for storage and transportation.
- When using de-soldering tools, ensure they have static reduction. Some de-soldering tools can actually generate large static voltages that will damage CMOS and NMOS devices.

The following list identifies CMOS and NMOS integrated circuits commonly used in Westronic equipment. Handle these devices with great care as noted.

68B09(MPU)	88C681(DUART)
82C55(PPI)	6264(RAM)
65256(RAM)	28C64(EEPROM)
28C256(EEPROM)	27C256
14XXX	40XXX
74HCXXX	74CXXX
7555	

2.2.1 Module Substitution

When a WS2000 E-Telemetry Remote module requires replacement, or when substituting modules to quickly facilitate board diagnosis, the following important points should be kept in mind.

- Turn power off when removing or inserting modules. The boards are designed to withstand removal and insertion with power on, however it is recommended practice to turn the system power supply off when module substitution is required.
- Make sure the substitute board is the same type, and contains the same options, as the original board.
- When substituting modules, make sure EPROMs and current firmware are properly installed on the substitute board. Ensure each pin is mated correctly in the socket, and that they are not bent.
- Ensure substitute modules mate properly with the connectors at the rear of their bin. Never jam a board into position, as this may damage both the board and the connectors. If the module does not easily plug into position, determine why, prior to continuing

installation. When plugging a module into position, a firm push with the thumbs on the lower portion of the front should be all that is required. Use the side handles to remove a module, by gently rocking it from the bin until it is free of the connectors.

Actual module repair should be carried out only by qualified electronic technicians who are familiar with microcomputers and I/O interfacing. It is recommended that these personnel become more attuned to the WS2000 E-Telemetry Remote, by attending a training course where special circuit concepts and applications may be addressed.

When returning a faulty module, include a note describing the suspected problem, fault or symptom, and any other information that may aid in isolating and repairing the module.

2.3 Installation Procedures

The following paragraphs describe how to install the WS2000 E-Telemetry Remote master and slave units into a permanent location.

2.3.1 Bolting the Unit

The WS2000 E-Telemetry Remote is a standard one increment high shelf. Its dimensions are:

Width: 17.375"

Height: 1.75"

Depth: 8.0"

The unit mounts into a standard 19" rack. Adapters are included which allow mounting in a 23" rack. Figure 2-2 is an installation outline drawing applicable to a master, slave, or discrete expander unit.

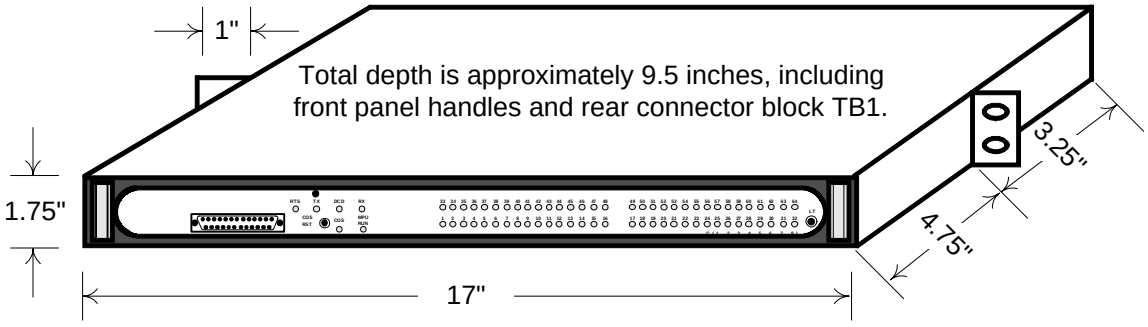


Figure 2-2 WS2000 E2A Master, Slave, and Discrete Expander Outline Drawing

2.3.2 Unit Inspection

Prior to power-up, remove the WS2000 E-Telemetry Remote main board assembly, and confirm that the plug-in boards are seated properly. **All option straps are preset at the factory.**

Verify the jumper options (Refer to Figure 2-7 through Figure 2-10).

2.3.3 Cabling the Unit

Figure 2-11 is a rear view of the unit that shows how the connections are grouped. Power, local annunciators, and host modem connections are made at TB1. All serial connections are made via eight pin connectors P1 through P6, and P8 through P13. All the discrete inputs are made via 50 pin connectors, J1 and J2. If discrete expanders are installed, they are connected at P7.

If Slave Units are to be used, the port used on the Master to communicate with the slaves must be configured as RS-422 (point-to-point). The host port on each slave must be RS-485 (multipoint).

2.3.4 Rear Connector EIA Strap Selections

2.3.4.1 Serial Interfaces

The electrical interconnection of this unit to the network requires selecting the appropriate EIA straps. For the serial interfaces, strap each interface for either RS-422 (insert the strap) or RS-232/485 (no strap) operation. Refer to Table 2-20.

2.3.4.2 Discrete Control Interfaces

Each discrete control interface can either operate Form A or Form C. These interconnections to the network require selecting the appropriate form option. Refer to Figure 2-12.

2.3.5 Serial Port Terminations

Table 2-1 shows the relationships between serial channels and rear termination designations.

Table 2-1 Rear Panel Serial Port Connectors

Channel No	Connector
1	P6, P12, or TB1
2	P4
3	P11
4	P3
5	P10
6	P8
7	P1
8	P9
9	P2
Wesmaint	P5

The host communications channel is dedicated to serial channel 1 and is available at TB1 if a modem is installed within the WS2000 E-Telemetry Remote. If no modem is installed, serial channel 1 is available at P6 (RS-422) and P12 (RS-232).

2.3.6 Control Outputs

Each control output can be set to either Form A or Form C contact closure.

In the Form A control output configuration, each control point provides one isolated normally open (N.O.) contact.

In the Form C control output configuration, each control point provides one normally open (N.O.) contact and one normally closed (N.C.) contact, with one common provided for each set of eight control points.

Jumper Block Z6 determines control output contact configurations for controls 1 through 8. Jumper Block Z8 determines control output contact configurations for controls 9 through 16. Pin 34 on both Connector J1 and J2 provide the control common voltage for Form C. Refer to Table 2-2.

Table 2-2 Control Outputs 1 – 16 (J1 and J2)

Control Point	Form A	Form C	J1 Pin	J2 Pin	Control Point	Form A	Form C
1	–	N.C.	1	1	9	–	N.C.
	N.O.	N.O.	26	26		N.O.	N.O.
2	–	N.C.	2	2	10	–	N.C.
	N.O.	N.O.	27	27		N.O.	N.O.
3	–	N.C.	3	3	11	–	N.C.
	N.O.	N.O.	28	28		N.O.	N.O.
4	–	N.C.	4	4	12	–	N.C.
	N.O.	N.O.	29	29		N.O.	N.O.
5	–	N.C.	5	5	13	–	N.C.
	N.O.	N.O.	30	30		N.O.	N.O.
6	–	N.C.	6	6	14	–	N.C.
	N.O.	N.O.	31	31		N.O.	N.O.
7	–	N.C.	7	7	15	–	N.C.
	N.O.	N.O.	32	32		N.O.	N.O.
8	–	N.C.	8	8	16	–	N.C.
	N.O.	N.O.	33	33		N.O.	N.O.
N/A	COM	COM	34	34	N/A	COM	COM

2.3.7 Rack Mount Modem Panel Connections

The power and digital signals for the rack mount modem panel are derived from the WS2000 via a special cable, P/N 977-0032. One end of the cable is fanned out into two connectors, J4 and J5.

Note: Older versions of this cable had these two connectors labeled as J1 and J2 respectively.

If both a rack mount modem and a rack mounted WESMAINT are used, another cable is available that connects power and data for both. It is P/N is 977-T055.

Connector J5 is mated with P5 on the WS2000 unit. This connection provides the necessary 12 Vdc power. Connector J4 is mated with any of the “P” connectors for data collection channels 2 through 5 (i.e., P3, P4, P10 or P11) on the WS2000 unit. It provides the RS-232 signals to the modem module from the data collection channel on the unit. Mount

connector J4 to the corresponding data collection serial channel mating connector. The other end of the cable is a single male DB25 connector (P1). This connection is mated to J1 on the rack mount modem panel. The rack mount modem connection points are shown in Figure 2-21 and Table 2-3.

Table 2-3 Rack Mount Modem Panel Connections

Pin	Function	
	Terminal Block TB1	Connector J1
1	Transmit TIP +	N/A
2	Transmit RING -	Transmit
3	Receive RING -	Receive
4	Receive TIP +	Request to Send (RTS)
5	Ground	Clear to Send (CTS)
6	Ground	Data Set Ready (DSR)
7	N/A	Common
8	Signal Ground	Data Carrier Detect (DCD)
9	+12 Vdc	+12 Vdc
10	-12 Vdc	-12 Vdc
11	N/A	+12 Vdc
13	N/A	-12 Vdc
20	N/A	Data Terminal Ready (DTR)
22	N/A	Ring Indicator (RI)

2.3.8 Telzon Termination Panel

The Telzon termination panel provides wire wrap access to all discrete and serial connections on the WS2000 (except Modem connections). Telzon Interface Assemblies can be ordered in either 19” or 23” rack sizes. Refer to Table 2-4 through Table 2-6.

Table 2-4 TELZON Interface Assembly Ordering Information

Item	Order #	TBOS Ports	Discrete I/O		Host	Rack Size
			Inputs	Outputs		
1	533-T011	8	64	16	Yes (2)	23"
2	533-T030	8	64	16	Yes (2)	19"

Table 2-5 533-T011 Configuration

Item	Qty	Westronic PN	AUGAT PN	Description
1	1	640-T002	483-0063-041	TELZON Wire Wrap Block
2	2	977-T003	800-0003-105	3' Discrete I/O Cable (for Connectors A and B)
3	1	977-T070	808-0003-127	3' Serial I/O Cable (for Connector C)
4	1	953-T003	000-4009-123	23" Mounting Bar
5	1	–	000-1000-928	Designation Label for Inside Door

Table 2-6 533-T030 Configuration

Item	Qty	Westronic PN	AUGAT PN	Description
1	1	640-T002	483-0063-041	TELZON Wire Wrap Block
2	2	977-T003	800-0003-105	3' Discrete I/O Cable (for Connectors A and B)
3	1	977-T070	808-0003-127	3' Serial I/O Cable (for Connector C)
4	1	953-T087	000-4009-119	19" Mounting Bar
5	1	–	000-1000-928	Designation Label for Inside Door

2.3.8.1 Connections and Cabling

Each Telzon termination panel has three connectors. Two provide access to the wire wrap terminations for the discrete I/O, the other provides access to the wire wrap terminations for the serial and digital host port communications I/O. The termination panel is connectorized with standard delta style female 50 pin connectors.

A maximum of three cables are needed to utilize the full capacity of the termination panel. These cables are three feet long, and come with the Telzon panel. The two discrete I/O cables have both ends terminated with standard male delta style 50 pin right angle connectors. Each of these cables supports 32 discrete alarm/status inputs and 8 discrete control outputs. The third cable has one end terminated with a standard male delta style 50 pin right angle connector, the other end is “fanned” out into eight or ten Molex female 8 pin connectors. Refer to Figure

2-24 and Table 2-33 for interconnections between the WS2000 and the termination panel.

2.3.8.2 Wire Wrap Features

Each discrete input on the Telzon termination panel is a dry contact input with two wire wrap pins for connection. One is the dry contact input and the other is a return. Each group of 32 returns is bussed together and terminated onto a “Com” wire wrap pin. Each discrete control output is a relay closure to two isolated contacts (Form A). The 8 TBOS serial ports are interconnected RS-422 or RS-485 and are represented by four wire wrap pins. They are transmit tip/ring and receive tip/ring. The digital host communications port can be interconnected RS-232, RS-422 or RS-485. The RS-232 connection is made by six wire wrap pins. They are transmit, receive, ground, request-to-send, clear-to-send, and data carrier detect. The RS-422 and RS-485 connection is made by four wire wrap pins (transmit tip/ring and receive tip/ring). Refer to Figure 2-25 for a diagram of wire wrap pin designations.

2.3.9 Front Access Wire Wrap Kit

The Front Access Wire Wrap Kit (Figure 2-3) is intended for any SmartScanner application where front access is required. It needs only one vertical rack space in addition to the WS2000. Thus only a a two rack space footprint is required for the Front Access panel and the SmartScanner unit. This makes this combination ideal for CEV or rear access restricted installations.

The front access wire wrap kit (part number 533-T032) contains the parts listed in Table 2-7.

Table 2-7 Front Access Wire Wrap Kit Components

Part Number	Qty	Description
510-T001	1	Wire Wrap Panel
977-T048	2	Discrete Cables (C&D)
977-T047	1	Serial Cable (B)
977-T046	1	TB1 Cable (A)
953-1001	2	23" Rack Adapters
900-0008	4	Rack Adapter Screws

The cables provided in the kit connect the front access panel directly to the SmartScanner as illustrated in Figure 2-3.

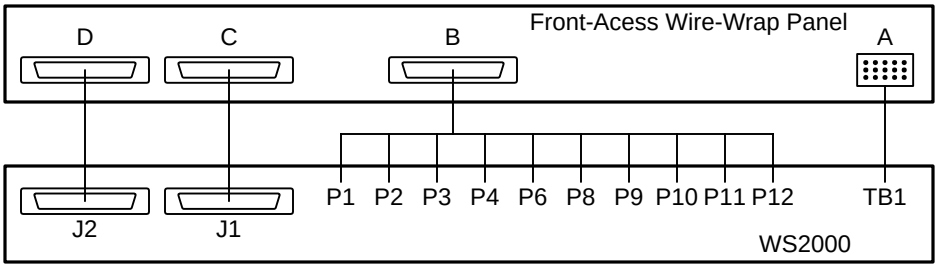


Figure 2-3 Front-Access Wire-Wrap Panel Connections

Table 2-8 through Table 2-11 list the pin outs for each of the connections between the SmartScanner and the front panel access wire wrap kit.

Table 2-8 Power/Auxiliary Host Port - Front-Access Wire-Wrap Panel Connector A

From Conn A Pin No	To WS2000 TB1 Pin No	Wire Color	Function
1	TB1-3	Red	(+) Battery Ground
2	TB1-1	Black	(–) Battery Input
3	TB1-13	Green	Frame Ground
A1	TB1-10	Orange	Internal 202T Modem Tip (Tx+)
A2	TB1-8	White	Internal 202T Modem Ring (Tx–)
A3	TB1-2	White/Black	MPU Run Relay NO
A4	TB1-4	Red/Black	MPU Run Relay Common
A5	TB1-6	Green/Black	MPU Run Relay NC
A6	No Connection		
D1	TB1-14	Blue/White	Internal 202T Modem Tip (Rx+)
D2	TB1-12	Blue	Internal 202T Modem Ring (Rx–)
D3	TB1-5	Black/White	COS Run Relay NO
D4	TB1-7	Red/White	COS Run Relay Common
D5	TB1-9	Green/White	COS Run Relay NC
D6	TB1-11	Blue/Black	External COS Reset

Table 2-9 Serial Port Connections for Front Wire-Wrap Panel Connector B

Pin.	Function	Pin.	Function	Pin.	Function	Pin.	Function
A7	Ch 2 Tx– (RS-422)	B7	Ch 2 Tx+ (RS-422)	C7	Ch 6 Tx– (RS-422)	D7	Ch 6 Tx+ (RS-422)
A8	Ch 2 Rx– (RS-422)	B8	Ch 2 Rx+ (RS-422)	C8	Ch 6 Rx– (RS-422)	D8	Ch 6 Rx+ (RS-422)
A9	Ch 2 Shld Gnd	B9	Ch 3 Shld Gnd	C9	Ch 7 Shld Gnd	D9	Ch 6 Shld Gnd
A10	Ch 3 Tx– (RS-422)	B10	Ch 3 Tx+ (RS-422)	C10	Ch 7 Tx– (RS-422)	D10	Ch 7 Tx+ (RS-422)
A11	Ch 3 Rx– (RS-422)	B11	Ch 3 Rx+ (RS-422)	C11	Ch 7 Rx– (RS-422)	D11	Ch 7 Rx+ (RS-422)
A12	Ch 4 Tx– (RS-422)	B12	Ch 4 Tx+ (RS-422)	C12	Ch 8 Tx– (RS-422)	D12	Ch 8 Tx+ (RS-422)
A13	Ch 4 Rx– (RS-422)	B13	Ch 4 Rx+ (RS-422)	C13	Ch 8 Rx– (RS-422)	D13	Ch 8 Rx+ (RS-422)
A14	Ch 4 Shld Gnd	B14	Ch 5 Shld Gnd	C14	Ch 9 Shld Gnd	D14	Ch 8 Shld Gnd
A15	Ch 5 Tx– (RS-422)	B15	Ch 5 Tx+ (RS-422)	C15	Ch 9 Tx– (RS-422)	D15	Ch 9 Tx+ (RS-422)
A16	Ch 5 Rx– (RS-422)	B16	Ch 5 Rx+ (RS-422)	C16	Ch 9 Rx– (RS-422)	D16	Ch 9 Rx+ (RS-422)
A17	Ch 1 Tx– (RS-422)	B17	Ch 1 Tx+ (RS-422)	C17	Ch 1 Tx (RS-232)	D17	Ch 1 RTS (RS-232)
A18	Ch 1 Rx– (RS-422)	B18	Ch 1 Rx+ (RS-422)	C18	Ch 1 CTS (RS-232)	D18	Ch 1 Sig Gnd (RS-232)
A19	Ch 1 Shld Gnd	B19	No Connection	C19	Ch 1 Rx (RS-232)	D19	Ch 1 DCD (RS-232)

Table 2-10 J1 Discrete Input/Output - Front Wire-Wrap Panel Connector C

Pin	Function	Pin	Function	Pin	Function	Pin	Function
A20	Control Output 1	B20	Control Output 1 Return	C20	Control Output 2	D20	Control Output 2 Return
A21	Control Output 3	B21	Control Output 3 Return	C21	Control Output 4	D21	Control Output 4 Return
A22	Control Output 5	B22	Control Output 5 Return	C22	Control Output 6	D22	Control Output 6 Return
A23	Control Output 7	B23	Control Output 7 Return	C23	Control Output 8	D23	Control Output 8 Return
A24	Status/Alarm Input 1	B24	Status/Alarm Input 1 Return	C24	Status/Alarm Input 2	D24	Status/Alarm Input 2 Return
A25	Status/Alarm Input 3	B25	Status/Alarm Input 3 Return	C25	Status/Alar m Input 4	D25	Status/Alarm Input 4 return
A26	Status/Alarm Input 5	B26	Status/Alarm Input 5 Return	C26	Status/Alarm Input 6	D26	Status/Alarm Input 6 Return
A27	Status/Alarm Input 7	B27	Status/Alarm Input 7 Return	C27	Status/Alarm Input 8	D27	Status/Alarm Input 8 Return
A28	Status/Alarm Input 9	B28	Status/Alarm Input 9 Return	C28	Status/Alarm Input 10	D28	Status/Alarm Input 10 Return
A29	Status/Alarm Input 11	B29	Status/Alarm Input 11 Return	C29	Status/Alarm Input 12	D29	Status/Alarm Input 12 Return
A30	Status/Alarm Input 13	B30	Status/Alarm Input 13 Return	C30	Status/Alarm Input 14	D30	Status/Alarm Input 14 Return
A31	Status/Alarm Input 15	B31	Status/Alarm Input 15 Return	C31	Status/Alarm Input 16	D31	Status/Alarm Input 16 Return
A32	Status/Alarm Input 17	B32	Status/Alarm Input 17 Return	C32	Status/Alarm Input 18	D32	Status/Alarm Input 18 Return
A33	Status/Alarm Input 19	B33	Status/Alarm Input 19 Return	C33	Status/Alarm Input 20	D33	Status/Alarm Input 20 Return
A34	Status/Alarm Input 21	B34	Status/Alarm Input 21 Return	C34	Status/Alarm Input 22	D34	Status/Alarm Input 22 Return
A35	Status/Alarm Input 23	B35	Status/Alarm Input 23 Return	C35	Status/Alarm Input 24	D35	Status/Alarm Input 24 Return
A36	Status/Alarm Input 25	B36	Status/Alarm Input 25 Return	C36	Status/Alarm Input 26	D36	Status/Alarm Input 26 Return
A37	Status/Alarm Input 27	B37	Status/Alarm Input 27 Return	C37	Status/Alarm Input 28	D37	Status/Alarm Input 28 Return
A38	Status/Alarm Input 29	B38	Status/Alarm Input 29 Return	C38	Status/Alarm Input 30	D38	Status/Alarm Input 30 Return
A39	Status/Alarm Input 31	B39	Status/Alarm Input 31 Return	C39	Status/Alarm Input 32	D39	Status/Alarm Input 32 Return

Table 2-11 J2 Discrete Input/Output - Front Wire-Wrap Panel Connector D

Pin	Function	Pin	Function	Pin	Function	Pin	Function
A40	Control Output 9	B40	Cntrl Out 9 Return	C40	Control Output 10	D40	Cntrl Out 10 Return
A41	Control Output 11	B41	Cntrl Out 11 Return	C41	Control Output 12	D41	Cntrl Out 12 Return
A42	Control Output 13	B42	Cntrl Out 13 Return	C42	Control Output 14	D42	Cntrl Out 14 Return
A43	Control Output 15	B43	Cntrl Out 15 Return	C43	Control Output 16	D43	Cntrl Out 16 Return
A44	Status/Alarm Input 33	B44	Status/Alarm Input 33 Return	C44	Status/Alarm Input 34	D44	Status/Alarm Input 34 Return
A45	Status/Alarm Input 35	B45	Status/Alarm Input 35 Return	C45	Status/Alarm Input 36	D45	Status/Alarm Input 36 Return
A46	Status/Alarm Input 37	B46	Status/Alarm Input 37 Return	C46	Status/Alarm Input 38	D46	Status/Alarm Input 38 Return
A47	Status/Alarm Input 39	B47	Status/Alarm Input 39 Return	C47	Status/Alarm Input 40	D47	Status/Alarm Input 40 Return
A48	Status/Alarm Input 41	B48	Status/Alarm Input 41 Return	C48	Status/Alarm Input 42	D48	Status/Alarm Input 42 Return
A49	Status/Alarm Input 43	B49	Status/Alarm Input 43 Return	C49	Status/Alarm Input 44	D49	Status/Alarm Input 44 Return
A50	Status/Alarm Input 45	B50	Status/Alarm Input 45 Return	C50	Status/Alarm Input 46	D50	Status/Alarm Input 46 Return
A51	Status/Alarm Input 47	B51	Status/Alarm Input 47 Return	C51	Status/Alarm Input 48	D51	Status/Alarm Input 48 Return
A52	Status/Alarm Input 49	B52	Status/Alarm I Inputn 49 Return	C52	Status/Alarm Input 50	D52	Status/Alarm Input 50 Return
A53	Status/Alarm Input 51	B53	Status/Alarm Input 51 Return	C53	Status/Alarm Input 52	D53	Status/Alarm Input 52 Return
A54	Status/Alarm Input 53	B54	Status/Alarm Input 53 Rtrn	C54	Status/Alarm Input 54	D54	Status/Alarm Input 54 Rtrn
A55	Status/Alarm Input 55	B55	Status/Alarm Input 55 Rtrn	C55	Status/Alarm Input 56	D55	Status/Alarm Input 56 Rtrn
A56	Status/Alarm Input 57	B56	Status/Alarm Input 57 Rtrn	C56	Status/Alarm Input 58	D56	Status/Alarm Input 58 Rtrn
A57	Status/Alarm Input 59	B57	Status/Alarm Input 59 Rtrn	C57	Status/Alarm Input 60	D57	Status/Alarm Input 60 Rtrn
A58	Status/Alarm Input 61	B58	Status/Alarm Input 61 Rtrn	C58	Status/Alarm Input 62	D58	Status/Alarm Input 62 Rtrn
A59	Status/Alarm Input 63	B59	Status/Alarm Input 63 Rtrn	C59	Status/Alarm Input 64	D59	Status/Alarm Input 64 Rtrn

2.3.10 Rear Access Wire Wrap Kit

The Rear Access Wire Wrap Kit (Figure 2-4) is intended for any Smart-Scanner application where rear access is available to the unit. The wire wrap kit "snaps" into connectors on the back of a SmartScanner.

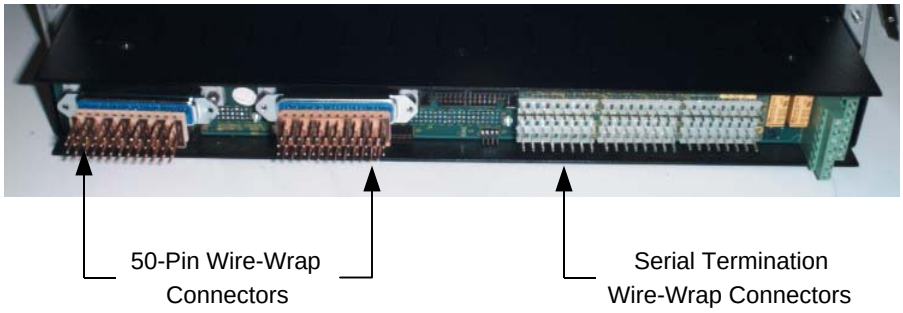


Figure 2-4 WS2000 with Rear-Access Wire-Wrap Kit

The wire wrap kit preserves the one rack space footprint of the Smart-Scanner unit, making this kit ideal for CPE or cabinet installations. J1 and J2 wire wrap connectors provide alarm input pins and a single ground return pin. Control pins are available for Form A or Form C contacts. Serial port pins provide all serial input/output signals on the SmartScanner. It (part number 585-T034) contains the parts listed in Table 2-12.

Table 2-12 Rear-Access Wire-Wrap Kit (PN 585-T034) Components

Part Number	Quantity	Description
620-T030	2	50-Pin Wire-Wrap Connectors (for J1/J2)
517-T003	1	Serial Termination Wire-Wrap Connector

Figure 2-5 and Figure 2-6 and Table 2-13 through Table 2-15 list the pinouts for the various rear-access wire-wrap connectors.

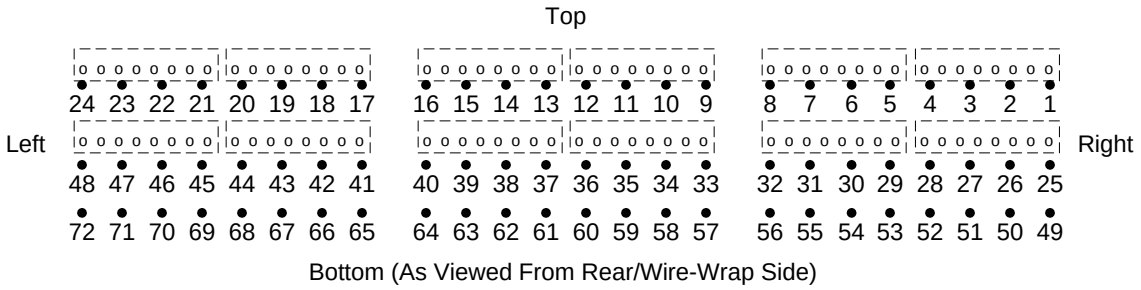


Figure 2-5 Rear-Access Serial Termination Wire-Wrap Connector Pinouts

Table 2-13 Serial Port Connections for the Rear-Access Wire-Wrap Assembly

Pin	Chan/Function	Pin	Chan/Function	Pin	Chan/Function
1	4 RS-422 Tx +	25	7 RS-422 Tx +	49	6 RS-422 Tx +
2	4 RS-422 Tx –	26	7 RS-422 Tx –	50	6 RS-422 Tx –
3	4 RS-422 Rx +	27	7 RS-422 Rx +	51	6 RS-422 Rx +
4	4 RS-422 Rx –/RS-232 Rx	28	7 RS-422 Rx –	52	6 RS-422 Rx –
5	4 Ground	29	9 RS-422 Tx +	53	8 RS-422 Tx +
6	4 RS-232 CTS	30	9 RS-422 Tx –	54	8 RS-422 Tx –
7	4 RS-232 RTS	31	9 RS-422 Rx +	55	8 RS-422 Rx +
8	4 RS-232 Tx	32	9 RS-422 Rx –	56	8 RS-422 Rx –
9	2 RS-422 Tx +	33	3 RS-422 Tx +	57	5 RS-422 Tx +
10	2 RS-422 Tx –	34	3 RS-422 Tx –	58	5 RS-422 Tx –
11	2 RS-422 Rx +	35	3 RS-422 Rx +	59	5 RS-422 Rx +
12	2 RS-422 Rx – /RS-232 Rx	36	3 RS-422 Rx – /RS-232 Rx	60	5 RS-422 Rx – /RS-232 Rx
13	2 Ground	37	3 Ground	61	5 Ground
14	2 RS-232 CTS	38	3 RS-232 CTS	62	5 RS-232 CTS
15	2 RS-232 RTS	39	3 RS-232 RTS	63	5 RS-232 RTS
16	2 RS-232 Tx	40	3 RS-232 Tx	64	5 RS-232 Tx
17	Craft Time In	41	1 RS-422 Tx Clock +	65	1 RS-422 Tx Clock –
18	Craft +12 Vdc	42	1 RS-422 Rx Clock +	66	1 RS-422 Rx Clock –
19	Craft +5 Vdc	43	1 RS-422 Tx +	67	1 RS-232 DCD
20	Craft –12 Vdc	44	1 RS-422 Tx –	68	1 RS-422 Rx –/RS-232 Rx
21	Craft Ground	45	1 RS-422 Rx +	69	1 Ground
22	Craft Prog En	46	1 RS-422 Rx –	70	1 RS-232 CTS
23	Craft RS-232 Rx	47	1 RS-422 RTS +	71	1 RS-232 RTS
24	Craft RS-232 Tx	48	1 RS-422 RTS –	72	1 RS-232 Tx

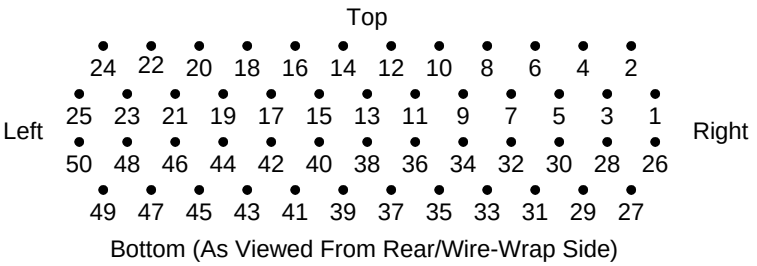


Figure 2-6 Rear-Access 50-Pin Wire-Wrap Connector on J1/J2

Table 2-14 J1 Discrete I/O Connections for the Rear-Access Wire-Wrap Assembly

Function	Pin		Function
Control Relay 1 Form C – NC	1	26	Control Relay 1 Form A or C – NO
Control Relay 2 Form C – NC	2	27	Control Relay 2 Form A or C – NO
Control Relay 3 Form C – NC	3	28	Control Relay 3 Form A or C – NO
Control Relay 4 Form C – NC	4	29	Control Relay 4 Form A or C – NO
Control Relay 5 Form C – NC	5	30	Control Relay 5 Form A or C – NO
Control Relay 6 Form C – NC	6	31	Control Relay 6 Form A or C – NO
Control Relay 7 Form C – NC	7	32	Control Relay 7 Form A or C – NO
Control Relay 8 Form C – NC	8	33	Control Relay 8 Form A or C – NO
Ground	9	34	Control Relay Common Voltage
Status/Alarm Input 1	10	35	Status/Alarm Input 2
Status/Alarm Input 3	11	36	Status/Alarm Input 4
Status/Alarm Input 5	12	37	Status/Alarm Input 6
Status/Alarm Input 7	13	38	Status/Alarm Input 8
Status/Alarm Input 9	14	39	Status/Alarm Input 10
Status/Alarm Input 11	15	40	Status/Alarm Input 12
Status/Alarm Input 13	16	41	Status/Alarm Input 14
Status/Alarm Input 15	17	42	Status/Alarm Input 16
Status/Alarm Input 17	18	43	Status/Alarm Input 18
Status/Alarm Input 19	19	44	Status/Alarm Input 20
Status/Alarm Input 21	20	45	Status/Alarm Input 22
Status/Alarm Input 23	21	46	Status/Alarm Input 24
Status/Alarm Input 25	22	47	Status/Alarm Input 26
Status/Alarm Input 27	23	48	Status/Alarm Input 28
Status/Alarm Input 29	24	49	Status/Alarm Input 30
Status/Alarm Input 31	25	50	Status/Alarm Input 32

Table 2-15 J2 Discrete I/O Connections for the Rear-Access Wire-Wrap Assembly

Function	Pin		Function
Control Output 9, Form C – NC	1	26	Control Output 9, Form A or C – NO
Control Output 10, Form C – NC	2	27	Control Output 10, Form A or C – NO
Control Output 11, Form C – NC	3	28	Control Output 11, Form A or C – NO
Control Output 12, Form C – NC	4	29	Control Output 12, Form A or C – NO
Control Output 13, Form C – NC	5	30	Control Output 13, Form A or C – NO
Control Output 14, Form C – NC	6	31	Control Output 14, Form A or C – NO
Control Output 15, Form C – NC	7	32	Control Output 15, Form A or C – NO
Control Output 16, Form C – NC	8	33	Control Output 16, Form A or C – NO
Ground	9	34	Control Relay Common Voltage
Status/Alarm Input 33	10	35	Status/Alarm Input 34
Status/Alarm Input 35	11	36	Status/Alarm Input 36
Status/Alarm Input 37	12	37	Status/Alarm Input 38
Status/Alarm Input 39	13	38	Status/Alarm Input 40
Status/Alarm Input 41	14	39	Status/Alarm Input 42
Status/Alarm Input 43	15	40	Status/Alarm Input 44
Status/Alarm Input 45	16	41	Status/Alarm Input 46
Status/Alarm Input 47	17	42	Status/Alarm Input 48
Status/Alarm Input 49	18	43	Status/Alarm Input 50
Status/Alarm Input 51	19	44	Status/Alarm Input 52
Status/Alarm Input 53	20	45	Status/Alarm Input 54
Status/Alarm Input 55	21	46	Status/Alarm Input 56
Status/Alarm Input 57	22	47	Status/Alarm Input 58
Status/Alarm Input 59	23	48	Status/Alarm Input 60
Status/Alarm Input 61	24	49	Status/Alarm Input 62
Status/Alarm Input 63	25	50	Status/Alarm Input 64

2.3.11 PC-Wesmaint Connections

The PC-WESMAINT software package (P/N 567-T007) provides WESMAINT interface, upload, download, display configuration, and

print configuration features. Refer to the PC-WESMAINT User Manual for more detailed information.

Connection of a PC to the WS2000 E-Telemetry Remote requires the PC-WESMAINT cable (included in the software package) and possibly the DB9 to DB25 adapter. Connect the cable to the COM1 or COM2 port on the PC. If the PC has a 25 pin COM port, use a DB9 to DB25 converter between the PC-WESMAINT cable and the COM port. Next, connect the 25 pin connector of the PC- WESMAINT cable to the WESMAINT port on the front panel of the WS2000 Remote. If an extension cable is required, use a standard RS-232 cable between the WESMAINT cable and the WS2000.

Note: To avoid EEPROM corruption, the PC-WESMAINT cable must be disconnected when powering the WS2000 up and down.

2.4 Powering the Unit

Power to the unit should be provided from a fuse panel. The input voltage range is -20 to -60 Vdc. Use #14-24 AWG power wire. Ensure the plug-in board assembly is installed and the power input wire terminated before inserting the fuse into the fuse bay.

Each master or slave unit has a maximum load of 24W (with all discrete inputs active on the WS2000 and including utilization of a rack mount modem). Refer to Table 2-22 for fusing requirements. Figure 2-14 shows where power is terminated on the unit.

Power-up the WS2000 E-Telemetry Remote by installing the appropriate fuse at the power distribution panel. The front panel MPU RUN LED should light and remain lit.

Connect the PC or portable WESMAINT Unit to the DB25 connector on the front, or the rack mount WESMAINT Unit to P5 on the rear of the Master Unit. If no display is present, press DSPY. If nothing appears on the screen or the message "EEPROM CORRUPT" appears, a memory problem has occurred. Contact Westronic Customer Service for assistance.

CAUTION: Do not power down the e-telemetry remote without first disconnecting the portable wesmaint unit. EEPROM corruption may occur.

When a WESMAINT is connected to P5 on the rear of the unit, a jumper plug must be inserted in the front panel DB25 connector for configuration changes to take effect. Disconnect the jumper plug prior to powering down the WS2000.

The termination plug is not required when viewing the unit's configuration or running diagnostic menus. The unit may be powered down with

the rack mount WESMAINT unit connected, without affecting the EEPROM.

The Master and Slave units have no password control at initial installation and turn-up time. If a password is required for the installed unit, refer to Section 4.

2.4.1 System Turn-up

If more than a single WS2000 unit is being turned up as part of an E-Telemetry Remote system, activation of the system should be done systematically. Perform the following general steps.

1. Activate the Master Unit followed by any Discrete Expander Unit(s) connected to the Master.
2. Activate the Slave Unit(s) followed by any Discrete Expander Unit(s) connected to them.

2.4.1.1 Master Unit Turn-Up

If the Master Unit has Discrete Expander Units connected to it, and the Discrete Expander Units share the same fuse as the Master Unit, remove the WPIB cable connector, P7, from the Master Unit's backplane. Pull all the Discrete Expander plug-ins out from their shelves about 1" from the backplane. If the Master Unit has Discrete Expander Units connected to it, and the Discrete Expander Units have separate fusing from the Master Unit, remove the WPIB cable connector, P7, from the Master Unit's backplane. Removal of Discrete Expander plug-ins is not required.

2.4.1.2 Master Unit Discrete Expander Turn-Up

Power down the Master Unit and reconnect the WPIB cable to the connector on the Master Unit. Verify each Discrete Expander Unit's address. Note that each Discrete Expander has a unique address. Install Discrete Expander plug-ins into their shelves. Physically inspect the WPIB cable assembly to ensure the P7 connections on all interconnected shelves are seated correctly over the proper pins. Perform the power-up procedures. To verify the Discrete Expander units are communicating properly with the Master Unit, connect the WESMAINT to the Master Unit and perform the following steps:

1. Configure the Master unit. Refer to Section 3
2. Configure the discrete points of each Discrete Expander to a chosen host output display number. Refer to Section 4 to perform display assignments for the Discrete Expanders.

3. Put the Master unit in Normal Mode. Refer to Section 4.
4. Activate several latching controls on each discrete expander. An audible relay closure should be heard within the unit. If the unit's status loop back straps (Z7 and Z9) are inserted on the backplane, the control point LED should turn on or off in conjunction with the relay closure. Exercising several control points on each Discrete Expander verifies proper communication between the Master unit and the Discrete Expander unit(s).

2.4.1.3 Slave Unit Turn-Up

When a Slave unit has Discrete Expander unit(s) that share the same fuse as the Slave unit, remove the WPIB cable connector, P7, from the Slave unit's backplane. Pull all the Discrete Expander plug-ins from their shelves about 1" from the backplane. If the Discrete Expander unit(s) have separate fusing from the Slave unit, removal of Discrete Expander plug-ins is not required. Perform power up procedures.

Connect the Slave unit(s) to the Master unit. Make a note of which serial channel(s) are to be used for connecting the Master to the Slave unit(s). The serial channel assignment(s) will be used in the configuration set-up. To verify that the slave unit(s) are communicating properly with the Master unit, connect the WESMAINT unit to the first slave unit and perform the following steps:

5. Put the Slave unit into the Configuration mode.
6. Configure the Slave unit's address, EIA interface, and baud rate.
7. Put the Slave unit in Normal Mode and proceed to the next Slave unit.
8. Repeat Steps 1, 2 and 3 for each Slave unit.
9. ***Note:*** Each Slave unit utilizes a unique address.
10. Connect the WESMAINT (to the Master) and configure the Master unit.
11. Configure the Master unit for Slave unit communication.
12. Configure the EIA interface and baud rate for the communication between the Slave unit(s) and the Master unit. At this time, the configuration is assigned to the Master unit, not the Slave unit(s).
13. Configure the discrete points of each Slave unit to a chosen host output display number.
14. Put the Master unit in Normal Mode.
15. Activate several latching controls on each Slave unit. An audible relay closure should be heard within the unit. If the unit's status loopback straps (Z7 and Z9) are inserted on the backplane, the con-

trol point LED should turn on or off in conjunction with the relay closure. Exercising several control points on each Slave unit verifies proper communication between the Master unit and the Slave unit(s).

2.4.1.4 Slave Unit Discrete Expander Turn-Up

Power down the Slave Unit and reconnect the WPIB cable to the connector on the Slave Unit. Verify each Discrete Expander Unit's address by referencing Table 2-21. Note that each Discrete Expander has a unique address. Install Discrete Expander plug-ins into their shelves. Physically inspect the WPIB cable assembly to ensure the P7 connections on all interconnected shelves are seated correctly over the proper pins. Perform the power-up procedures. To verify the Discrete Expander units are communicating properly with the Master Unit, connect the WESMAINT to the Master Unit and perform the following steps:

16. Configure the Master unit.
17. Configure the discrete points of each Discrete Expander to a chosen host output display number. Refer to Section 4 to perform display assignments for the Discrete Expanders.
18. Put the Master unit in Normal Mode.
19. Activate several latching controls on each discrete expander. An audible relay closure should be heard within the unit. If the unit's status loopback straps (Z7 and Z9) are inserted on the backplane, the control point LED should turn on or off in conjunction with the relay closure. Exercising several control points on each Discrete Expander verifies proper communication between the Master unit and the Discrete Expander unit(s).

The WS2000 E-Telemetry Remote system is now ready to be configured according to the site requirements. Refer to Section 3.

2.5 Strapping and Wiring

The following text, figures and tables provide strapping and wiring information required to configure the WS2000 and associated modules, boards and expander options.

Master and Slave Main Boards can be of four types. They are referred to as Type 1, Type 2, Type 3 and Type 4. Compare the board in the unit with Figure 2-7 through Figure 2-10 to determine which type is installed

Note: All strapping options have been preset at the factory.

2.5.1 Master/Slave Main Board Strapping

Four main boards (referred to as Type 1, Type 2, Type 3, and Type 4) are available. Compare the board in the unit with Figure 2-7 through Figure 2-10 to determine the type installed. Use the appropriate table, Table 2-16 through Table 2-19, to configure the main board.

Note: All strap options are preset at the factory.

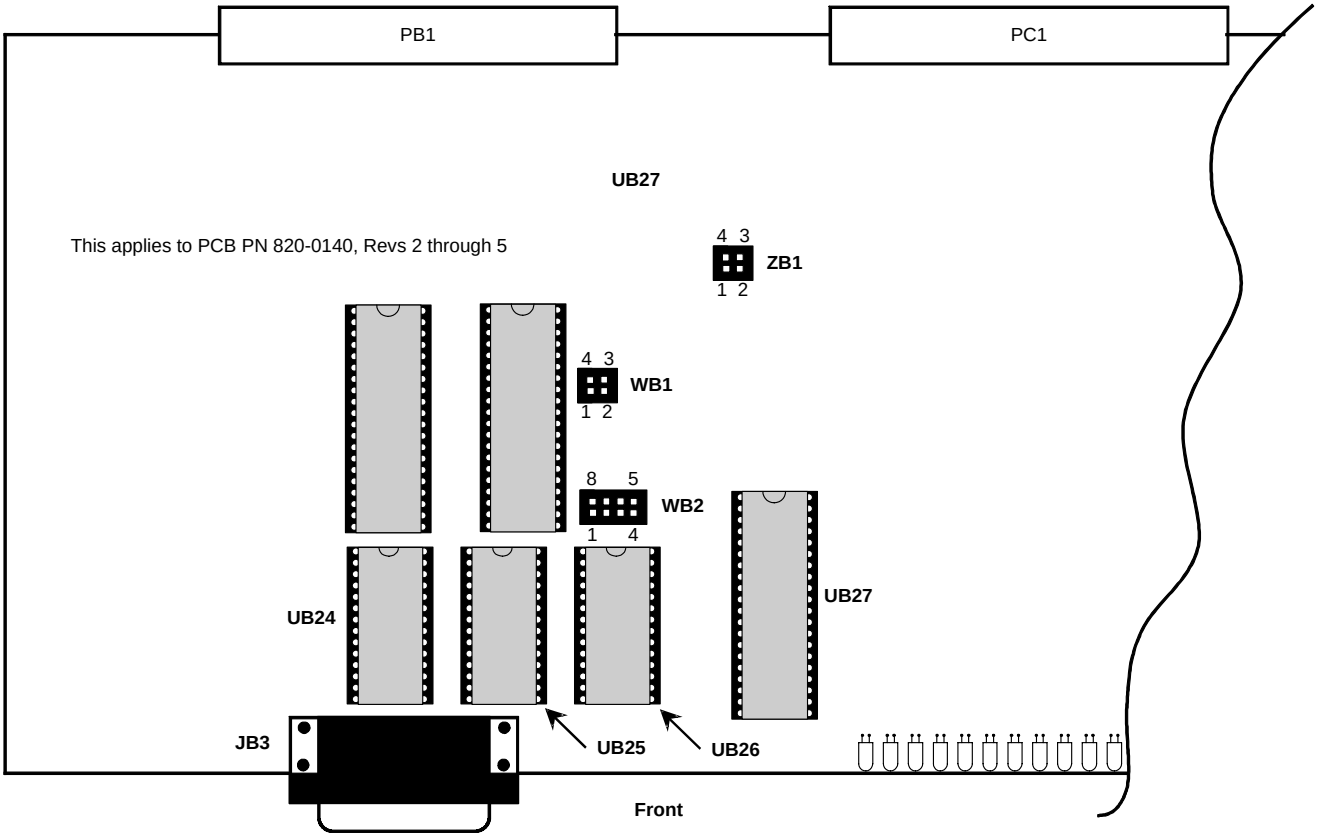


Figure 2-7 Strap Arrangements for Type 1 Main Board

Table 2-16 Strap Arrangements for Type 1 Main Board

Block	Pin	Function
WB1	1 – 2	Channel 1 RTS from Main board. Remove when daughter board provides source.
	3 – 4	Channel 1 Tx from Main board. Remove when daughter board provides source.
WB2	1 – 2, 7 – 8	32K EPROM (27C256)
	2 – 7, 3 – 6	32K EEPROM (28C256)
	3 – 6	8K EEPROM (28C64)
	4 – 5	32K RAM (65256)
	None	8K RAM (62640)
ZB1	1 – 2	I/O Reset Enable
	3 – 4	Watch Dog Enable

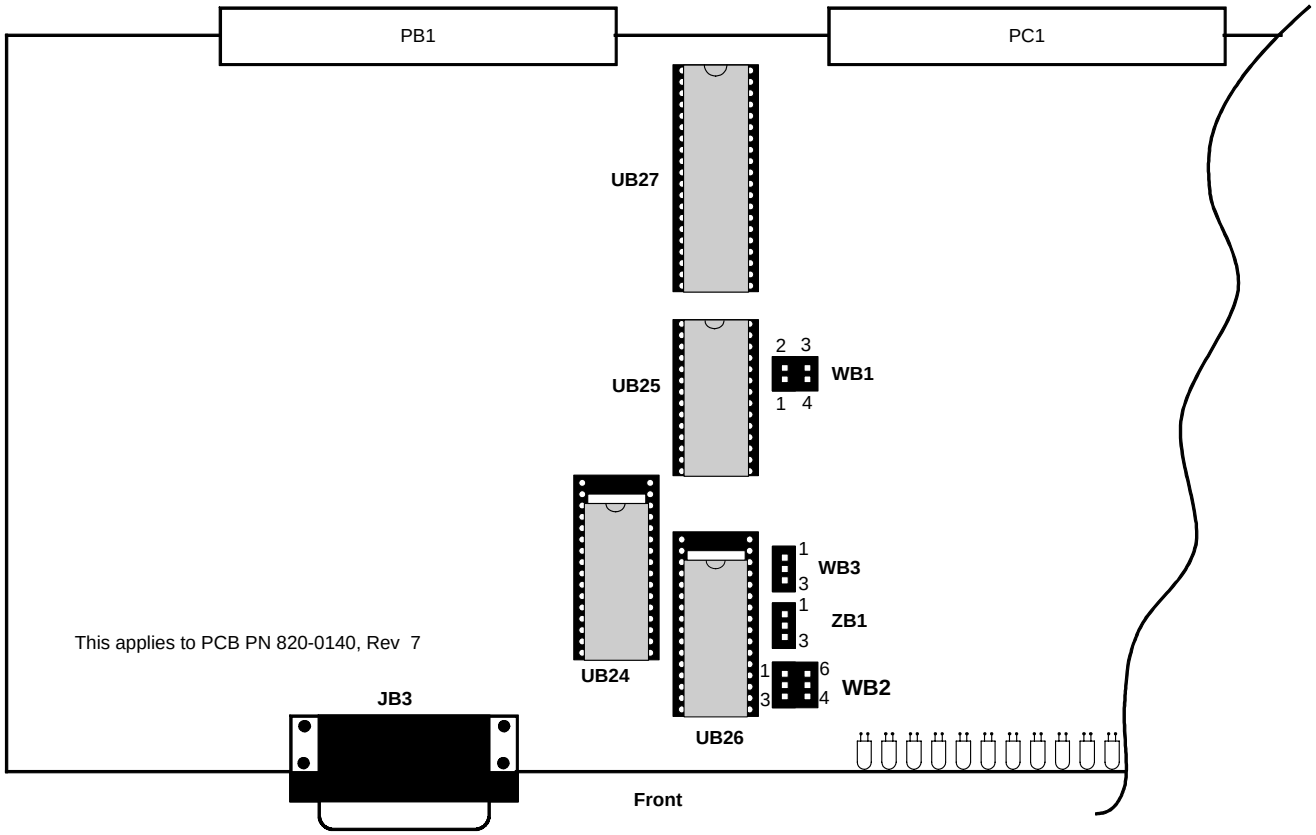


Figure 2-8 Strap Arrangements for Type 2 Main Board

Table 2-17 Strap Arrangements for Type 2 Main Board

Block	Pin	Function
WB1	1 – 4	Channel 1 RTS from Main board. Remove when daughter board provides source.
	2 – 3	Channel 1 Tx from Main board. Remove when daughter board provides source.
WB2	1 – 6	**Do Not Install**. Address range of UB24 RAM
	2 – 5	**Do Not Install**. Address range of UB24 RAM
	3 – 4	UB25 EEPROM (Write Enable)
WB3	1 – 2	UB26 is 32-pin device.
	2 – 3	UB26 is 28-pin device.
ZB1	None	Watch Dog Enable

Notes: When UB24 and UB26 are 28-pin devices, insert them in the pins closest to the front of the board.

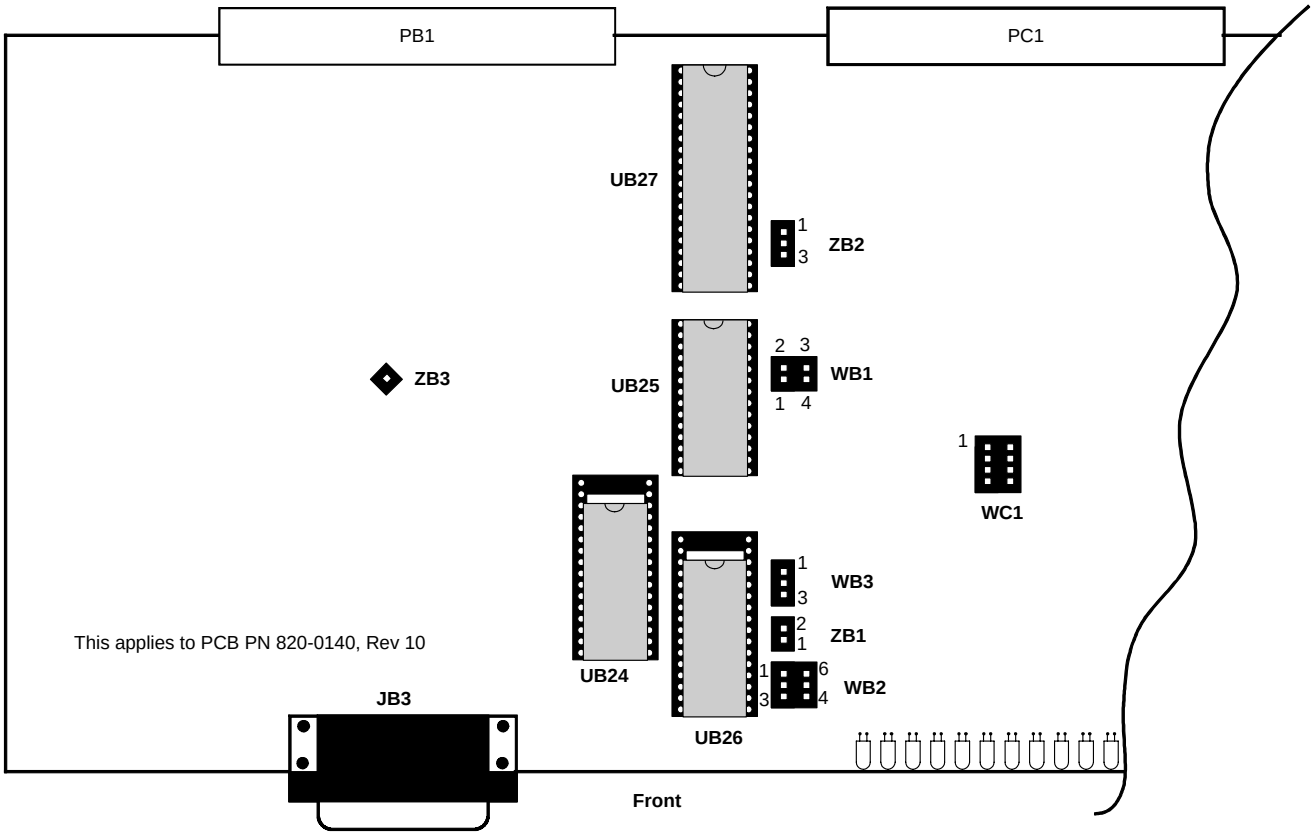


Figure 2-9 Strap Arrangements for Type 3 Main Board

Table 2-18 Strap Arrangements for Type 3 Main Board

Block	Pin	Function
WB1	1 – 4	Channel 1 RTS from Main board. Remove when daughter board provides source.
	2 – 3	Channel 1 Tx from Main board. Remove when daughter board provides source.
WB2	1 – 6	Address range of UB24 RAM (Note)
	2 – 5	Address range of UB24 RAM (Note)
	3 – 4	UB25 EEPROM (Write Enable)
WB3	1 – 2	UB26 is 32-pin device.
	2 – 3	UB26 is 28-pin device.
ZB1	None	Watch Dog Enable
ZB3	Installed	For Testing Purposes
WC1	Not Used	Board ID

Notes: When UB24 and UB26 are 28-pin devices, insert them in the pins closest to the front of the board.

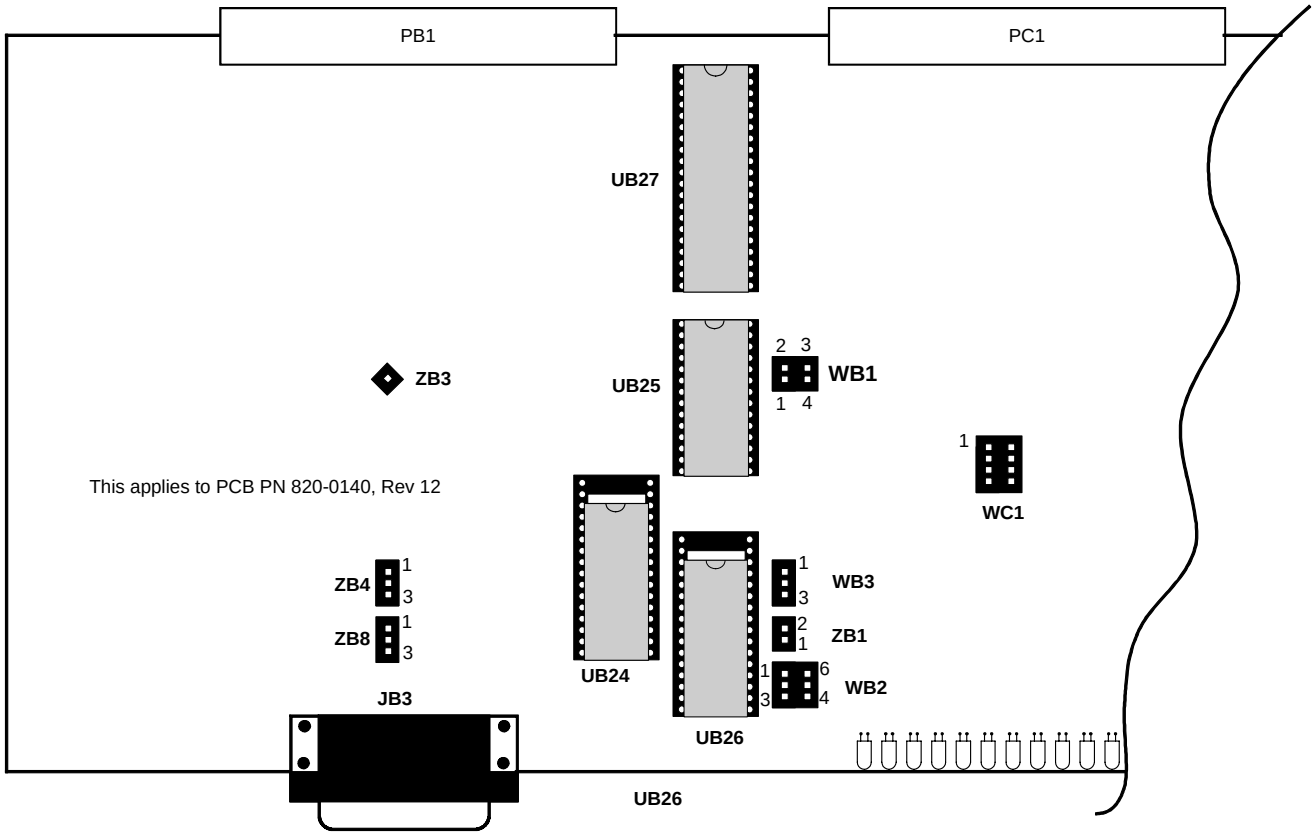


Figure 2-10 Strap Arrangements for Type 4 Main Board

Table 2-19 Strap Arrangements for Type 4 Main Board

Block	Pin	Function
WB1	1 – 4	Channel 1 RTS from Main board. Remove when daughter board provides source.
	2 – 3	Channel 1 Tx from Main board. Remove when daughter board provides source.
WB2	1 – 6	Address range of UB24 RAM (Note)
	2 – 5	Address range of UB24 RAM (Note)
	3 – 4	Write enable, when UB25 is EEPROM
WB3	1 – 2	UB26 is 32-pin device.
	2 – 3	UB26 is 28-pin device.
WC1	Not Used	Board ID
ZB1	1 – 2	Install to disable watchdog timer.
ZB2	1 – 2	UB25 bank switchable
	2 – 3	Not Applicable

Table 2-19 Strap Arrangements for Type 4 Main Board

Block	Pin	Function
ZB3	1	Test point
ZB4	1 – 2	UB25 bank switchable
	2 – 3	Not Applicable

Notes: When UB24 and UB26 are 28-pin devices, insert them in the pins closest to the front of the board.

2.5.2 Master/Slave Rear Panel Connectors and Strapping

Figure 2-11 shows the location of the discrete input/output point connectors (J1/J2), the Westronic Peripheral Interface Bus (WPIB) port (P7), the serial port connectors (P1 – P6, P8 – P13), and option jumper blocks Z1 – Z9.

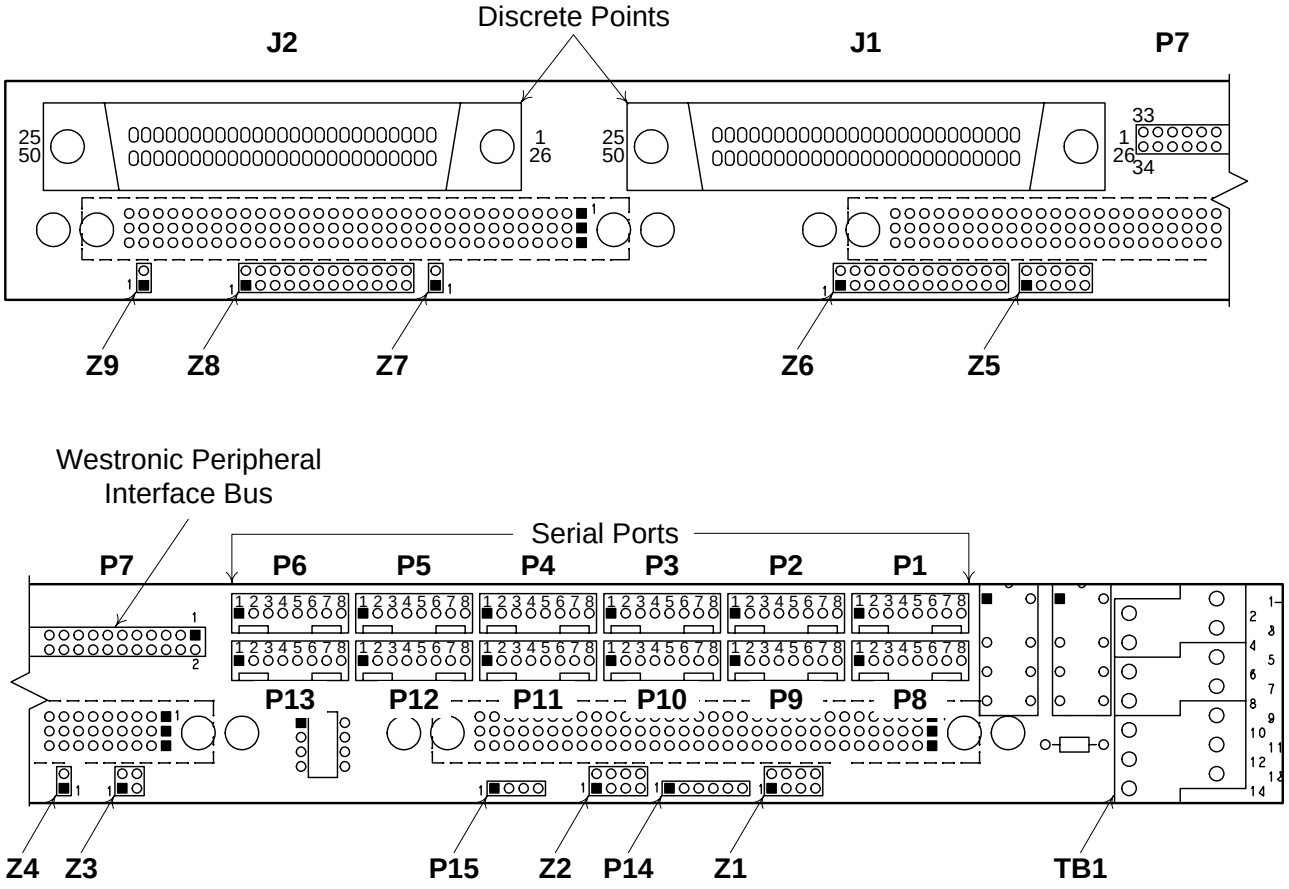


Figure 2-11 WS2000 Backplane Rear Connectors and Jumper Block Locations

Table 2-20 and Table 2-21 show the strapping for Z1, Z2, Z3, and Z5. Figure 2-12 shows the strapping for Z6 and Z8.

Table 2-20 Z1, Z2, Z3 Jumper Strap Arrangements for RS-422/RS-485 Receiver

Pins	Function		
	Z1	**Z2**	**Z3** (Note)
1 – 8	Chan 9 Rx	Chan 2 Rx	Chan 1 CTS (Rev A)
2 – 7	Chan 8 Rx	Chan 3 Rx	Chan 1 Rx (Rev A)
3 – 6	Chan 7 Rx	Chan 4 Rx	Chan 1 RxC (Rev A)
4 – 5	Chan 6 Rx	Chan 5 Rx	Chan 1 TxC (Rev A)
1 – 4	N/A	N/A	Chan 1 CTS (Rev B+)
2 – 3	N/A	N/A	Chan 1 Rx (Rev B+)

Note: Backplanes from Revision B onward have a 4-pin Z3 block.

Table 2-21 Z5 WPIB Address Jumper Strap Settings

Expander	WPIB Address	Z5 Pins
0 (WS2000)	00	None
1	08	5–6
2	10	4–7
3	18	4–7,5–6
4	20	3–8
5	28	3–8,5–6
6	30	3–8,4–7
7	38	3–8,4–7,5–6

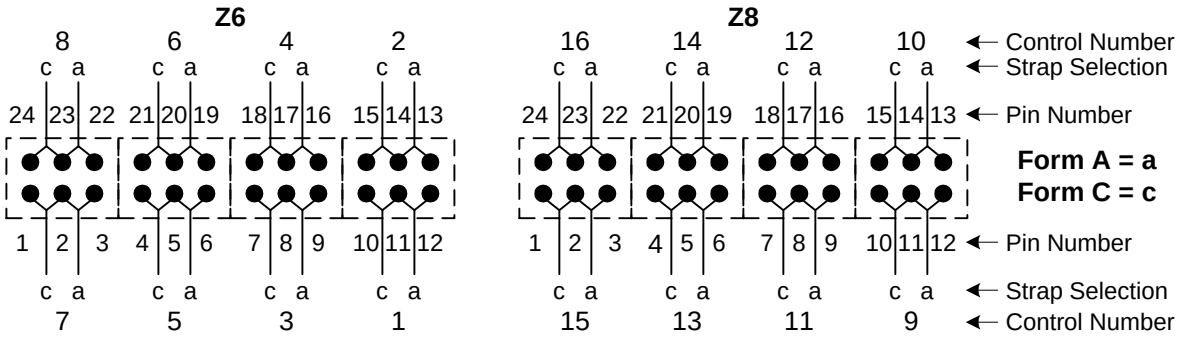


Figure 2-12 Z6/Z8 Form A/Form C Jumper Strap Arrangements

2.5.2.1 Fuse Requirements

Table 2-22 WS2000 Fusing Requirements

No of Discrete Expanders	–48 Vdc		–24 Vdc	
	GMT	Type 70	GMT	Type 70
0	0.75 A	0.75 A	1.3 A	1.3 A
1	1.3 A	1.3 A	2.0 A	2.0 A
2	2.0 A	2.0 A	2.5 A	2.0 A
3	2.5 A	2.0 A	3.0 A	3.0 A
4	3.0 A	3.0 A	3.5 A	5.0 A
5	3.5 A	5.0 A	4.0 A	5.0 A
6	4.0 A	5.0 A	5.0 A	5.0 A
7	5.0 A	5.0 A	5.0 A	5.0 A

2.5.2.2 CRAFT Port Connections

Table 2-23 shows the P5 rear panel connection and JB3 front panel connection. Figure 2-13 shows pin locations for the front panel DB25 connector.

Table 2-23 Craft Port Connections

Connector	RS-	Pin						
		1	2	3	4	5	6	7
P5	232	Tx	Rx	Prog En	COM	-12 Vdc	+5 Vdc	+12 Vdc
DB25 (Front Panel)	232	Tx	Rx	COM	+12 Vdc	-12Vdc	+5 Vdc	Prog En

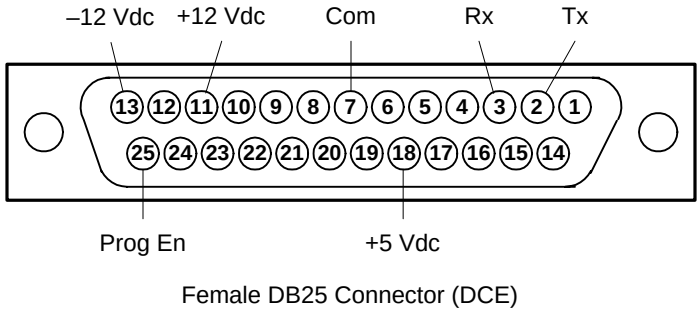


Figure 2-13 Front-Panel Connector JB3

2.5.2.3 Host Port Connections

Table 2-24 shows Host port connections when there is no installed modem.

Table 2-24 Host Port Connections (No Modem)

Connector	RS-	Pin							
		1	2	3	4	5	6	7	8
P6	422	N/A	N/A	N/A	Gnd	Rx-	Rx+	Tx-	Tx+
P6	485	RTS-	RTS+	N/A	Gnd	Rx-	Rx+	Tx-	Tx+
P12	232	Tx	RTS	CTS	Gnd	Rx	DCD	N/A	N/A

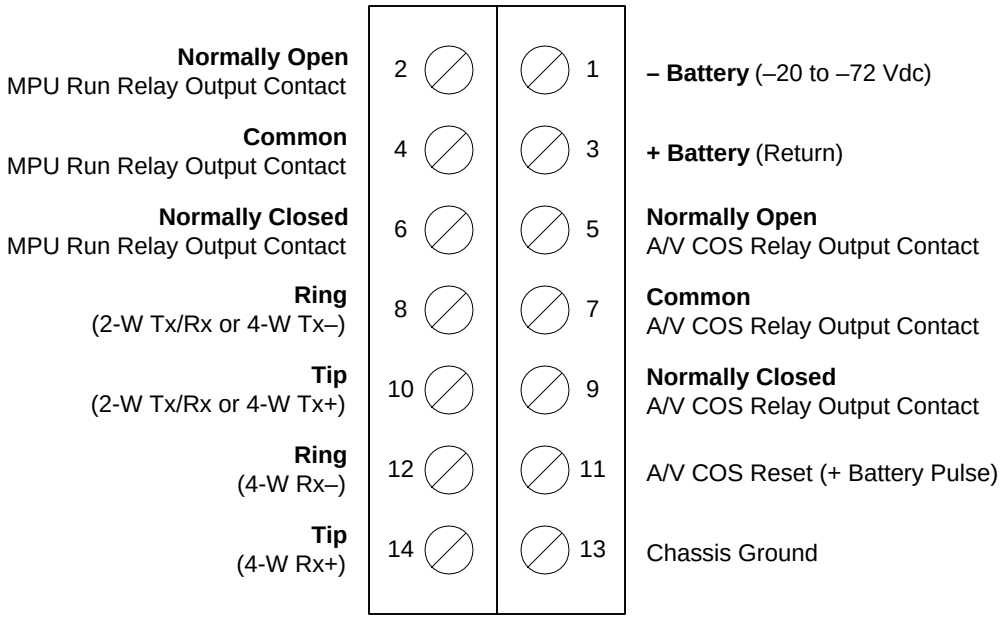
Table 2-25 shows Host port connections on TB1 with an installed modem.

Table 2-25 Host Port Connections (With 202T Modem)

Type	Pin			
	8	10	12	14
2-Wire	Tx/Rx-	Tx/Rx+	N/A	N/A
4 -Wire	Tx-	Tx+	Rx-	Rx+

2.5.2.4 Terminal Board TB1 Connections

Figure 2-14 shows all TB1 connections.



Use #14 – #24 AWG Solid Wire for All TB1 Connections

A/V	Audio/Visual
AWG	American Wire Gauge
COS	Change of State
MPU	Microprocessor Unit

Figure 2-14 WS2000 Rear Connector TB1

2.5.2.5 TBOS Serial Ports Connections

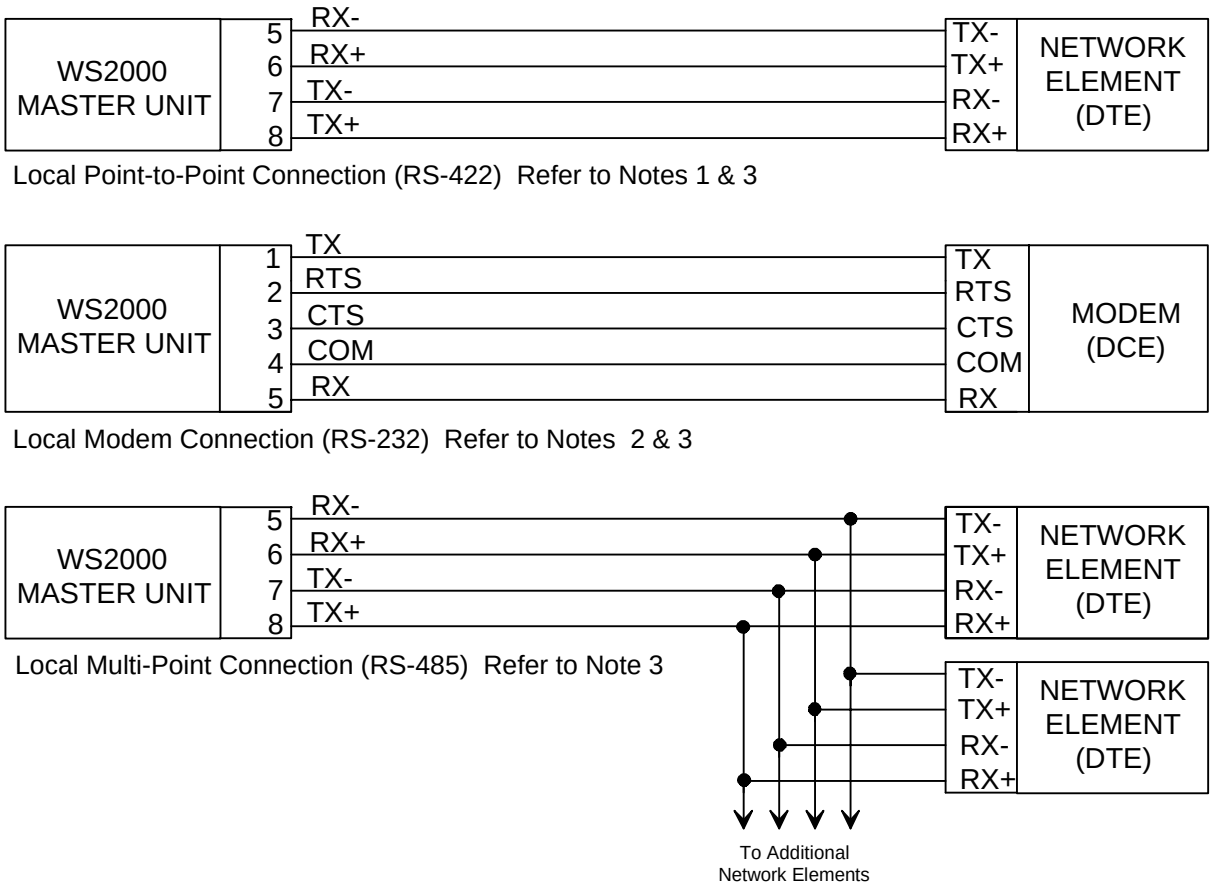


Figure 2-15 TBOS Port Interface Connections

Notes to Figure 2-15:

1. Any of the TBOS serial data collection ports can be used to interconnect network elements via RS-422. The WS2000 is considered DTE equipment. If the network element to be connected is DTE, the transmit signal lines from the WS2000 terminate into the receive inputs of the network element. The receive signal lines from the WS2000 terminate into the transmit outputs of the network element.
2. Four of the eight main unit's TBOS serial data collection ports can be used to interconnect to networks via RS-232 or RS-485. These connections are suitable for use with external clear channel modems, such as the 202T. In RS-232, if the modem to be connected is DCE, the transmit signal lines from the WS2000 terminate into the transmit outputs of the modem. The receive signal lines from the WS2000 terminate into the receive inputs of the modem. In RS-485, if the modem to be connected is DCE, the transmit signal lines from the WS2000 terminate into the receive inputs of the network element. The receive signal lines from the WS2000 terminate into the transmit outputs of the network element.
3. Some equipment vendors that provide TBOS interface on their equipment, use different terminology to define the interface and differentiation of balanced line connections. Some transmission vendors reference their serial alarm connections as "E2A" when in fact they really mean "TBOS". Common terminology for balanced line connections are plus (+) and minus (-). Other naming conventions are:

   Plus (+) = tip (T) = true (T) = letter (A). Minus (-) = ring (R) = false (F) = letter (B).

Table 2-26 TBOS Serial Port Pin Assignments

Connector	Port	Number	Type	Pin							
				1	2	3	4	5	6	7	8
P4	1	2	RS-422	N/A	N/A	N/A	Gnd	Rx-	Rx+	Tx-	Tx+
	1	2	RS-485	N/A	N/A	N/A	Gnd	Rx-	Rx+	Tx-	Tx+
	1	2	RS-232	Tx	RTS	CTS	Gnd	Rx	N/A	N/A	N/A
P11	2	3	RS-422	N/A	N/A	N/A	Gnd	Rx-	Rx+	Tx-	Tx+
	2	3	RS-485	N/A	N/A	N/A	Gnd	Rx-	Rx+	Tx-	Tx+
	2	3	RS-232	Tx	RTS	CTS	Gnd	Rx	N/A	N/A	N/A
P3	3	4	RS-422	N/A	N/A	N/A	Gnd	Rx-	Rx+	Tx-	Tx+
	3	4	RS-485	N/A	N/A	N/A	Gnd	Rx-	Rx+	Tx-	Tx+
	3	4	RS-232	Tx	RTS	CTS	Gnd	Rx	N/A	N/A	N/A
P10	4	5	RS-422	N/A	N/A	N/A	Gnd	Rx-	Rx+	Tx-	Tx+
	4	5	RS-485	N/A	N/A	N/A	Gnd	Rx-	Rx+	Tx-	Tx+
	4	5	RS-232	Tx	RTS	CTS	Gnd	Rx	N/A	N/A	N/A
P8	5	6	RS-422	N/A	N/A	N/A	Gnd	Rx-	Rx+	Tx-	Tx+
P1	6	7	RS-422	N/A	N/A	N/A	Gnd	Rx-	Rx+	Tx-	Tx+
P9	7	8	RS-422	N/A	N/A	N/A	Gnd	Rx-	Rx+	Tx-	Tx+
P2	8	9	RS-422	N/A	N/A	N/A	Gnd	Rx-	Rx+	Tx-	Tx+

2.5.2.6 Discrete Connectors

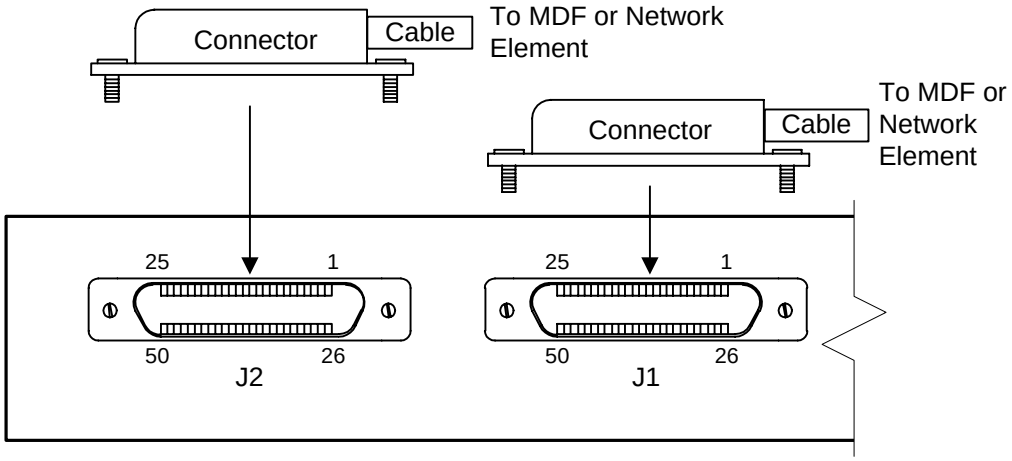


Figure 2-16 Master/Slave and Discrete Expander Cabling Interface for Discrete I/O

The cable is a standard 25-pair unshielded telephone cable; 24 AWG single strand. The connector is Westronic Part Number 620-0078 or TRW Part Number 97-12500-180. Table 2-27 and Table 2-28 delineate the connector's pin-outs.

Table 2-27 Pinouts for WS2000 Discrete Interface Connector J1

Function	Pin		Function
Control Output 1, Form C – NC	1	26	Control Output 1, Form A or C – NO
Control Output 2, Form C – NC	2	27	Control Output 2, Form A or C – NO
Control Output 3, Form C – NC	3	28	Control Output 3, Form A or C – NO
Control Output 4, Form C – NC	4	29	Control Output 4, Form A or C – NO
Control Output 5, Form C – NC	5	30	Control Output 5, Form A or C – NO
Control Output 6, Form C – NC	6	31	Control Output 6, Form A or C – NO
Control Output 7, Form C – NC	7	32	Control Output 7, Form A or C – NO
Control Output 8, Form C – NC	8	33	Control Output 8, Form A or C – NO
Ground	9	34	Control Output Common Voltage
Status/Alarm Input 1	10	35	Status/Alarm Input 2
Status/Alarm Input 3	11	36	Status/Alarm Input 4
Status/Alarm Input 5	12	37	Status/Alarm Input 6
Status/Alarm Input	13	38	Status/Alarm Input 8
Status/Alarm Input 9	14	39	Status/Alarm Input 10
Status/Alarm Input 11	15	40	Status/Alarm Input 12
Status/Alarm Input 13	16	41	Status/Alarm Input 14
Status/Alarm Input 15	17	42	Status/Alarm Input 16
Status/Alarm Input 17	18	43	Status/Alarm Input 18
Status/Alarm Input 19	19	44	Status/Alarm Input 20
Status/Alarm Input 21	20	45	Status/Alarm Input 22
Status/Alarm Input 23	21	46	Status/Alarm Input 24
Status/Alarm Input 25	22	47	Status/Alarm Input 26
Status/Alarm Input 27	23	48	Status/Alarm Input 28
Status/Alarm Input 29	24	49	Status/Alarm Input 30
Status/Alarm Input 31	25	50	Status/Alarm Input 32

Table 2-28 Pinouts for WS2000 Discrete Interface Connector J2

Function	Pin		Function
Control Output 9, Form C – NC	1	26	Control Output 9, Form A or C – NO
Control Output 10, Form C – NC	2	27	Control Output 10, Form A or C – NO
Control Output 11, Form C – NC	3	28	Control Output 11, Form A or C – NO
Control Output 12, Form C – NC	4	29	Control Output 12, Form A or C – NO
Control Output 13, Form C – NC	5	30	Control Output 13, Form A or C – NO
Control Output 14, Form C – NC	6	31	Control Output 14, Form A or C – NO
Control Output 15, Form C – NC	7	32	Control Output 15, Form A or C – NO
Control Output 16, Form C – NC	8	33	Control Output 16, Form A or C – NO
Ground	9	34	Control Output Common Voltage
Status/Alarm Input 33	10	35	Status/Alarm Input 34
Status/Alarm Input 35	11	36	Status/Alarm Input 36
Status/Alarm Input 37	12	37	Status/Alarm Input 38
Status/Alarm Input 39	13	38	Status/Alarm Input 40
Status/Alarm Input 41	14	39	Status/Alarm Input 42
Status/Alarm Input 43	15	40	Status/Alarm Input 44
Status/Alarm Input 45	16	41	Status/Alarm Input 46
Status/Alarm Input 47	17	42	Status/Alarm Input 48
Status/Alarm Input 49	18	43	Status/Alarm Input 50
Status/Alarm Input 51	19	44	Status/Alarm Input 52
Status/Alarm Input 53	20	45	Status/Alarm Input 54
Status/Alarm Input 55	21	46	Status/Alarm Input 56
Status/Alarm Input 57	22	47	Status/Alarm Input 58
Status/Alarm Input 59	23	48	Status/Alarm Input 60
Status/Alarm Input 61	24	49	Status/Alarm Input 62
Status/Alarm Input 63	25	50	Status/Alarm Input 64

2.5.2.7 Discrete Expander Cabling

Discrete Expander cables can be used with both Master and Slave units. They connect to P7 on both the WS2000 and the Discrete Expanders, and are available from Westronic as follows:

Table 2-29 Westronic Peripheral Interface Bus (WPIB) Cable Part Numbers

PN	Description
963-0003	WPIB cable, 2 connectors: 1 expander
963-0004	WPIB cable, 3 connectors: 2 expanders
963-0005	WPIB cable, 4 connectors: 3 expanders
963-0006	WPIB cable, 5 connectors: 4 expanders
963-0007	WPIB cable, 6 connectors: 5 expanders
963-0012	WPIB cable, 7 connectors: 6 expanders
963-0013	WPIB cable, 8 connectors: 7 expanders

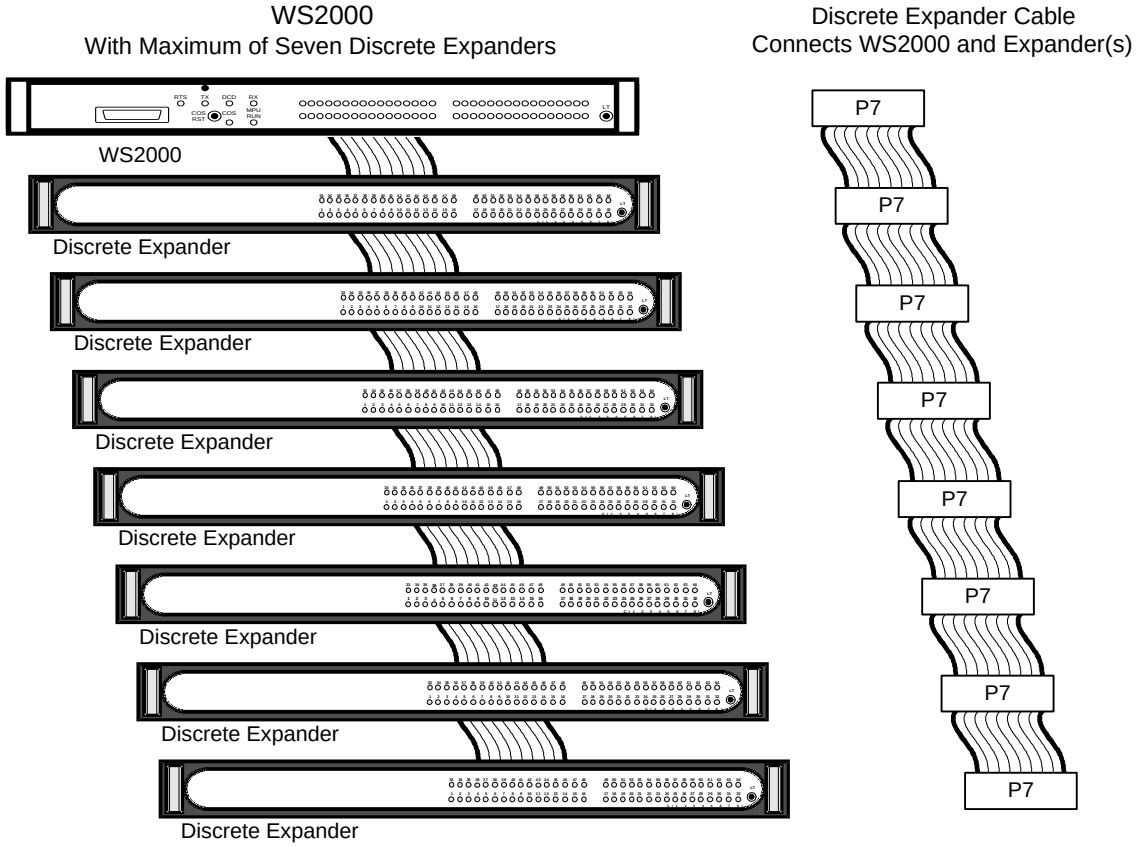


Figure 2-17 Master/Slave to Discrete Expander(s) Interface Connections

2.5.3 Master/Slave Interconnections

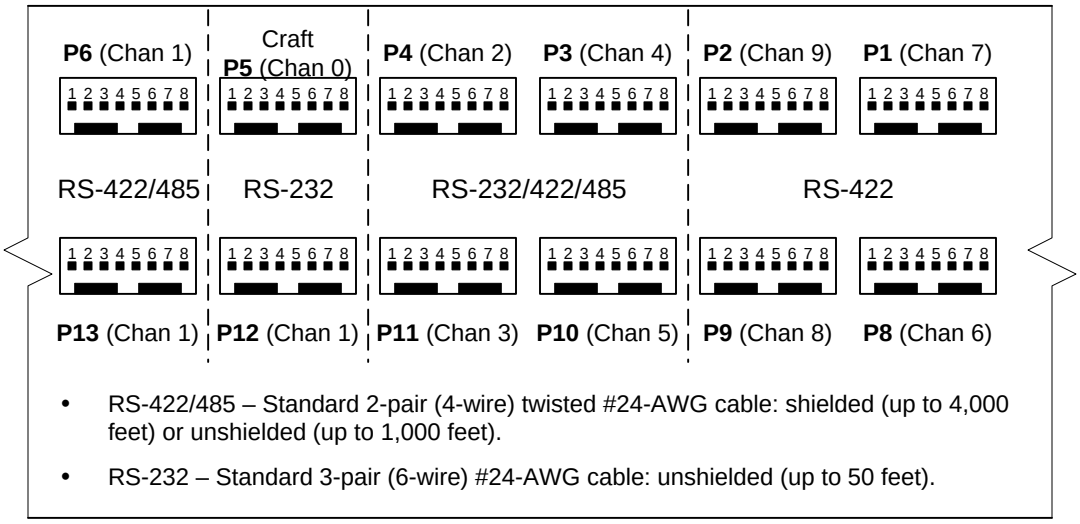


Figure 2-18 Master/Slave Cabling Interface for Serial I/O

The connector is a straight 8 Pin female connector, Westronic Part Number 620-0077, or Methode Part Numbers 1300-108 (body), and 1400-003 (pins). A connector crimp tool is available, Westronic Part Number 990-0150, or Methode Part Number HC1001. Table 2-26 delineates the pin connections.

2.5.3.1 RS-422 Connections

Each Slave Unit may be connected to a separate Master Unit serial port. Any of the Master Unit's serial data collection ports can be used. The Master data collection port selected for connection to a Slave Unit and the Slave Unit's host port (P6) are set to RS-422. Unshielded cable may be up to 1000 feet long. Shielded cable may be up to 4000 feet long. Unshielded cable can be ordered with connectors attached (P/N 977-0033).

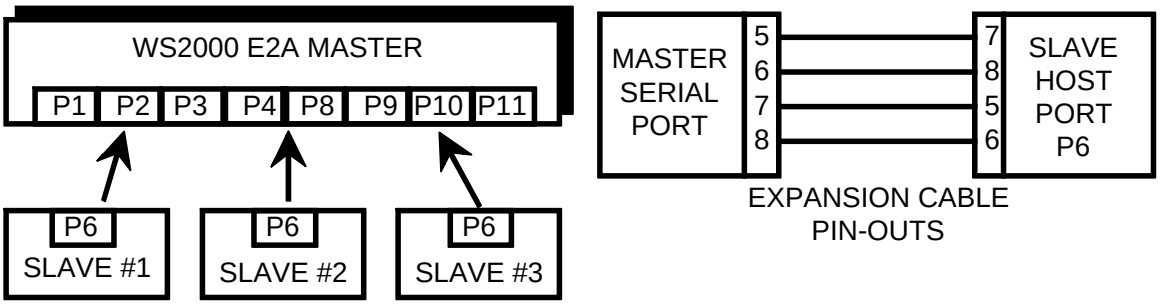


Figure 2-19 RS-422 Point-to-Point Cable Interconnection

2.5.3.2 RS-485 Connections

Any of the Master Unit's serial data collection ports can be used to interconnect to the Slave Units. The Master data collection port selected for interconnection to the Slave Units can be set to either RS-422 or RS-485. The Slave Unit's host ports (P6) must be set to RS-485. Unshielded cable may be up to 1000 feet long. Shielded cable may be up to 4000 feet long. Unshielded cables can be ordered with different connectors attached:

- P/N 977-0033 Connectors (Master and 1 Slave)
- P/N 977-0034 Connectors (Master and 2 Slaves)
- P/N 977-0035 Connectors (Master and 3 Slaves)

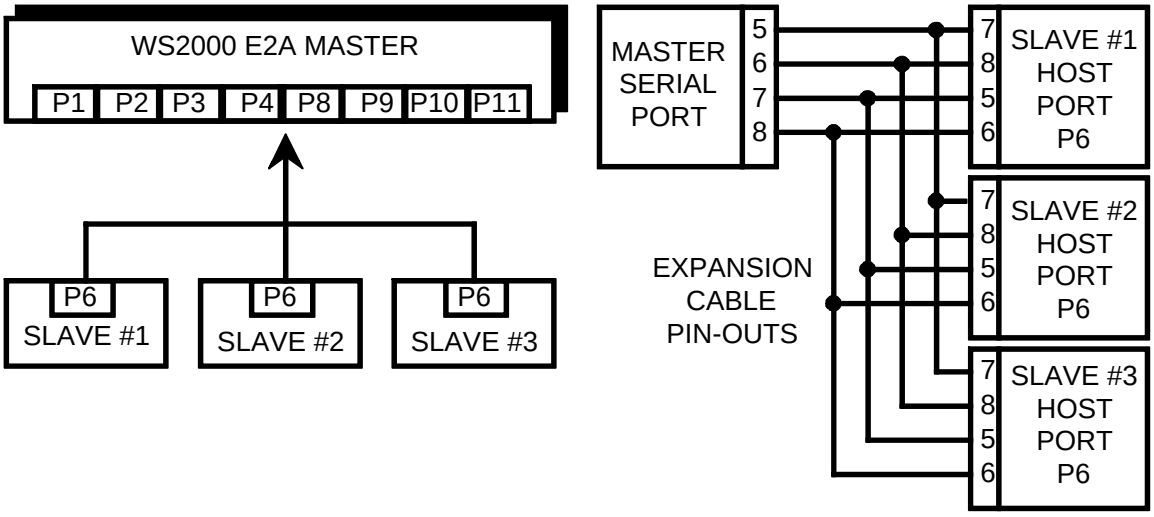


Figure 2-20 RS-485 Multi-Point Cable Interconnection

2.5.4 Rack Mount Modem Strapping and Connections

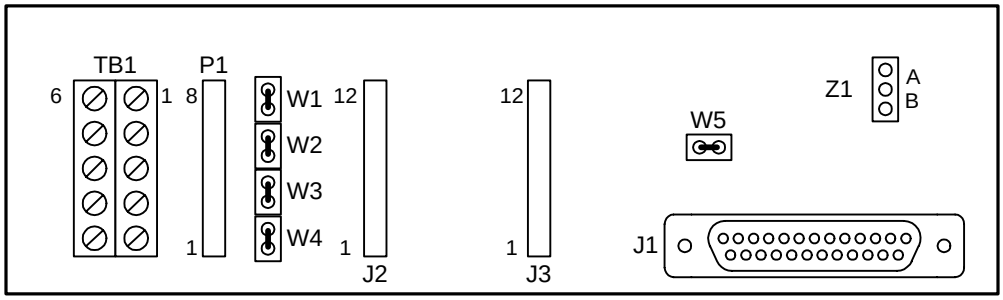
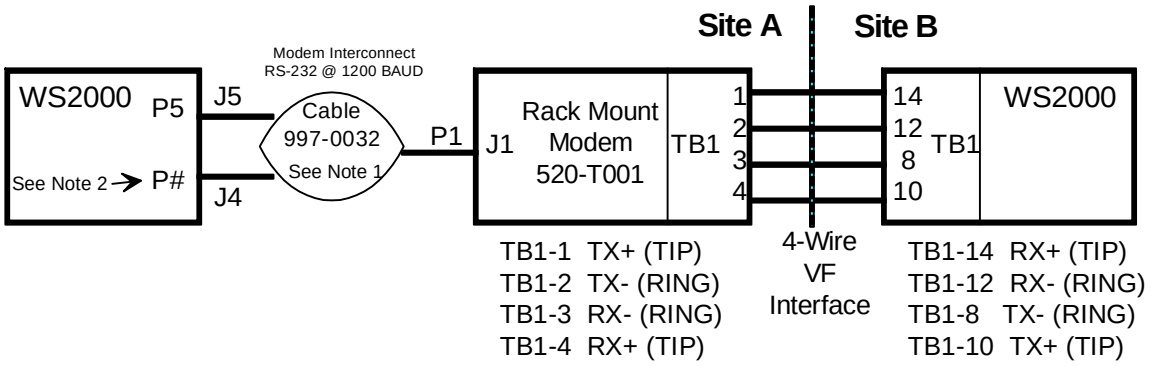


Figure 2-21 Rack-Mount Modem Main Board Strapping



Notes:

4. J5 was labeled J1 and J4 was labeled J2 in early versions of cable 977-0032
5. J4 can be connected to P3 (Ch 4), P4 (Ch 2), P10 (Ch 5) or P11 (Ch 3).

Figure 2-22 Rack Mount Modem Interconnection Diagram

2.5.5 202T Modem Module Strapping

Table 2-30 through Table 2-32 describe the modem strapping options shown in Figure 2-23.

Table 2-30 202T Modem Card Jumper Blocks and Functions

Item	Function
Z1	Jumper block Z1 does not apply to WS2000 applications.
Z2	Jumper block Z2 performs two functions: ■ Pins 1 – 12 provide receiver squelch on the Request To Send (RTS) line. Install when modem runs 2-wire half-duplex mode. ■ Pins 2 through 11 establish the modem mode operation type. See Table 2-31 for Z2 strap arrangements. Factory default is 4W/202.
Z3	Jumper block Z3 sets the modem receive signal sensitivity. See Table 2-32 for receiver sensitivity Z3 strap arrangements. The setting should be set 5 – 10 dBm lower than the actual receive level. Default is –36 dBm.
Z4	Jumper block Z4 selects between 2-wire and 4-wire operating modes. Strap pins 1 – 2 for 2-wire operation or strap pins 2 – 3 for 4-wire operation. Default is 4-wire.
Z5	Jumper block Z5 provides a timing circuit for another product line/application. Z5 must be strapped when used in the WS2000 to bypass the timing circuit. Default is installed.
R1	Trim pot R1 adjusts the modem transmit output level. Clockwise rotation increases output level (+3 dBm maximum output). Default is –10 dBm.

Table 2-31 202T Modem Mode Operation Type (Z2 Jumper Block)

Mode	Z2 Pin Straps				
	2–11	3–10	4–9	5–8	6–7
2W/202	In	Out	In	In	In
2W/202/EQ	Out	Out	In	In	In
2W/V.23	In	Out	Out	In	In
2W/V.23/EQ	Out	Out	Out	In	In
4W/202	In	Out	In	In	Out
4W/202/EQ	Out	Out	In	In	Out
4W/V.23	In	Out	Out	In	Out
4W/V.23/EQ	Out	Out	Out	In	Out

Table 2-32 202T Modem Receive Signal Sensitivity (Z3 Jumper Block)

Rx Level	Z3 Pin Straps				
	1–10	2–9	3–8	4–7	5–6
–6 dBm	In	In	In	In	In
–12 dBm	Out	Out	Out	Out	In
–18 dBm	Out	Out	Out	In	Out
–24 dBm	Out	Out	In	Out	Out
–30 dBm	Out	In	Out	Out	Out
–36 dBm	In	Out	Out	Out	Out
–42 dBm	Out	Out	Out	Out	Out

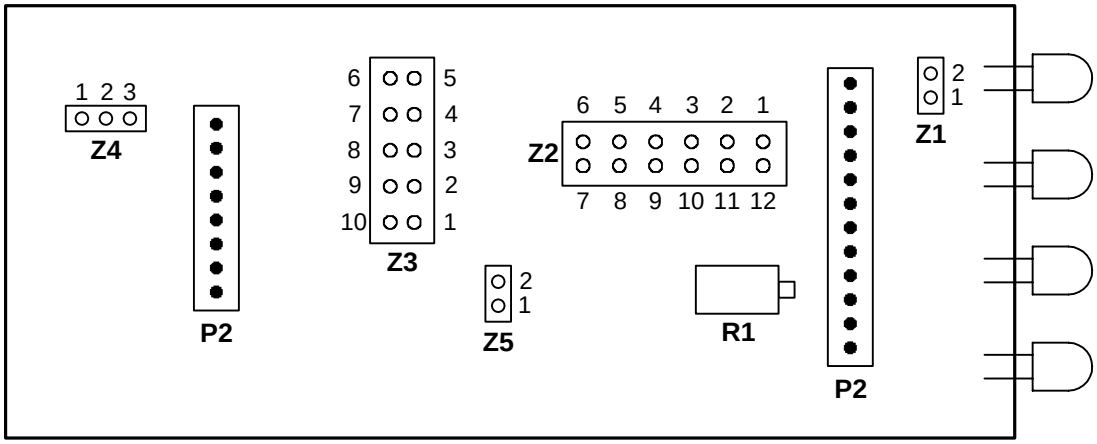


Figure 2-23 202T Modem Card

2.5.6 TELZON Wire Wrap Panel Connections

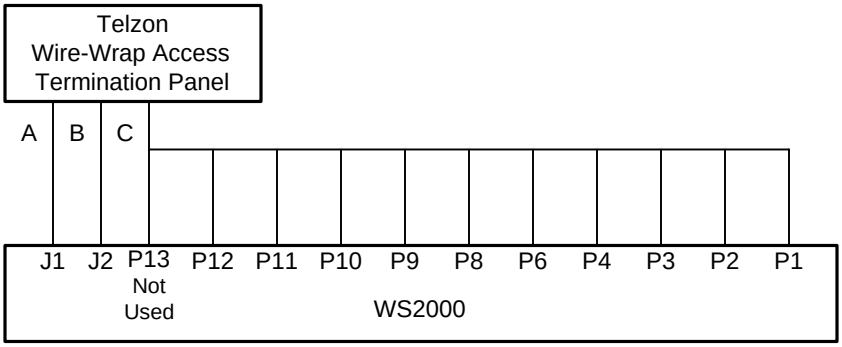


Figure 2-24 Remote and Telzon Termination Block Interconnection

Table 2-33 shows the wire color-pair combinations identifying which serial connection from the Telzon cable terminates to the mating WS2000 unit “P” plug.

Table 2-33 Telzon Serial Connector Identification and Wire Colors

WS2000 Plug	Serial Channel/Interface Type	Telzon Cable Wire
P1	7 RS-422 (TBOS)	Orange/Yellow, Orange/Red
P2	9 RS-422 (TBOS)	Brown/Yellow, Brown/Red
P3	4 RS-232/422/485 (TBOS)	Green/Black, Green/White
P4	2 RS-232/422/485 (TBOS)	Blue/Black, Blue/White
P6	1 RS-422 (E2A Host)	Slate/Black, Slate/White, Slate/Red
P8	6 RS-422 (TBOS)	Blue/Yellow, Blue/Red
P9	8 RS-422 (TBOS)	Green/Yellow, Green/Red
P10	5 RS-232/422/485 (TBOS)	Brown/Black, Brown/White
P11	3 RS-232/422/485 (TBOS)	Orange/Black, Orange/White
P12	1 RS-232 (E2A Host)	Green/Violet, Brown/Violet, Slate/Violet
P13	1 RS-485 (Not Used)	Slate/Yellow, Slate/Violet

Figure 2-25 shows the layout chart that appears on the inside front cover.

Figure 2-25 Telzon Termination Block Layout

3 Configuration

3.1 Overview

This chapter explains how to configure a WS2000. It contains three major sections. Section 3.2 presents a methodology for organizing configuration parameters. Sections 3.3 and 3.4 are detailed sets of instructions for configuring a WS2000 Master and Slav, respectively.

The WS2000 allows various types of Operation Systems to monitor and control diverse groups of transmission and switching equipment by converting the serial and discrete information provided by the equipment to a format that is understood by the Operation System (E-Telemetry). Before the WS2000 can perform this conversion, it must be informed of the characteristics of the equipment that it is interfacing with. This process is called configuration.

There are many parameters that must be considered when configuring the unit. These parameters include:

- The physical characpfteristics and communications rate of each serial interface: RS-232, RS-422, RS-485.
- The protocol to be used by each serial interface: TBOS.
- Mapping of Alarm and Control information from remote equipment to the format used by the Operation System.
- Other attributes affecting how alarm/status information to be reported to the Operation System, which may have a number of attributes assigned to them that affect the way in which they are reported.
- The address used by the Operation System to identify the WS2000.

3.2 Maintenance System Organization

This section provides an overview of the elements that comprise a maintenance operations system. An understanding of these elements is helpful when configuring the WS2000.

A maintenance system is a hierarchical organization of units designed to report and control digital transmission equipment. The top of the hierarchy is occupied by a centralized Operation System. The Operation System collects data from Remote Telemetry Units on a polled basis.

The Remote Telemetry Units form the second level of the hierarchy. The WS2000 is a Remote Telemetry Unit that processes information

from monitored equipment and discrete inputs on a polled basis. The monitored equipment and discrete inputs are the base of the hierarchy.

3.2.1 Scan Points

The basic unit of information processed by the WS2000 is a **Scan Point**. A Scan Point is a binary signal provided by the monitored equipment that indicates some aspect of its condition. The Scan Points are defined by the manufacturer of the monitored equipment. Scan Points are active either high or low. The invert attribute allows Scan Point status to be inverted before it is processed. In this manner, the Remote Telemetry Unit can process the status, regardless of the electronic output of the monitored equipment.

The Scan Point data is processed by the WS2000 before it is reported to the Operation System. This processing is accomplished according to various attributes defined in a **Process List**.

3.2.2 Process Lists

A **Process List** is a set of attribute definitions for each of the 64 scan points in a display. Each display that is processed by a WS2000 must have a process list associated with it.

The Process List defines a Scan Point as either an **Alarm Point** or a **Status Point**. Scan Points that are classified as alarm points will cause a Change-of-State indication when the status of the Scan Point goes from a low to a high state. Alarm points also result in local alarm annunciation via the COS LED. Alarm points can also be defined as **Bipolar Alarms**. A bipolar alarm causes a Change-of-State indication when the status of the Scan Point changes state (Both High to Low and Low to High). Status points are informative and never cause a Change-of-State indication.

Scan Points can be active when they are high or low. The invert attribute allows Scan Point status to be inverted before it is processed. That is, when the Scan Point status is low, it will be processed as if it were high. When the Scan Point status is high, it will be treated as if it were low.

A Process List may define a memory attribute for each Scan Point. If a Scan Point has memory (sometimes referred to as stretch), any changes in Scan Point status will be held by the WS2000 until they are reported to the Operation System.

Several pre-defined process lists are supplied in the default configuration database of the WS2000. Any of the pre-defined process lists can be customized, deleted or copied. New process lists can be created from scratch, or generated by copying and modifying an existing

process list. Westronic recommends pre-defined lists not be permanently modified.

3.2.3 Control Points

Control Points are provided by the monitored equipment to effect some aspect of its operations. Typical uses of Control Points are to silence alarm indications or to restart microprocessor based equipment. Like Scan Points, the actual meanings of the Control Points are also defined by the manufacturer of the monitored equipment.

Some Control Points are bipolar and require a latching command (on or off). Other Control Points require only a momentary command (pulse).

Each WS2000 unit (Master or Slave) may provide up to one display (64 points) of discrete input data. The first 16 points of each discrete display may be operated as either latching or momentary control points. Latching controls are available on Displays 5 through 12 only.

3.2.4 Physical Interfaces

Communications between the monitored equipment, the WS2000, and the Operation System are accomplished via physical interfaces. While there are many such interfaces defined, this document will focus on the three that are used by the WS2000. They are RS-232, RS-422 (point-to-point) and RS-485 (multi-point).

3.2.5 Channel Speed

Communication on any physical interface must be accomplished at a given speed. The WS2000 measures channel speed in terms of bits/second. It supports 1200 and 2400 bps for external communications, and 4800 and 9600 bps for Master-Slave communications.

3.2.6 Protocols

Although there are many possible protocols that can be used between the monitored equipment, the WS2000 and the Operation System, this document will deal only with three of them: TBOS, E2A and WAP.

3.2.6.1 TBOS Protocol

TBOS is an acronym for Telemetry Byte Oriented Serial protocol, and is employed between the WS2000 and monitored equipment. TBOS normally utilizes the RS-422 physical interface, at a speed of 2400 bps.

It is a Master/Slave protocol. Do not confuse this Master/Slave relationship with Master and Slave WS2000s.

The Master scans the Slave for Scan Point data, and commands the Slave to operate Control Points. The smallest unit of information organization in the TBOS protocol is the **Display**. A Display is a set of 64 Scan Points and 64 Control Points. Each set of Scan Points has a corresponding set of Control Points defined. Monitored equipment may contain one or more Displays, depending upon the number of Scan Points and Control Points defined. TBOS supports a maximum of eight Displays.

Displays are organized into **Characters**. A Character is a set of eight Scan Points. Since there are 64 Scan Points in a Display, each Display contains eight Characters. The Character is the smallest unit of information transferred by the TBOS protocol.

The WS2000 polls the Characters in a Display through the use of a **Scan List**. The Scan List is set up so that only active Characters are polled. By only polling the active Characters in each Display, the WS2000 can process the Display more efficiently. Newly installed, but untested equipment can also be disabled via a Scan List.

There are two types of TBOS messages sent by the Master: Scan Requests and Command Requests. Each TBOS scan request identifies which Display and Character the TBOS master is polling for. The requested character is returned by the TBOS Slave. Each TBOS command request identifies which Display and Control Point the Master wants to control. It also identifies the type of control (Latch, Unlatch, or Momentary).

3.2.6.2 E2A Protocol

E2A protocol is employed between the WS2000 and the Operation System (OS). The OS scans the WS2000 for Scan Point data and commands the WS2000 to operate Control Points. In this respect, the E2A protocol is similar to TBOS.

The smallest addressable unit of information in the E2A protocol is a **Display**. An E2A Display is a set of 64 Scan Points and 64 Momentary Control Points. Each Scan Point has a corresponding Momentary Control Point.

In TBOS, all Control Points can be executed as momentary or latched commands. In the E2A Protocol only 512 Control Points can execute latching commands. The WS2000 maps these 512 Control Points to Displays 5 through 12.

Note: The location of Control Points that can execute latching commands may be a consideration when assigning Output Displays.

Monitored equipment may contain one or more Displays, depending on the number of Scan and Control Points defined by the equipment manufacturer. The E2A protocol supports a maximum of 64 Displays, but four of them are used for protocol overhead. As a result, the WS2000 can report on a maximum of 3840 Scan Points (64 Scan Points times 60 Displays) using the E2A protocol.

3.2.6.3 WAP Protocol

The WAP protocol is employed within the WS2000 E2A Remote master unit for communicating with the WS2000 E2A Remote slave units.

Westronic Asynchronous Protocol (WAP) utilizes a channel speed of either 1200, 2400, 4800 or 9600 bps.

The WAP protocol can utilize either RS-232, RS-422 or RS-485 physical layer interfaces. One, two or three slave RTU's can be configured on an Input Channel. When one slave RTU is configured on a line, both the master and slave RTU's can use any of the interfaces. When more than one slave RTU is configured on a line, the master RTU can use either RS-422 or RS-485, however RS-422 is normally used by the WS2000 master, due to its superior noise immunity. The slave RTUs must use RS-485.

Each slave RTU requires a WAP address. The address is used by the WAP protocol to identify the destination slave RTU. The station address is required regardless of whether the Slave is configured on a multi-point or point-to-point line.

3.2.7 Serial Channels

Each WS2000 is equipped with 10 serial Channels. One channel is dedicated to Host communications, and one is dedicated to Craft communications. The remaining 8 channels are used for serial input data.

On the master WS2000, channel 1 is used to communicate with the Host Operation System. It can have a channel speed of either 1200 or 2400 bps and use either the RS-232, RS-422 or RS-485 physical interface. Channel 1 can also be equipped with an optional two or four wire 202T/V.23 compatible (1200 baud) modem.

On slave WS2000s, channel 1 is used to communicate with the master WS2000 via any of the serial input ports on the master. It can have a channel speed of 1200, 2400, 4800 or 9600 bps and uses RS-232, RS-422 or RS-485 physical interface.

Channels 2 through 5 can use either RS-232, RS-422 or RS-485 physical interface.

Channels 6 through 9 are optional, and can only use RS-422 physical interface.

When TBOS is used for data collection, channels 2 through 9 on both the master and the slave WS2000's can be configured to run at a channel speed of 1200 or 2400 bps. When the master WS2000 communicates with Slave RTU's, channels 2 through 9 can be configured to run at 1200, 2400, 4800 or 9600 bps.

Channel 10 is used by the WESMAINT unit on both the master and slave WS2000(s). Channel 10's parameters are fixed and cannot be altered.

3.3 WS2000 Master Configuration Procedures

This section contains step-by-step procedures for configuring a Master WS2000 E-Telemetry E2A Remote using the WESMAINT terminal. Detailed information on WESMAINT operation (for configuring Master remotes) is contained in Section 4.

Note: When the WESMAINT is connected to Rear Panel connector P5, a jumper must be installed on JB3 between pins 18 and 25 to enable the EEPROM and store configuration information.

Ensure the jumper is removed prior to applying or removing power to the wesmaint.

3.3.1 Configuring Slaves

1. Enter CONFIG MODE. For details on entering CONFIG mode, see Section 4.
2. Select the Config Slaves function. For details on the operation of this function, see Section 4.
3. Select the number of the Slave to be configured.
4. Select whether the Slave is to be EQUIPPED or NOT EQUIPPED.

3.3.2 Configuring Serial Channels

1. Enter CONFIG MODE. For details on entering CONFIG mode, see Section 4.
2. For each serial Channel to be configured:
   - Select the Serial Channel Interface function. For details on the operation of this function, see Section 4.
   - Select an RTU. This can be the Master or one of the Slaves.
   - Select a serial Channel.

- View the Interface type of the selected Channel. Change the Interface Type, if necessary
- View the Baud Rate of the selected Channel. Change the Baud Rate, if necessary.

3.3.3 Configuring Process Lists

Note: The WS2000 can store up to 100 Process Lists in its EEPROM. Since it is capable of handling a maximum of 60 Input Displays, only 60 different Process Lists can be in use at any one time. Westronic recommends that alterations not be made to pre-defined Process Lists. If modifications are required, generate a new List using the Create or Modify Lists command. The attributes for the pre-defined Process Lists are shown in Appendix A.

1. Enter CONFIG MODE. For details on entering CONFIG mode, refer to paragraph 4.3.2.1.
2. Select the Configure Lists function. For details on the operation of this function, see Section 4.
3. For each new Process Attribute List to be configured, select either the CREATE LIST, DUPLICATE LIST, or MODIFY LIST function. If the new Process List closely resembles an pre-defined list, the fastest way to configure it is via the copy and modify functions. If the new list bears little resemblance to any existing list, it may be more efficient to use the create function.

   To re-configure an existing list, use the DELETE and CREATE LIST, or the MODIFY LIST function. The choice depends on how different the existing list is from the new list. If the number of required changes are small, the most efficient way is via the MODIFY LIST function. If a large number of changes are required, it is more efficient to delete the existing list and use the CREATE LIST function. If the Process List attributes are identical for many of the Scan Points, configuration can be accomplished faster using the AUTO PROPAGATE feature. If AUTO PROPAGATE mode has been selected, changing the attributes of one point will cause the same changes to be applied to all subsequent (higher) points in the list.

3.3.4 Configuring Output Displays

1. Enter CONFIG MODE. For details on entering CONFIG mode, see Section 4.
2. Select the Configure Displays function. For details on the operation of this function, see Section 4.

3. Select each Output Display:
    - Select an RTU. This can be the Master or one of the Slaves.
    - If the source of data for this Output Display is a TBOS Input Display:
        - Specify the TBOS channel for this Display.
        - Specify TBOS Input Display number for this Display.
        - Specify the Process List number for this Display.
        - Specify the Scan List for this Display.
    - If the source of data for this Output Display is Discrete Input:
        - Specify the WPIB address for this Display.
        - Specify the Process List number for this Display.
        - Specify the Scan List for this Display.
    - If this Display is a spare:
        - Specify the Display as 'spare'.

3.3.5 Select the E2A Address

1. Enter CONFIG MODE. For details on entering CONFIG mode, see Section 4.
2. Select the E2A Remote Addr function. For details on the operation of this function, see Section 4.
3. Enter the E2A remote station address.

3.3.6 Select the Error Reporting Format

1. Enter CONFIG MODE. For details on entering CONFIG mode, see Section 4.
2. Select the Sel Error Rprt function. For details on the operation of this function see Section 4.
3. Select either TASC or TCAS format for error reporting.

3.3.7 Verifying the New Configuration

1. Enter NORMAL MODE. For details on entering NORMAL mode, see Section 4.
2. Select the Serial Channel Interface function. See Section 4.
    - Select each serial Channel that was configured.
    - Verify the Interface Type of the selected Channel.
    - Verify the Baud Rate of the selected Channel

3. Select the Configure Lists function. See Section 4.
    - Select each Process List that was configured.
    - Verify the Process List attributes via VIEW LIST function.
4. Select the Configure Displays function. See Section 4.
    - Select each Output Display.
    - If the data source is a TBOS Input Display:
        - Verify the RTU number.
        - Verify the TBOS serial Channel and Input Display number.
        - Verify the Process and Scan List numbers.
    - If the data source is a discrete input:
        - Verify the WPIB address.
        - Verify the Process and Scan List numbers.
    - If the Display is spare, verify that the Output Display is spare.

3.4 WS2000 Slave Configuration Procedures

This section contains step-by-step procedures for configuring a Slave WS2000 E-Telemetry E2A Remote using the WESMAINT terminal. Detailed information on WESMAINT operation (for configuring Slave Remotes) is contained in Section 5.

Note: When the WESMAINT is connected to Rear Panel connector P5, a jumper must be installed on JB3 between pins 18 and 25 to enable the EEPROM and store configuration information.

CAUTION: ensure the jumper is removed prior to applying or removing power to the wesmaint.

3.4.1 Configuring Slave Address

1. Enter CONFIG MODE. For details on entering CONFIG mode, see Section 4.
2. Select the Slave Addr function. For details on the operation of this function, see Section 5.
3. Select the number of the Slave.

3.4.2 Configuring Serial Channel

Note: Only Channel 1 is configured at the Slave. Other Channels are configured via the Master WS2000 Remote.

1. Enter CONFIG MODE. For details on entering CONFIG mode, see Section 4.
2. Select the Serial Channel Interface function. For details on the operation of this function, see Section 5.
3. View the Interface type of the selected Channel. Change the Interface Type, if necessary
4. View the Baud Rate of the selected Channel. Change the Baud Rate, if necessary.

4 WESMAINT Reference (Master)

4.1 Overview

The WS2000 Maintenance Unit, the WESMAINT, is available in either a rack mount or portable version. The WESMAINT is a multi-functional local display that provides user interface with the WS2000. Refer to Figure 4-1. The front panel consists of 16 hexadecimal keys, 16 function keys, and a 16 character LED display. Power for the WESMAINT unit is supplied through the serial cable that is connected to either JB3 (Front Panel) or P5 (Backplane) on the WS2000.

In addition to the rack mount or portable WESMAINT, Westronic offers a PC-WESMAINT Software Package that provides a WESMAINT interface using a PC as the "WESMAINT" unit. In addition to the WESMAINT function, the PC-WESMAINT software can retrieve, view, and download WS2000 SmartScanner configuration information.

The WESMAINT software on the WS2000 provides a powerful set of tools for on and off line configuration and maintenance. The WES-MAINT software features include:

- examining all system inputs.
- controlling system outputs.
- modifying system operating parameters.
- monitoring system operating conditions

Note: When the WESMAINT is connected to Rear Panel connector P5, a jumper must be installed on JB3 between pins 18 and 25 to enable the EEPROM and store configuration information.

CAUTION: Ensure the jumper is removed prior to applying or removing power to the wesmaint.

4.2 Selecting a Function

When using a rack mount WESMAINT unit, the initial display reads "WESMAINT READY". When using a portable or PC WESMAINT, the display is initially blank. If CMD is pressed, the display reads "WESMAINT MODE". If DSPY is pressed, the display reads "VERSION NUMBER". Keypad entries can then be accepted by the software. There are two types of WESMAINT functions:

- Display - to view data

- Command - to program data

The menu of display functions is accessed by pressing the DSPY key. The menu of command functions is accessed by pressing the CMD key. Both the DSPY and CMD keys are active at all times.

Pressing either the DSPY or CMD key will cause the first function title in that menu to be displayed. The list of function titles may be viewed by pressing the UP or DOWN arrow keys, see Display Menu Tree or Command Menu Tree elsewhere in this section.

To access a function, press the DSPY key if the function is in the Display menu or the CMD key if the function is in the Command menu. Manipulate the UP and DOWN arrow keys until the function title is displayed, then press the SEL (SELECT) key. A function may be exited or aborted at any time by pressing the DSPY or CMD keys again.

4.2.1 WESMAINT Unit Key Layout

Figure 4-1 is an illustration of the WESMAINT panel and its key pads. Table 4-1 provides an ASCII cross reference of the WESMAINT function keys if a PC-WESMAINT is used instead of a WESMAINT.

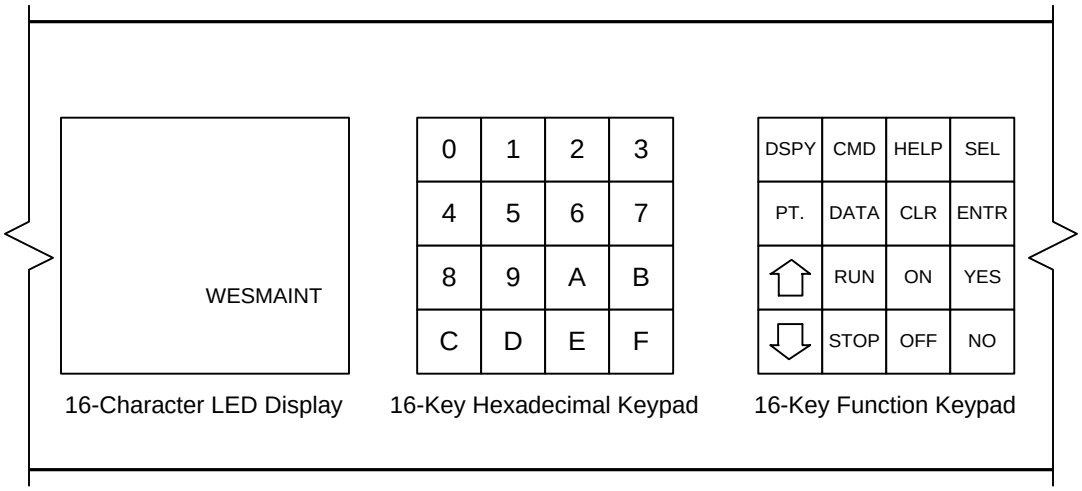


Figure 4-1 WS2000 Wesmaint Maintenance Unit

4.2.2 ASCII Terminal Key Layout

Table 4-1 Wesmaint-ASCII Terminal Functional Equivalence

Wesmaint Key	ASCII Character	Wesmaint Key	ASCII Character
0	0	DSPY	@
1	1	CMD	A
2	2	HELP	B
3	3	SEL	C
4	4	PT	D
5	5	DATA	E
6	6	CLR	F
7	7	ENTR	G
8	8	⇑	H
9	9	RUN	I
A	:	ON	J
B	;	YES	K
C	<	⇓	L
D	=	STOP	M
E	>	OFF	N
F	?	NO	O

The Craft firmware driver in the WS2000 issues a Carriage Return (CR) character after each line.

WS2000 Characters

The WS2000 Tx/Rx characters consist of one start bit, seven data bits, even parity, and one stop bit at a data rate of 9,600 bps.

CAUTION: If you are using a PC, the arrow key can cause a "?" prompt to appear on the screen, at which point the WS2000 appears to lock up. The question mark prompt is a WS2000 mode that allows a PC ASCII file to load into the EEPROM.

To get out of the “lock up” question mark prompt, perform the following steps.

1. Enter @
2. Press Carriage Return (ENTER)
3. Enter @

These steps should bring back the Version Number or the Wesmaint Mode function.

4.2.3 Operator Prompts

When using the PC-WESMAINT to program a WS2000, the software will prompt the user for information. These operator prompts are explained in the following text.

4.2.3.1 Question Mark (?)

Certain functions are questions followed by a question mark (?). These questions require a YES or NO response. Press **YES** or **NO** as appropriate.

4.2.3.2 Numerical Input Prompt (^)

Certain functions require the input of numerical data from the operator. When the numerical input prompt (^) is displayed, enter the appropriate data using the hex keypad. Press **ENTR** to signal the end of data entry. If a mistake is made in entering data (and noticed before **ENTR** is pressed) press **CLR** to erase the data and start over. Pressing **ENTR** without entering data is equivalent to entering a zero.

4.3 WESMAINT Commands (Master)

This section contains detailed descriptions of all WESMAINT functions. The descriptions outline the formats of the displayed data, indicate which keys are active, and provide step-by-step operating procedures.

More information about the WS2000 configuration elements such as Process Lists, Displays, and Channels, is included in Section 3.

Note that some WESMAINT functions are valid only in NORMAL mode, some in CONFIG mode, and that some functions are valid in either mode. Figure 4-2 illustrates the entire WESMAINT command hierarchy for Master Remotes.

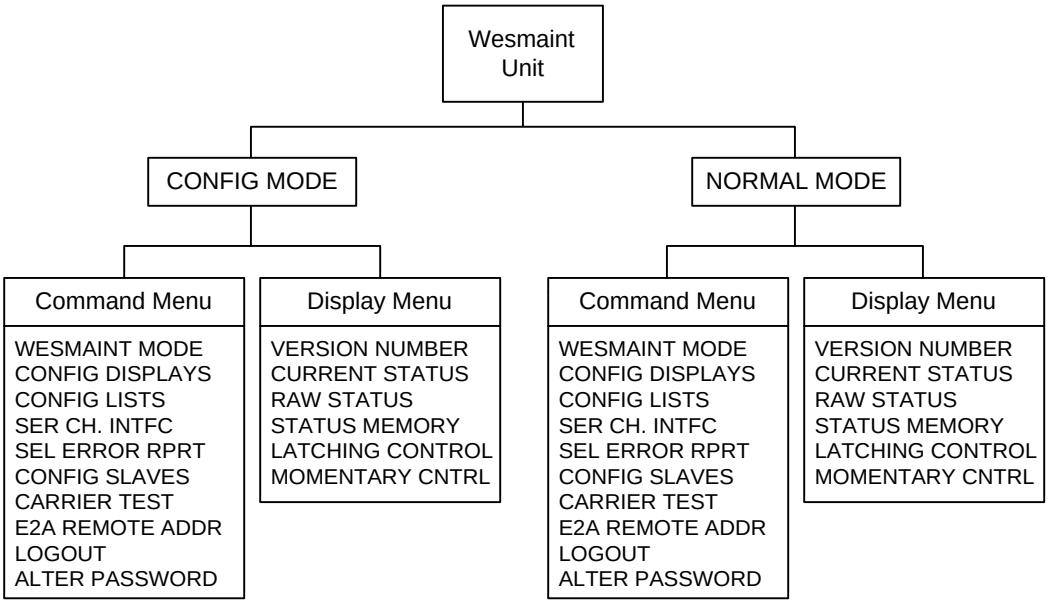


Figure 4-2 WESMAINT Menu Tree

4.3.1 Display Menu Functions

Table 4-2 shows the functions that are accessed from the DSPY menu.

Table 4-2 Display Menu Functions

Function	Purpose
VERSION NUMBER	View software load ID string
CURRENT STATUS	View processed input data
RAW STATUS	View unprocessed input data
STATUS MEMORY	View status memory data
LATCHING CONTROL	Latch discrete or serial outputs
MOMENTARY CONTROL	Pulse discrete or serial outputs

4.3.1.1 Version Number (Software Load Identification)

This section describes how to identify the current software version installed in the WS2000 SmartScanner.

Menu: DSPY

Purpose: To view the software load identification stored in the EPROM. This identification should be used to report any problems with the WS2000 firmware.

Screen Format: When the function is selected, the screen will show the content of the stored software load identification.

Keys Used: The following keys are active while this function is selected:

- **UP:** Scroll software load identification in a forward direction.
- **DOWN:** Scroll software load identification in a backwards direction.
- **STOP:** Stops scrolling software load identification.
- **RUN:** Starts scrolling software load identification.

Valid Modes: NORMAL and CONFIG

Operation: The steps below must be followed in order to view the software revision in the WS2000.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "VERSION NUMBER" appears on the screen.
3. Press the SEL key. The software version information will then scroll across the screen.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

4.3.1.2 Current Status

The following describes how to view the current status of the WS2000 input data.

Menu: DSPY

Purpose: To view the status of input data as it will be seen by the master station. This data has been processed according to the point attributes defined in the related Process Lists. Refer to the Section 3 in this guide for a discussion of Process Lists.

Screen Format: The screen format for this function is:

Cxx-y zzzzzzzz

where:

C = Current Status Menu
xx = output display number (1-64)
y = character number (1-8)
zzzzzzzz = data bit status

Note the data bits are shown from lowest number on the left to the highest number on the right, e.g., bits 1, 2, 3, 4, 5, 6, 7, 8.

A flashing asterisk (*) indicates that the status memory bit is on for one or more of the points shown. This indicates that a change has occurred on a data point that has alarm attributes that have not yet been reported to the master station. If any of the data points shown has both alarm and memory attributes, the state shown may or may not be the current state of the input. Once the alarm is reported to the master station, the asterisk (*) disappears.

Keys Used: The following keys are active when this function is selected:

- **UP**: Advance to the next character in the current output display or to the first character in the next output display.
- DOWN: Back up to the previous character in the current output display or to the last character in the previous output display.
- POINT (PT): Select a particular output display and character for viewing.
- CLEAR (CLR): Clear status memory bits for character on screen.

Note: The CLR key affects the data that will be reported to the master station. This key is primarily intended to be used when the WS2000 is in an off-line diagnostic mode. When the WS2000 is in an on-line mode, this command should be used with discretion.

Valid Modes: NORMAL only

Operation: The steps below are required in order to view the current status of the WS2000 input data.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "CURRENT STATUS" appears on the screen.
3. Press the SEL key.

Select Other Displays/Characters

1. Press the UP key to view the next character of the current output display or the first character of the next output display.
2. Press the DOWN key to view the previous character of the current output display or the last character in the previous output display.
3. Press the PT. key to select a specific output display and character for viewing.
4. The WESMAINT screen will prompt with "DISPLAY=". Enter the desired output display number (1-8) on the hex keypad and press the ENTER key.

5. The WESMAINT screen will prompt with "CHARACTER=". Enter the desired character number (1-8) on the hex keypad and press the ENTER key.

Clear Status Memory Bits

1. Press the CLR key to clear the status memory bits for the current output display and character.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

4.3.1.3 Raw Status

The following describes how to view the input data of the WS2000 prior to processing of the information.

Menu: DSPY

Purpose: To view the status of raw input data before processing according to the point attributes defined in the related Process Lists. Refer to the Configuration section elsewhere in this guide for a discussion of Process Lists.

Screen Format: The screen format for this function is:

Rxx-y zzzzzzzz

where:

R = Raw Status Menu
xx = output display number (1-64)
y = character number (1-8)
zzzzzzzz = data bit status

Note the data bits are shown from the lowest number on the left to the highest number on the right, e.g., bits 1, 2, 3, 4, 5, 6, 7, 8.

Keys Used: The following keys are active while this function is selected:

- **UP:** Advance to the next character in the current output display or to the first character in the next output display.
- DOWN: Back up to the previous character in the current output display or to the last character in the previous output display.
- POINT **(PT):** Select a particular output display and character for viewing.

Valid Modes: NORMAL only

Operation: The following steps must be followed in order to view the raw status of the WS2000 input data.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "RAW STATUS" appears on the screen.
3. Press the SEL key.

Select Other Displays/Characters

1. Press the UP key to view the next character of the current output display or the first character of the next output display.
2. Press the DOWN key to view the previous character of the current output display or the last character in the previous output display.
3. Press the PT. key to select a specific output display and character for viewing.
4. The WESMAINT screen will prompt with "DISPLAY=". Enter the desired output display number (1-64) on the hex keypad. Then press the ENTER key.
5. The WESMAINT screen will prompt with "CHARACTER=". Enter the desired character number (1-8) on the hex keypad. Then press the ENTER key.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

4.3.1.4 Status Memory

The information below describes how to view the unreported change of state of a data point.

Menu: DSPY

Purpose: To view the points that have the status memory bit on. This indicates that a data point, which has the memory attribute, has experienced an unreported change of state.

Screen Format: The screen format for this function is:

Mxx-y zzzzzzzz

where:

M = Status Memory Menu
xx = output display number (1-64)
y = character number (1-8)
zzzzzzzz = data bit status

Note the data bits are shown from the lowest number on the left to the highest number on the right, e.g., bits 1, 2, 3, 4, 5, 6, 7, 8.

Keys Used: The following keys are active while this function is selected:

- **UP:** Advance to the next character in the current output display or to the first character in the next output display.
- DOWN: Back up to the previous character in the current output display or to the last character in the previous output display.
- POINT (PT): Select a particular output display and character for viewing.

Valid Modes: NORMAL only

Operation: The steps below are required in order to access the Status Memory menu.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "STATUS MEMORY" appears on the screen.
3. Press the SEL key.

Select Other Displays/Characters

1. Press the UP key to view the next character of the current output display or the first character of the next output display.
2. Press the DOWN key to view the previous character of the current output display or the last character in the previous output display.
3. Press the PT. key to select a specific output display and character for viewing.
4. The WESMAINT screen will prompt with "DISPLAY=". Enter the desired output display number (1-64) on the hex keypad. Then press the ENTER key.

5. The WESMAINT screen will prompt with "CHARACTER=". Enter the desired character number (1-8) on the hex keypad. Then press the ENTER key.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

4.3.1.5 Latching Control

The following describes how to operate latching commands for discrete control outputs on the WS2000 SmartScanner.

Menu: DSPY

Purpose: To operate the discrete outputs in latching mode or to cause a latching control command to be sent via a data collection port to monitored equipment.

The WS2000 local discrete outputs and inputs (status and control) are mapped together. Controls are accessed on points 1-8 or 1-16 (depending on hardware). Status is collected on points 1-32 or 1-64 (depending on hardware).

The WS2000 may be strapped to allow 16 of the input points to read back the state of the 16 control outputs. When this strapping option is installed, the state of control points, 1-8, will be read back on status inputs 25-32, while the state of the second eight control points, 9-16, will be read back on status inputs 57-64.

Screen Format: The general format for the screen is:

DSP xx PT yy

where:

DSP = Display
xx = output display number (5-64)
PT = Point
yy = discrete output point number (1-64)

Keys Used: The following keys are active while this function is selected:

- **UP:** Advance to the next control point
- DOWN: Back up to the previous control point
- POINT (PT): Select a specific control point
- ON: Energize the currently selected control point
- OFF: De-energize the currently selected discrete output
- HELP: Display a brief help message

Valid Modes: NORMAL only

Operation: The steps below are required for latching of discrete control points on the WS2000.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "LATCHING CONTROL" appears on the screen.
3. Press the SEL key.

Select Another Control Point

1. Press the UP key to select the next control point.
2. Press the DOWN key to back up to the previous control point.
3. Press the PT. key to select a specific control point.
4. The WESMAINT screen will prompt with "DISPLAY=". Enter the desired output display number (5-64) on the hex keypad. Then press the ENTER key.
5. The WESMAINT screen will prompt with "POINT=." Enter the desired control point number (1-64) on the hex keypad. Then press the ENTER key.

Operate the Selected Control Point

1. Press the ON key to energize the selected control point
2. Press the OFF key to de-energize the control point.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

4.3.1.6 Momentary Control

This section describes how to operate a momentary command for discrete control outputs on the WS2000 SmartScanner.

Menu: DSPY

Purpose: To operate the discrete outputs in momentary mode or to cause a momentary control command to be sent via a data collection port to monitored equipment.

The WS2000 local discrete outputs and inputs (status and control) are mapped together. Controls are accessed on points' 1-8 or 1-16 (depending on hardware). Status is collected on points' 1-32 or 1-64 (depending on hardware).

The WS2000 may be strapped to allow 16 of the input points to read back the state of the 16 control outputs. When this strapping option is installed, the state of the first eight control points, 1-8, will be read back on status inputs 25-32, while the state of the second eight control points, 9-16, will be read back on status inputs 57-64.

Screen Format: The general format for the screen is:

DSP xx PT yy zz

where:

DSP = Display
xx = output display number (5-64)
PT = Point
yy = point number (1-64)
zz = operating indicator (ON)

Note: The operating indicator is normally blank, or (OFF).

Keys Used: The following keys are active while this function is selected:

- **UP:** Advance to the next screen for current display or the first point in the next display.
- DOWN: Back up to the previous point in the current display or the last point in the previous display.
- POINT (PT): Select a specific display/point.
- ON: Operate the currently selected point and briefly turn the operating indicator on.

Valid Modes: NORMAL only

Operation: The following steps explain how to initiate momentary control commands to control points.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "MOMENTARY CONTROL" appears on the screen.
3. Press the SEL key.

Select Another Control Point

1. Press the UP key to select the next control point.
2. Press the DOWN key to back up to the previous control point.
3. Press the PT. key to select a specific control point.

4. The WESMAINT screen will prompt with "DISPLAY=". Enter the desired output display number (5-64) on the hex keypad. Then press the ENTER key.
5. The WESMAINT screen will prompt with "POINT=". Enter the desired control point number (1-64) on the hex keypad. Then press the ENTER key.

Operate the Selected Control Point

1. Press the ON key to energize the selected control point.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

4.3.2 Command Menu Functions

Table 4-3 identifies the functions that are accessed from the CMD menu.

Table 4-3 Command Menu Functions

Function	Purpose
WESMAINT MODE	Select WESMAINT mode (CONFIG or NORMAL)
CONFIG DISPLAYS	View and alter output display configuration
CONFIG LISTS	View, alter, create, delete and duplicate process lists
SERIAL CH. INTERFACE	View and/or alter serial channel interfaces and baud rates
CARRIER TEST	Manually operate WS2000 modem carrier
LOGOUT	End WESMAINT command session
ALTER PASSWORD	Change login password
CONFIG SLAVES	View and alter slave configuration
E2A REMOTE ADDR	View and alter E2A remote address
SEL ERROR RPRT	Select reporting format (TASC or TCAS)

4.3.2.1 WESMAINT Mode

The following describes how to change the WS2000 SmartScanner between configuration mode (for changing data) and normal mode (for processing information) of operation.

Menu: CMD

Purpose: To view/alter the WESMAINT operating mode. Note that some functions can operate in both NORMAL and CONFIG mode

while other functions can operate in only one of the two operating modes. Each function description has a section labeled "VALID MODES" that identifies the valid mode(s) for that function.

Screen Format: One of two messages will appear, depending on the current operating mode: NORMAL MODE or CONFIG MODE

Keys Used: The following keys are active while this function is selected:

- **UP:** Display a potential operating mode
- DOWN: Return to the current operating mode
- YES: Select the new operating mode

Valid Modes: NORMAL and CONFIG

Operation: The following steps change the operating status between normal and configuration modes.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "WESMAINT MODE" appears on the screen.
3. Press the SEL key.

Change Current Operating Mode

1. To change the current operating mode, press the UP key to display the new operating mode. The following apply:
    - If changing from NORMAL mode to CONFIG mode, the screen will prompt "CONFIG MODE?" Press the YES key to enter CONFIG mode.
    - If the YES key is pressed, the screen will briefly show the message "STOPPING TASKS" to indicate that normal WS2000 functions are being shut down in preparation for entering CONFIG mode.
    - If changing from CONFIG mode to NORMAL mode, the WESMAINT screen will prompt "NORMAL MODE?" Press the YES key to restart the WS2000 and resume normal operation.

      If the YES key is pressed, the screen will briefly show the message "INITIALIZING" to indicate that normal WS2000 functions are being restarted in preparation for entering NORMAL mode.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

4.3.2.2 Config Displays (Configure Displays)

The following describes how to configure the output displays of the WS2000 SmartScanner.

Menu: CMD

Purpose: To view and/or change the output displays configuration.

Screen Format: Several WESMAINT screens are used to show E2A display configuration. E2A displays 1 through 4 are reserved for special purposes by the E2A protocol and are not configurable. When these screens are selected, they will show:

01 CHANGE INDEX

02 ANY INDEX

03 ERROR INDEX

04 RSS INDEX

E2A displays 5 through 64 are configurable. Each display has three configurable components; data SOURCE, process LIST and SCAN list. For displays with data originating from a serial port, the SOURCE screen will show the source RTU, the serial port number, and the TBOS display number:

ww TBOS xxCyDz

where:

ww = Output Display Number (5-64)
xx = RTU number M (Master), S1 (Slave 1), S2 (Slave 2) or S3 (Slave 3)
y = Serial Channel Number (2-9)
z = Input Display Number (1-8)

For Output Displays with data originating from the WS2000 discrete inputs, the SOURCE screen will show the PERIPHERAL INTERFACE BUS address for the discrete inputs:

xx DISCRETE yyWPzz

where:

xx = Output Display Number (5-64)
yy = RTU number M (Master), S1 (Slave 1), S2 (Slave 2) or S3 (Slave 3)
zz = WPIB Address for Inputs

If an output is not configured (spare), the SOURCE screen will show:

xxSPARE

The Process LIST screens show the selected Process List number for the Output Display:

xx LIST yyyy

where:

xx = Output Display Number (5-64)
yyyy = Process List Identifier

A Process List identifier of 0000 indicates no list has been selected and that the points in the Display will be processed as "status without memory".

The SCAN list screens indicate which of the eight Characters in each Display are valid. Invalid Characters will not be scanned, and the data bits will be constantly held to 0. The SCAN list screen shows the numbers of the valid Characters:

xx SCAN zzzzzzzz

where:

xx = Output Display Number (5-64)
zzzzzzzz = Valid Character number(s) (1-8)

Keys Used: The following keys are active while this function is selected:

- **UP:** Advance to next screen for current output display or first screen of next output display.
- DOWN: Back up to previous screen for current output display or last screen of previous output display.
- POINT (PT): Select a specific output display.
- DATA: Change configuration of output display.
- HELP: Displays a brief help message.

Valid Modes: CONFIG only

Operation: The following steps describe how to configure an output display.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "CONFIG DISPLAYS" appears on the screen.
3. Press the SEL key.

Select Another Screen or Output Display

1. Press the UP key to advance to the next screen on the current output display or to the last screen on the previous output display.
2. Press the DOWN key to back up to the previous screen on the current output display or to the last screen on the previous output display.
3. Press the PT. key to select a specific output display. The WESMAINT screen will prompt "DISPLAY=". Enter the desired output display number (5-64) using the hex keypad. Then press the ENTER key.

Change the Data Source for a Display

1. Select the SOURCE screen of the desired Output Display using the steps outlined above.
2. Press the DATA key to select the RTU Number. Enter 0 to indicate the Master, or 1, 2, or 3 to indicate a Slave, then press the ENTR key.
3. The WESMAINT screen will prompt "CHANNEL=".
4. If the data source is to be a TBOS Input Display do steps 5 and 6, otherwise go to step 7.
5. Enter the channel number (2-9) using the hex keypad, and press the ENTR key.
6. The WESMAINT screen will then prompt for an input display number "DISPLAY=". Enter the desired display number (1-8) using the hex keypad, and press the ENTR key.
7. If the data source is to be DISCRETE inputs do steps 8 and 9, other wise go to step 10.
8. Press the "D" key on the hex keypad. Then press the ENTR key.
9. The WESMAINT screen will then prompt "WPIB ADDR=." Enter the WPIB Address of the discrete inputs using the hex keypad, and press the ENTR key.
10. To configure the display as a SPARE, press the "0" key on the hex keypad. Then press the ENTR key.

Change the Process LIST

1. Select the LIST screen of the desired Output Display using the steps previously outlined.
2. Press the DATA key. The WESMAINT screen will prompt "LIST=".

3. Enter the Process List identifier code using the hex keypad. Then press the ENTER key.
4. If the selected Process List is not contained in the RTU configuration, the WESMAINT screen will briefly display the message "NO SUCH LIST" and will prompt again for a list number.

   Note: To view, alter, create, duplicate and delete Process Lists, use the CONFIGURE LISTS function.

Change the SCAN List

1. Select the SCAN screen of the desired output display using the steps previously outlined.
2. Press the DATA key. The WESMAINT screen will prompt "SCAN=".
3. Enter the numbers of the characters to be scanned using the hex keypad (e.g., to scan characters 1, 2, and 8 enter 128). Then press the ENTR key. To disable scanning of all characters in the display, press only the ENTER key.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

4.3.2.3 Config Lists (Configure Process Attribute Lists)

This section describes how to view, create, modify, or delete configuration Process Lists in the WS2000.

Menu: CMD

Purpose: To view and/or modify process list attributes. This function also allows process lists to be CREATED, DELETED and DUPLICATED.

Screen Format: The screen format for this function is:

LST xxxx yy aaaa

where:

LST = Process List
xxxx = process list identifier number
yy = point number (1-64)
aaaa = point attributes (see below)

Each point in a process list has four attributes:

- B - bipolar alarm enable
- A - alarm enable
- M - change of state memory enable
- I - invert state

These attributes may be enabled or disabled individually for each point. If all the attributes are disabled, the point is processed as "status without memory" and is displayed as a blank space.

Keys Used: The following keys are active while this function is selected:

- UP: Advance to the next point in the current list.
- DOWN: Back up to the previous point in the current list.
- POINT (PT): Select a list to view and/or modify.

Note: The following keys are active in MODIFY mode only:

- RUN: Enable bipolar attribute
- STOP: Disable bipolar attribute
- ON: Enable alarm attribute
- OFF: Disable alarm attribute
- YES: Enable memory attribute
- **NO:** Disable memory attribute
- DATA: Toggle invert attribute
- CLR: Clear all attributes
- ENTR: Store modified process list

Valid Modes:

- VIEW Process List NORMAL and CONFIG
- MODIFY Process List CONFIG only
- CREATE Process List CONFIG only
- DUPLICATE Process List CONFIG only
- DELETE Process List CONFIG only

Operation: The following steps are required to view, modify, create, or delete a Process List identifier code.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "CONFIG LISTS" appears on the screen.
3. Press the SEL key.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

VIEW Process List Attributes

If the RTU is in NORMAL mode, process lists may be viewed only. The screen will briefly show "VIEW LIST" and then prompt for a list identifier. Proceed with Step 7 below.

1. Select the function using the steps described above.
2. The WESMAINT screen should show "VIEW LIST?". If not, press the NO key until it does. Then press the YES key.
3. The WESMAINT screen will prompt for a list identifier "LIST NUMBR=". Enter the four digit list identifier using the hex keypad. Then press the ENTER key.
4. Use the UP and DOWN keys to view the attributes of the points in the list.
5. Press the PT. key to select a different list for viewing and follow the procedure from Step 7.

MODIFY List Attributes

1. Select the function using the steps previously described.
2. Press the NO key until the screen shows "MODIFY LIST?". Then press the YES key.
3. The WESMAINT screen will prompt for a list identifier "LIST NUMBR=". Enter the four digit list identifier using the hex keypad. Then press the ENTER key.
4. The screen will prompt "AUTO PROPAGATE?". Press the YES key to enable the AUTO PROPAGATE mode or the NO key to disable it.

   Note: If AUTO PROPAGATE mode has been selected, changing the attributes of one point will cause the same changes to be applied to all subsequent (higher) points in the list.
5. Use the UP and DOWN keys to view the attributes of the points in the list.
6. Use the RUN, STOP, ON, OFF, YES, NO, DATA, and CLR keys to modify the attributes of the point displayed on the screen. The function of these keys is described in the KEYS USED section of this function.
7. Press the ENTER key to store the modified attributes in the non-volatile memory of the WS2000. The WESMAINT screen will

prompt "STORE LIST?". Press the YES key to store the list or the NO key to continue with modifications.

Note: Pressing the PT., SEL, DSPY, or CMD keys before storing a modified list will cause all modifications to be ignored.

Create a New Process List

1. Select the function using the steps previously described.
2. Press the NO key until the screen shows "CREATE LIST?". Then press the YES key.
3. The WESMAINT screen will prompt for a list identifier "LIST NUMBR=". Enter the four digit list identifier using the hex keypad. Then press the ENTER key.
4. If the entered list number does not already exist, then a new list will be created, and the MODIFY LIST function will be invoked automatically. Proceed from Step 13 in the MODIFY LIST procedure.
5. If the entered list number already exists, the screen will briefly show the message "LIST EXISTS NOW" followed by the prompt "MODIFY LIST?". Press the YES key to modify the existing list or the NO key to select another operation.
6. If after Step 19 the screen shows "NO SPACE LEFT", then an existing list must be deleted to make room for the new one. The screen will prompt "DELETE LIST?" Follow the procedure for deleting a list.

Note: The WS2000 EEPROM has space for 100 Process Lists.

Create a DUPLICATE of a List

1. Select the function using the steps described above.
2. Press the NO key until the screen shows "DUPLICATE LIST?" Then press the ENTER key.
3. The WESMAINT screen will prompt for the list identifier of the list to copy "DUP FROM=". Enter the four digit list identifier using the hex keypad. Then press the ENTER key.
4. If the list specified in Step 25 does not exist, the screen will briefly show "NO SUCH LIST". Repeat Step 25 above.
5. Once the FROM list has been selected, the screen will prompt "DUP TO=". Enter the list identifier to be assigned to the new list using the hex keypad. Then press the ENTER key.
6. If the list specified in Step 27 already exists, then the screen will show "LIST EXISTS NOW" followed by the prompt "OVER-

WRITE?". Press the YES key to overwrite the existing list or the NO key to repeat Step 27.

7. If the list specified in Step 27 does not already exist, it will be created using the attributes from the list specified in Step 25. The screen will then prompt "MODIFY LIST?". Press the YES key to enter the MODIFY mode or the NO key to select another operation.
8. If after Step 28 the screen shows "NO SPACE LEFT", then an existing list must be deleted to make room for the new one. The screen will prompt "DELETE LIST?". Follow the procedure for deleting a list.

DELETE a Process List

1. Select the function using the steps previously described.
2. Press the NO key until the screen shows "DELETE LIST?" Then press the YES key.
3. The WESMAINT screen will prompt for a list identifier "LIST NUMBR=". Enter the four digit list identifier using the hex keypad. Then press the ENTER key.
4. If the entered list exists, the screen will briefly show "LIST DELETED", followed by the prompt "VIEW LIST?".
5. If the list specified in Step 33 does not exist, the screen will briefly show "NO SUCH LIST". Repeat Step 33.

4.3.2.4 Serial Ch. Intfc (Serial Channel Interface)

This section describes how to set the electrical interface type and its baud rate for the WS2000 serial ports.

Note: Slave Channel 1 can only be modified at the Slave itself. The remaining Slave Channels can only be configured at the Master unit.

Menu: CMD

Purpose: To view/alter data collection protocols, the electrical interface specification (i.e., RS-232, RS-422, or RS-485) or the baud rate (i.e., 1200 baud, 2400 baud) for the serial channels.

Screen Format: The initial screen format for this function is:

CHx = RSeeee

where:

CH = Channel
x = Channel number 1-9.
RSeeee = RS-232, 485 or 422

The next screen for each channel displays the baud rate for that channel. The format for the screen is:

CHx = yyyy BAUD

where:

CH = Channel
x = Channel number (1-9)
yyyy BAUD = 1200 or 2400 BAUD

Keys Used: The following keys are active while this function is selected:

- **UP:** Advance to interface type or baud rate of current channel or to protocol type of next channel.
- DOWN: Back up to baud rate of previous channel or to previous display for this channel.
- POINT (PT): Select a new channel.
- DATA: Change displayed configuration data for current channel.

Valid Modes: View data NORMAL and CONFIG

Modify data CONFIG only

Operation: The following explains how to view and modify the serial channel interface and baud rate of the WS2000 serial ports.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "SERIAL CH. INTFC" appears on the screen.
3. Press the SEL key.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

View Serial Channel Configuration Data

1. After the SEL key is pressed, the function display asks "Config. Master?"

2. Press YES to view the Master Unit configuration. Press NO, and "Config. Slave 1?" is displayed.
3. Press YES to view Slave 1 configuration, or NO to view Slave 2 configuration.
4. Press YES to view Slave 2 configuration or NO view Slave 3 configuration.
5. Press YES to view Slave 3 configuration or NO to return to Master Unit configuration.
6. When YES is pressed for the Master Unit, the display shows "CH1=RS232/485".
7. Press the UP key to display the baud rate of Channel 1.
8. When YES is pressed for any of the Slaves, the display shows the Channel number and the assigned Interface type.
9. Press the UP key again to make the next channel the current channel and to display its Interface type. Note that the channel numbers automatically "wrap" from 9 to 1.
10. Press the UP key again to display the baud rate for the new current channel.
11. The DOWN key works similarly to the up key. By pressing the DOWN key the previous display for the current channel, or the last display (BAUD rate) for the previous channel is accessed. When at channel 1 and the DOWN key is pressed, the display wraps around to channel 9. Similarly, when at channel 9 and the UP key is pressed, the display wraps to Channel 1.
12. Press the PT. key to select a specific channel. The WESMAINT screen will prompt with "CHANNEL=". Enter the desired Channel number 1-9 using the hex keypad. Then press the ENTR key. Continue with Step 7 to view the baud rate of the selected channel.

Change Interface Type and Baud Rate (Config Mode Only)

1. Select the desired channel using the procedures described in the "Viewing Serial Channel Configuration Data" section.
2. Press the DATA key. The WESMAINT screen will prompt "CH1=RS-232/485?".
3. Press the YES key to select RS-232/RS-485 interface.
4. Press the NO key. The display will prompt "RS-422?".
5. Press the YES key to select RS-422 interface, or the NO key to redisplay RS-232/485 prompt.
6. Press the UP arrow, and the display reads "CH1-1200 BAUD"

7. Press the DATA key. The WESMAINT screen will prompt "1200 BAUD?".
8. Press the YES key to select 1200 BAUD.
9. Press the NO key, and the display will prompt "2400 BAUD?".
10. Press the YES key to select 2400 BAUD or the NO key to re-display the 1200 baud prompt. Note that 4800 and 9600 bauds may be selected on Slave units.

4.3.2.5 Select Err Reporting (Select Error Reporting)

This section describes how to select an error reporting format.

Menu: CMD

Purpose: To select either TASC or TCAS error reporting formats.

Screen Format: The screen format for this function is: TASC? or TCAS?

Keys Used: The following keys are active while this function is selected:

- NO
- UP
- DOWN
- DATA: Display the next error reporting option
- HELP: Display a brief help message
- YES: Selects the error reporting option

Valid Modes: View Error Reporting Format: NORMAL and CONFIG

Changing Error Reporting Format: CONFIG only

Operation: The following steps are required to view or change the Error Reporting format.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "SELECT ERR REPORTING" appears on the screen.
3. Press the SEL key. TASC or TCAS will be displayed depending on the current configuration setting.
4. Press the UP, DOWN, DATA or NO key to view the next selection.
5. Press the YES key to choose the selection.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

4.3.2.6 Config Slaves (Configure Slaves)

The following describes how to view, change and/or assign a serial channel to Slave RTUs.

Menu: CMD

Purpose: To view and/or change the status of the Slave RTUs. It also designates whether a Slave is installed and active (equipped), and assigns a serial channel to them.

Screen Format: The general format for the screen is:

Sx status

where:

x = Slave RTU number (1, 2 or 3)
status = NE, if slave RTU is "not equipped" or Cy, if slave is "equipped" on channel y.

Keys Used: The following keys are active while this function is selected:

- **UP:** Display the status of the next slave RTU
- DOWN: Display the status of the previous slave RTU
- HELP: Display a brief help message
- DATA: Alter the status (equipped or not equipped) of the slave RTU
- NO: De-activate (de-equip) the slave RTU (active only after the DATA key has been pressed)
- YES: Activate (equip) the slave RTU (active only after the DATA key has been pressed)

Valid Modes: View slave RTU status: NORMAL only.

Alter slave RTU status: CONFIG only.

Operation: The following steps are required to view or alter the status of Slave RTUs.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "CONFIG SLAVES" appears on the screen.
3. Press the SEL key.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

Selecting a Slave RTU.

1. Press the UP key to advance to the next Slave RTU.
2. Press the DOWN key to backup to the previous slave RTU.

Changing the slave RTU status (equipped/de-equipped).

1. Press the DATA key. The WESMAINT screen will prompt "EQUIPPED?". Follow one of the procedures below:
2. If the RTU is to be de-equipped, press the NO key. The new status of the RTU will be displayed.
3. If the RTU is to be equipped, press the YES key. The WESMAINT screen will prompt "CHANNEL=". Enter the Channel number (2-9) that the master RTU will use to communicate to the slave RTU.

   Note: If the desired Channel is already in use (communicating with a TBOS device), the WESMAINT unit will display the message "CHANNEL IN USE". If this message appears, use the CONFIGURE DISPLAYS command to locate the TBOS Displays mapped to that Channel and mark them as spare.

4.3.2.7 Carrier Test

This section describes how to perform a carrier test on the WS2000 host port.

Menu: CMD

Purpose: To manually operate the RTU carrier signal for testing purposes.

Screen Format: The screen format for this function is: CARRIER ON or CARRIER OFF

Keys Used: The following keys are active while this function is selected:

- **ON:** Manually turn carrier on.
- OFF: Return to normal operation.

Valid Modes: NORMAL and CONFIG

Operation: The steps below explain how to perform the Carrier Test function on the WS2000 host port.

Select the Function

1. Press the CMD key.

2. Press the UP key until the function title "CARRIER TEST" appears on the screen.
3. Press the SEL key.

Modify Carrier Status

1. Press the ON key to force the carrier ON.
2. Press the OFF key to force the carrier OFF (return to normal operation).

Exit the Function

1. To exit this function, press the DSPY or CMD key.

4.3.2.8 E2A Remote Address

The following describes how to view and alter the WS2000 E-Telemetry Remote address

Menu: CMD

Purpose: To view and/or alter the E2A remote station address.

Screen Format: The screen format for this function is:

REM ADDR= xx

where: xxx = E2A remote station address

Keys Used: The following keys are active while this function is selected:

- **DATA:** Used to alter the remote station address

Valid Modes: View Remote Address: NORMAL and CONFIG

Change Remote Address: CONFIG only

Operation: The following step are required to view or alter the station address

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "REMOTE ADDRESS" appears on the screen.
3. Press the SEL key.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

Change the Remote Address.

1. Press the DATA key.
2. The screen will prompt "REM ADDR=". Enter the desired remote address (1-256) using the hex keypad.
3. Press ENTR.

4.3.2.9 Logout (End Command Session)

This section describes how to log out of the WS2000 SmartScanner when a password is used.

Menu: CMD

Purpose: To end a command session. No new commands can be selected until a password is supplied. Also see the ALTER PASSWORD command.

Screen Format: When this function is selected, the screen will display the following message:

LOGOUT COMPLETE

Keys Used: No keys are active when this function is selected. Logout is performed automatically upon function selection.

Valid Modes: NORMAL and CONFIG

Operation: Perform the following steps to log out of the WS2000, when a password is used.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "LOGOUT" appears on the screen.
3. Press the SEL key.
4. To select another command, press the DSPY or the CMD key.

4.3.2.10 Alter Password

The following explains how to enable or disable a password on the WS2000.

Menu: CMD

Purpose: To change the password stored in the Serial EEPROM. This function also disables or enables the password function.

Screen Format: When the function is selected the screen will display: "PASSWORD=^"

Keys Used: Use any of the keys in the hex keypad to enter a four digit password. To store the new password, press the ENTER key. If a mistake is made in keying in the password, press the CLR key.

Note: The password "0000" disables the password function. Any other password value enables the password function. When the password function is disabled, the unit will not request a password when it is powered up, and the LOGOFF command has essentially no effect.

Valid Modes: CONFIG only

Operation: The following steps are required to alter the WS2000 password.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "ALTER PASSWORD" appears on the screen.
3. Press the SEL key.
4. Answer the prompt "PASSWORD" with a four digit number, using the hex keypad (0-9, A-F).
5. Answer the prompt "CONFIRM:" by re-entering the same four character code.
6. If the two passwords match, the message "CHANGED!" will appear on the display. This message indicates that the password has been stored in the Serial EEPROM.

   If the two passwords are different, the message "NOT CHANGED!" will appear on the display. This message indicates that the old password is still in effect. After a brief pause, the function title "ALTER PASSWORD" is displayed. To change the password, repeat steps 3 through 5.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

   Note: When passwords are enabled, the WS2000 will not allow commands to be executed until the password is entered. Password prompting occurs automatically after a LOGOUT command is executed. Also note that the WS2000 will NOT execute an automatic logout when the operator unplugs the WESMAINT unit (or hangs up the phone when connected via a modem). If the WS2000 goes through a reset sequence (e.g., power is cycled on the unit), the operator must logon again if passwords are enabled. If security is desired, the LOGOUT command must be used.

5 WESMAINT Reference (Slave)

5.1 WESMAINT Command Hierarchy

This section contains detailed descriptions of all WESMAINT functions. The descriptions outline the formats of the displayed data, indicate which keys are active, and provide step-by-step operating procedures.

More information about the WS2000 configuration elements such as Process Lists, Displays, and Channels, is included in Section 3.

Some WESMAINT functions are valid only in NORMAL mode, some in CONFIG mode, and some are valid in either mode. Figure 5-1 illustrates the entire WESMAINT command hierarchy for Slave Remotes.

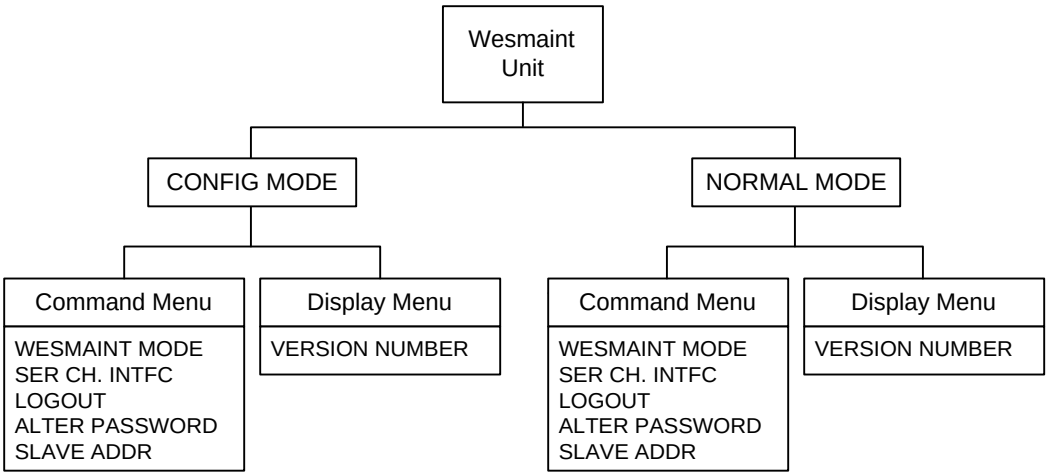


Figure 5-1 WESMAINT Menu Tree

5.2 Display Menu Functions

Table 5-1 shows the functions that are accessed from the DSPY menu.

Table 5-1 Display Menu Functions

Function	Purpose
VERSION NUMBER	View software load ID string
CURRENT STATUS	View processed input data
RAW STATUS	View unprocessed input data
STATUS MEMORY	View status memory data

5.2.1 Version Number (Software Load Identification)

This section describes how to identify the current software version installed in the WS2000 SmartScanner.

Menu: DSPY

Purpose: To view the software load identification stored in the EPROM. This identification should be used to report any problems with the WS2000 firmware.

Screen Format: When the function is selected, the screen will show the content of the stored software load identification.

Keys Used: The following keys are active while this function is selected:

- **UP:** Scroll software load identification in a forward direction.
- **DOWN:** Scroll software load identification in a backwards direction.
- **STOP:** Stops scrolling software load identification.
- **RUN:** Starts scrolling software load identification.

Valid Modes: NORMAL and CONFIG

Operation: The steps below must be followed in order to view the software revision in the WS2000.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "VERSION NUMBER" appears on the screen.
3. Press the SEL key. The software version information will then scroll across the screen.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

5.2.2 Current Status

The following describes how to view the current status of the WS2000 input data.

Menu: DSPY

Purpose: To view the status of input data as it will be seen by the master station. This data has been processed according to the point

attributes defined in the related Process Lists. Refer to the Section 3 in this guide for a discussion of Process Lists.

Screen Format: The screen format for this function is:

Cxx-y zzzzzzzz

where:

C = Current Status Menu
xx = output display number (1-64)
y = character number (1-8)
zzzzzzzz = data bit status

The data bits are shown from lowest number on the left to the highest number on the right, e.g., bits 1, 2, 3, 4, 5, 6, 7, 8.

A flashing asterisk (*) indicates that the status memory bit is on for one or more of the points shown. This indicates that a change has occurred on a data point that has alarm attributes that have not yet been reported to the master station. If any of the data points shown has both alarm and memory attributes, the state shown may or may not be the current state of the input. Once the alarm is reported to the master station, the asterisk (*) disappears.

Keys Used: The following keys are active when this function is selected:

- **UP**: Advance to the next character in the current output display or to the first character in the next output display.
- **DOWN:** Back up to the previous character in the current output display or to the last character in the previous output display.
- **POINT (PT):** Select a particular output display and character for viewing.
- **CLEAR (CLR)**: Clear status memory bits for character on screen.

Note: The CLR key affects the data that will be reported to the master station. This key is primarily intended to be used when the WS2000 is in an off-line diagnostic mode. When the WS2000 is in an on-line mode, this command should be used with discretion.

Valid Modes: NORMAL only

Operation: The steps below are required in order to view the current status of the WS2000 input data.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "CURRENT STATUS" appears on the screen.

3. Press the SEL key.

Select Other Displays/Characters

1. Press the UP key to view the next character of the current output display or the first character of the next output display.
2. Press the DOWN key to view the previous character of the current output display or the last character in the previous output display.
3. Press the PT. key to select a specific output display and character for viewing.
4. The WESMAINT screen will prompt with "DISPLAY=". Enter the desired output display number (1-8) on the hex keypad and press the ENTER key.
5. The WESMAINT screen will prompt with "CHARACTER=". Enter the desired character number (1-8) on the hex keypad and press the ENTER key.

Clear Status Memory Bits

1. Press the CLR key to clear the status memory bits for the current output display and character.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

5.2.3 Raw Status

The following describes how to view the input data of the WS2000 prior to processing of the information.

Menu: DSPY

Purpose: To view the status of raw input data before processing according to the point attributes defined in the related Process Lists. Refer to the Configuration section elsewhere in this guide for a discussion of Process Lists.

Screen Format: The screen format for this function is:

Rxx-y zzzzzzzz

where:

R = Raw Status Menu
xx = output display number (1-64)
y = character number (1-8)
zzzzzzzz = data bit status

The data bits are shown from the lowest number on the left to the highest number on the right, e.g., bits 1, 2, 3, 4, 5, 6, 7, 8.

Keys Used: The following keys are active while this function is selected:

- **UP:** Advance to the next character in the current output display or to the first character in the next output display.
- **DOWN:** Back up to the previous character in the current output display or to the last character in the previous output display.
- **POINT (PT):** Select a particular output display and character for viewing.

Valid Modes: NORMAL only

Operation: The following steps must be followed in order to view the raw status of the WS2000 input data.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "RAW STATUS" appears on the screen.
3. Press the SEL key.

Select Other Displays/Characters

1. Press the UP key to view the next character of the current output display or the first character of the next output display.
2. Press the DOWN key to view the previous character of the current output display or the last character in the previous output display.
3. Press the PT. key to select a specific output display and character for viewing.
4. The WESMAINT screen will prompt with "DISPLAY=". Enter the desired output display number (1-64) on the hex keypad. Then press the ENTER key.
5. The WESMAINT screen will prompt with "CHARACTER=". Enter the desired character number (1-8) on the hex keypad. Then press the ENTER key.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

5.2.4 Status Memory

The information below describes how to view the unreported change of state of a data point.

Menu: DSPY

Purpose: To view the points that have the status memory bit on. This indicates that a data point, which has the memory attribute, has experienced an unreported change of state.

Screen Format: The screen format for this function is:

Mxx-y zzzzzzzz

where:

M = Status Memory Menu
xx = output display number (1-64)
y = character number (1-8)
zzzzzzzz = data bit status

The data bits are shown from the lowest number on the left to the highest number on the right, e.g., bits 1, 2, 3, 4, 5, 6, 7, 8.

Keys Used: The following keys are active while this function is selected:

- **UP:** Advance to the next character in the current output display or to the first character in the next output display.
- **DOWN:** Back up to the previous character in the current output display or to the last character in the previous output display.
- **POINT (PT):** Select a particular output display and character for viewing.

Valid Modes: NORMAL only

Operation: The steps below are required in order to access the Status Memory menu.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "STATUS MEMORY" appears on the screen.
3. Press the SEL key.

Select Other Displays/Characters

1. Press the UP key to view the next character of the current output display or the first character of the next output display.

2. Press the DOWN key to view the previous character of the current output display or the last character in the previous output display.
3. Press the PT. key to select a specific output display and character for viewing.
4. The WESMAINT screen will prompt with "DISPLAY=". Enter the desired output display number (1-64) on the hex keypad. Then press the ENTER key.
5. The WESMAINT screen will prompt with "CHARACTER=". Enter the desired character number (1-8) on the hex keypad. Then press the ENTER key.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

5.3 Command Menu Functions

Table 5-2 identifies the functions that are accessed from the CMD menu.

Table 5-2 Command Menu Functions

Function Title	Purpose
WESMAINT MODE	Select WESMAINT mode (CONFIG or NORMAL)
CONFIG DISPLAYS	View and alter output display configuration
CONFIG LISTS	View, alter, create, delete and duplicate process lists
SERIAL CH. INTERFACE	View and/or alter serial channel interfaces and baud rates
CARRIER TEST	Manually operate WS2000 modem carrier
LOGOUT	End WESMAINT command session
ALTER PASSWORD	Change login password
CONFIG SLAVES	View and alter slave configuration
E2A REMOTE ADDR	View and alter E2A remote address
SEL ERROR RPRT	Select reporting format (TASC or TCAS)

5.3.1 WESMAINT Mode

The following describes how to change the WS2000 SmartScanner between configuration mode (for changing data) and normal mode (for processing information) of operation.

Menu: CMD

Purpose: To view/alter the WESMAINT operating mode. Note that some functions can operate in both NORMAL and CONFIG mode while other functions can operate in only one of the two operating modes. Each function description has a section labeled "VALID MODES" that identifies the valid mode(s) for that function.

Screen Format: One of two messages will appear, depending on the current operating mode: NORMAL MODE or CONFIG MODE.

Keys Used: The following keys are active while this function is selected:

- **UP:** Display a potential operating mode
- **DOWN:** Return to the current operating mode
- **YES:** Select the new operating mode

Valid Modes: NORMAL and CONFIG

Operation: The following steps change the operating status between normal and configuration modes.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "WESMAINT MODE" appears on the screen.
3. Press the SEL key.

Change Current Operating Mode

1. To change the current operating mode, press the UP key to display the new operating mode. The following apply:
    - If changing from NORMAL mode to CONFIG mode, the screen will prompt "CONFIG MODE?" Press the YES key to enter CONFIG mode.
    - If the YES key is pressed, the screen will briefly show the message "STOPPING TASKS" to indicate that normal WS2000 functions are being shut down in preparation for entering CONFIG mode.
    - If changing from CONFIG mode to NORMAL mode, the WESMAINT screen will prompt "NORMAL MODE?" Press the YES key to restart the WS2000 and resume normal operation.

      If the YES key is pressed, the screen will briefly show the message "INITIALIZING" to indicate that normal WS2000 functions are being restarted in preparation for entering NORMAL mode.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

5.3.2 Serial Ch. Intfc (Serial Channel Interface)

This section describes how to set the electrical interface type and its baud rate for the WS2000 serial ports.

Note: Slave Channel 1 can only be modified at the Slave itself. The remaining Slave Channels can only be configured at the Master unit.

Menu: CMD

Purpose: To view/alter data collection protocols, the electrical interface specification (i.e., RS-232, RS-422, or RS-485) or the baud rate (i.e., 1200 baud, 2400 baud) for serial channel 1.

Screen Format: The initial screen format for this function is:

CH1 = RSeeee

where:

CH = Channel
1 = Channel number 1
RSeeee = RS-232, 485 or 422

The next screen for each channel displays the baud rate for that channel. The format for the screen is:

CH1 = yyyy BAUD

where:

CH = Channel
1 = Channel number 1
yyyy BAUD = 1200, 2400, 4800, or 9600 BAUD

Keys Used: The following keys are active while this function is selected:

- **UP:** Advance to interface type or baud rate of current channel or to protocol type of next channel.
- **DOWN:** Back up to baud rate of previous channel or to previous display for this channel.
- **POINT (PT):** Select a new channel.
- **DATA:** Change displayed configuration data for current channel.

Valid Modes: View data NORMAL and CONFIG

Modify data CONFIG only

Operation: The following explains how to view and modify the serial channel interface and baud rate of the WS2000 serial ports.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "SERIAL CH. INTFC" appears on the screen.
3. Press the SEL key.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

View Serial Channel Configuration Data

1. After the SEL key is pressed, the function displays the Channel 1 Interface Type.
2. Pressing either the UP or DOWN key displays the baud rate of Channel 1.
3. Pressing either the UP or DOWN key again displays the Interface Type.

Change Interface Type and Baud Rate (Config Mode Only)

1. Select the Interface Type screen using the procedures described in the "Viewing Serial Channel Configuration Data" section.
2. Press the DATA key. The WESMAINT screen will prompt "RS232/485?".
3. Press the YES key to select RS-232/RS-485 interface.
4. Press the NO key. The display will prompt "RS422?".
5. Press the YES key to select RS-422 interface, or the NO key to re-display RS-232/485 prompt.
6. Press the UP arrow, and the display reads "CH1=2400 BAUD" (or whatever baud was previously set).
7. Press the DATA key. The WESMAINT screen will prompt "1200 BAUD?".
8. Press the YES key to select 1200 BAUD.
9. Press the NO key, and the display will prompt "2400 BAUD?".
10. Press the YES key to select 2400 BAUD.

11. Press the NO key, and the display will prompt "4800 BAUD?".
12. Press the YES key to select 4800 BAUD.
13. Press the NO key, and the display will prompt "9600 BAUD?".
14. Press the YES key to select 9600 BAUD.
15. Press the NO key to re-display the 1200 baud prompt.

5.3.3 Slave Addr (Slave WAP Address)

The following describes how to view and/or alter the slave RTU WAP addresses. This command will only operate on a Slave remote.

Menu: CMD

Purpose: To view and/or alter the slave RTU's WAP address.

Screen Format: The screen format for this function is:

SLAVE ADDR = x

where: x = WAP address

Keys Used: The following keys are active while this function is selected:

- **DATA:** Used to alter the slave RTU's WAP address.

Valid Modes: View Slave Address: NORMAL and CONFIG

Change Slave Address: CONFIG only

Operation: The following steps are required to alter or view the Slave's WAP address.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "SLAVE ADDR" appears on the screen.
3. Press the SEL key.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

Change the Slave Address

1. Press the DATA key.
2. The screen will prompt "SLAVE ADDR=^". Enter the desired remote address (1-3) using the hex keypad.

3. Press ENTR.

5.3.4 Logout (End Command Session)

This section describes how to log out of the WS2000 SmartScanner when a password is used.

Menu: CMD

Purpose: To end a command session. No new commands can be selected until a password is supplied. Also see the ALTER PASSWORD command.

Screen Format: When this function is selected, the screen will display the following message: LOGOUT COMPLETE.

Keys Used: No keys are active when this function is selected. Logout is performed automatically upon function selection.

Valid Modes: NORMAL and CONFIG

Operation: Perform the following steps to log out of the WS2000, when a password is used.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "LOGOUT" appears on the screen.
3. Press the SEL key.
4. To select another command, press the DSPY or the CMD key.

5.3.5 Alter Password

The following explains how to enable or disable a password on the WS2000.

Menu: CMD

Purpose: To change the password stored in the Serial EEPROM. This function also disables or enables the password function.

Screen Format: When the function is selected, the screen will display: "PASSWORD=^".

Keys Used: Use any of the keys in the hex keypad to enter a four digit password. To store the new password, press the ENTER key. If a mistake is made in keying in the password, press the CLR key.

Note: The password "0000" disables the password function. Any other password value enables the password function. When the password

function is disabled, the unit will not request a password when it is powered up, and the LOGOFF command has essentially no effect.

Valid Modes: CONFIG only

Operation: The following steps are required to alter the WS2000 password.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "ALTER PASSWORD" appears on the screen.
3. Press the SEL key.
4. Answer the prompt "PASSWORD" with a four digit number, using the hex keypad (0-9, A-F).
5. Answer the prompt "CONFIRM:" by re-entering the same four character code.
6. If the two passwords match, the message "CHANGED!" will appear on the display. This message indicates that the password has been stored in the Serial EEPROM.

   If the two passwords are different, the message "NOT CHANGED!" will appear on the display. This message indicates that the old password is still in effect. After a brief pause, the function title "ALTER PASSWORD" is displayed. To change the password, repeat steps 3 through 5.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

   Note: When passwords are enabled, the WS2000 will not allow commands to be executed until the password is entered. Password prompting occurs automatically after a LOGOUT command is executed. Also note that the WS2000 will NOT execute an automatic logout when the operator unplugs the WESMAINT unit (or hangs up the phone when connected via a modem). If the WS2000 goes through a reset sequence (e.g., power is cycled on the unit), the operator must logon again if passwords are enabled. If security is desired, the LOGOUT command must be used.

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6 WESMAINT Reference (Slave)

6.1 WESMAINT Command Hierarchy

This section contains detailed descriptions of all WESMAINT functions. The descriptions outline the formats of the displayed data, indicate which keys are active, and provide step-by-step operating procedures.

More information about the WS2000 configuration elements such as Process Lists, Displays, and Channels, is included in Section 3.

Some WESMAINT functions are valid only in NORMAL mode, some in CONFIG mode, and some are valid in either mode. Figure 5-1 illustrates the entire WESMAINT command hierarchy for Slave Remotes.

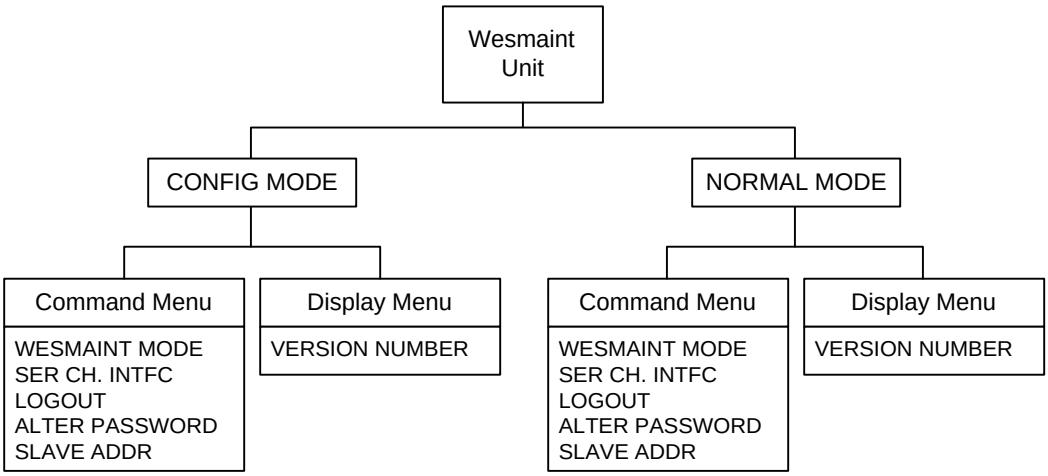

Figure 6-1 WESMAINT Menu Tree

6.2 Display Menu Functions

Table 5-1 shows the functions that are accessed from the DSPY menu.

Table 6-1 Display Menu Functions

Function	Purpose
VERSION NUMBER	View software load ID string
CURRENT STATUS	View processed input data
RAW STATUS	View unprocessed input data
STATUS MEMORY	View status memory data

6.2.1 Version Number (Software Load Identification)

This section describes how to identify the current software version installed in the WS2000 SmartScanner.

Menu: DSPY

Purpose: To view the software load identification stored in the EPROM. This identification should be used to report any problems with the WS2000 firmware.

Screen Format: When the function is selected, the screen will show the content of the stored software load identification.

Keys Used: The following keys are active while this function is selected:

- **UP:** Scroll software load identification in a forward direction.
- **DOWN:** Scroll software load identification in a backwards direction.
- **STOP:** Stops scrolling software load identification.
- **RUN:** Starts scrolling software load identification.

Valid Modes: NORMAL and CONFIG

Operation: The steps below must be followed in order to view the software revision in the WS2000.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "VERSION NUMBER" appears on the screen.
3. Press the SEL key. The software version information will then scroll across the screen.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

6.2.2 Current Status

The following describes how to view the current status of the WS2000 input data.

Menu: DSPY

Purpose: To view the status of input data as it will be seen by the master station. This data has been processed according to the point

attributes defined in the related Process Lists. Refer to the Section 3 in this guide for a discussion of Process Lists.

Screen Format: The screen format for this function is:

Cxx-y zzzzzzzz

where:

C = Current Status Menu
xx = output display number (1-64)
y = character number (1-8)
zzzzzzzz = data bit status

The data bits are shown from lowest number on the left to the highest number on the right, e.g., bits 1, 2, 3, 4, 5, 6, 7, 8.

A flashing asterisk (*) indicates that the status memory bit is on for one or more of the points shown. This indicates that a change has occurred on a data point that has alarm attributes that have not yet been reported to the master station. If any of the data points shown has both alarm and memory attributes, the state shown may or may not be the current state of the input. Once the alarm is reported to the master station, the asterisk (*) disappears.

Keys Used: The following keys are active when this function is selected:

- **UP**: Advance to the next character in the current output display or to the first character in the next output display.
- **DOWN:** Back up to the previous character in the current output display or to the last character in the previous output display.
- **POINT (PT):** Select a particular output display and character for viewing.
- **CLEAR (CLR)**: Clear status memory bits for character on screen.

Note: The CLR key affects the data that will be reported to the master station. This key is primarily intended to be used when the WS2000 is in an off-line diagnostic mode. When the WS2000 is in an on-line mode, this command should be used with discretion.

Valid Modes: NORMAL only

Operation: The steps below are required in order to view the current status of the WS2000 input data.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "CURRENT STATUS" appears on the screen.

3. Press the SEL key.

Select Other Displays/Characters

1. Press the UP key to view the next character of the current output display or the first character of the next output display.
2. Press the DOWN key to view the previous character of the current output display or the last character in the previous output display.
3. Press the PT. key to select a specific output display and character for viewing.
4. The WESMAINT screen will prompt with "DISPLAY=". Enter the desired output display number (1-8) on the hex keypad and press the ENTER key.
5. The WESMAINT screen will prompt with "CHARACTER=". Enter the desired character number (1-8) on the hex keypad and press the ENTER key.

Clear Status Memory Bits

1. Press the CLR key to clear the status memory bits for the current output display and character.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

6.2.3 Raw Status

The following describes how to view the input data of the WS2000 prior to processing of the information.

Menu: DSPY

Purpose: To view the status of raw input data before processing according to the point attributes defined in the related Process Lists. Refer to the Configuration section elsewhere in this guide for a discussion of Process Lists.

Screen Format: The screen format for this function is:

Rxx-y zzzzzzzz

where:

R = Raw Status Menu
xx = output display number (1-64)
y = character number (1-8)
zzzzzzzz = data bit status

The data bits are shown from the lowest number on the left to the highest number on the right, e.g., bits 1, 2, 3, 4, 5, 6, 7, 8.

Keys Used: The following keys are active while this function is selected:

- **UP:** Advance to the next character in the current output display or to the first character in the next output display.
- **DOWN:** Back up to the previous character in the current output display or to the last character in the previous output display.
- **POINT (PT):** Select a particular output display and character for viewing.

Valid Modes: NORMAL only

Operation: The following steps must be followed in order to view the raw status of the WS2000 input data.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "RAW STATUS" appears on the screen.
3. Press the SEL key.

Select Other Displays/Characters

1. Press the UP key to view the next character of the current output display or the first character of the next output display.
2. Press the DOWN key to view the previous character of the current output display or the last character in the previous output display.
3. Press the PT. key to select a specific output display and character for viewing.
4. The WESMAINT screen will prompt with "DISPLAY=". Enter the desired output display number (1-64) on the hex keypad. Then press the ENTER key.
5. The WESMAINT screen will prompt with "CHARACTER=". Enter the desired character number (1-8) on the hex keypad. Then press the ENTER key.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

6.2.4 Status Memory

The information below describes how to view the unreported change of state of a data point.

Menu: DSPY

Purpose: To view the points that have the status memory bit on. This indicates that a data point, which has the memory attribute, has experienced an unreported change of state.

Screen Format: The screen format for this function is:

Mxx-y zzzzzzzz

where:

M = Status Memory Menu
xx = output display number (1-64)
y = character number (1-8)
zzzzzzzz = data bit status

The data bits are shown from the lowest number on the left to the highest number on the right, e.g., bits 1, 2, 3, 4, 5, 6, 7, 8.

Keys Used: The following keys are active while this function is selected:

- **UP:** Advance to the next character in the current output display or to the first character in the next output display.
- **DOWN:** Back up to the previous character in the current output display or to the last character in the previous output display.
- **POINT (PT):** Select a particular output display and character for viewing.

Valid Modes: NORMAL only

Operation: The steps below are required in order to access the Status Memory menu.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "STATUS MEMORY" appears on the screen.
3. Press the SEL key.

Select Other Displays/Characters

1. Press the UP key to view the next character of the current output display or the first character of the next output display.

2. Press the DOWN key to view the previous character of the current output display or the last character in the previous output display.
3. Press the PT. key to select a specific output display and character for viewing.
4. The WESMAINT screen will prompt with "DISPLAY=". Enter the desired output display number (1-64) on the hex keypad. Then press the ENTER key.
5. The WESMAINT screen will prompt with "CHARACTER=". Enter the desired character number (1-8) on the hex keypad. Then press the ENTER key.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

6.3 Command Menu Functions

Table 5-2 identifies the functions that are accessed from the CMD menu.

Table 6-2 Command Menu Functions

Function Title	Purpose
WESMAINT MODE	Select WESMAINT mode (CONFIG or NORMAL)
CONFIG DISPLAYS	View and alter output display configuration
CONFIG LISTS	View, alter, create, delete and duplicate process lists
SERIAL CH. INTERFACE	View and/or alter serial channel interfaces and baud rates
CARRIER TEST	Manually operate WS2000 modem carrier
LOGOUT	End WESMAINT command session
ALTER PASSWORD	Change login password
CONFIG SLAVES	View and alter slave configuration
E2A REMOTE ADDR	View and alter E2A remote address
SEL ERROR RPRT	Select reporting format (TASC or TCAS)

6.3.1 WESMAINT Mode

The following describes how to change the WS2000 SmartScanner between configuration mode (for changing data) and normal mode (for processing information) of operation.

Menu: CMD

Purpose: To view/alter the WESMAINT operating mode. Note that some functions can operate in both NORMAL and CONFIG mode while other functions can operate in only one of the two operating modes. Each function description has a section labeled "VALID MODES" that identifies the valid mode(s) for that function.

Screen Format: One of two messages will appear, depending on the current operating mode: NORMAL MODE or CONFIG MODE.

Keys Used: The following keys are active while this function is selected:

- **UP:** Display a potential operating mode
- **DOWN:** Return to the current operating mode
- **YES:** Select the new operating mode

Valid Modes: NORMAL and CONFIG

Operation: The following steps change the operating status between normal and configuration modes.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "WESMAINT MODE" appears on the screen.
3. Press the SEL key.

Change Current Operating Mode

1. To change the current operating mode, press the UP key to display the new operating mode. The following apply:
    - If changing from NORMAL mode to CONFIG mode, the screen will prompt "CONFIG MODE?" Press the YES key to enter CONFIG mode.
    - If the YES key is pressed, the screen will briefly show the message "STOPPING TASKS" to indicate that normal WS2000 functions are being shut down in preparation for entering CONFIG mode.
    - If changing from CONFIG mode to NORMAL mode, the WESMAINT screen will prompt "NORMAL MODE?" Press the YES key to restart the WS2000 and resume normal operation.

      If the YES key is pressed, the screen will briefly show the message "INITIALIZING" to indicate that normal WS2000 functions are being restarted in preparation for entering NORMAL mode.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

6.3.2 Serial Ch. Intfc (Serial Channel Interface)

This section describes how to set the electrical interface type and its baud rate for the WS2000 serial ports.

Note: Slave Channel 1 can only be modified at the Slave itself. The remaining Slave Channels can only be configured at the Master unit.

Menu: CMD

Purpose: To view/alter data collection protocols, the electrical interface specification (i.e., RS-232, RS-422, or RS-485) or the baud rate (i.e., 1200 baud, 2400 baud) for serial channel 1.

Screen Format: The initial screen format for this function is:

CH1 = RSeeee

where:

CH = Channel
1 = Channel number 1
RSeeee = RS-232, 485 or 422

The next screen for each channel displays the baud rate for that channel. The format for the screen is:

CH1 = yyyy BAUD

where:

CH = Channel
1 = Channel number 1
yyyy BAUD = 1200, 2400, 4800, or 9600 BAUD

Keys Used: The following keys are active while this function is selected:

- **UP:** Advance to interface type or baud rate of current channel or to protocol type of next channel.
- **DOWN:** Back up to baud rate of previous channel or to previous display for this channel.
- **POINT (PT):** Select a new channel.
- **DATA:** Change displayed configuration data for current channel.

Valid Modes: View data NORMAL and CONFIG

Modify data CONFIG only

Operation: The following explains how to view and modify the serial channel interface and baud rate of the WS2000 serial ports.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "SERIAL CH. INTFC" appears on the screen.
3. Press the SEL key.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

View Serial Channel Configuration Data

1. After the SEL key is pressed, the function displays the Channel 1 Interface Type.
2. Pressing either the UP or DOWN key displays the baud rate of Channel 1.
3. Pressing either the UP or DOWN key again displays the Interface Type.

Change Interface Type and Baud Rate (Config Mode Only)

1. Select the Interface Type screen using the procedures described in the "Viewing Serial Channel Configuration Data" section.
2. Press the DATA key. The WESMAINT screen will prompt "RS232/485?".
3. Press the YES key to select RS-232/RS-485 interface.
4. Press the NO key. The display will prompt "RS422?".
5. Press the YES key to select RS-422 interface, or the NO key to re-display RS-232/485 prompt.
6. Press the UP arrow, and the display reads "CH1=2400 BAUD" (or whatever baud was previously set).
7. Press the DATA key. The WESMAINT screen will prompt "1200 BAUD?".
8. Press the YES key to select 1200 BAUD.
9. Press the NO key, and the display will prompt "2400 BAUD?".
10. Press the YES key to select 2400 BAUD.

11. Press the NO key, and the display will prompt "4800 BAUD?".
12. Press the YES key to select 4800 BAUD.
13. Press the NO key, and the display will prompt "9600 BAUD?".
14. Press the YES key to select 9600 BAUD.
15. Press the NO key to re-display the 1200 baud prompt.

6.3.3 Slave Addr (Slave WAP Address)

The following describes how to view and/or alter the slave RTU WAP addresses. This command will only operate on a Slave remote.

Menu: CMD

Purpose: To view and/or alter the slave RTU's WAP address.

Screen Format: The screen format for this function is:

SLAVE ADDR = x

where: x = WAP address

Keys Used: The following keys are active while this function is selected:

- **DATA:** Used to alter the slave RTU's WAP address.

Valid Modes: View Slave Address: NORMAL and CONFIG

Change Slave Address: CONFIG only

Operation: The following steps are required to alter or view the Slave's WAP address.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "SLAVE ADDR" appears on the screen.
3. Press the SEL key.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

Change the Slave Address

1. Press the DATA key.
2. The screen will prompt "SLAVE ADDR=∧". Enter the desired remote address (1-3) using the hex keypad.

3. Press ENTR.

6.3.4 Logout (End Command Session)

This section describes how to log out of the WS2000 SmartScanner when a password is used.

Menu: CMD

Purpose: To end a command session. No new commands can be selected until a password is supplied. Also see the ALTER PASSWORD command.

Screen Format: When this function is selected, the screen will display the following message: LOGOUT COMPLETE.

Keys Used: No keys are active when this function is selected. Logout is performed automatically upon function selection.

Valid Modes: NORMAL and CONFIG

Operation: Perform the following steps to log out of the WS2000, when a password is used.

Select the Function

1. Press the DSPY key.
2. Press the UP key until the function title "LOGOUT" appears on the screen.
3. Press the SEL key.
4. To select another command, press the DSPY or the CMD key.

6.3.5 Alter Password

The following explains how to enable or disable a password on the WS2000.

Menu: CMD

Purpose: To change the password stored in the Serial EEPROM. This function also disables or enables the password function.

Screen Format: When the function is selected, the screen will display: "PASSWORD=^".

Keys Used: Use any of the keys in the hex keypad to enter a four digit password. To store the new password, press the ENTER key. If a mistake is made in keying in the password, press the CLR key.

Note: The password "0000" disables the password function. Any other password value enables the password function. When the password

function is disabled, the unit will not request a password when it is powered up, and the LOGOFF command has essentially no effect.

Valid Modes: CONFIG only

Operation: The following steps are required to alter the WS2000 password.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "ALTER PASSWORD" appears on the screen.
3. Press the SEL key.
4. Answer the prompt "PASSWORD" with a four digit number, using the hex keypad (0-9, A-F).
5. Answer the prompt "CONFIRM:" by re-entering the same four character code.
6. If the two passwords match, the message "CHANGED!" will appear on the display. This message indicates that the password has been stored in the Serial EEPROM.

   If the two passwords are different, the message "NOT CHANGED!" will appear on the display. This message indicates that the old password is still in effect. After a brief pause, the function title "ALTER PASSWORD" is displayed. To change the password, repeat steps 3 through 5.

Exit the Function

1. To exit this function, press the DSPY or CMD key.

   Note: When passwords are enabled, the WS2000 will not allow commands to be executed until the password is entered. Password prompting occurs automatically after a LOGOUT command is executed. Also note that the WS2000 will NOT execute an automatic logout when the operator unplugs the WESMAINT unit (or hangs up the phone when connected via a modem). If the WS2000 goes through a reset sequence (e.g., power is cycled on the unit), the operator must logon again if passwords are enabled. If security is desired, the LOGOUT command must be used.

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Appendix A – Default Data/Configuration

This appendix includes default configuration data and configuration templates as follows:

- Default Serial Channel Information (Table A-1)
- Serial Channel Configuration Template (Table A-2)
- Output Display Configuration Template (Table A-3)
- Predefined Process Lists (Table A-4)
- Process List Configuration Template (Table A-5)

  Copy this table as often as needed to develop your process lists.

Table A-1 Default Serial Channel Information

Channel	Protocol	Interface Type	Data Rate (BPS)
1 (Notes 1, 2)	Host E2A/ WAP	RS-232/RS-485*, RS-485	1200*, 2400, 4800, 9600
2	TBOS	RS-232/RS-485, RS-422*	1200, 2400*
3	TBOS	RS-232/RS-485, RS-422*	1200, 2400*
4	TBOS	RS-232/RS-485, RS-422*	1200, 2400*
5	TBOS	RS-232/RS-485, RS-422*	1200, 2400*
6	TBOS	RS-422	1200, 2400*
7	TBOS	RS-422	1200, 2400*
8	TBOS	RS-422	1200, 2400*
9	TBOS	RS-422	1200, 2400*

Notes:

1 Master host channel uses E2A to report to an Operations System. Slave host channel uses WAP to report to a master WS2000.

2 Master/slave WS2000s can report using 1200 or 2400 bps. A slave WS2000 can also use 4800 or 9600 bps to report to the master.

* Default value

Table A-2 Serial Channel Configuration Template

RTU Number _____ (Note)

Channel	**Protocol**	**Interface Type**	**Data Rate** (BPS)
1			
2	TBOS		
3	TBOS		
4	TBOS		
5	TBOS		
6	TBOS	RS-422	
7	TBOS	RS-422	
8	TBOS	RS-422	
9	TBOS	RS-422	

Note: Use 0 for a master WS2000 and 1, 2, or 3 for a slave WS2000.

All input displays automatically map as shown Table A-3 and default to Process List #0001. All characters are scanned.

A serial TBOS port supports a maximum of eight displays of information (1 – 8).

When mapping occurs on an input display, the scan points and control points associated with that display have identical mapping. That is, to map the scan points for a particular display separately from the control points is not possible.

Table A-3 Output Display Configuration Template

Output Display	**Input Display Data Source** (Note)		**Process List** (Default 0001)	**Scanned Characters**
	Chan No	**In Display**		
0–1	0	0 (WS2000)		1 2 3 4 5 6 7 8
0–2	0	1		1 2 3 4 5 6 7 8
0–3	0	2		1 2 3 4 5 6 7 8
0–4	0	3		1 2 3 4 5 6 7 8
0–5	0	4		1 2 3 4 5 6 7 8
0–6	0	5		1 2 3 4 5 6 7 8
0–7	0	6		1 2 3 4 5 6 7 8
0–8	0	7		1 2 3 4 5 6 7 8

Table A-3 Output Display Configuration Template

Output Display	Input Display Data Source (Note)		Process List (Default 0001)	Scanned Characters
	Chan No	In Display		
2–1	2	1		1 2 3 4 5 6 7 8
2–2	2	2		1 2 3 4 5 6 7 8
2–3	2	3		1 2 3 4 5 6 7 8
2–4	2	4		1 2 3 4 5 6 7 8
2–5	2	5		1 2 3 4 5 6 7 8
2–6	2	6		1 2 3 4 5 6 7 8
2–7	2	7		1 2 3 4 5 6 7 8
2–8	2	8		1 2 3 4 5 6 7 8
3–1	3	1		1 2 3 4 5 6 7 8
3–2	3	2		1 2 3 4 5 6 7 8
3–3	3	3		1 2 3 4 5 6 7 8
3–4	3	4		1 2 3 4 5 6 7 8
3–5	3	5		1 2 3 4 5 6 7 8
3–6	3	6		1 2 3 4 5 6 7 8
3–7	3	7		1 2 3 4 5 6 7 8
3–8	3	8		1 2 3 4 5 6 7 8
4–1	4	1		1 2 3 4 5 6 7 8
4–2	4	2		1 2 3 4 5 6 7 8
4–3	4	3		1 2 3 4 5 6 7 8
4–4	4	4		1 2 3 4 5 6 7 8
4–5	4	5		1 2 3 4 5 6 7 8
4–6	4	6		1 2 3 4 5 6 7 8
4–7	4	7		1 2 3 4 5 6 7 8
4–8	4	8		1 2 3 4 5 6 7 8
5–1	5	1		1 2 3 4 5 6 7 8
5–2	5	2		1 2 3 4 5 6 7 8
5–3	5	3		1 2 3 4 5 6 7 8

Table A-3 Output Display Configuration Template

Output Display	Input Display Data Source (Note)		Process List (Default 0001)	Scanned Characters
	Chan No	In Display		
5–4	5	4		1 2 3 4 5 6 7 8
5–5	5	5		1 2 3 4 5 6 7 8
5–6	5	6		1 2 3 4 5 6 7 8
5–7	5	7		1 2 3 4 5 6 7 8
5–8	5	8		1 2 3 4 5 6 7 8
6–1	6	1		1 2 3 4 5 6 7 8
6–2	6	2		1 2 3 4 5 6 7 8
6–3	6	3		1 2 3 4 5 6 7 8
6–4	6	4		1 2 3 4 5 6 7 8
6–5	6	5		1 2 3 4 5 6 7 8
6–6	6	6		1 2 3 4 5 6 7 8
6–7	6	7		1 2 3 4 5 6 7 8
6–8	6	8		1 2 3 4 5 6 7 8
7–1	7	1		1 2 3 4 5 6 7 8
7–2	7	2		1 2 3 4 5 6 7 8
7–3	7	3		1 2 3 4 5 6 7 8
7–4	7	4		1 2 3 4 5 6 7 8
7–5	7	5		1 2 3 4 5 6 7 8
7–6	7	6		1 2 3 4 5 6 7 8
7–7	7	7		1 2 3 4 5 6 7 8
7–8	7	8		1 2 3 4 5 6 7 8
8–1	8	1		1 2 3 4 5 6 7 8
8–2	8	2		1 2 3 4 5 6 7 8
8–3	8	3		1 2 3 4 5 6 7 8
8–4	8	4		1 2 3 4 5 6 7 8
8–5	8	5		1 2 3 4 5 6 7 8
8–6	8	6		1 2 3 4 5 6 7 8
8–7	8	7		1 2 3 4 5 6 7 8

Table A-3 Output Display Configuration Template

Output Display	Input Display Data Source (Note)		Process List (Default 0001)	Scanned Characters
	Chan No	In Display		
8–8	8	8		1 2 3 4 5 6 7 8
9–1	9	1		1 2 3 4 5 6 7 8
9–2	9	2		1 2 3 4 5 6 7 8
9–3	9	3		1 2 3 4 5 6 7 8
9–4	9	4		1 2 3 4 5 6 7 8
9–5	9	5		1 2 3 4 5 6 7 8
9–6	9	6		1 2 3 4 5 6 7 8
9–7	9	7		1 2 3 4 5 6 7 8
9–8	9	8		1 2 3 4 5 6 7 8

Note: Chann No 0 = discrete inputs (Input Display 0 = WS2000; 1 – 7 are external discrete expanders; Chan No 2 – 9 = TBOS channels 2 – 9.

Table A-4 Predefined Process Lists

List	Points	Attributes
0001	1 – 64	BAM
118A	1 – 64	AM
119A	1 – 48	AM
	49 – 64	A
120A	1 – 32	AM
	33 – 64	A
121A	1 – 16	AM
	17 – 64	A
122A	1 – 64	A
123A	1 – 48	AM
124A	1 – 36	AM
	37 – 48	A
125A	1 – 24	AM
	25 – 48	A
126A	1 – 12	AM
	13 – 48	A
127A	1 – 48	A
128A	1 – 32	AM
129A	1 – 24	AM
	25 – 32	A
130A	1 – 16	AM
	17 – 32	A
131A	1 – 8	AM
	9 – 32	A

List	Points	Attributes
139A	1 – 16	BA
140A	1 – 32	BA
141A	1 – 48	BA
0118	1 – 63	AM
	64	BA
0119	1 – 48	AM
	49 – 63	A
	64	BA
0120	1 - 32	AM
	33 – 63	A
	64	BA
0121	1 – 16	AM
	17 – 63	A
	64	BA
0122	1 – 63	A
	64	BA
0123	1 – 48	AM
	64	BA
0124	1 – 36	AM
	37 – 48	A
	64	BA
0125	1 – 24	AM
	25 – 48	A
	64	BA

List	Points	Attributes
0130	1 – 16	AM
	17 – 32	A
	64	BA
0131	1 – 8	AM
	9 – 32	A
	64	BA
0132	1 – 32	A
	64	BA
0133	1 – 16	AM
	64	BA
0134	1 – 12	AM
	13 – 16	A
	64	BA
0135	1 – 8	AM
	9 – 16	A
	64	BA
0136	1 – 4	AM
	5 – 16	A
	64	BA
0137	1 – 16	A
	64	BA
0138	64	BA
0139	1 – 16, 64	BA
0140	1 – 32, 64	BA

Table A-4 Predefined Process Lists

List	Points	Attributes
132A	1 – 32	A
133A	1 – 16	AM
134A	1 – 12	AM
	13 – 16	A
135A	1 – 8	AM
	9 – 16	A
136A	1 – 4	AM
	5 – 16	A
137A	1 – 16	A
138A	1 – 64	STATUS

List	Points	Attributes
0126	1 – 12	AM
	13 – 48	A
	64	BA
0127	1 – 48	A
	64	BA
0128	1 – 32	AM
	64	BA
0129	1 – 24	AM
	25 – 32	A
	64	BA

List	Points	Attributes
0141	1 – 48, 64	BA
9999	9 – 16	M
	17 – 24	AM
	25 – 32	BAM
	33 – 40	I
	41 – 48	IM
	49 – 56	AMI
	57 – 64	BAMI
B = Bipolar, A = Alarm		
M = Memory, I = Invert		

Table A-5 Process List Configuration Template

List _____				List _____			
Point	**Attributes**	**Point**	**Attributes**	**Point**	**Attributes**	**Point**	**Attributes**
1		**33**		**1**		**33**	
2		**34**		**2**		**34**	
3		**35**		**3**		**35**	
4		**36**		**4**		**36**	
5		**37**		**5**		**37**	
6		**38**		**6**		**38**	
7		**39**		**7**		**39**	
8		**40**		**8**		**40**	
9		**41**		**9**		**41**	
10		**42**		**10**		**42**	
11		**43**		**11**		**43**	
12		**44**		**12**		**44**	
13		**45**		**13**		**45**	
14		**46**		**14**		**46**	
15		**47**		**15**		**47**	
16		**48**		**16**		**48**	
17		**49**		**17**		**49**	
18		**50**		**18**		**50**	
19		**51**		**19**		**51**	
20		**52**		**20**		**52**	
21		**53**		**21**		**53**	
22		**54**		**22**		**54**	
23		**55**		**23**		**55**	
24		**56**		**24**		**56**	
25		**57**		**25**		**57**	
26		**58**		**26**		**58**	
27		**59**		**27**		**59**	
28		**60**		**28**		**60**	

Table A-5 Process List Configuration Template

List _____			
Point	**Attributes**	**Point**	**Attributes**
29		**61**	
30		**62**	
31		**63**	
32		**64**	

List _____			
Point	**Attributes**	**Point**	**Attributes**
29		**61**	
30		**62**	
31		**63**	
32		**64**	

B = Bipolar A = Alarm M = Memory I = Invert

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