Westronic

WS2000 TBOS SmartScanner

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Technical Manual

Technical Manual

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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

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B	August, 1990	System Turnup, Rack-Mounted Modem, and Telzon Termination Panel Added
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Section 1: Product Description

1.1 Overview

The WS2000 TBOS SmartScanner collects information from network elements and equipment equipped with TBOS (Telemetry Byte Oriented Serial), and discrete telemetry interfaces, and reports it via the TBOS protocol.

The WS2000 can collect alarm, status and control information from the TBOS-equipped network elements, combine it with local site alarms (discrete or TBOS) and other network elements (TBOS) and present a single TBOS port to the operations system. Most operations systems, including those based on proprietary protocols, will also support TBOS.

The TBOS interfaces can be equipped with internal and external 202T modems. The modem allows for extended distances (greater than 4,000 feet) between remotes.

Its ability to combine multiple TBOS serial ports and discrete I/O logic into one TBOS serial output, provide the capability to:

- Collect TBOS serial and discrete I/O logic data at sites remote from a variety of products, including AT&T E2A remotes, Dantel E2A compatible remotes, Northern Telecom DFMS remotes, Rockwell International DCP-1X00 mediation devices, WESTRONIC WS2000 E-Telemetry remotes, and other TBOS collection units
- Provide low cost monitor and control features at Customer Premises or Controlled Environment Vault sites.
- Conserve the number of TBOS serial ports used on main TBOS data collection units.
- Extend the range of coverage of the network.
- Use TBOS data collection in new networks as a low cost front end for the evolving X.25 based networks.

The WS2000 TBOS SmartScanner provides compact mechanical packaging for rack mounting utilizing a metal enclosure for shielding and support.

A watchdog/power supply monitor circuit is used to facilitate power up and power down situations as well as provide automatic initialize reset/restart capability. A microprocessor unit (MPU) RUN LED indication is provided together with a relay output contact. Event change-of-state (COS) conditions are presented by a COS LED and a relay output. A COS RESET front panel push button is provided for local reset of COS. COS can also be reset externally via a rear panel connection.

Power for the WS2000 TBOS SmartScanner is provided by -24 or -48 Vdc. It has its own integral power supply for meeting on-board logic supply requirements.

Terminal block access for input site battery power connections, four-wire modem lines, MPU RUN and COS output contacts are available at the rear of the shelf. Serial port access for the 10 serial

channels is available on eight-pin connectors at the rear of the unit, and access to discrete input/output logic points is available on two rear accessible 50 position delta-type connectors.

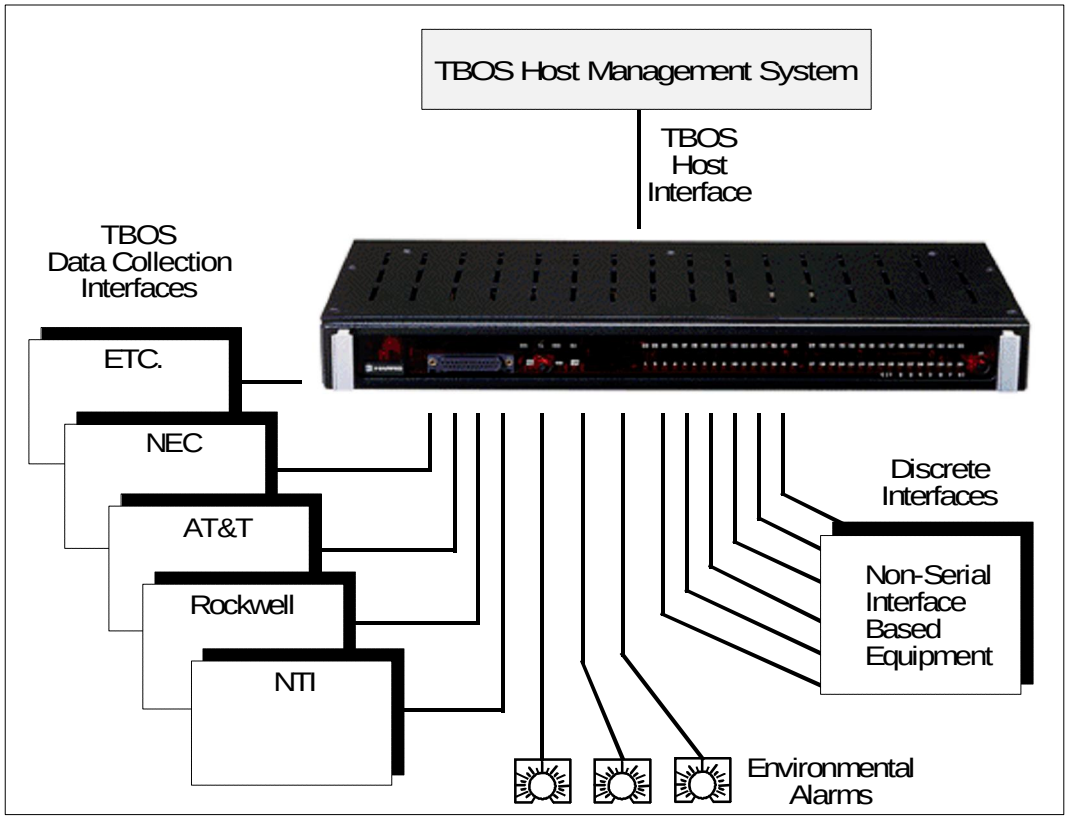

Figure 1-1 Multiple Application Monitoring Capabilities

1.2 Capabilities

1.2.1 Front Panel Controls and Indicators

Figure 1-2 is an illustration of the WS2000 front panel.

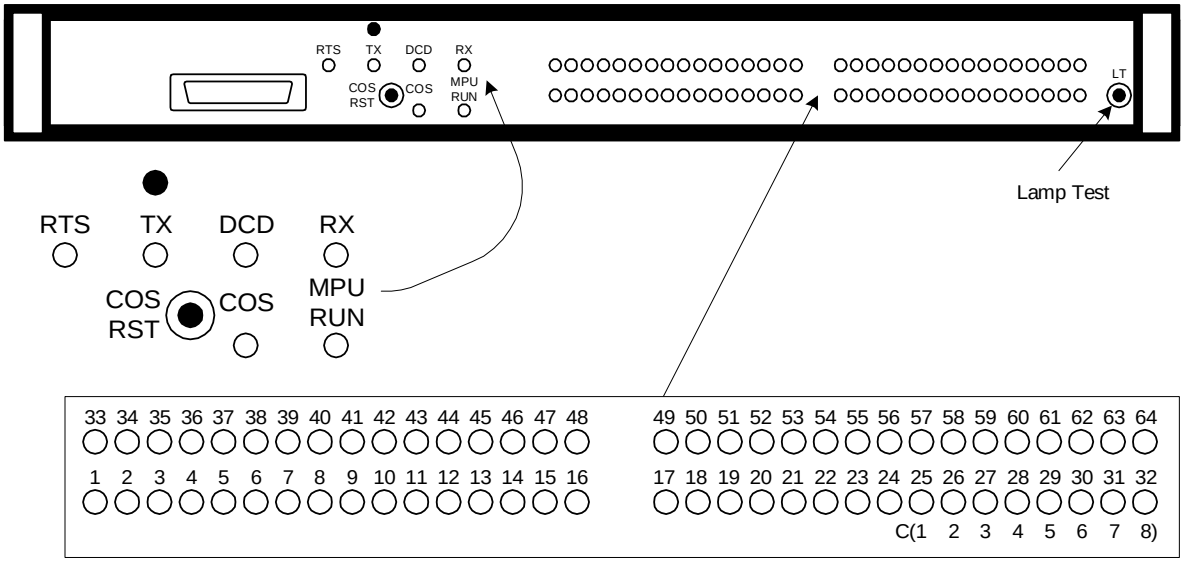

Figure 1-2 WS2000 Front Panel

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

Indicator	Title	Function

* If the WS2000 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	Resets 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 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 Discrete Interfaces

The WS2000 TBOS SmartScanner and Discrete Expander units can each process 32 discrete status/alarm inputs. Daughter boards can add up to 32 inputs and 8 outputs each. LED indications are provided for both discrete inputs and control outputs.

Discrete logic inputs must be referenced to either + or - battery as desired. These inputs require "wetting" current to operate. WS2000 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 1-3 shows Form A and Form C 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. The outputs are routed to status input points 25 - 32. This reduces the discrete point input capability from 32 to 24 inputs.

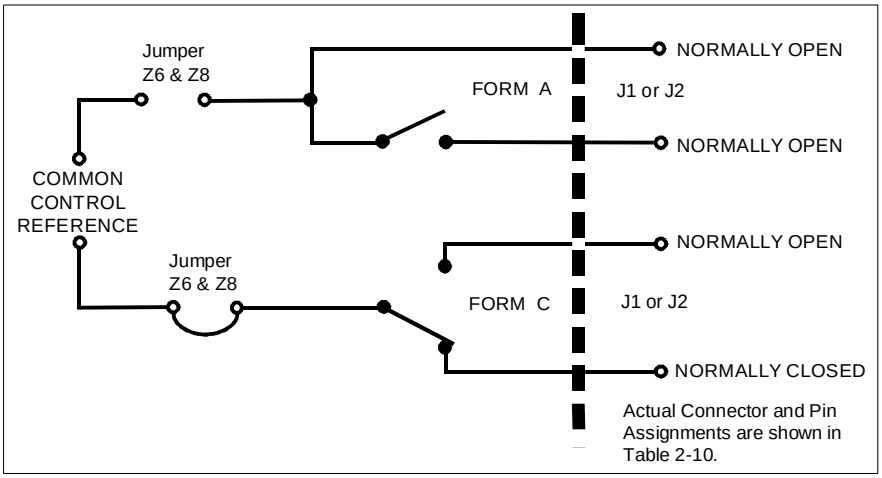

Figure 1-3 Form A and Form C Control Output Configuration

1.2.3 Serial Interfaces

The WS2000 TBOS SmartScanner is equipped with 4 TBOS serial collection channels (with on-board expansion capability to 8), 32 alarm/status inputs (with on-board expansion capability to 64), and 8 control outputs (with on-board expansion capability to 16). Channel 1 supports TBOS host communications, and can use either RS-232, RS-422 or RS-485 interface. Channels 2-5 are for TBOS data collection and can also use either RS-232, RS-422 or RS-485 interface. Optional Channels 6 - 9 are for TBOS data collection, but can only use RS-422 interface. They can be activated with the addition of an internally mounted daughter board. Channel 10 is an RS-232, 9600 bps port used for CRAFT interface. Another optional daughter board adds 32 alarm/status inputs and 8 control outputs. 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.

1.2.4 Configuration and Diagnostics

The maintenance (Craft) port is accessible via connectors on both the front and rear of the unit. It is 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 displays available on the TBOS host communications port.

Optional four digit hexadecimal password control can be set into the Remote. 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.

1.3 Features

This section describes additional external features of the WS2000 TBOS SmartScanner monitoring system. It includes information about discrete expansion, external alarm indications, and rack mount modems for serial input ports.

1.3.1 External Discrete Expanders

Each WS2000 Remote can control up to 7 WS2000 Discrete Expanders over a parallel Peripheral Interface Bus (WPIB). Each WS2000 Discrete Expander has a minimum of 32 discrete alarm status inputs and 8 discrete control outputs. They can each be further expanded with a 32 input/8 output daughter board, providing a maximum of 64 discrete inputs and 16 discrete control outputs per Expander.

1.3.2 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) 202T/CCITT V.23 modem (P/N 520-T001) and 2) VFCT modem (P/N 540-T001). They each require only 1 vertical space (1x") 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 (refer to paragraph 2.5.4).

1.3.3 External Alarm Panel

The WESTRONIC External Alarm Panel can be connected to the COS relay outputs (located on TB1) to provide both audible and visual standing alarm summary indications. The external alarm panel is equipped with an audible annunciator, audible alarm disable toggle switch, ACO button and alarm summary LED. Whenever the WS2000 detects a new alarm, the audible annunciator is activated. It remains active until the ACO button is pressed, or all active alarms have cleared. The alarm summary LED remains lit as long as the WS2000 detects one or more active alarms.

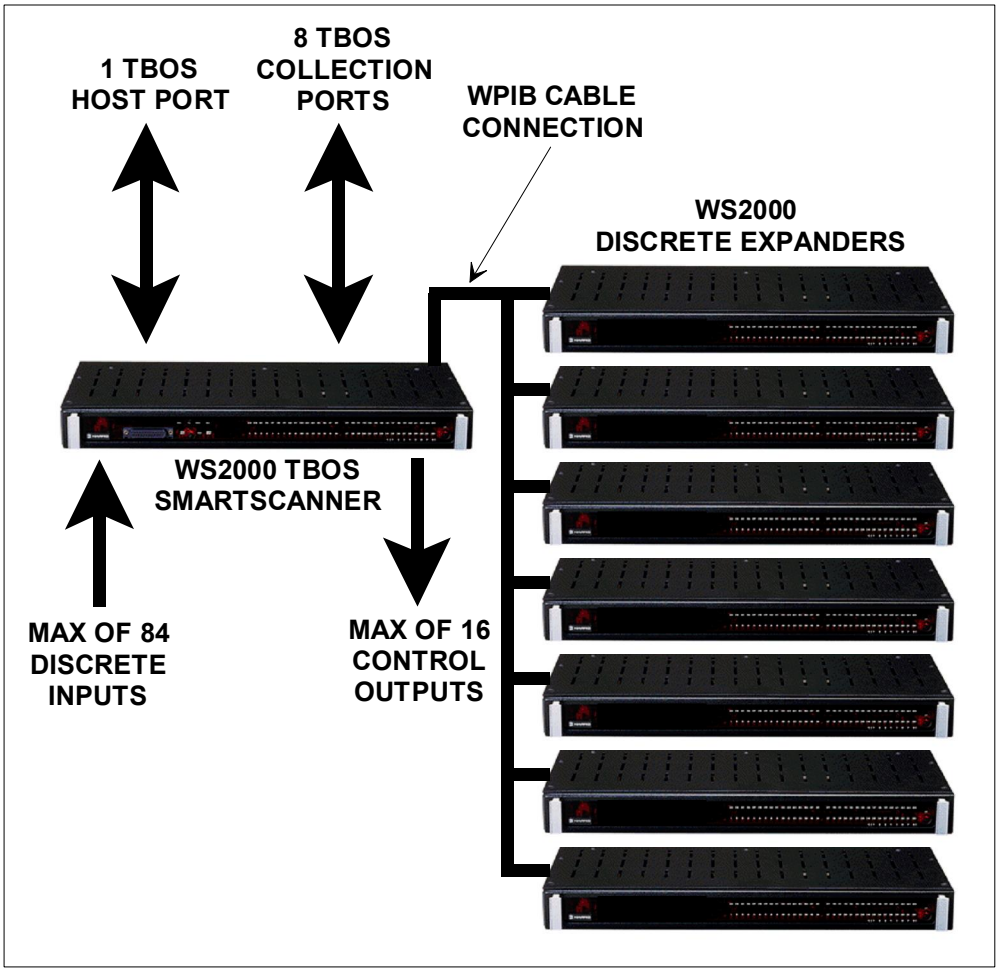
1 TBOS
HOST PORT
8 TBOS
COLLECTION
PORTS
WPIB CABLE
CONNECTION
WS2000
DISCRETE EXPANDERS
WS2000 TBOS
SMARTSCANNER
MAX OF 84
DISCRETE
INPUTS
MAX OF 16
CONTROL
OUTPUTS

Figure 1-4 Typical Discrete Expander Configuration

The external audible indication can be silenced by depressing the COS button located on the front panel of the WS2000 or by using an external button or other device to temporarily ground the external COS reset terminal located on TB1. The COS LED on the WS2000 front panel mirrors the operation of the COS relay, providing a visual indication of the state of the relay.

When a new alarm is detected by the WS2000, the COS relay and LED are activated. Pressing the COS button acknowledges all alarms that are currently active in the WS2000. It also causes the COS relay to be released and the COS LED to be extinguished. Any new alarm that is detected after the COS button has been released, will reactivate the COS relay and LED. When all unacknowledged alarms have cleared, the COS relay and LED will be deactivated. If an acknowledged alarm clears, then reoccurs, the alarm is considered to be unacknowledged and the COS relay and LED will be reactivated. The part number for this unit is 520-T007. Figure 1-9 shows the panel.

Figure 1-5 External Audible/Visual Alarm Panel with WS2000

1.4 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. They are explained in the following text.

1.4.1 Telzon Interface Assembly

The Telzon termination panel (Figure 1-6) is a standard "Type 89 Block". It provides front panel wire-wrap access to all discrete and serial connections. Up to two (2) blocks can be mounted on the same mounting bar. Interconnecting cables are provided to accommodate the TELZON wire wrap interfaces and the WS2000. 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 (6") are available for the WS2000 unit and interface assembly. All discrete input, control output, serial collection and host port connections are available on the Telzon Assembly. Part numbers for this unit are 533-T011 (23" mounting) and 533-T030 (19" mounting).

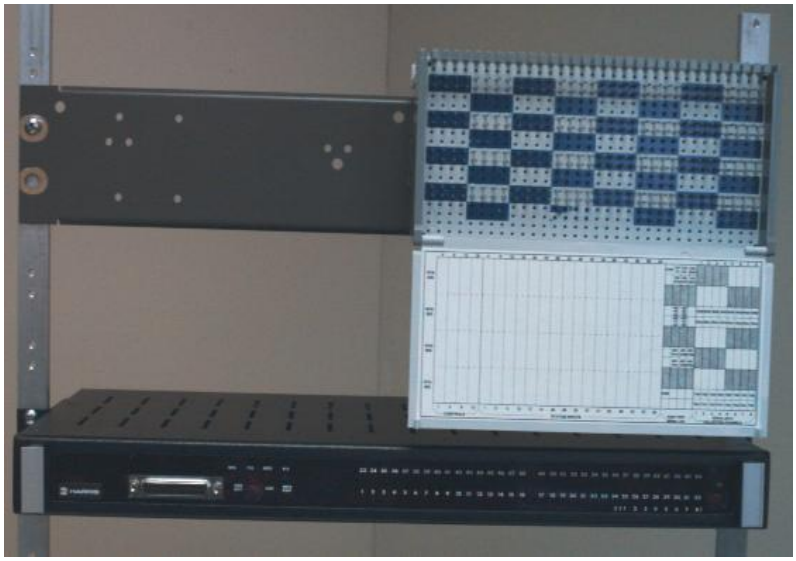

Figure 1-6 Telzon Interface Assembly

1.4.2 Rear Access Wire-Wrap Assembly

The Rear Access Interface Assembly is ideally suited for installations where only 1 vertical rack space (1x") is available for all alarm equipment. It preserves the 1 increment space for each WS2000 unit. The Rear Access Interface Assembly consists of 3 connectors that mount directly onto the WS2000 back plane connectors. It provides the capability of making all cabling

connections (64 discrete alarm inputs, 16 discrete control outputs, 8 data collection serial ports, 1 TBOS host port, and 1 CRAFT port) via wire wrap pins. It does not provide connections for signals available at rear panel connector TB1. Part number 585-T034 is used for both 19" or 23" mounting. Refer to Figure 1-7.

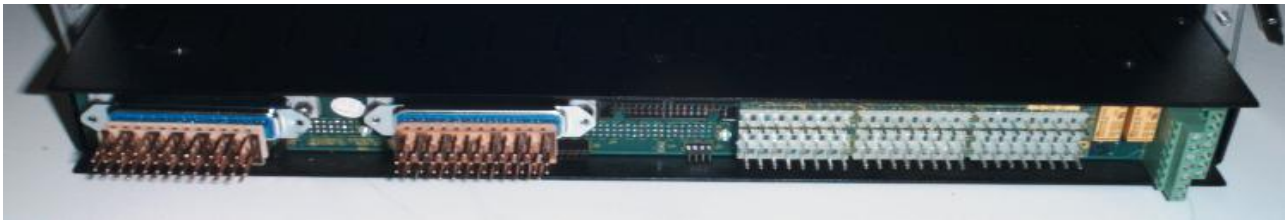

Figure 1-7 Rear Wire-Wrap Connectors

1.4.3 Front Access Wire-Wrap 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 2U rack increments; one for itself and one for the WS2000, and 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. It has a clear plastic cover to protect its connections. It is shown in Figure 1-8.

Figure 1-8 Front Access Interface Assembly

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.

1.5 Specifications

This section provides detailed information on the electrical, environmental and mechanical specifications of the WS2000 product line. It also provides detailed data for the parallel, serial, host port and auxiliary interfaces.

1.5.1 Electrical

This section provides engineering data and electrical requirements for WS2000 alarm systems installation.

1.5.1.1 Typical Power Requirements

- Input Voltage Range: -20 to -60 Vdc
- WS2000 Power Usage: 5.0W (No input sense currents)
  24.0W (64 inputs sense currents)
- Fusing of WS2000 units: 17A GMT or Type 70 @ -24 Vdc
  xA GMT or Type 70 @ -48 Vdc
- Add per discrete expanders: pA @ -24 or -48 Vdc

1.5.1.2 Switching Power

- External power is available from the WS2000 unit.
- Supply Outputs: + 5.0 Vdc ±5% @ 1.5A (maximum)
  +12.0 Vdc ±0% @ 400mA ea. (maximum)
  ±12.0 W total output power

1.5.2 Interfaces

This section provides detailed data on each of the WS2000 interfaces.

1.5.2.1 Parallel Interface

- WPIB (Peripheral Interface Bus)
- 8 WPIB Addresses assigned to WS2000 TBOS SmartScanner

1.5.2.2 Serial Ports

Host Port

- TBOS protocol, asynchronous, 8 data bit characters, odd parity, 2 stop bits, 1200 or 2400 bps
- 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 (selectable, see paragraph 2.5.5), 2-Wire or 4-Wire modem
- Connectors: P6, P12, or TB1 (see Section 2 for specific connector applications)

TBOS Communications Ports

- Asynchronous, 8 data bit characters, odd parity, 2 stop bits, 1200, or 2400 bps
- RS-232/RS-422/RS-485 selectable
- Connectors: P3 (Ch. 4), P4 (Ch. 2), P10 (Ch. 5), P11 (Ch. 3)

Optional TBOS Ports

- Asynchronous, 8 data bit characters, odd parity, 2 stop bits, 1200/2400 bps
- RS-422
- Connectors: P1 (Ch. 7), P2 (Ch. 9), P8 (Ch. 6), P9 (Ch. 8)

WESMAINT (Maintenance Port)

- Asynchronous, 7-bit character, even parity, 1 stop bit, 9600 bps

- RS-232
- +5 Vdc, ±12 Vdc
- PROGEN (Program Enable/EEPROM Write Enable)
- Connectors: P5 or front access DB25

1.5.2.3 Status/Alarm Inputs

- 32 or 64 photo-coupled inputs, arranged in groups of 8, with a single common for all inputs
- + Battery (Ground) Input Voltage, - Battery (-48/-24 Vdc) Common
- Input current: 3 to 5mA per point.
- Logic Levels for -24 Vdc system :
  - Logic 0: input open or -18 to -30 Vdc
  - Logic 1: input greater than -8.0 Vdc
- Logic Levels for -48 Vdc system :
  - Logic 0: input open -40 to -60 Vdc
  - Logic 1: input greater than -12.0 Vdc

- Logic level sensing may be inverted through maintenance port configuration set-up

1.5.2.4 Control Outputs

- 8 or 16 relay control outputs
- Momentary/latched operation set via either the CRAFT port or TBOS Host.
- Contact Arrangement (Selectable per output): SPST Normally Open (Form A) or SPDT (Form C) with common voltage applied to contact wiper
- Contact Ratings: 2A @ 30 Vdc
  0.6A @ 110 Vdc
  60W (maximum) switching power

1.5.2.5 Auxiliary

- MPU RUN Relay Output: SPDT (Form C)
- COS Relay Output: SPDT (Form C)
- Output Contact Ratings: 1A @ 60 Vdc
- COS RESET input: + battery pulse

1.5.3 Environmental

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

1.5.4 Mechanical

The WS2000 hardware is described in the following paragraphs. Dimensions and mounting requirements are the same for WS2000 SmartScanners and WS2000 Discrete Expanders.

1.5.4.1 Dimensions

- Height - 1.75" (4.4 cm) Width - 17.373" (44.13 cm) Depth - 8.0" (20.3 cm)

1.5.4.2 Mounting

- 19" (48.26 cm) rack mounting, or
- 23" (58.42 cm) rack mount (with optional adapters)

1.5.4.3 Weight

- 5.3 lbs. (2.4 Kg.) maximum unpackaged
- 8 lbs. packaged

1.5.4.4 Connectors

Power, analog and auxiliary connections: TB1 - 14 position, dual level, compression terminal block, accepts #14 to #24 AWG.

Serial and digital host port connections: P1-P6, P8-P13 - 8 position, header terminal connectors. Mating connectors are female 8-position headers. They are available from WESTRONIC individually (P/N 620-0077), or as part of a kit (P/N 585-0005) that includes 12 connectors and an insertion tool (P/N 990-0150).

WPIB connection: P7 - (2 X 17) 34 position, ribbon cable header. Mating connectors are sold as part of special cables. Refer to

Discrete and control output connections: J1, J2 - 50 position, female, Delta-type connectors. Mating connectors are available from WESTRONIC (P/N 620-0078)

1.6 Part Numbers

Table 1-3 lists Part Numbers for ordering the WS2000 TBOS SmartScanners, accessories and spares.

Table 1-3 WS2000 TBOS SmartScanner Equipment Part Numbers and Codes

PN	Name	TBOS Ports	Discrete I/O		Modem Type	19/23 Mount	CLEI Code
			Input	Output			
WS2000							
590-0116	TBOS *	4	32	8	None	Either	See Plug-In
590-0117	TBOS *	4	32	8	202T	Either	See Plug-In
590-0118	TBOS *	4	64	16	None	Either	See Plug-In
590-0119	TBOS *	4	64	16	202T	Either	See Plug-In
590-0120	TBOS *	8	32	8	None	Either	See Plug-In
590-0109	TBOS *	8	32	8	202T	Either	See Plug-In
590-0121	TBOS *	8	64	16	None	Either	See Plug-In
590-0110	TBOS *	8	64	16	202T	Either	See Plug-In
Accessories							

PN	Name	TBOS Ports	Discrete I/O		Modem Type	19/23 Mount	CLEI Code
			Input	Output			
590-0106	Discrete Expander		32	16		Either	
590-0074	Discrete Expander		64	32		Either	
519-0300	Wesmaint Portable						RMTE300BAB
519-T001	Rack Mount Wesmaint					Either	RMMYAAHDAA
567-T007	PC-Wesmaint Software						CPR#0990604
533-T030	Telzon Wire-Wrap Block		64	16		19"	CPR#099999
533-T011	Telzon Wire-Wrap Block		64	16		23"	CPR#099999

PN	Name	TBOS Ports	Discrete I/O		Modem Type	19/23 Mount	CLEI Code
			Input	Output			
533-T032	Front Access Interface Assy		64	16		Either	CPR#099604
585-T034	Rear Access Interface Assy		64	16			CPR#099604
520-T001	Rack Mount 202T Modem				202T	Either	2DMMBA01
520-T007	Audible/ Visual Alarm Panel						
620-0077	8-Pin Serial Connector						N/A
620-0078	50-Pin Delta Connector						N/A

PN	Name	TBOS Ports	Discrete I/O		Modem Type	19/23 Mount	CLEI Code
			Input	Output			
990-0150	Serial Insertion Tool						N/A
977-T042	JB3 Term Plug						N/A
585-0005	Serial Connector Kit (12-connectors, 1 tool)						N/A
Spares							
500-T001	TBOS Plug-in	4	32	8	None		TBA
500-T002	TBOSPlug-in	4	32	8	202T		TBA
500-T003	TBOS Plug-in	4	64	16	None		ETPQ2CDAAA

PN	Name	TBOS Ports	Discrete I/O		Modem Type	19/23 Mount	CLEI Code
			Input	Output			
500-T004	TBOS Plug-in	4	64	16	202T		TBA
500-T005	TBOS Plug-in	8	32	8	None		TBA
500-T020	TBOSPlug-in	8	32	8	202T		TBA
500-T006	TBOS Plug-in	8	64	16	None		TBA
500-2010	TBOS Plug-in	8	64	16	202T		ETPQ20GAAA
500-2006	Disc. Expander Plug-in		32	8			ETPQ20JAAA
500-2004	Disc. Expander Plug-in		64	16			ETPQ20HAAA
500-2000	Shelf Assembly					19"	TBA

PN	Name	TBOS Ports	Discrete I/O		Modem Type	19/23 Mount	CLEI Code
			Input	Output			
Spec-0016	User Guide						N/A
585-T055	Rack Adapters Kit					23"	N/A

1.7 Other Products from WESTRONIC

The following information is provided about other WESTRONIC products which are available to meet alarm system needs. Call **(403) 250-8304** and talk with a WESTRONIC representative to learn more about these and other WESTRONIC products.

1.7.1 C1000

The 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 (1x") 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 DB9 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.

1.7.2 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.

1.7.3 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-232/422/485 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-232/422/485 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

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Section 2: Installation

2.1 Overview

This section describes how to perform installation and hardware configuration of the WS2000 TBOS SmartScanner. The first paragraph describes handling considerations and precautions. Subsequent paragraphs provide details about how to install the unit. The final paragraphs describe the physical layout of the unit and available options.

2.2 Handling Considerations and Precautions

Caution is necessary when handling WS2000 TBOS modules due to Complementary Metal Oxide Semiconductor (CMOS) and NChannel Metal Oxide Semiconductor (NMOS) integrated circuits. These components are provided to maximize noise immunity and promote low power consumption. There is a possibility that CMOS and NMOS integrated circuits could become damaged due to high static voltage levels.

The CMOS and NMOS devices are equipped with protection diodes, but incorrect handling allowing excessive static energy to enter the devices may still cause device failure. Failure may not be readily detected, and in time could lead to premature device failure.

Figure 2-1 Electrostatic Discharge (ESD) Warning

The following points are worth noting as they will significantly reduce static damage on CMOS or NMOS components thereby improving system reliability and keeping system downtime to specified limits.

- Before removing or inserting WS2000 modules, personnel should ensure that they are not carrying static charges. This can easily be done by grounding oneself (i.e., using a heel or wrist ESD strap).
- After a WS2000 module is extracted, it should always be placed into an anti-static bag or covering for transportation and storage.
- Repair work on WS2000 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).

- Extreme care should be exercised when handling CMOS/NMOS components. Try not to touch their pins and always place them in anti-static foam for storage and transportation.
- Ensure that de-soldering tools have static reduction. Some de-soldering tools can actually generate large static voltages that will damage CMOS and NMOS devices.

2.2.1 Module Substitution

The following important points should be kept in mind when replacing or substituting WS2000 modules for board diagnosis:

- Turn power off when removing or inserting modules. While the boards are designed to withstand removal and insertion with power on, it is recommended practice to always turn the system power supply off when substituting modules.
- Note boards jumper and mini-jumper arrangements. Ensure they are identical when substituting WS2000 modules. Failure to do so could cause module operational failure, point displacement because of incorrect board address, communication failure with the host and other mini-jumper related failures. Substitute WS2000 modules only with identical jumpering.

- Make sure the substitute board has the same part number and options as the original.
- When substituting modules make sure the EPROM and current firmware is installed on the substitute board. Always make sure when substituting or replacing EPROMS that the EPROM is properly placed in the socket with the correct pin alignment. Make sure all pins are inserted in the socket and that none are bent outward or inward.
- Make sure substitute WS2000 modules mate properly with the connectors at the rear of its bin. Never jam a board into position as this may damage rear connectors. Determine why the module does not easily plug into position. 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 the module while drawing it from the bin until it is free of the rear connectors.

Caution: Remove the WESMAINT or Termination plug from front panel DB25 connector before power is applied or removed.

Actual module repair should be carried out only by qualified electronic personnel familiar with microcomputers and I/O interfacing. It is recommended that such personnel become more acquainted with the WS2000 by attending a training course where special circuit concepts and applications may be pointed out.

When returning a faulty module, please note the suspected problem, fault or symptom.

2.3 Installation Procedures

The following paragraphs describe how to install the WS2000 SmartScanner and ancillary products into a permanent location. Refer to the check list at the end of this section for a step-by-step WS2000 installation guide. After working through the installation steps the WS2000 unit is ready for software configuration. Refer to Sections 3 and 4 and the configuration check list in Section 3 for these procedures.

2.3.1 Installing the WS2000 Unit

The WS2000 TBOS SmartScanner requires 1 vertical space in a 19" standard telecommunications rack. Rack adapters are included with the unit for mounting in 23" wide racks. Figure 2-2 is an installation outline drawing of a Remote or Discrete Expander unit.

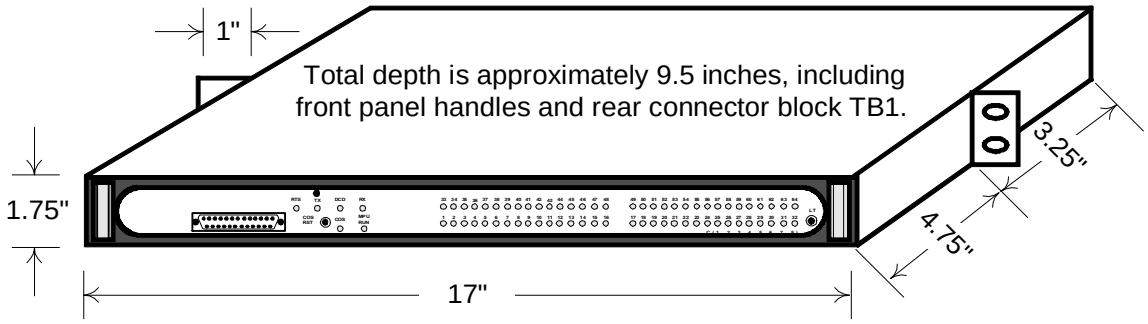

Figure 2-2 WS2000 TBOS SuperScanner and Discrete Expander Outline Drawing

2.3.2 WS2000 Unit Inspection

Prior to power-up, remove the WS2000 main board assembly from its housing and confirm that the plug-on daughter boards are seated properly. Strap options have been preset in the factory; however, they can be changed per user requirements. Strap options for main board, daughter boards and back plane are listed in this section.

2.4 SmartScanner Strapping

The following text, figures and tables provide the information required to install the appropriate WS2000 main board and backplane straps for a particular installation. Strapping options have been preset at the factory and default settings are noted where applicable.

2.4.1 Main Board Strapping

Main Boards can be one of four types. They are referred to as Type 1, Type 2, Type 3 and Type 4. Compare the board in the unit with Figures 2-3, 2-4, 2-5, and 2-6 to determine which type is installed.

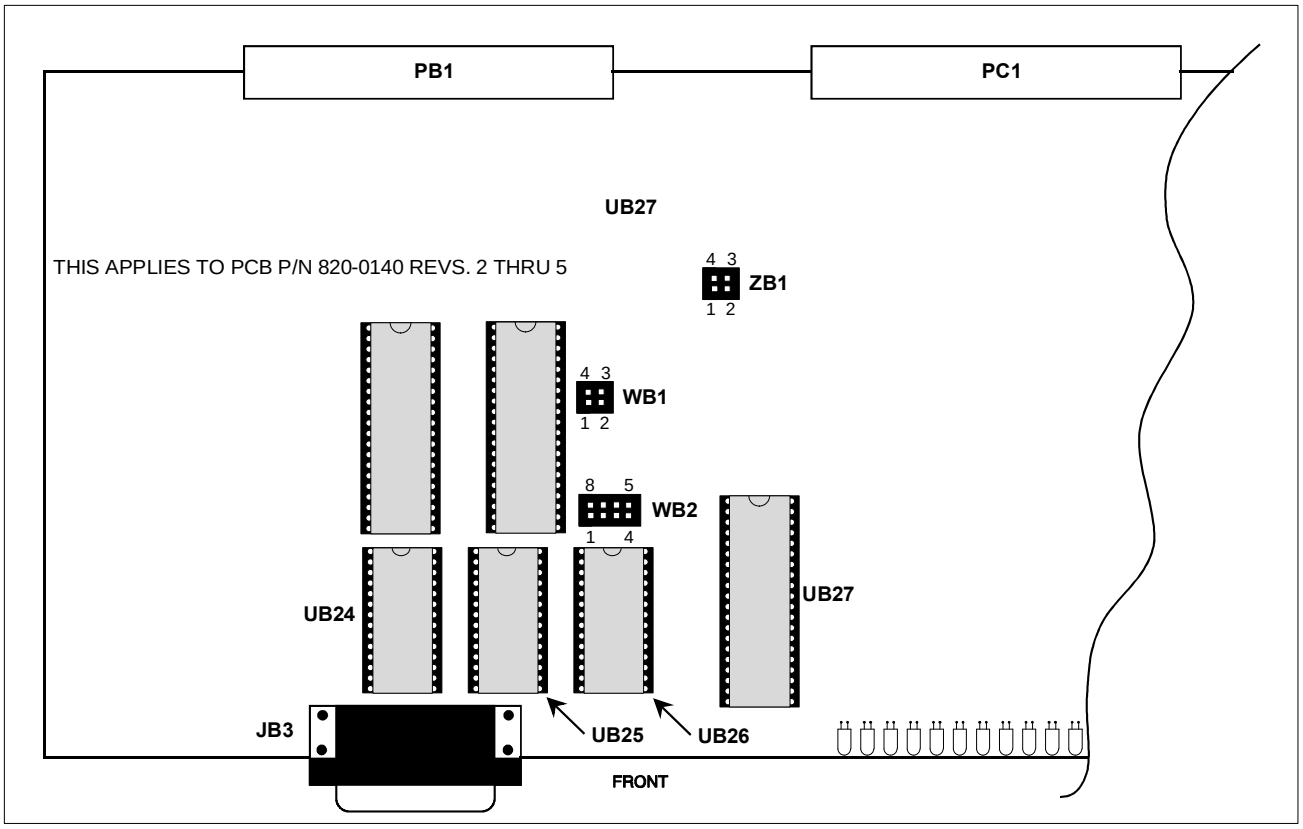
PB1
PC1
UB27
THIS APPLIES TO PCB P/N 820-0140 REVS. 2 THRU 5
4 3
ZB1
1 2
4 3
WB1
1 2
8 5
WB2
1 4
UB24
UB27
JB3
UB25
UB26
FRONT

Figure 2-3 Type 1 Main Board Strapping

Table 2-1 Type 1 Main Board Strapping

Block	Pin	Function
WB1	1 ï 2	Channel 1 RTS from Main board. Remove when daughter board provides source. (Note)
	3 ï 4	Channel 1 Tx from Main board. Remove when daughter board provides source. (Note)
WB2	1 ï 2, 7 ï 8	UB25 is 32 K EPROM (27C256)
	2 ï 7, 3 ï 6	UB25 is 32K EEPROM (28C256)
	3 ï 6	8K EEPROM (28C64)
	4 ï 5	UB24 is 32K RAM (65256); Not installed when UB24 is 8K RAM (62640)
ZB1	1 ï 2	I/O Reset Enable (Reset Control Output Latches During Power Up/Down, Auto Restart)
	3 ï 4	Watchdog Enable (Auto Restart)

Note: This applies to an internal modem.

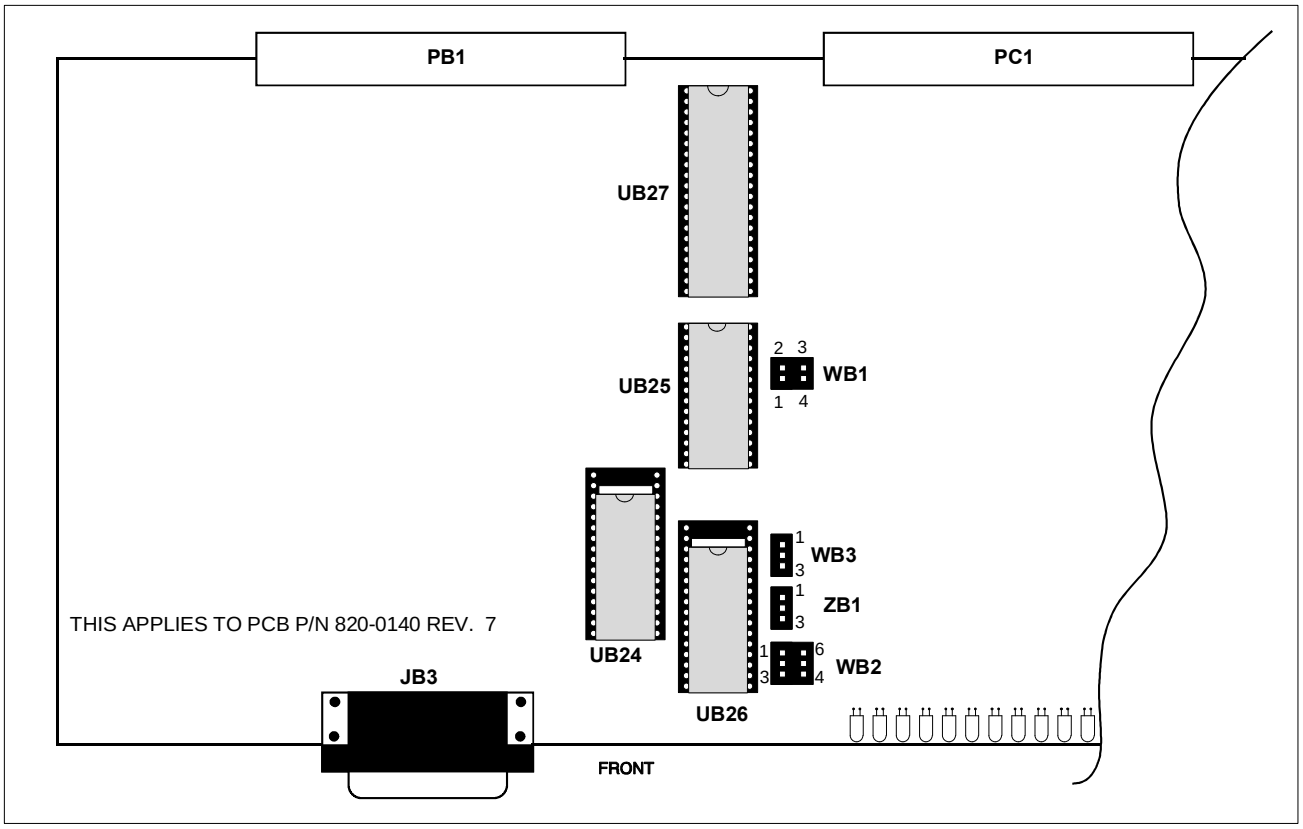
PB1
PC1
UB27
UB25
2 3
1 4
WB1
UB24
1
3
WB3
1
3
ZB1
1
3
6
4
WB2
UB26
THIS APPLIES TO PCB P/N 820-0140 REV. 7
JB3
FRONT

Figure 2-4 Type 2 Main Board Strapping

Table 2-2 Type 2 Main Board Strapping

Block	Pin	Function
WB1	1 ï 4	Channel 1 RTS from Main board. Remove when daughter board provides source. (Note 1)
	2 ï 3	Channel 1 Tx from Main board. Remove when daughter board provides source. (Note 1)
WB2	1 ï 6	***Do not install***. UB24 address range
	2 ï 7	***Do not install***. UB24 address range
	3 ï 4	Write Enable when UB25 is EEPROM
WB3	1 ï 2	UB26 is 32-pin device.
	2 ï 3	UB26 is 28-pin device; Default (Note 2)
ZB1	1 ï 2	Watchdog Enable (Auto Restart), Default
	3 ï 4	Watchdog Disable

Notes:

1. This applies to an internal modem.

2. When UB26 is a 28-pin device, insert it in the pins closest to the front of the board.

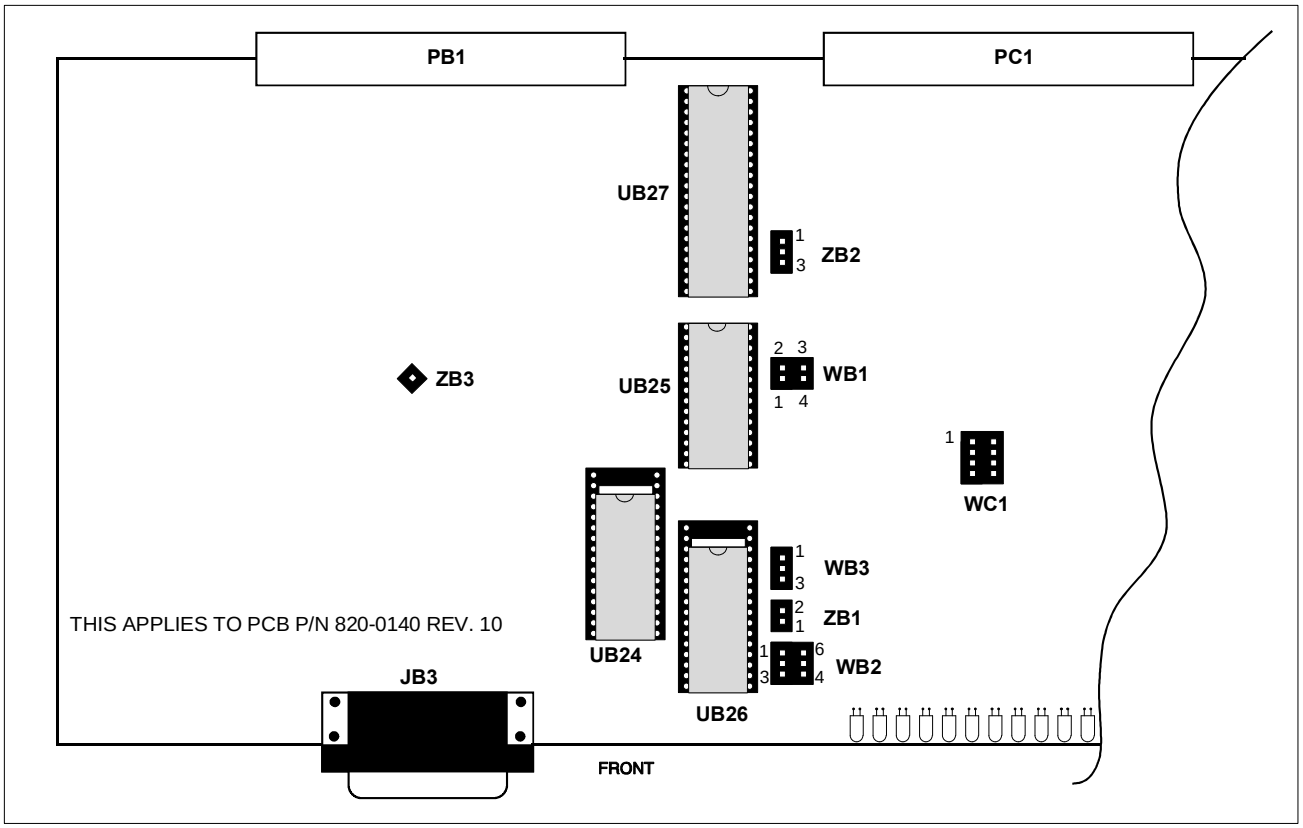

Figure 2-5 Type 3 Main Board Strapping

Table 2-3 Type 3 Main Board Strapping

Block	Pin	Function
WB1	1 ï 4	Channel 1 RTS from Main board. Remove when daughter board provides source. (Note 1)
	2 ï 3	Channel 1 Tx from Main board. Remove when daughter board provides source. (Note 1)
WB2	1 ï 6	***Do not install***. UB24 address range
	2 ï 7	***Do not install***. UB24 address range
	3 ï 4	Write Enable when UB25 is EEPROM
WB3	1 ï 2	UB26 is 32-pin device.
	2 ï 3	UB26 is 28-pin device; Default (Note 2)
WC1	Not Used	Board ID
ZB1	1 ï 2	Watchdog Enable (Auto Restart), Default
	3 ï 4	Watchdog Disable
ZB2, ZB3	None	For Testing Purposes Only

Notes:

1. This applies to an internal modem.
2. When UB26 is a 28-pin device, insert it in the pins closest to the front of the board.

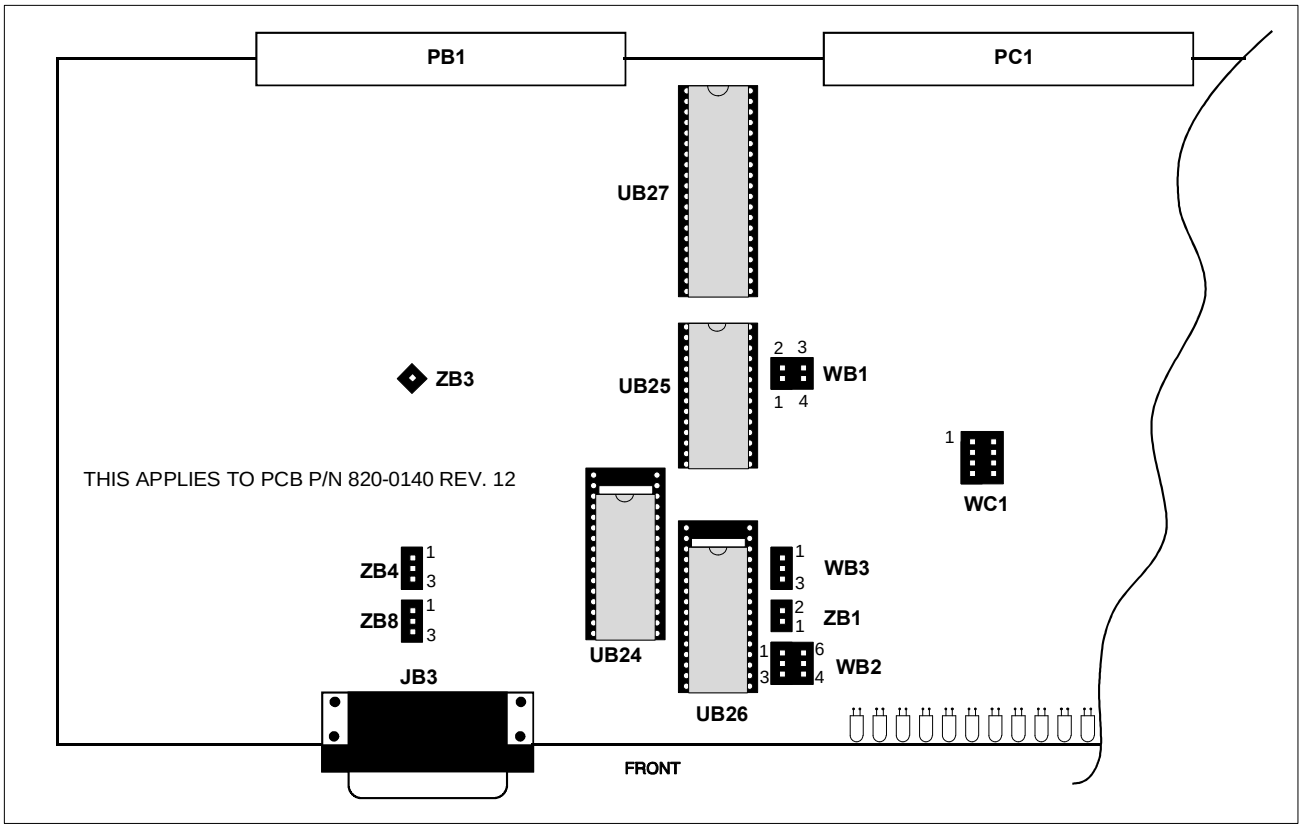

Figure 2-6 Type 4 Main Board Strapping

Table 2-4 Type 4 Main Board Strapping

Block	Pin	Function
WB1	1 ï 4	Channel 1 RTS from Main board. Remove when daughter board provides source. (Note 1)
	2 ï 3	Channel 1 Tx from Main board. Remove when daughter board provides source. (Note 1)
WB2	1 ï 6	***Do not install***. UB24 address range
	2 ï 7	***Do not install***. UB24 address range
	3 ï 4	Write Enable when UB25 is EEPROM
WB3	1 ï 2	UB26 is 32-pin device.
	2 ï 3	UB26 is 28-pin device; Default (Note 2)
WC1	Not Used	Board ID
ZB1	None	Watchdog Enable (Auto Restart), Default
	1 ï 2	Watchdog Disable
ZB4, ZB8	1 ï 2	Not Applicable
	2 ï 3	UB25/UB26 bank switchable; Default
ZB3	None	For Testing Purposes Only

Table 2-4 Type 4 Main Board Strapping

Block	Pin	Function

Notes:

1. This applies to an internal modem.
2. When UB26 is a 28-pin device, insert it in the pins closest to the front of the board.

2.4.2 Internal Modem Strapping

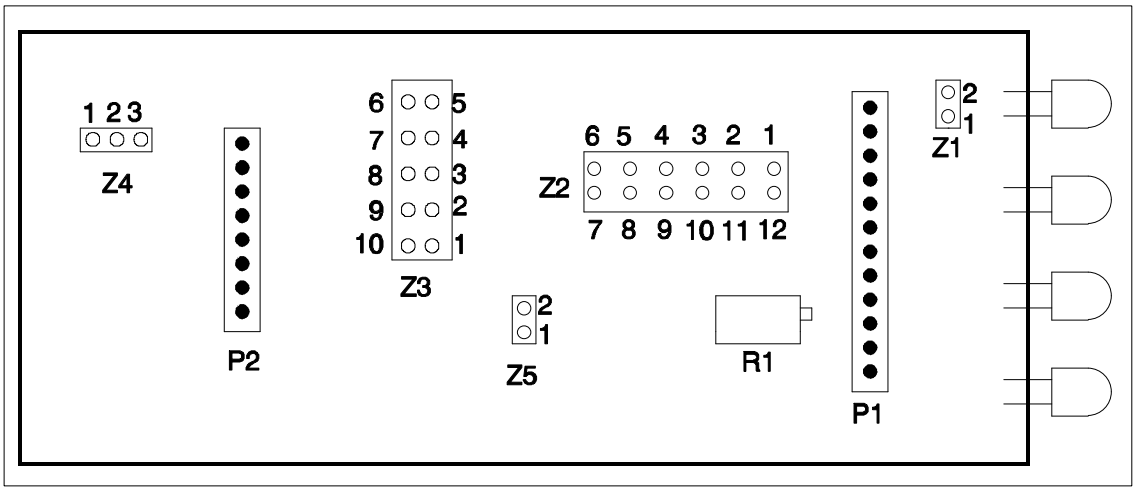

Figure 2-7 Internal Modem Strapping

Table 2-5 Internal Modem Strapping

Item	Function
Z1	N/A

Table 2-5 Internal Modem Strapping

Item	Function
Z2	▪ Pins 1 ï 12 provide receiver squelch on 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 2-6 for Z2 strap arrangements. Factory default is 4W/202.
Z3	Z3 sets the modem receive signal sensitivity. See Table 2-7 for Z3 strap arrangements. The setting should be set 5 ï 10 dBm lower than the actual receive level. Default is ï 36 dBm.
Z4	Pins 1 ï 2 select two wire operation. Pins 2 ï 3 select four wire operation.
Z5	Z5 must be installed when the modem is used in the WS2000 to bypass a timing circuit that is used in another application. Installed is the default.
R1	R1 adjusts the modem transmit output level. Clockwise rotation increases output level (+3 dBm maximum output). Default is ï 10 dBm.

Table 2-6 Modem Operation Type (Z2 Option Straps)

Mode	Z2 Strap Pins				
	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 2-7 Modem Receiver Sensitivity (Z3 Option Straps)

Rx Level	Z3 Strap Pins				
	1–10	2–9	3–8	4–7	5–6
ï 6 dBm	In	In	In	In	In
ï 12 dBm	Out	Out	Out	Out	In

Table 2-7 Modem Receiver Sensitivity (Z3 Option Straps)

Rx Level	Z3 Strap Pins				
	1–10	2–9	3–8	4–7	5–6
ï 18 dBm	Out	Out	Out	In	Out
ï 24 dBm	Out	Out	In	Out	Out
ï 30 dBm	Out	In	Out	Out	Out
ï 36 dBm	In	Out	Out	Out	Out
ï 42 dBm	Out	Out	Out	Out	Out

2.4.3 Rear-Panel Strapping

This section describes the strapping options for the serial data ports terminations, discrete control points, and address strapping for the WPIB address. Figure 2-8 shows the location of these strapping blocks. Note that Z4 is not used.

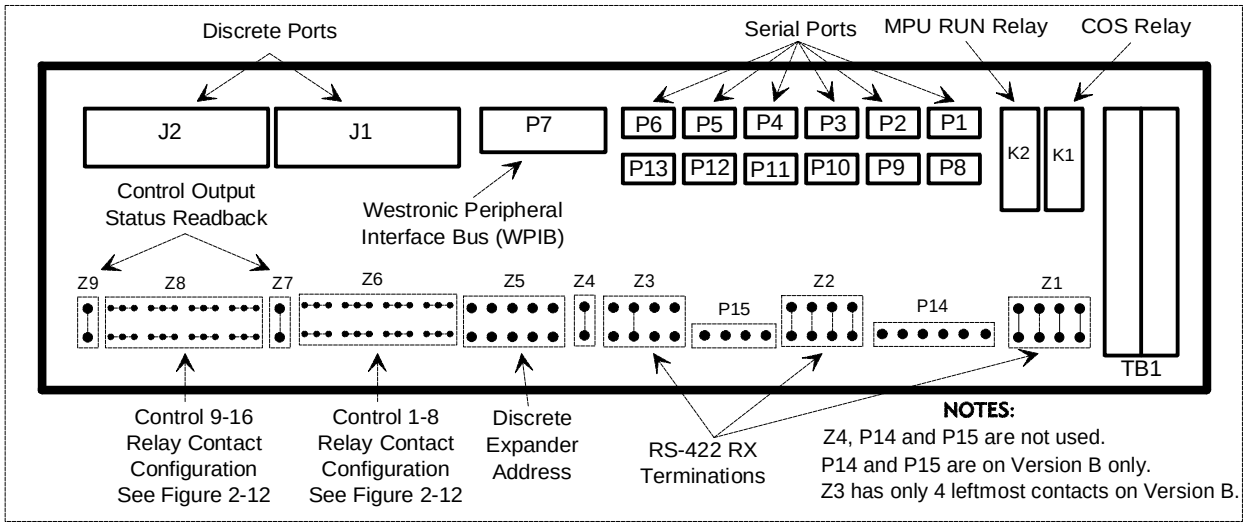

Figure 2-8 Rear Panel Connector and Strap Locations

2.4.3.1 Serial Port Termination Resistors (Z1 Z2 Z3)

If a port is to be connected using RS-422 or RS-485, termination resistors may be required. It is recommended that they be installed on the receiver end of all RS-422 circuits, and on the end receiver of an RS-485 circuit. Table 2-8 defines the straps which install the termination resistors.

Table 2-8 RS-422/RS-485 Rx Termination Strapping

Pins	Function		
	Z1	**Z2**	**Z3** (Note)
1 ï 8	CH 9 Rx	CH 2 Rx	CH 1 CTS
2 ï 7	CH 8 Rx	CH 3 Rx	CH 1 Rx
3 ï 6	CH 7 Rx	CH 4 Rx	CH 1 RxC
4 ï 5	CH 6 Rx	CH 5 Rx	CH 1 TxC
1 ï 4	N/A	N/A	CH 1 CTS
2 ï 3	N/A	N/A	CH 1 Rx

Note: Version A backplanes have an 8-pin Z3; Version B and later have a 4-pin Z3.

2.4.3.2 Discrete Control Interfaces (Z6 Z8)

Each discrete control interface can either operate FORM A or FORM C (Refer to paragraph 1.2.3). These interconnections to the network require selecting the appropriate FORM option. Refer to Figure 2-9.

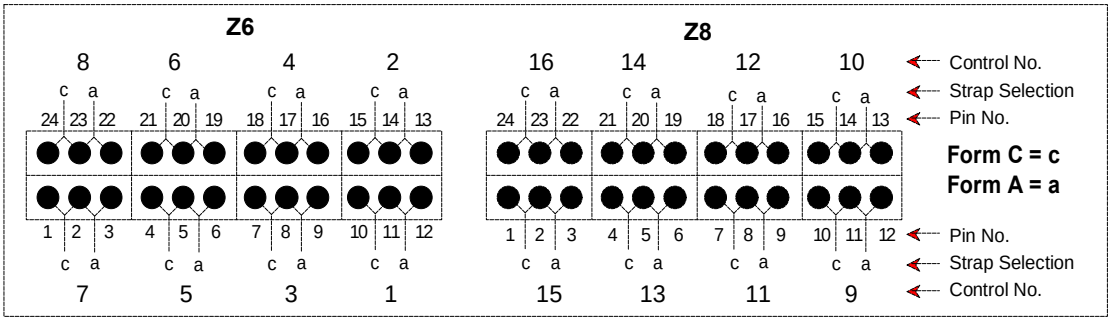

Figure 2-9 Z6 and Z8 Strapping

2.4.3.3 WPIB Address (Z5)

The straps shown in Table 2-3 are required to identify each Discrete Expander to the WS2000. The WS2000 itself requires no strapping on Z5.

Table 2-9 Discrete Expander Address Strapping

Expander	WPIB Address	Z5 Pins
0	00	None
1	08	5 ï 6
2	10	4 ï 7

Table 2-9 Discrete Expander Address Strapping

Expander	WPIB Address	Z5 Pins
3	18	4 ï 7, 5 ï 6
4	20	3 ï 8
5	28	3 ï 8, 5 ï 6
6	30	4 ï 7, 3 ï 8
7	38	3 ï 8, 4 ï 7, 5 ï 6

2.5 Cabling the Unit

Power, local annunciators, and host modem connections are made at TB1. All the RS-232/RS-422/RS-485 serial connections are made via eight pin connectors P1 through P6, and P8 through P13. All the discrete inputs and control outputs are made via 50 pin connectors, J1 and J2. If discrete expanders are installed, they are connected at P7. Refer to Figure 2-8.

2.5.1 Terminal Block 1 (TB1)

TB1 provides connection points for input power, MPU RUN and COS relay outputs, COS reset and the optional host port internal modem.

Table 2-10 Terminal Block TB1 Connector

Function	Pin	Purpose
Power	**1**	ï Battery Input
	3	+Battery Input (Battery Return)
	13	Earth Gnd (Chassis Gnd)
MPU RUN Relay (K2) Output	**2**	Normally Open
	4	Common
	6	Normally Closed
COS Relay (K1) Output	**5**	Normally Open
	7	Common
	9	Normally Closed
	11	Cos Reset (+Battery Pulse)
4-Wire (Channel 1)	**10**	Tip Tx
	8	Ring Tx
	14	Tip Rx
	12	Ring Rx
2-Wire	10	Tip Tx/Rx

Table 2-10 Terminal Block TB1 Connector

Function	Pin	Purpose
(Channel 1)	8	Ring Tx/Rx

2.5.2 Serial Port Terminations

Table 2-11 shows the relationships between the TBOS Host and Serial channels and their rear-panel connectors.

Table 2-11 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

Table 2-11 Rear Panel Serial Port Connectors

Channel No	Connector
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 TBOS SmartScanner. If no modem is installed, serial channel 1 is available at P6 (RS-422/485) or P12 (RS-232).

2.5.2.1 Host Port Connections

Serial Port 1 (TBOS Host Port) is connected to either P6 or P12 connectors, depending on the physical interface type of the host port connection. P6 is for RS-422/485 and P12 is for RS-232. When an optional internal modem is installed, Host Port connections are made on TB1. Refer to paragraph 2.5.1 for TB1 Host port connections when a modem is installed.

Table 2-12 Host Port Connections (No Modem)

Connector	Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
P6	RS-422	N/A	N/A	N/A	GND	Rxï	Rx+	Txï	Tx+

Table 2-12 Host Port Connections (No Modem)

Connector	Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
P6	RS-485	RTSï	RTS+	N/A	GND	Rxï	Rx+	Txï	Tx+
P12	RS-232	Tx	RTS	CTS	GND	Rx	DCD	N/A	N/A

2.5.2.2 Serial Input Ports

Channels 2-5 are for TBOS data collection and can use either RS-232, RS-422 or RS-485 interface. Optional Channels 6 - 9 are for TBOS data collection, but can only use RS-422/485 interface. Figure 2-10 shows interface configurations for RS-232, RS-422 and RS-485 communications.

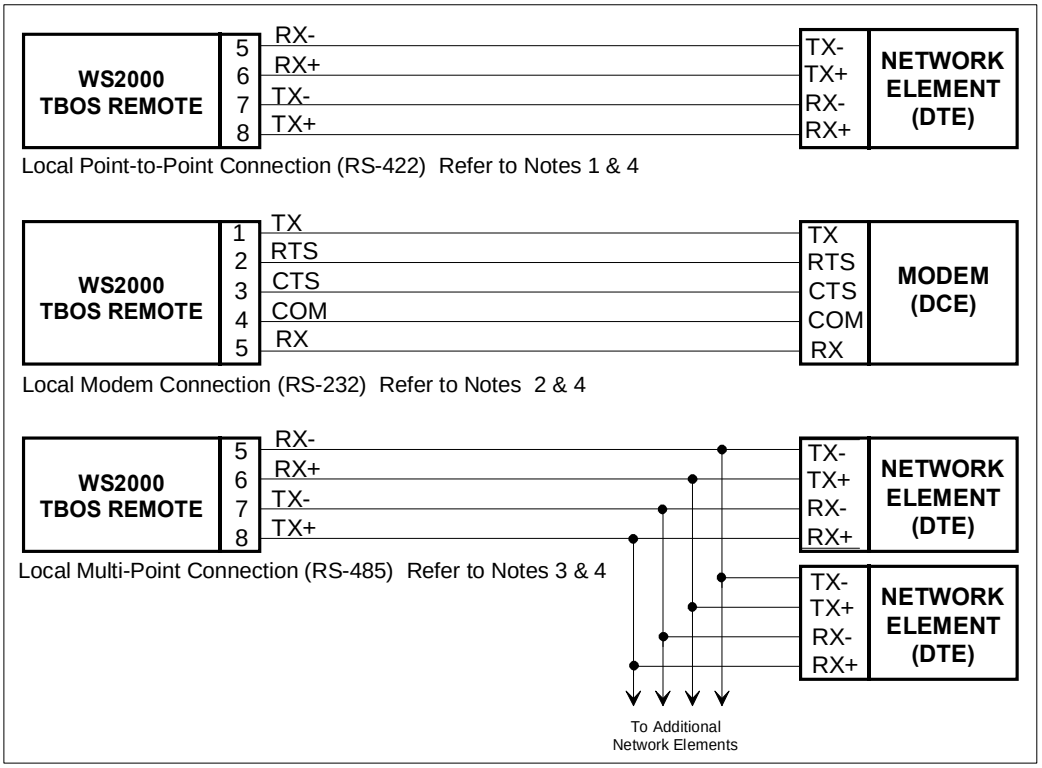

Figure 2-10 TBOS Port Interface Connections

Notes

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 TBOS serial data collection ports can be used to interconnect to networks via RS-232. This connection is suitable for use with external clear channel modems, such as the 202T. 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.
3. Four of the eight TBOS serial data collection ports can be used to interconnect to networks via RS-485. This connection is suitable for use with external clear channel modems, such as the 202T. 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.
4. 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).

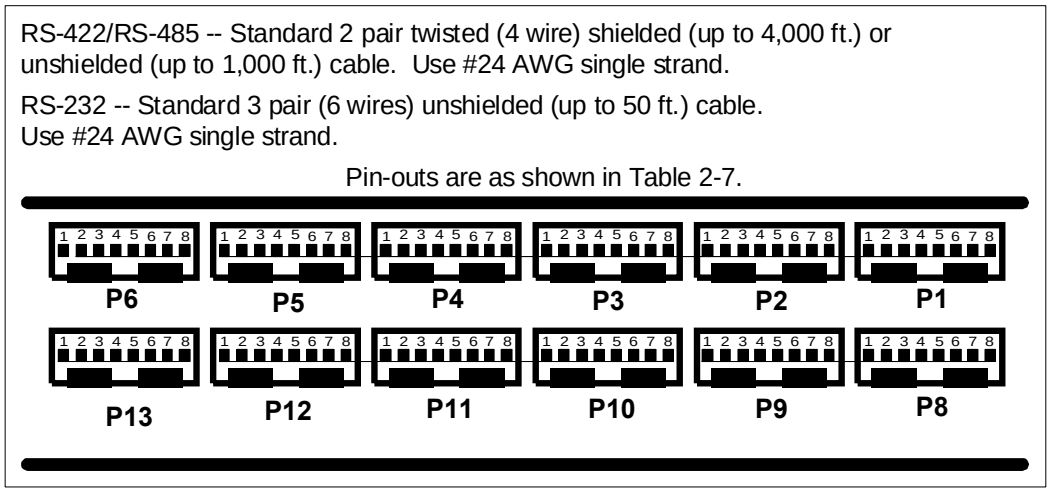

Figure 2-11 Serial Connector Pin-outs

The connector is a straight 8 Pin female connector, Westronic P/N 620-0077, or Methode P/N 1300-108 (body), and 1400-003 (pins). A connector crimp tool is available, Westronic P/N 990-0150, or Methode P/NHC1001. Table 2-13 delineates the pin connections.

Table 2-13 TBOS Serial Port Pin Assignments

Connector	TBOS Port	Chan No.	Type	Pin							
				1	2	3	4	5	6	7	8
P4	1	2	RS-422	N/A	N/A	N/A	GND	Rxï	Rx+	Txï	Tx+
	1	2	RS-485	N/A	N/A	N/A	GND	Rxï	Rx+	Txï	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	Rxï	Rx+	Txï	Tx+
	2	3	RS-485	N/A	N/A	N/A	GND	Rxï	Rx+	Txï	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	Rxï	Rx+	Txï	Tx+
	3	4	RS-485	N/A	N/A	N/A	GND	Rxï	Rx+	Txï	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	Rxï	Rx+	Txï	Tx+
	4	5	RS-485	N/A	N/A	N/A	GND	Rxï	Rx+	Txï	Tx+
	4	5	RS-232	Tx	RTS	CTS	GND	Rx	N/A	N/A	N/A
P8	5	6	RS-422/485	N/A	N/A	N/A	GND	Rxï	Rx+	Txï	Tx+
P1	6	7	RS-422/485	N/A	N/A	N/A	GND	Rxï	Rx+	Txï	Tx+

Table 2-13 TBOS Serial Port Pin Assignments

Connector	TBOS Port	Chan No.	Type	Pin							
				1	2	3	4	5	6	7	8
P9	7	8	RS-422/485	N/A	N/A	N/A	GND	Rxï	Rx+	Txï	Tx+
P2	8	9	RS-422/485	N/A	N/A	N/A	GND	Rxï	Rx+	Txï	Tx+

2.5.3 Craft Port

The Front Panel (JB3) Port is a DB25 connector that is normally used for interface with a portable Wesmaint. Rear Panel connector P5 is electrically the same as JB3, but is normally used with a Rack Mount Wesmaint. The Wesmaint functions are described in detail in Section 4 of this Guide.

Table 2-14 shows the P5 rear panel connection and JB3 front panel connection. Figure 2-12 shows pin locations for the front panel DB25 connector. Pin locations for P5 are the same as for the serial ports.

Table 2-14 Craft Port Connections

Connector	Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
Rear Panel (P5)	RS-232	Tx	Rx	Prog En	Com	ï 12 Vdc	+5 Vdc	+12 Vdc
Connector	**Type**	**Pin 2**	**Pin 3**	**Pin 7**	**Pin 11**	**Pin 13**	**Pin 18**	**Pin 25**
Front Panel (JB3)	RS-232	Tx	Rx	Com	+12 Vdc	ï 12 Vdc	+5 Vdc	Prog En

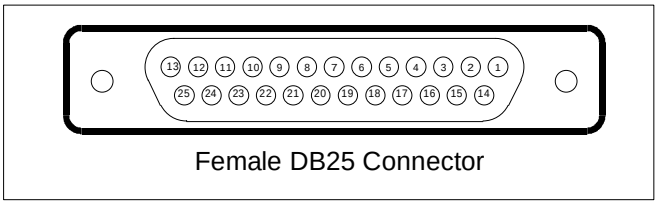

Figure 2-12 Front Panel Connector JB3

2.5.4 Discrete Inputs & Control Outputs

Discrete inputs 1-32 and control outputs 1-8 are connected to J1. Discrete inputs 33-64 and control outputs 9-17 are connected to J2. Inputs are shown in Table 2-15, and outputs are shown in Table 2-16.

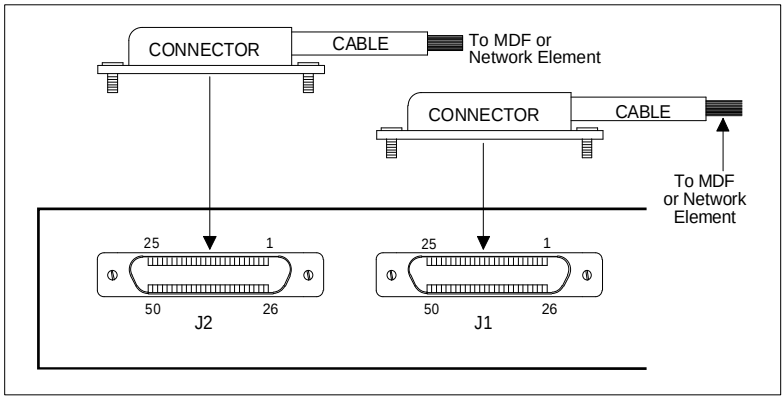

Figure 2-13 Interface for Discrete I/O

Table 2-15 Status/Alarm Inputs J1 and J2

Inputs	J1 Pin		Inputs	Inputs	J2 Pin		Inputs
Input 1	10	35	Input 2	Input 33	10	35	Input 34
Input 3	11	36	Input 4	Input 35	11	36	Input 36
Input 5	12	37	Input 6	Input 37	12	37	Input 38
Input 7	13	38	Input 8	Input 39	13	38	Input 40
Input 9	14	39	Input 10	Input 41	14	39	Input 42
Input 11	15	40	Input 12	Input 43	15	40	Input 44
Input 13	16	41	Input 14	Input 45	16	41	Input 46
Input 15	17	42	Input 16	Input 47	17	42	Input 48
Input 17	18	43	Input 18	Input 49	18	43	Input 50
Input 19	19	44	Input 20	Input 51	19	44	Input 52
Input 21	20	45	Input 22	Input 53	20	45	Input 54
Input 23	21	46	Input 24	Input 55	21	46	Input 56
Input 25	22	47	Input 26	Input 57	22	47	Input 58
Input 27	23	48	Input 28	Input 59	23	48	Input 60
Input 29	24	49	Input 30	Input 61	24	49	Input 62

Table 2-15 Status/Alarm Inputs J1 and J2

Inputs	J1 Pin		Inputs	Inputs	J2 Pin		Inputs
Input 31	**25**	**50**	Input 32	Input 63	**25**	**50**	Input 64

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 (NO) contact. In the Form C control output configuration, each control point provides one NO contact and one normally closed (NC) 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 2-16.

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

Control Point	Form C	J1 Pin		Form A/C	Control Point	Form C	J1 Pin		Form A/C
1	NC	**1**	**26**	NO	9	NC	**1**	**26**	NO
2	NC	**2**	**27**	NO	10	NC	**26**	**27**	NO
3	NC	**3**	**28**	NO	11	NC	**2**	**28**	NO
4	NC	**4**	**29**	NO	12	NC	**27**	**29**	NO
5	NC	**5**	**30**	NO	13	NC	**3**	**30**	NO
6	NC	**6**	**31**	NO	14	NC	**28**	**31**	NO
7	NC	**7**	**32**	NO	15	NC	**4**	**32**	NO
8	NC	**8**	**33**	NO	16	NC	**29**	**33**	NO
ï	Grd (Batt Rtn)	**9**	**34**	Common Voltage	ï	Grd (Batt Rtn)	**9**	**34**	Common Voltage

2.5.5 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 Tables 2-11 through 2-13.

Table 2-17 Telzon Interface Assembly Ordering Information

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

Table 2-18 533-T011 Configuration

Item	Qty	Part No	Description
1	1	640-T002	Telzon Wire Wrap Block
2	2	977-T003	3' Discrete I/O Cable (for Connectors A and B)
3	1	977-T070	3' Serial I/O Cable (for Connector C)
4	1	953-T003	23" Mounting Bar
5	1	ï	Designation Label for Inside Door

Table 2-19 533-T030 Configuration

Item	Qty	Part No	Description

Table 2-19 533-T030 Configuration

Item	Qty	Part No	Description
1	1	640-T002	Telzon Wire Wrap Block
2	2	977-T003	3' Discrete I/O Cable (for Connectors A and B)
3	1	977-T070	3' Serial I/O Cable (for Connector C)
4	1	953-T091	19" Mounting Bar
5	1	ï	Designation Label for Inside Door

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 2-14 and Table 2-14 for interconnections between the WS2000 and the termination panel.

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 2-15 for a diagram of wire-wrap pin designations.

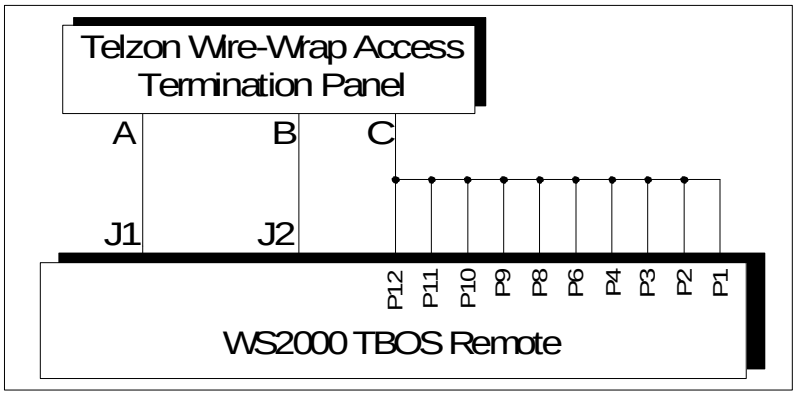

Figure 2-14 Telzon Termination Block Interconnections

Table 2-20 Telzon Cable Wire Colors

Wire Colors	WS2000 Plug	Serial Port	Channel
Orange/Yellow Orange/Red	P1	6 (TBOS)	7
Blue/Yellow Blue/Red	P8	5 (TBOS)	6
Brown/Yellow Brown/Red	P2	8 (TBOS)	9
Green/Yellow Green/Red	P9	7 (TBOS)	8
Green/Black Green/White	P3	3 (TBOS)	4
Brown/Black Brown/White	P10	4 (TBOS)	5
Blue/Black Blue/White	P4	1 (TBOS)	2
Orange/Black Orange/White	P11	2 (TBOS)	3
Slate/Black Slate/White	P6	Host RS-422	1

Table 2-20 Telzon Cable Wire Colors

Wire Colors	WS2000 Plug	Serial Port	Channel
Green/Violet Brown/Violet Slate/Violet	P12	Host RS-232	1

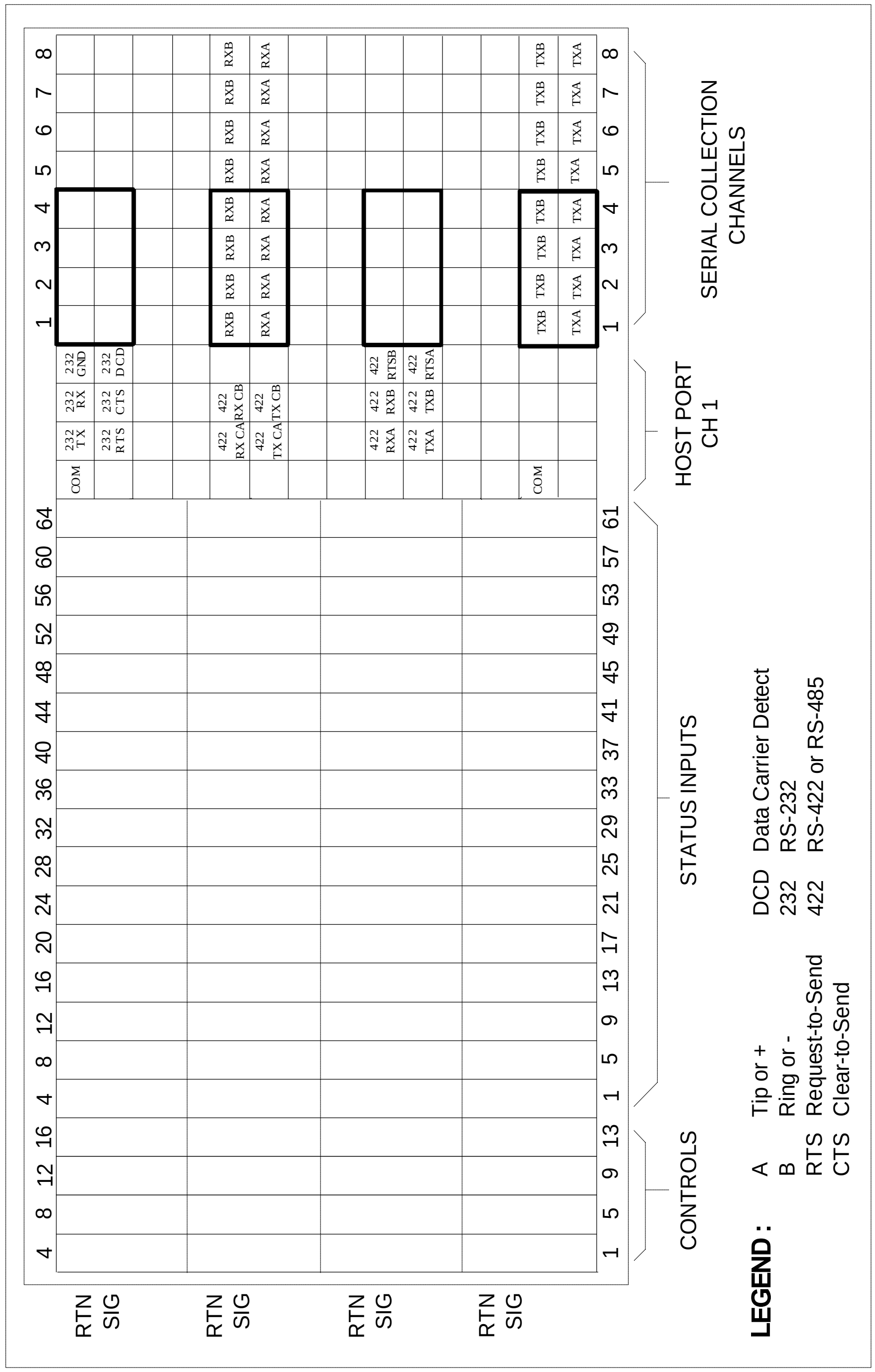
RTN
SIG
CONTROLS
STATUS INPUTS
HOST PORT CH 1
SERIAL COLLECTION CHANNELS
COM
232 TX
232 RX
232 GND
232 RTS
232 CTS
232 DCD
422 RX CA
422 RX CB
422 TX CA
422 TX CB
422 RXA
422 RXB
422 RTSB
422 TXA
422 TXB
422 RTSA
RXB
RXA
TXB
TXA
LEGEND :
A Tip or +
B Ring or -
RTS Request-to-Send
CTS Clear-to-Send
DCD Data Carrier Detect
232 RS-232
422 RS-422 or RS-485

Figure 2-15 Telzon Block Wire Wrap Designations

2.5.6 Front-Access Wire-Wrap Kit

The Front Access Wire Wrap Kit (Figure 2-3) is intended for any SmartScanner application where front access is available to the unit. Wire wrap panel is one rack space, thus providing a two rack space footprint of the SmartScanner unit, making this kit ideal for CEV or rear access restricted installation.

The front access wire wrap kit (part number 533-T032) contains the parts listed in Table 2-21.

Table 2-21 Front Access Wire Wrap Kit Components

Part number	Quantity	Description
510-T001	1	Wire Wrap Panel
977-T046	1	TB1 Cable (A)
977-T047	1	Serial Cable (B)
977-T048	2	Discrete Cables (C&D)
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 2-16.

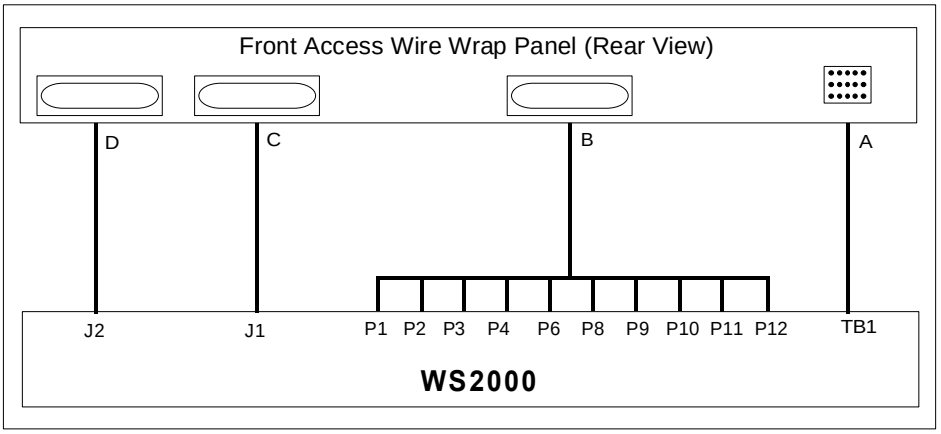

Figure 2-16 SmartScanner Front Access Wire Wrap Panel Connections

Table 2-22 through 2-19 list the pin outs for each of the connections between the SmartScanner and the front panel access wire wrap kit.

Table 2-22 Analog/Power/Auxiliary Host Port Connections with Front Wire Wrap Panel Connector A

From Wire-Wrap Conn A Pin No	To WS2000 TB1 PinNo	Wire Color	Function
1	TB1-3	Red	(+) Battery Ground
2	TB1-1	Black	(ï) Battery Input
3	TB1-13	Green	Frame Ground
A1	TB1-10	Orange	202T Modem Tx Tip
A2	TB1-8	White	202T Modem Tx Ring
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	202T Modem Rx Tip
D2	TB1-12	Blue	202T Modem Rx Ring
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

Table 2-22 Analog/Power/Auxiliary Host Port Connections with Front Wire Wrap Panel Connector A

From Wire-Wrap Conn A Pin No	To WS2000 TB1 PinNo	Wire Color	Function
D6	TB1-11	Blue/Black	External COS Reset

Table 2-23 Serial Port Connections for Front Wire Wrap Panel

Pin	Function	Pin	Function	Pin	Function	Pin	Function
A7	CH 2 Txï (RS-422)	**B7**	CH 2 Tx+ (RS-422)	**C7**	CH 6 Txï (RS-422)	**D7**	CH 6 Tx+ (RS-422)
A8	CH 2 Rxï (RS-422)	**B8**	CH 2 Rx+ (RS-422)	**C8**	CH 6 Rxï (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 Txï (RS-422)	**B10**	CH 3 Tx+ (RS-422)	**C10**	CH 7 Txï (RS-422)	**D10**	CH 7 Tx+ (RS-422)
A11	CH 3 Rxï (RS-422)	**B11**	CH 3 Rx+ (RS-422)	**C11**	CH 7 Rxï (RS-422)	**D11**	CH 7 Rx+ (RS-422)
A12	CH 4 Txï (RS-422)	**B12**	CH 4 Tx+ (RS-422)	**C12**	CH 8 Txï (RS-422)	**D12**	CH 8 Tx+ (RS-422)
A13	CH 4 Rxï (RS-422)	**B13**	CH 4 Rx+ (RS-422)	**C13**	CH 8 Rxï (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 Txï (RS-422)	**B15**	CH 5 Tx+ (RS-422)	**C15**	CH 9 Txï (RS-422)	**D15**	CH 9 Tx+ (RS-422)

Table 2-23 Serial Port Connections for Front Wire Wrap Panel

Pin	Function	Pin	Function	Pin	Function	Pin	Function
A16	CH 5 Rxï (RS-422)	**B16**	CH 5 Rx+ (RS-422)	**C16**	CH 9 Rxï (RS-422)	**D16**	CH 9 Rx+ (RS-422)
A17	CH 1 Txï (RS-422)	**B17**	CH 1 Tx+ (RS-422)	**C17**	CH 1 Tx (RS-232)	**D17**	CH 1 RTS (RS-232)
A18	CH 1 Rxï (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 2-24 J1 Discrete Input/Output Connections for Front Wire Wrap Panel

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/Alarm 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

Table 2-24 J1 Discrete Input/Output Connections for Front Wire Wrap Panel

Pin	Function	Pin	Function	Pin	Function	Pin	Function
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 2-25 J2 Discrete Input/Output Connections for Front Wire Wrap Panel

Pin	Function	Pin	Function	Pin	Function	Pin	Function
A40	Control Output 9	**B40**	Control Output 9 Return	**C40**	Control Output 10	**D40**	Control Output 10 Return
A41	Control Output 11	**B41**	Control Output 11 Return	**C41**	Control Output 12	**D41**	Control Output 12 Return
A42	Control Output 13	**B42**	Control Output 13 Return	**C42**	Control Output 14	**D42**	Control Output 14 Return
A43	Control Output 15	**B43**	Control Output 15 Return	**C43**	Control Output 16	**D43**	Control Output 16 Return
A44	Status/Alarm Input 33	**B44**	Status Input 33 Return	**C44**	Status Input 34	**D44**	Status Input 32 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

Table 2-25 J2 Discrete Input/Output Connections for Front Wire Wrap Panel

Pin	Function	Pin	Function	Pin	Function	Pin	Function
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 57	**B51**	Status/Alarm Input 57 Return	**C51**	Status/Alarm Input 48	**D51**	Status/Alarm Input 48 Return
A52	Status/Alarm Input 49	**B52**	Status/Alarm Input 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 Return	**C54**	Status/Alarm Input 54	**D54**	Status/Alarm Input 54 Return
A55	Status/Alarm Input 55	**B55**	Status/Alarm Input 55 Return	**C55**	Status/Alarm Input 56	**D55**	Status/Alarm Input 56
A56	Status/Alarm Input 57	**B56**	Status/Alarm Input 57 Return	**C56**	Status/Alarm Input 58	**D56**	Status/Alarm Input 58 Return
A57	Status/Alarm Input 59	**B57**	Status/Alarm Input 59 Return	**C57**	Status/Alarm Input 60	**D57**	Status/Alarm Input 60 Return
A58	Status/Alarm Input 61	**B58**	Status/Alarm Input 61 Return	**C58**	Status/Alarm Input 62	**D58**	Status/Alarm Input 62 Return
A59	Status/Alarm Input 63	**B59**	Status/Alarm Input 63 Return	**C59**	Status/Alarm Input 64	**D59**	Status/Alarm Input 64 Return

2.5.7 Rear Access Wire Wrap Kit

The Rear Access Wire Wrap Kit (Figure 2-17) is intended for any SmartScanner application where rear access is available to the unit. The wire wrap kit consists of 3 connectors that "snap" into the serial and discrete backplane connectors on the SmartScanner.

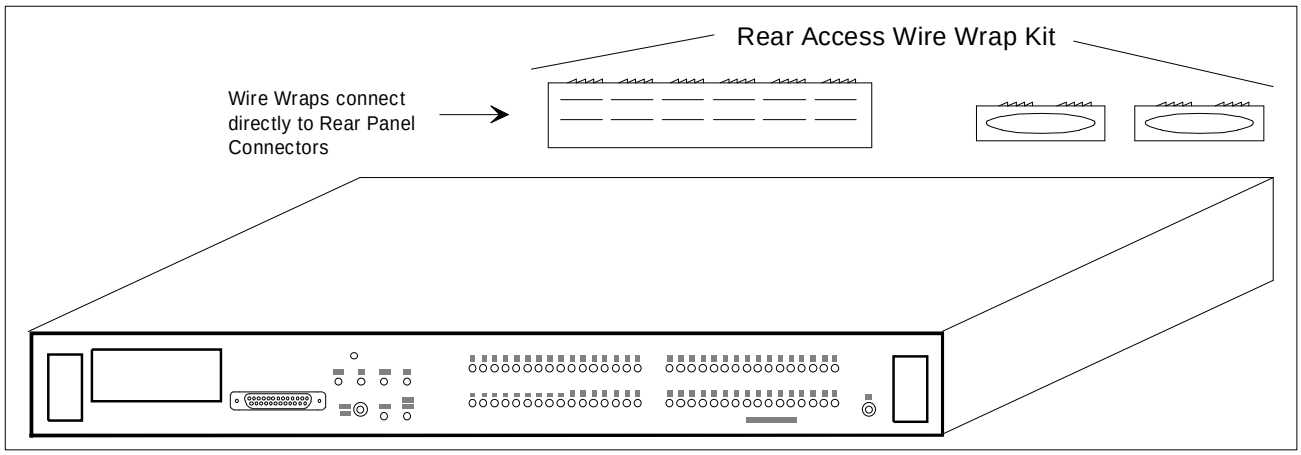

Figure 2-17 SmartScanner and Rear Access Wire Wrap Kit

The wire wrap kit preserves the one rack space footprint of the SmartScanner unit, making this kit ideal for CPE or cabinet installations. The discrete connectors snap onto J1 and J2, and provide alarm input pins and a single ground return pin. Control pins are available for Form A or Form C contacts. The Serial port board plugs onto the rear panel Methode connectors, and provides pins for

all serial input/output signals on the SmartScanner. It (part number 585-T034) contains the parts listed in Table 2-26.

Table 2-26 Rear Access Wire Wrap Kit Components

Part Number	Qty	Description
620-T030	2	50-Pin Wire Wrap Connectors
517-T003	1	Serial Termination Wire Wrap Board

Figure 2-18 shows the J1 and J2 connectors, and Figure 2-19 shows the serial connectors.

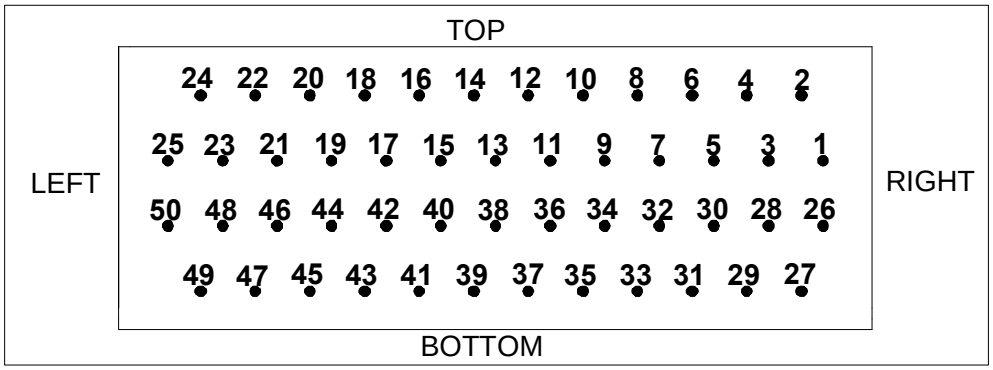

Figure 2-18 Rear Access Wire Wrap Panel Discrete Pin Locations

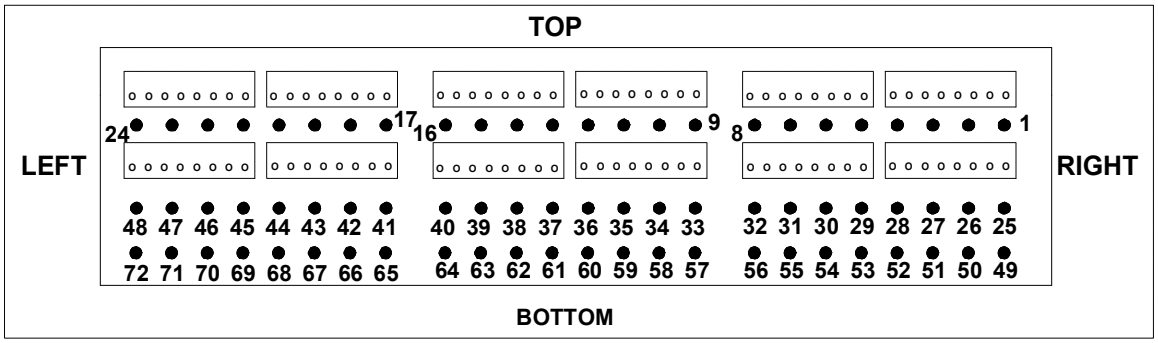

Figure 2-19 Rear Access Wire Wrap Panel Serial Pin Locations

Pin outs for the Rear Access Wire Wrap assemblies are listed in Tables 2-21 through 2-23.

Table 2-27 J1 Discrete Input/Output Connections for the Rear Access Wire Wrap Assembly

Function	Pin		Function
Control Relay 1 Form C ï NC	1	26	Control Relay 1 Form A/C ï NO
Control Relay 2 Form C ï NC	2	27	Control Relay 2 Form A/C ï NO
Control Relay 3 Form C ï NC	3	28	Control Relay 3 Form A/C ï NO
Control Relay 4 Form C ï NC	4	29	Control Relay 4 Form A/C ï NO
Control Relay 5 Form C ï NC	5	30	Control Relay 5 Form A/C ï NO
Control Relay 6 Form C ï NC	6	31	Control Relay 6 Form A/C ï NO
Control Relay 7 Form C ï NC	7	32	Control Relay 7 Form A/C ï NO
Control Relay 8 Form C ï NC	8	33	Control Relay 8 Form A/C ï 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

Table 2-27 J1 Discrete Input/Output Connections for the Rear Access Wire Wrap Assembly

Function	Pin		Function
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 J2 Discrete Input/Output Connections for the Rear Access Wire Wrap Assembly

Function	Pin		Function
Control Relay 9 Form C ï NC	1	26	Control Relay 9 Form A/C ï NO
Control Relay 10 Form C ï NC	2	27	Control Relay 10 Form A/C ï NO
Control Relay 11 Form C ï NC	3	28	Control Relay 11 Form A/C ï NO
Control Relay 12 Form C ï NC	4	29	Control Relay 12 Form A/C ï NO
Control Relay 13 Form C ï NC	5	30	Control Relay 13 Form A/C ï NO
Control Relay 14 Form C ï NC	6	31	Control Relay 14 Form A/C ï NO
Control Relay 15 Form C ï NC	7	32	Control Relay 15 Form A/C ï NO
Control Relay 16 Form C ï NC	8	33	Control Relay 16 Form A/C ï 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

Table 2-28 J2 Discrete Input/Output Connections for the Rear Access Wire Wrap Assembly

Function	Pin		Function
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

Table 2-29 Serial Port Connections for the Rear Access Wire Wrap Assembly

Pin	Function	Pin	Function	Pin	Function
1	CH4 RS-422 Tx+	25	CH7 RS-422 Tx+	49	CH6 RS-422 Tx+
2	CH4 RS-422 Txï	26	CH7 RS-422 Txï	50	CH6 RS-422 Txï
3	CH4 RS-422 Rx+	27	CH7 RS-422 Rx+	51	CH6 RS-422 Rx+
4	CH4 RS-422 Rxï /RS-232 Rx	28	CH7 RS-422 Rxï	52	CH6 RS-422 Rxï
5	CH4 Ground	29	CH9 RS-422 Tx+	53	CH8 RS-422 Tx+
6	CH4 RS-232 CTS	30	CH9 RS-422 Txï	54	CH8 RS-422 Txï
7	CH4 RS-232 RTS	31	CH9 RS-422 Rx+	55	CH8 RS-422 Rx+
8	CH4 RS-232 Tx	32	CH9 RS-422 Rxï	56	CH8 RS-422 Rxï
9	CH2 RS-422 Tx+	33	CH3 RS-422 Tx+	57	CH5 RS-422 Tx+
10	CH2 RS-422 Txï	34	CH3 RS-422 Txï	58	CH5 RS-422 Txï
11	CH2 RS-422 Rx+	35	CH3 RS-422 Rx+	59	CH5 RS-422 Rx+
12	CH2 RS-422 Rxï /RS-232 Rx	36	CH3 RS-422 Rxï /RS-232 Rx	60	CH5 RS-422 Rxï /RS-232 Rx
13	CH2 Ground	37	CH3 Ground	61	CH5 Ground
14	CH2 RS-232 CTS	38	CH3 RS-232 CTS	62	CH5 RS-232 CTS
15	CH2 RS-232 RTS	39	CH3 RS-232 RTS	63	CH5 RS-232 RTS

Table 2-29 Serial Port Connections for the Rear Access Wire Wrap Assembly

Pin	Function	Pin	Function	Pin	Function
16	CH2 RS-232 Tx	**40**	CH3 RS-232 Tx	**64**	CH5 RS-232 Tx
17	Wesmaint Time Input	**41**	CH1 RS-422 Tx Clock+	**65**	CH1 RS-422 Tx Clockï
18	Wesmaint +12V	**42**	CH1 RS-422 Rx Clock+	**66**	CH1 RS-422 Rx Clockï
19	Wesmaint +5V	**43**	CH1 RS-422 Tx+	**67**	CH1 RS-232 DCD
20	Wesmaint -12V	**44**	CH1 RS-422 Txï	**68**	CH1 RS-422 Rxï /RS-232 Rx
21	Wesmaint Ground	**45**	CH1 RS-422 Rx+	**69**	CH1 Ground
22	Wesmaint Program Enable	**46**	CH1 RS-422 Rxï	**70**	CH1 RS-232 CTS
23	Wesmaint RS-232 Rx	**47**	CH1 RS-422 RTS+	**71**	CH1 RS-232 RTS
24	Wesmaint RS-232 Tx	**48**	CH1 RS-422 RTSï	**72**	CH1 RS-232 Tx

2.5.8 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 TBOS SmartScanner 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.

2.6 Ancillary Equipment Strapping & Cabling

The following paragraphs describe the required strapping and cabling for equipment external to the WS2000.

2.6.1 Discrete Expanders

Each WS2000 Remote can control up to 7 WS2000 Discrete Expanders over a parallel Peripheral Interface Bus (WPIB). Each WS2000 Discrete Expander has a minimum of 32 discrete alarm status inputs and 8 discrete control outputs. They can each be further expanded with a 32 input/8 output daughter board, providing a maximum of 64 discrete inputs and 16 discrete control outputs per Expander. Each Discrete Expander and the WS2000 are identified by a separate WPIB address. Refer to paragraph 2.4.3.3 for the address designations. The Discrete Expanders are connected to SmartScanner via P7 on the backplane of each unit. Discrete Expander cables are available from Westronic as follows:

963-0003	2 Connectors (WS2000 and 1 Discrete Expander)
962-0004	3 Connectors (WS2000 and 2 Discrete Expanders)
962-0005	4 Connectors (WS2000 and 3 Discrete Expanders)
962-0006	5 Connectors (WS2000 and 4 Discrete Expanders)
962-0007	6 Connectors (WS2000 and 5 Discrete Expanders)
962-0012	7 Connectors (WS2000 and 6 Discrete Expanders)
962-0013	8 Connectors (WS2000 and 7 Discrete Expanders)

Table 2-30 Westronic Peripheral Interface Bus (WPIB) P7

Function	Pin		Function
ï 12 Vdc	1	18	AO0
+12 Vdc	2	19	0 Vdc
+5 Vdc	3	20	AO4
+V1 (Control Relay Coil Voltage)	4	21	AO3
I/O RST	5	22	AO2
ID	6	23	AO7
STB	7	24	AO6
DI1	8	25	AO5
DI0	9	26	DO1
ï	10	27	DO0
DI4	11	28	0 Vdc
DI3	12	29	DO4
DI2	13	30	DO3
DI7	14	31	DO2
DI6	15	32	DO7

Table 2-30 Westronic Peripheral Interface Bus (WPIB) P7

Function	Pin		Function
DI5	16	33	DO6
AO1	17	34	DO5

2.6.2 Rack Mount Wesmaint

Rear Panel connector P5 is used to connect the WS2000 to a Rack Mount Wesmaint. It also is used to provide power supply voltages (±12Vdc) to a Rack Mount Modem. If both a Rack Mount Modem and Wesmaint are to be connected, a special cable (Westronic P/N 977-0032) is required. Complete details about the Wesmaint function are located in Section 4.

Table 2-31 WESMAINT Channel Connector P5 Pinout

Pin	Function
1	Tx (RS-232)
2	Rx (RS-232)
3	Not Used
4	Common (+ Battery)
5	ï 12 Vdc
6	+5 Vdc
7	+12 Vdc
8	Not Used

2.6.3 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) 202T/CCITT V.23 modem (P/N 520-T001) and 2) VFCT modem (P/N 540-T001). They each require only 1 vertical space (1x") 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.

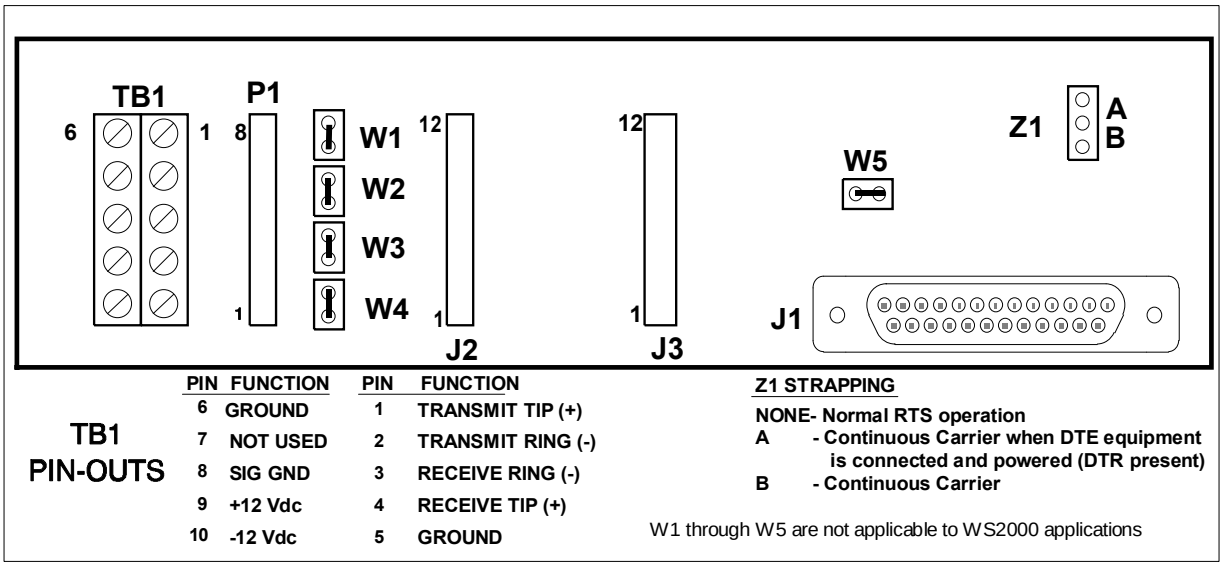

Figure 2-20 Rack Mount Modem Strapping

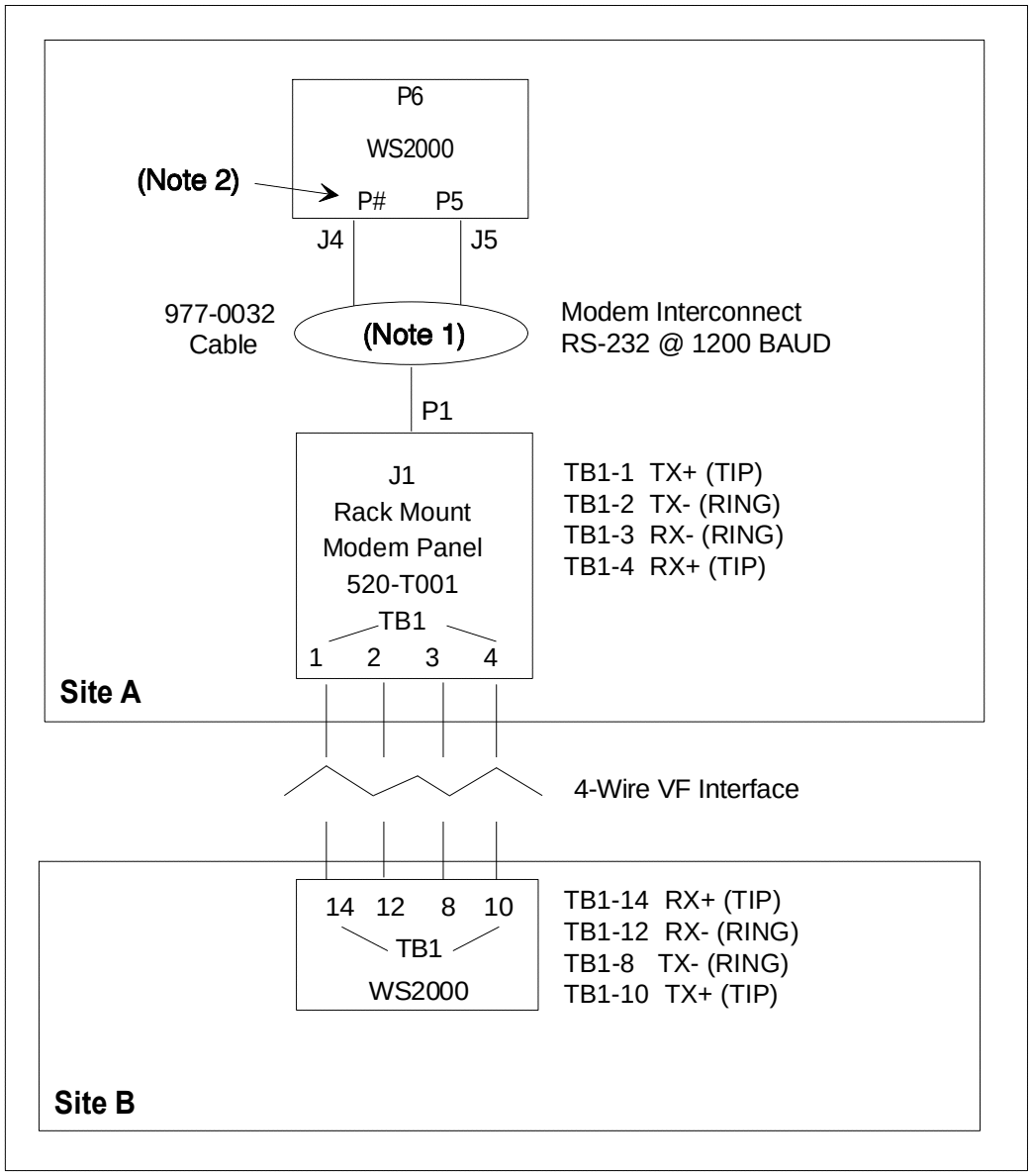
P6
WS2000
(Note 2)
P#
P5
J4
J5
977-0032
Cable
(Note 1)
Modem Interconnect
RS-232 @ 1200 BAUD
P1
J1
Rack Mount
Modem Panel
520-T001
TB1
1 2 3 4
TB1-1 TX+ (TIP)
TB1-2 TX- (RING)
TB1-3 RX- (RING)
TB1-4 RX+ (TIP)
Site A
4-Wire VF Interface
14 12 8 10
TB1
WS2000
TB1-14 RX+ (TIP)
TB1-12 RX- (RING)
TB1-8 TX- (RING)
TB1-10 TX+ (TIP)
Site B

Figure 2-21 Rack Mount Modem Interconnection Diagram

Notes:

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

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 (P/N is 977-T055) is available that connects power and data for both.

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 2-32.

Table 2-32 Rack Mount Modem Panel Connections

Modem Connector J1

Pin	Function
1	N/A
2	Transmit In
3	Receive Out
4	Request to Send (RTS)
5	Clear to Send (CTS)
6	Data Set Ready (DSR)
7	Common
8	Data Carrier Detect (DCD)
9	+12 Vdc
10	ï 12 Vdc
11	+12 Vdc
13	ï 12 Vdc
20	Data Terminal Ready (DTR)
22	Ring Indicator (RI)

2.6.4 External Audible/Visual Alarm Panel

The WESTRONIC External Audible/Visual Alarm Panel can be connected to the COS relay outputs located on TB1 to provide both audible and visual standing alarm summary indications. The external alarm panel is equipped with an audible annunciator, audible alarm disable toggle switch, ACO button and alarm summary LED. P5 IN receives power from P5 on the rear of the WS2000. P5 OUT passes the information on P5 out, so it may be used by other equipment, for example, a PC WESMAINT. Figure 2-22 shows the front and rear panels, and Table 2-27 defines the TB1 and P5 connections.

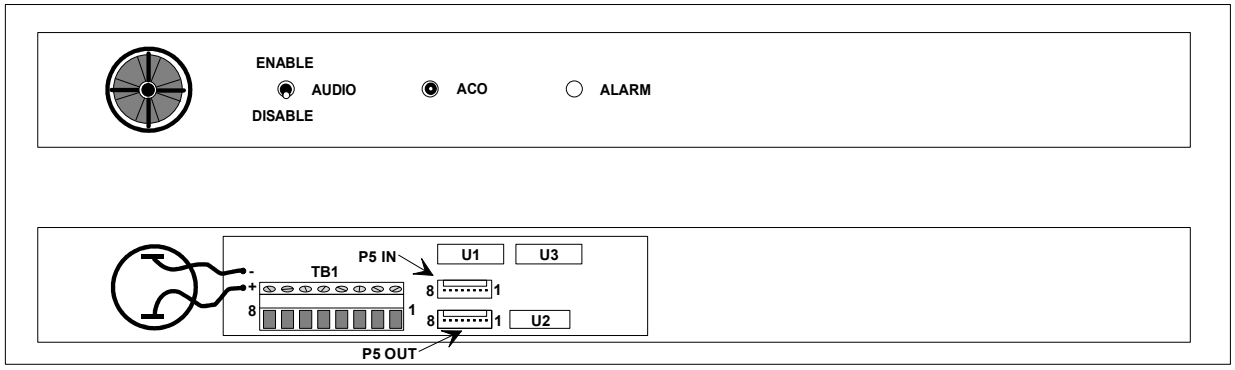

Figure 2-22 External Audible Alarm Panel

Table 2-33 Audible/Visual Alarm Panel Pinouts

WS2000 TB1	P5IN/P5 OUT

Pin	Function	Pin	Function
1	Audio Com	1	Tx
2	Audio Normally Closed	2	Rx
3	Audio Normally Open	3	Prog En
4	LED Com	4	Com
5	LED Normally Closed	5	ï 12 Vdc
6	LED Normally Open	6	+5 Vdc
7	COS Common	7	+12 Vdc
8	COS Normally Open	8	N/A

2.7 Powering the Unit

2.7.1 Without Discrete Expanders

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 Remote 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 2-28 for fusing requirements.

Power-up the WS2000 TBOS SmartScanner 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 Remote. 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 TBOS SMARTSCANNER 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. Refer to paragraph 4.1. 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 Remote has no password control at initial installation and turn-up time. If a password is required for the installed unit, refer to Section 4.

Table 2-34 Fusing Requirements

No of	–48 Vdc	–24 Vdc

Discrete Expanders	GMT	Type 70	GMT	Type 70
0	3/4 A	3/4 A	1 1/3 A	1 1/3 A
1	1 1/3 A	1 1/3 A	2 A	2 A
2	2 A	2 A	2 1/2 A	2 A
3	2 1/2 A	2 A	3 A	3 A
4	3 A	3 A	3 1/2 A	5 A
5	3 1/2 A	5 A	4 A	5 A
6	4 A	5 A	5 A	5 A
7	5 A	5 A	5 A	5 A

2.7.2 With Discrete Expanders

2.7.2.1 Unit Turn-Up

If the Remote has Discrete Expander Units connected to it, and the Discrete Expander Units share the same power source and fuse as the Remote, remove the WPIB cable connector, P7, from the Remote's backplane. Pull all the Discrete Expander plug-ins out from their shelves about 1" from the backplane. If the Remote has Discrete Expander Units connected to it, and the Discrete Expander Units use a different power source and fuse from the Remote, remove the WPIB cable connector, P7, from the Remote's backplane. The Discrete Expander plug-ins need not be removed.

2.7.2.2 Discrete Expander Turn-Up

Power down the Remote and reconnect the WPIB cable to the connector on the Remote. 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 outlined in paragraph 2.7.1. To verify the Discrete Expander units are communicating properly with the Remote, connect the WESMAINT to the Remote and perform the following steps:

1. Configure the Remote. Refer to Section 3.3

2. Configure the discrete points of each Discrete Expander to a chosen host output display number. Refer to Section 4.3.2.2 to perform display assignments for the Discrete Expanders.

3. Put the Remote unit in Normal Mode. Refer to Section 4.3.2.1.

Activate several latching controls on each discrete expander (Section 4.3.1.5). 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 Remote and the Discrete Expander unit(s).

2.8 Installation Check List

Use the following check list when installing the WS2000 hardware:

7. Mount the unit
8. Verify default strapping:
    - Main board
    - Modem board
    - Discrete I/O daughter board
9. Cable the unit
    - Verify serial port connections (DTE/DCE or DTE/DTE)
    - Verify discrete connections

The unit is now ready to be configured for software. Refer to Section 3 for configuration information and Section 4 for WESMAINT reference material.

Section 3: Configuration

3.1 Overview

This section contains configuration information for the WS2000. It is composed of three major parts:

- An overview of the configuration process
- A methodology for organizing configuration parameters
- A detailed set of instructions for configuring a WS2000

The WS2000 comes from the factory with a default configuration.

The WS2000 allows operation centers to monitor and control diverse groups of transmission and switching equipment by converting the serial and discrete information to a format which is understood by the center. Before the WS2000 can perform this conversion, it must be informed (configured) about the characteristics of the equipment which it is interfacing with.

The first part of Section 3 discusses each parameter which must be configured. These parameters include:

- The physical characteristics and communications rate of each serial interface: RS-232, RS-422, RS-485.
- Mapping Alarm and Control information from remote equipment to the format used by the operations center.
- Other attributes that affect how alarm/status information is to be reported to the operations center.

3.2 Configuration Overview

This section provides an overview of the elements that compose 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.

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 can 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.

3.3 Serial Interfaces

Communications between the monitored equipment, the WS2000, and the operations center is accomplished via a serial interface. A serial interface can be described as a physical connection which is used to transport information. The rules which govern the transport of the information are called a protocol.

Each WS2000 is equipped with 10 serial Channels, 4 of which (channels 6 - 9) are optional.

3.3.1 Physical Connections

The WS2000 supports three types of physical connections for serial interfaces: RS-232, RS-422 (point-to-point physical interfaces), and RS-485 (multi-point interface). Serial channels 1 through 5 support all three types of physical level interfaces. Channels 6 through 9 support RS-422 only. Channel 10 (Craft interface) is RS-232 only. Refer to Section 1 for more information on the interface characteristics of each channel.

3.3.2 Handshaking

Serial channels 1 through 5 on the WS2000 provide the RTS handshaking signal when operated in RS-232 mode. Serial channel 1 also provides an RS-422 RTS signal. When channel 2 through 5 are operated in RS-232 mode, RTS is asserted 10-20 milliseconds before data transmission begins, and is de-asserted after the data transmission has completed. When operating in RS-422 mode, the RTS signal is asserted on power up and is never de-asserted. Some channels provide pins for CTS and DCD handshake signals, however these signals are not used by the WS2000. Refer to Section 1 for detailed information on the interface parameters of each channel.

3.3.3 Communication Rates

Each serial interface communicates at a configurable speed of 1200 or 2400 bps.

Channel 10 is used to interface with the Wesmaint and PC-Wesmaint for configuration and local monitoring of the WS2000. Channel 10's configuration parameters are fixed and cannot be altered.

Wesmaint functions are described in detail in Chapter 4 of this document. Refer to Section 1 for specific information on channel interface parameters.

3.3.4 Protocols

The WS2000 uses TBOS protocol to transfer serial information to and from monitored equipment, as well as with the operations center. TBOS is discussed briefly in this document, but is defined in AT&T Compatibility Bulletin 149 (CB149). CB149 is available from AT&T.

3.3.4.1 TBOS Protocol Organization

The Telemetry Byte Oriented Serial (TBOS) protocol is a master/slave protocol. During communications with monitored equipment, the WS2000 acts as the master, and the monitored equipment acts as the slave. When communicating with the host, the WS2000 acts as the slave, and the host is the master. Under the rules for TBOS, the master issues a poll or command character to the slave. The master will wait up to 200ms for a response character from the slave.

3.3.4.2 Displays

The master scans the slave for Scan Point data, and commands the slave to operate Control Points. The fundamental 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 (512 points) per serial port.

3.3.4.3 Characters

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.

3.3.4.4 Scan List

A Scan List is used by the WS2000 to control the polling of Characters in a Display. When all of the Scan Points in a Display are active, the Scan List is set up so that all Characters are polled. If one or more Characters in a Display are not active, the Scan List can be set up so that the inactive Characters are never polled. By polling only the active Characters in each Display, the WS2000 can process the Display more efficiently. A Scan List can also be used to disable Scan Character (consisting of 8 scan points) processing for newly installed, but untested equipment.

Note: To insure proper operation of the TBOS protocol, it is necessary to poll at least two characters on a given TBOS serial channel.

3.3.4.5 TBOS Commands and Responses

TBOS messages sent by the master are of two types; 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. In addition, each command request identifies the type of control (latch, unlatch, or momentary).

3.3.5 Display Mapping

As described earlier, the WS2000 TBOS SmartScanner can report up to 8 displays (64 points each) of alarm and status information to the operations center and can also accept control commands for up to 8 displays. These 8 displays are addressed and understood by the operations center and must be mapped (translated) to the displays which are used by the monitored equipment connected to the WS2000 using TBOS or discrete interfaces.

Displays numbers which are understood by the operations center are referred to as ***output displays***. Display numbers which correspond to the monitored equipment are referred to as ***input displays.***

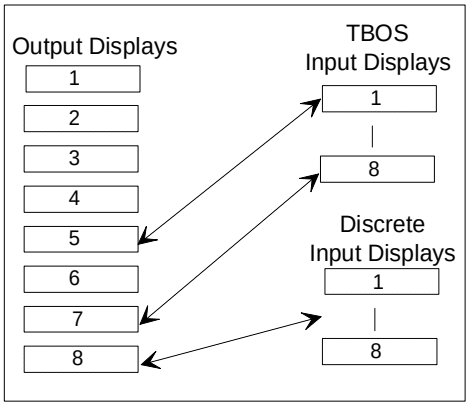

Figure 3-1 Alarm Status and Control Point Mapping

When one of the output displays is mapped, it is assigned to either a specific input display on one of the serial channels or to a specific group of 64 discrete inputs on the main board, or one of the expander units. When a serial port is configured as a TBOS port, it can support up to 8 displays of information, numbered 1 though 8.

The WS2000 allows an alarm planner to select any 8 input displays from any combination of these sources and map each of those displays to output displays 1-8, to be reported to the operations center.

When a display is mapped, both the scan points and the control points associated with that display are mapped identically. It is not possible to map the scan points for a specific display separately from the control points.

3.4 Configuration Templates

It is useful to plan the configuration setup before configuring the WS2000. The following configuration templates provide a method of defining serial Channel characteristics, custom Process Lists, and verifying Input to Output Display mappings. They are intended to be copied and used to organize and document your configuration.

Once the configuration templates have been completed, they can be used as a guide during WS2000 installation and programming.

Three configuration templates are provided:

- Serial Channel Configuration
- Display Configuration
- Process List Configuration

Note: Appendix B shows default configuration templates and the attributes of the pre-defined process lists.

3.4.1 Serial Channel Configuration Template

The Serial Channel Configuration Template is shown in Appendix A. To configure a WS2000 serial channel, the following information must be defined:

- The interface type of the channel. The interface type can be RS-232 (point-to-point), RS-422 (point-to-point) or RS-485 (multi-point).

- The communications rate of the channel (1200 or 2400 bps).

The serial channel configuration template provides a row for each of the configurable serial channels of the WS2000. Each row has a column to define each of the types of information described previously.

3.4.2 Display Configuration Template

The Display Configuration Template is shown in Appendix A. To configure a WS2000 display, the following information must be defined:

- The physical source of the data to be stored in the display, either a serial channel number (channel 2-9) or the WPIB address for a block of discrete data points. Refer to Section 2 for details on WPIB addresses.
- The input display for data being gathered from serial channels.
- The number of a Process List that defines the desired attributes for the data points within the display. Refer to Appendix B for pre-defined Process Lists.
- A list of the Characters within the display which should be scanned and reported. For example, scan characters 1 and 2 in Display #5 will only scan/report scan points 1 through 16 on Display #5.

The output display configuration template provides a row for each of the output displays reportable by the WS2000. Each row has a column to define each of the types of information described above.

When the source of the data to be stored in the display is a serial Channel, ignore the column for the Discrete WPIB Address. Similarly, when the source of the data to be stored in the display is a block of discrete data points, ignore the columns for the Channel number and Input Display number.

Note: When a TBOS port fails to retrieve data for any of its assigned displays, the first 63 scan points of the display will be set to 0 while the 64th point is set to a 1. It is therefore recommended that point 64 on any display being assigned to a serial port be classified as a bipolar alarm to facilitate the detection of the failure by the operations center.

3.4.3 Process List Configuration Template

The Process List Configuration Template is shown in Appendix A. To configure a WS2000 Process List, a list number must be selected and some combination of data point attributes must be assigned to each data point in the Display. Possible attributes for each data point are:

Bipolar	Classifying a data point as a bipolar alarm will cause the point to be reported as a change when it goes from high to low as well as from low to high. The change-of-state (COS) indicator will be illuminated on both transitions. Bipolar has no meaning for points which are not also classified as alarms.
Invert	Invert the state of the data before processing.
Memory	Latch any change of state until it is reported.

Alarm	Classifying a data point as an alarm point, as opposed to a status point will cause it to be reported as a change when it goes from a low to a high state. The COS indicator on the front panel of the WS2000 will also illuminate when the data point goes from a low to a high state.
Status	Scan point which is not classified as an alarm point and is not reported in response to a change request.

The Process List configuration template provides a row for defining the number of the proposed Process List and a space for each point in the display. Each entry in the Process List configuration template should be filled out to indicate which attributes apply to the corresponding point. A summary section is included on the form so the Process List configuration can be identified.

It is recommended that the first letter of each attribute be used to specify that attribute for each point. (**Note:** Status is represented by a blank space and is used only by itself.) It is further recommended that the attributes be listed in the order in which they appear on the Wesmaint display to facilitate entry and verification of the configuration.

The process list attributes are always listed by the Wesmaint display in the following order: **B A M I,** where

B = Bipolar

A = Alarm

M = Memory

I = Inverted

This attribute list indicates that the corresponding point is a bipolar alarm with memory and is inverted before it is processed.

3.5 WS2000 Step-by-Step Configuration

This section delineates the step-by-step procedures for configuring a WS2000 TBOS using the WESMAINT terminal. It is assumed that the reader is familiar with the material presented in the Configuration Overview and Configuration Templates sections.

3.5.1 Configuring the Serial Channels

Configuration begins with defining the physical characteristics and protocols for the serial channels. During configuration, verify that the RS-422/RS-485 straps, located on the rear of the WS2000, are correct. Refer to the Installation section for details on strapping and cabling options for serial ports.

- Enter CONFIG MODE. For details on entering CONFIG MODE, refer to the WESMAINT Operating Mode section of the WESMAINT Reference, located elsewhere in this guide.
- For each serial channel to be configured:

  10. Select the Serial Channel Interface function. For details on the operation of this function, refer to the Serial Channel Interface section of the WESMAINT Reference.

11. Select a serial channel.
12. View the interface type of the selected channel (RS-232, RS-422, RS-485). Change the interface type if necessary.
13. View the communications rate of the selected channel (1200 or 2400 bps). Change the rate if necessary.

3.5.2 Configuring the Process Lists

The WS2000 is provided with many pre-defined process lists. Appendix B shows all pre-defined lists. If none of the pre-defined lists provide a set of scan point attributes which match the requirements of the displays to be reported, new lists can be built from scratch, or by modifying an existing list.

Enter CONFIG MODE. For details on entering CONFIG MODE, refer to the WESMAINT Operating Mode section of the WESMAINT Reference.

Select the Configure Lists function. For details on the operation of this function, refer to the Configure Process Attribute Lists section of the WESMAINT Reference.

When generating a new Process Attribute List, select either the CREATE LIST, DUPLICATE LIST, or MODIFY LIST function. If the new Process List closely resembles an existing list, the fastest way to configure it may be via the duplicate and modify functions. If the new list bears little resemblance to an existing list, the fastest way to configure it may be via the create function.

When changing an existing list, use either the DELETE LIST, CREATE LIST or MODIFY LIST function. The choice will depend upon how different the existing list is from the new list. If the number of changes that need to be made is small, then the fastest way to configure the list may be via the MODIFY LIST function. If a large number of changes need to be made, it may be faster to delete the existing list and start fresh, via the CREATE LIST function. If the attributes in the new Process List are identical for many of the Scan Points, configuration is faster if the AUTO PROPAGATE feature is turned on. The Auto Propagate function takes the attribute(s) assigned to the first Scan Point and "copies" the attribute(s) to the remaining Scan Points in the Process List.

3.5.3 Configuring the Displays

Now that the serial ports and process lists are prepared, you are ready to map and configure the output displays. (**Note:** The Output Displays are defined as those which are reported to the Operations Center. The Input Displays are those from the monitored equipment.) Output displays must be mapped to an input serial channel or a block of discretes. When an display is mapped to a serial channel, the display must also be mapped to an input display. Once mapped, a process list can be assigned to the display and a character scan list can be defined for the display.

- Enter CONFIG MODE. For details on entering CONFIG MODE, refer to the WESMAINT Operating Mode section of the WESMAINT Reference.
- Select the Configure Display function. For details on the operation of this function, refer to the Configure Display section of the WESMAINT Reference.
- Select each output display to be configured using the arrow keys or the Point (PT) key.

14. If the source of data for this Display is a TBOS Input Display:

(a) Specify the serial channel (2-9) for this Display.

(b) Specify TBOS Input Display number (1-8) for this Display.

(c) Specify the Process List number for this Display.

(d) Specify the Scan Character List (1, 2, 3, 4, 5, 6, 7, 8) for this Display.

15. If the source of data for this Display is Discrete Input:
    (a) Specify channel as D for discretes for this display.
    (b) Specify the expander number (1-7, or 0 for main board).
    (c) Specify the Process List number for this Display.
    (d) Specify the Scan Character List for this Display.
16. If this Display is a spare, specify the Display as "spare" by entering channel number 0.

3.5.4 Verifying the New Configuration

- Enter NORMAL mode. For details on entering NORMAL mode, refer to the Wesmaint Operating Mode section of the Wesmaint Reference.
- Select the Serial Channel Interface function.
  17. Select each serial Channel that was configured.
  18. Verify the Interface Type of the selected Channel.
  19. Verify the Baud Rate of the selected Channel.
- Select the Configure Lists function.

20. Select each Process List that was configured.

21. Verify the Process List attributes via VIEW LIST function.

- Select the Configure Displays function.

22. Select each Output Display using the arrow keys or the Point (PT) key.

23. If the data source is a serial input:
    (a) Verify the TBOS serial Channel.
    (b) Verify the TBOS Input Display number.
    (c) Verify the Process List number.
    (d) Verify the Scan List number.

24. If the data source is discrete input:
    (a) Verify the expander number.
    (b) Verify the Process List number.
    (c) Verify the Scan List number.

3.6 Configuration Check List

Use the following check list when configuring the WS2000 TBOS monitoring unit.

25. Enter CONFIG mode
26. Configure serial channel interfaces
27. Configure Process Lists
28. Configure displays
29. Adjust modem transmit level (-10dB is default)
30. Enter NORMAL mode

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Section 4: Maintenance Interface

4.1 Interface Hardware

The WS2000 Maintenance Unit, the WESMAINT, is a multi-functional local display that provides user interface with the WS2000. It is available in either a rack mount or portable version. 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 which is connected to JB3 or P5 on the WS2000.

In addition to the rack mount and portable WESMAINT, Westronic offers a PC-WESMAINT Software Package which 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. In the absence of a WESMAINT or PC-WESMAINT, configuration can be accomplished via a VT100 terminal using equivalent ASCII characters.

4.2 Cabling

If the rack mount WESMAINT unit is used, connect it to P5 on the rear of the WS2000. Westronic recommends connecting the portable WESMAINT Unit, PC-WESMAINT, or VT100 terminal to JB3, the DB25 connector on the front of the WS2000. A PC or VT100 terminal can be connected to P5 using the terminations shown in Table 4-1.

When using a rack mount WESMAINT connected to P5, install a termination plug (jumpering pins 18 and 25) on JB3. This plug is available from Westronic, P/N 977-T042.

Note: Install this plug only AFTER power has been applied, and remove it BEFORE power is removed.

The WESMAINT Unit or VT100 should display menu choices when the Command (CMD) and Display (DSPY) keys are pressed. This indicates that the WS2000 is operating properly and is ready to be configured according to the site requirements. If nothing appears on the screen or the message **"EEPROM CORRUPT"** appears, a memory problem has occurred. Figure 2-17 and Table 2-20 identify the individual pins on JB3.

Table 4-1 PC/VT100 Maintenance Connections

PC/VT100 (9-Pin DTE)	**JB3** (25-Pin DCE)	**P5** (8-Pin DTE)
Pin 3 (Tx)	Pin 2 (Tx)	Pin 2 (Rx)
Pin 2 (Rx)	Pin 3 (Rx)	Pin 1 (Tx)
Pin 5 (Common)	Pin 4 (Common)	Pin 4 (Common)
Jumper 7 to 8, 4 to 6 (PC only)	Jumper 18 to 25	No Jumpers Required

4.3 Selecting a WESMAINT 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 ï to view data
- Command ï 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.

4.3.1 WESMAINT Unit Key Layout

Figure 4-1 is an illustration of the WESMAINT panel and its key pads.

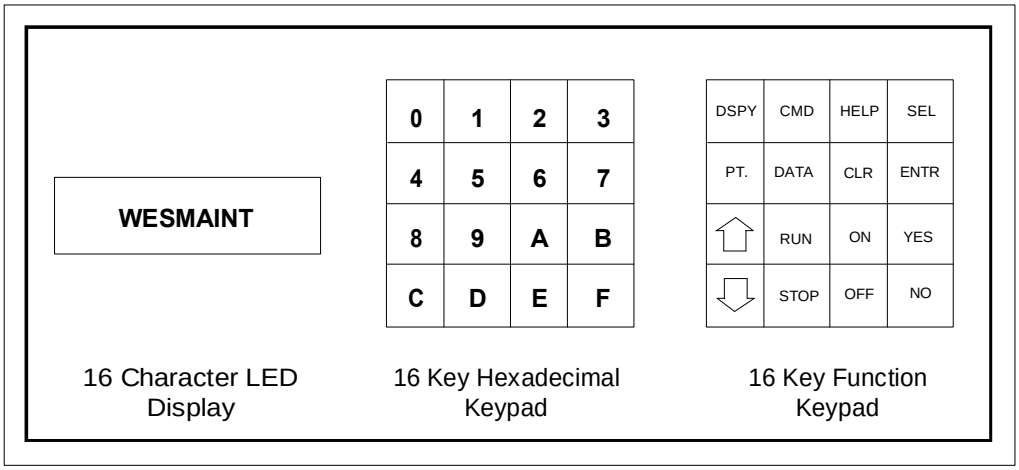

Figure 4-1 WS2000 Maintenance Unit

4.3.2 ASCII Terminal Key Layout

Table 4-2 provides an ASCII cross reference of the WESMAINT function keys if a VT100 terminal is being used instead of a WESMAINT.

Table 4-2 WESMAINT ASCII Terminal Functional Equivalency

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.

The WS2000's Tx/Rx characters consist of one start bit, seven data bits, even parity, and one stop bit at a baud rate of 9600.

Caution: If using a PC, the arrow key may cause a "?" prompt to appear on the screen at which point the WS2000 appears to lock up. The question mark prompt is a mode on the WS2000 that allows a PC ASCII file to be loaded into the EEPROM. To get out of the question mark prompt "lock up", perform the following steps:

31. @
32. Carriage Return
33. @

These steps should bring back the Version Number or WESMAINT Mode menu.

4.3.3 Operator Prompts

When using the WESMAINT/VT100 to program a WS2000, the software will prompt the user for information. These operator prompts are explained in the following text.

4.3.3.1 Question Mark (?)

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

4.3.3.2 Numerical Input Prompt (^)

Certain functions require the input of numerical data from the operator. When the numerical input prompt (^) is displayed, key in the appropriate data using the hex keypad. After keying in the data, press the ENTR key to signal the end of data entry. If a mistake is made in entering data, and noticed before the ENTR key is pressed, the operator may press the CLR key to erase the data and start over. Pressing the ENTR key without entering any data is equivalent to entering the value 0.

4.4 Display Menu Functions

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.

For a discussion of how to use the various WESMAINT functions to configure a WS2000, refer to Section 3. More information about the WS2000 configuration elements such as Process Lists, Displays, and Channels, is included in the Overview of 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. For a discussion of NORMAL vs. CONFIG mode, see the section on the WESMAINT MODE function.

Table 4-3 shows the functions that are accessed from the DSPY menu, and Figure 4-2 the display menu hierarchy.

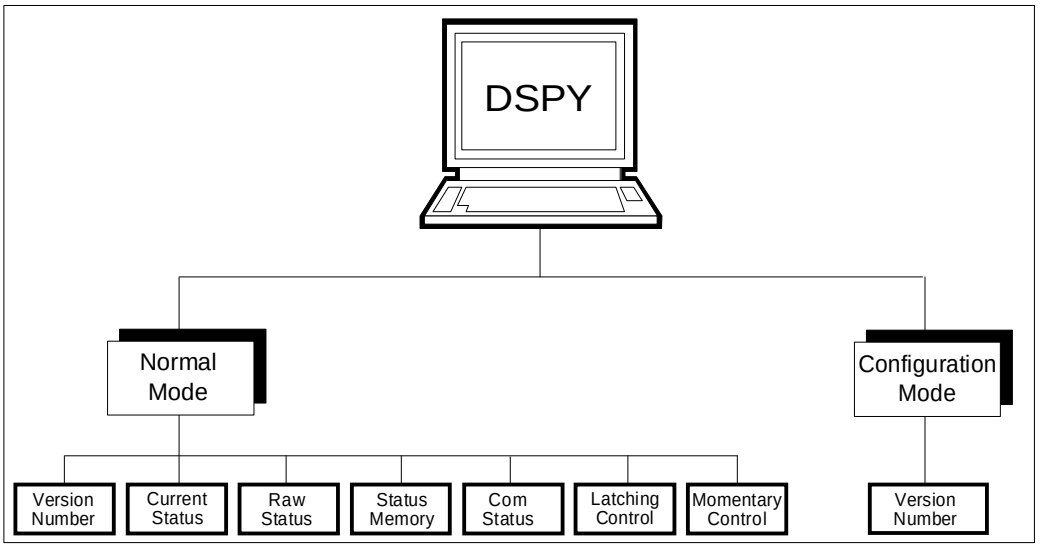

Figure 4-2 Display Menu Tree

Table 4-3 Display Menu Functions

Function Title	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
COM STATUS	View channel communication data
LATCHING CONTROL	Latch discrete or serial outputs
MOMENTARY CONTROL	Pulse discrete or serial outputs

4.4.1 Version Number (Software Load Identification)

This section describes how to view the current version of software in the WS2000 SmartScanner by using the WESMAINT.

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, CONFIG

Operation

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

Select the Function

– Press the DSPY key.

– Press the UP key until the function title "VERSION NUMBER" appears on the screen.

– Press the SEL key. The software version information will then scroll across the screen.

Exit the Function

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

4.4.2 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 (1-8)
yy = character number (1-8)
zzzzzzzz = data bit status

Note the data bits are shown from least significant bit (LSB) on the left to most significant bit (MSB) 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 have 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 mode 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

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

Exit the Function

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

Clear Status Memory Bits

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

4.4.3 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 (1-8)
yy = character number (1-8)
zzzzzzzz = data bit status

Note the data bits are shown from least significant bit (LSB) on the left to most significant bit (MSB) 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 mode 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

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

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

4.4.4 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 (1-8)
y = character number (1-8)
zzzzzzzz = data bit status

Note the data bits are shown from least significant bit (LSB) on the left to most significant bit (MSB) 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 mode 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

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

5. Press the DOWN key to view the previous character of the current output display or the last character in the previous output display.

6. Press the PT key to select a specific output display and character for viewing.
   - The WESMAINT screen will prompt with "DISPLAY=". Enter the desired output display number (1-8) on the hex keypad. Then press the ENTER key.
   - 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

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

4.4.5 Com Status (Communications Status)

The following describes how to view the communication status of incoming/outgoing alarm information. This menu provides information on each channel's data to indicate if data is being transmitted and received, and if frame, parity, overrun, or time-out errors are present.

Menu

DSPY

Purpose

To view the status of each channel 1-9 or 1-5 (depending on hardware).

Screen Format

The general format for the screen is:

CHxx aa bb c

where:

CH	=	Channel
xx	=	channel number 1-9
aa	=	transmit
bb	=	receive
c	=	frame, parity, overrun or time-out

Keys Used

The following keys are active while this function is selected:

- **UP:** Advance to the next channel
- **DOWN:** Back up to the previous channel
- **POINT (PT):** Select a specific channel
- **DATA:** Displays total number of bytes
- **CLEAR (CLR):** Returns error count to zero

Valid Modes

NORMAL mode only

Operation

The following steps are required to access the Communication Status menu.

Select the Function

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

Select Another Channel

4. Press the UP key to select the next channel.
5. Press the DOWN key to back up to the previous channel.

6. Press the PT key to select a specific channel. The WESMAINT screen will prompt with "CHANNEL=". Enter the desired channel number (1-9) on the hex keypad. Then press the ENTER key.

Exit the Function

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

View Total Count

8. Press the DATA key to view total number of transmitted bytes.
9. Press the DATA key again to view the total number of received bytes.
10. Press the DATA key again to view the total number of parity errors.
11. Press the DATA key again to view the total number of overrun errors.
12. Press the DATA key again to view the total number of frame errors.
13. Press the DATA key again to view the total number of time-out errors.

Reset to Zero

14. Press the CLR key to return count to zero.

4.4.6 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 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

where:

DSP	=	Display
xx	=	output display number (1-8)
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 mode 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

4. Press the UP key to select the next control point.

5. Press the DOWN key to back up to the previous control point.

6. Press the PT key to select a specific control point.
   - The WESMAINT screen will prompt with "DISPLAY=". Enter the desired output display number (1-8) on the hex keypad. Then press the ENTER key.
   - The WESMAINT screen will prompt with "POINT=". Enter the desired control point number (1-64) on the hex keypad. Then press the ENTER key.

Exit the Function

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

Operate the Selected Control Point

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

9. Press the OFF key to de-energize the control point.

4.4.7 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 (1-8)
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 mode 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

4. Press the UP key to select the next control point.
5. Press the DOWN key to back up to the previous control point.
6. Press the PT key to select a specific control point.
   - The WESMAINT screen will prompt with "DISPLAY=". Enter the desired output display number (1-8) on the hex keypad. Then press the ENTER key.
   - The WESMAINT screen will prompt with "POINT=". Enter the desired control point number (1-64) on the hex keypad. Then press the ENTER key.

Exit the Function

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

Operate the Selected Control Point

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

4.5 Command Menu Functions

Figure 4-3 shows the CMD menu hierarchy and identifies the functions that are accessed from it.

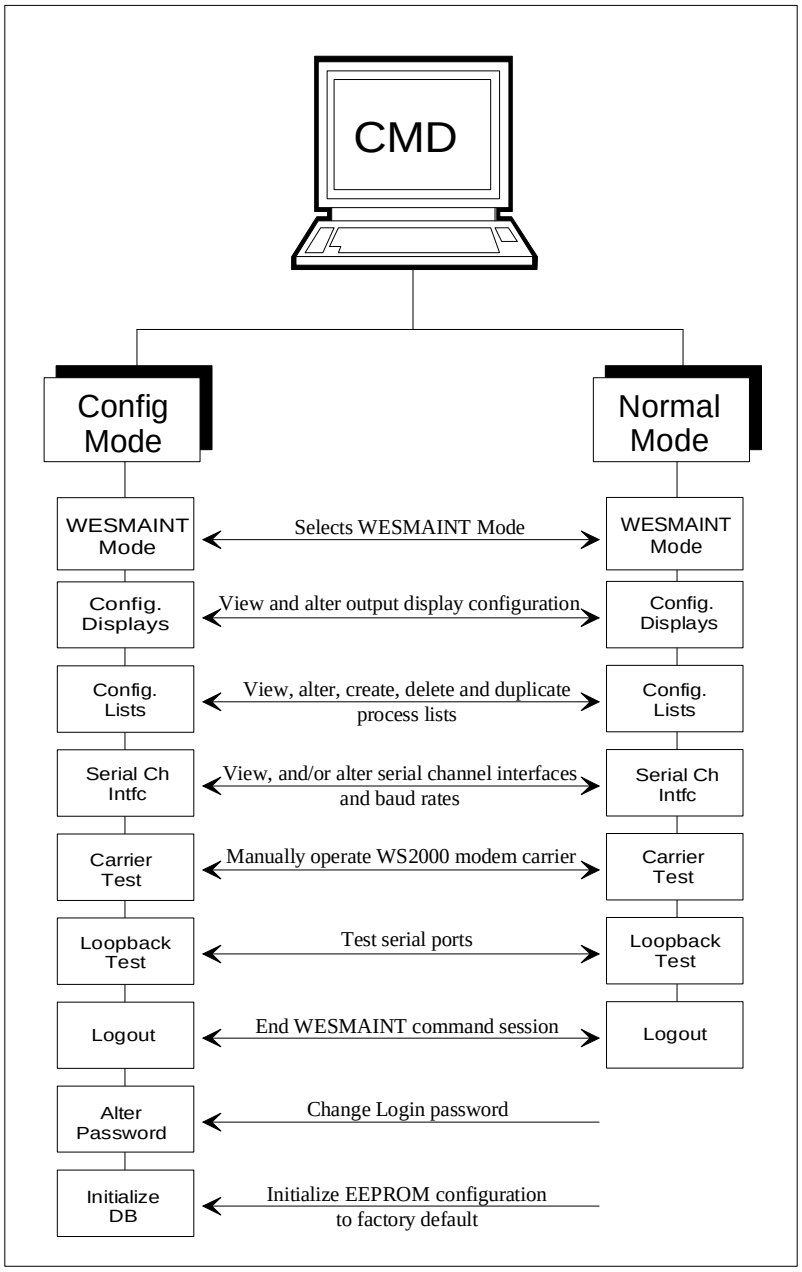

Figure 4-3 Command Menu Tree

4.5.1 WESMAINT Mode

The following describes how to change the WS2000 SmartScanner from a configuration mode for changing data to a normal mode of operation for processing information.

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, CONFIG

Operation

The following steps are required to alter the operating status of the WS2000 from a normal operating mode to a configuration mode.

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

4. 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

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

4.5.2 Config Displays (Configure Displays)

The following describes how to configure the output displays of the WS2000 SmartScanner. Figure 4-4 shows the screen hierarchy.

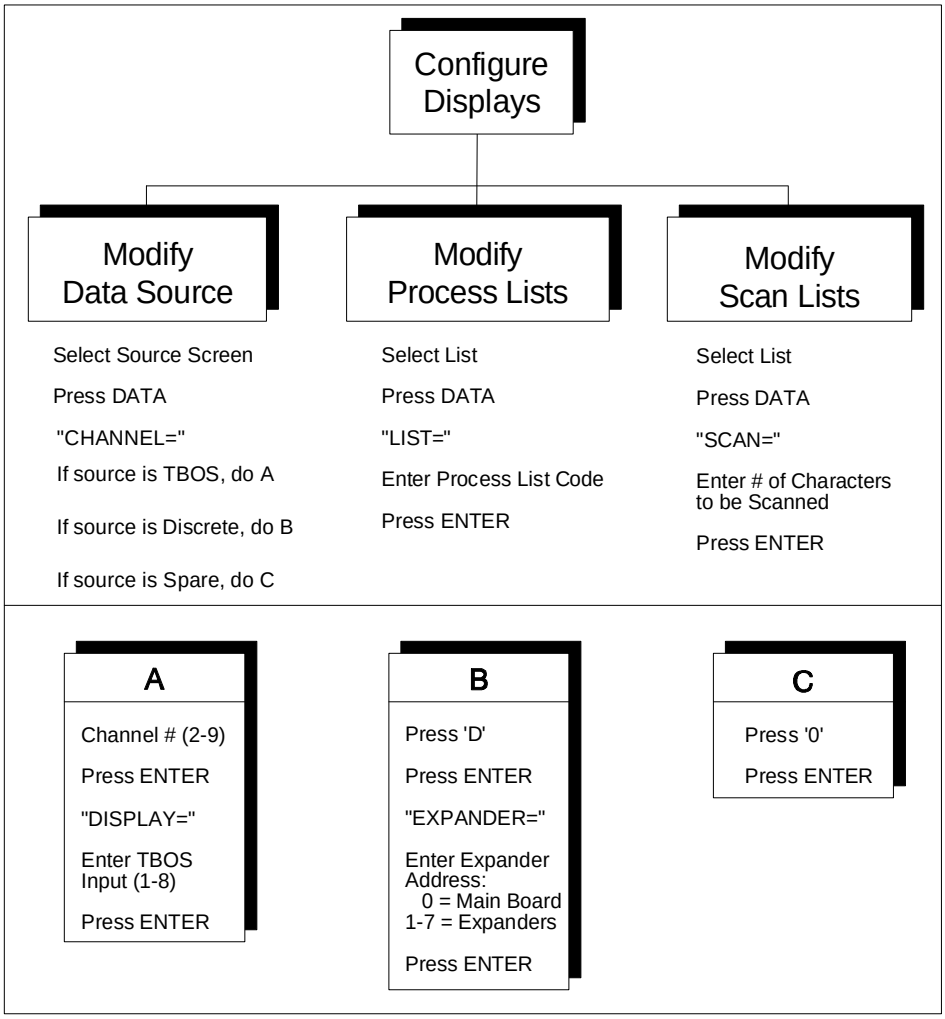

Figure 4-4 Configure Displays Menu Tree

Menu

CMD

Purpose

To view and/or change the output displays configuration.

Screen Format

Each display has three configurable components: the data SOURCE, the process LIST, and the SCAN list. Three separate screens are used to show this information.

4.5.2.1.1.... Source

4.5.2.1.1..... Serial

For displays where data originates from a serial port, the SOURCE screen will show the output TBOS display number, data collection port number, and the display number for the collected data.

Refer to Section 2 for the physical location of channels 2-9.

4.5.2.1.1..... Discretes

For output displays where data originates from the WS2000 discrete inputs, the SOURCE screen will show the expander address for the discrete inputs:

xx DISC WPyy

where:

xx	=	TBOS output display number (1-8)
DISC	=	Discrete
WP	=	WPIB
yy	=	WPIB address for inputs

4.5.2.1.1..... Spare

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

xx SPARE

4.5.2.1.1.... Process List

The Process LIST screen shows the selected process list number for the output display:

xx LIST yyyy

where:

xx	=	TBOS output display number (1-8)
LIST	=	List
yyyy	=	process list identifier number

A process list identifier of 0000 indicates no process list attributes have been selected and that the points in the display will be processed as "status without memory".

4.5.2.1.1.... Scan List

The SCAN list screen indicates which of the eight characters in each display are valid. Invalid characters will not be scanned by the WS2000, and the data bits will be constantly held at 0. The SCAN list screen shows the numbers of the valid characters:

xx SCAN zzzzzzzz

where:

xx = TBOS output display number (1-8)
SCAN = Scan List
zzzzzzzz = valid character number(s) (1-8), i.e., 1 2 3 4 5 6 7 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.

Valid Modes

CONFIG mode 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.
4. To exit this function, press the DSPY or CMD key.

Select Another Screen or Output Display

5. 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.
6. 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.
7. Press the PT key to select a specific output display. The WESMAINT screen will prompt "DISPLAY=". Enter the desired output display number (1-8) using the hex keypad. Then press the ENTER key.

Change the Data Source for a Display

8. Select the desired output display using the steps outlined above.
9. Press the DATA key. The WESMAINT screen will prompt "CHANNEL=". Execute one of the following procedures:

10. If the data source is to be an Input Display collected on a serial input, enter the channel number (2-9) using the hex keypad. Then press the ENTER key. Refer to Section 2 for the physical location of channels 2-9.

    The WESMAINT screen will then prompt for an input display number "DISPLAY=". Enter the desired display number (1-8) using the hex keypad. Then press the ENTER key.

    If the data source is to be DISCRETE inputs, press the "D" key on the hex keypad. Then press the ENTER key. The WESMAINT screen will then prompt "EXPANDER=". Enter the expander number of the discrete inputs using the hex keypad. Then press the ENTER key.

11. To configure the display as a SPARE, press the "0" key on the hex keypad. Then press the ENTER key.

Change the Process List

12. Select the LIST screen of the desired output display using the steps previously outlined.

13. Press the DATA key. The WESMAINT screen will prompt "LIST=".

14. Enter the Process List identifier code using the hex keypad. Then press the ENTER key.

15. 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, the CONFIGURE LISTS function is used.

Change the Scan List

16. Select the SCAN screen of the desired output display using the steps previously outlined.

17. Press the DATA key. The WESMAINT screen will prompt "SCAN=".

18. 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 ENTER key. To disable scanning of all characters in the display, press only the ENTER key.

4.5.3 Config Lists (Configure Process Attribute Lists)

This section describes how to view, create, modify, or delete configuration Process Lists in the WS2000. Figure 4-5 shows the screen hierarchy.

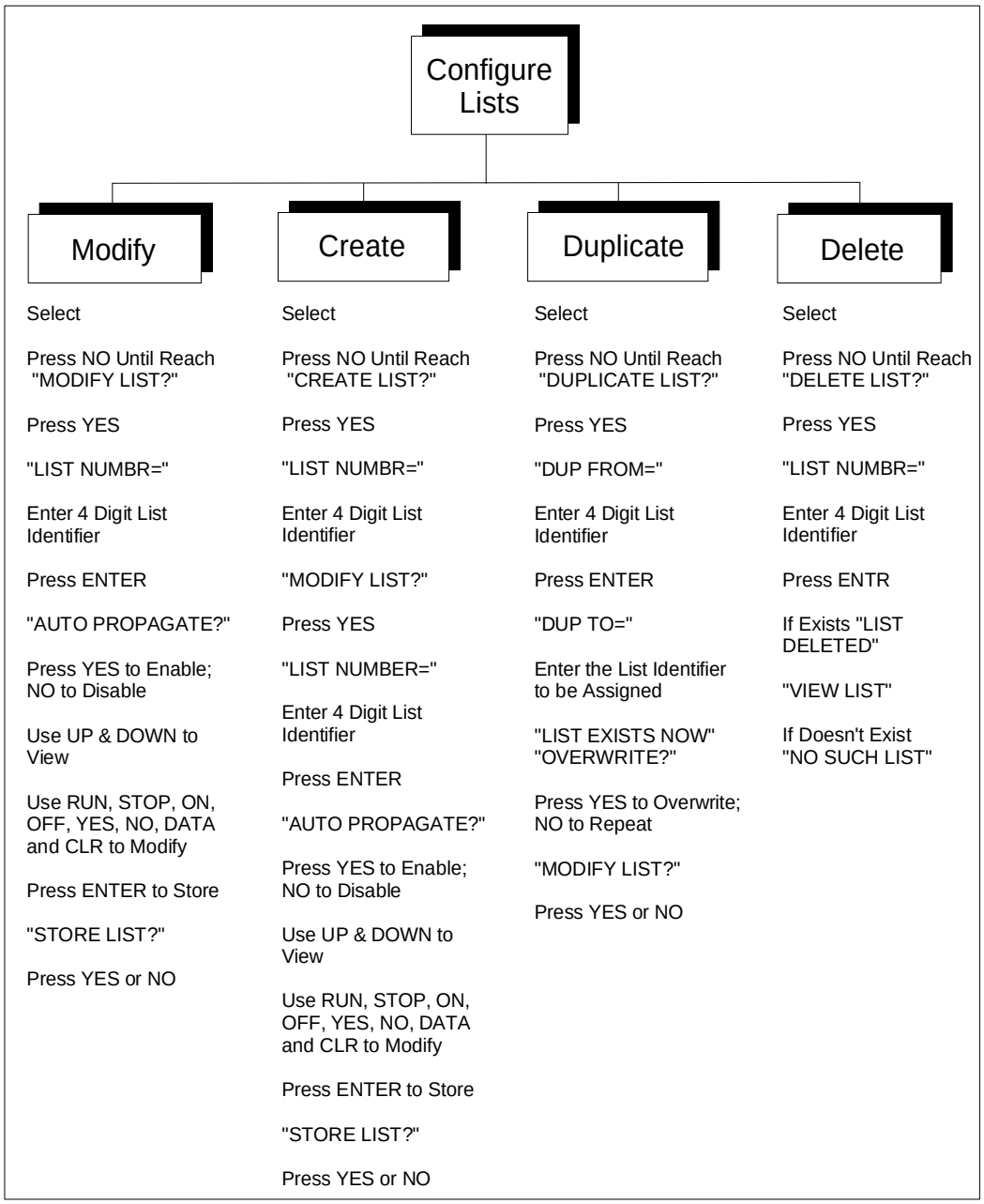

Figure 4-5 Configure Process Attribute Lists Menu Tree

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. They are:

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 mode, CONFIG mode
MODIFY Process List	CONFIG mode only
CREATE Process List	CONFIG mode only
DUPLICATE Process List	CONFIG mode only

DELETE Process List CONFIG mode 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.
4. 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.

5. Select the function using steps 1 ï 4.
6. The WESMAINT screen should show "VIEW LIST?". If not, press the NO key until it does. Then press the YES key.
7. 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.
8. Use the UP and DOWN keys to view the attributes of the points in the list.
9. Press the PT key to select a different list for viewing and follow the procedure from step 7.

Modify List Attributes

10. Select the function using steps 1 ï 4.
11. Press the NO key until the screen shows "MODIFY LIST?". Then press the YES key.
12. 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.
13. 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 affect the attributes of all subsequent (higher) points in the list.
14. Use the UP and DOWN keys to view the attributes of the points in the list.

15. 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.

16. 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

17. Select the function using steps 1 ï 4.

18. Press the NO key until the screen shows "CREATE LIST?". Then press the YES key.

19. 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.

20. 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.

21. 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 operations.

22. 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

23. Select the function using steps 1 ï 4.

24. Press the NO key until the screen shows "DUPLICATE LIST?" Then press the ENTER key.

25. 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.

26. If the list specified in step 3 does not exist, the screen will briefly show "NO SUCH LIST". Repeat step 3 above.

27. 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.

28. If the list specified in step 5 already exists, then the screen will show "LIST EXISTS NOW" followed by the prompt "OVERWRITE?". Press the YES key to overwrite the existing list or the NO key to repeat step 5.

29. If the list specified in step 5 does not exist already, it will be created using the attributes from the list specified in step 3. The screen will then prompt "MODIFY LIST?". Press the YES key to enter the MODIFY mode or the NO key to select another operation.

30. If after step 6 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

31. Select the function using steps 1 ï 4.

32. Press the NO key until the screen shows "DELETE LIST?" Then press the YES key.

33. 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.

34. If the entered list exists, the screen will briefly show "LIST DELETED", followed by the prompt "VIEW LIST?".

35. If the list specified in step 3 does not exist, the screen will briefly show "NO SUCH LIST". Repeat step 3.

4.5.4 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. Figure 4-6 shows the screen hierarchy.

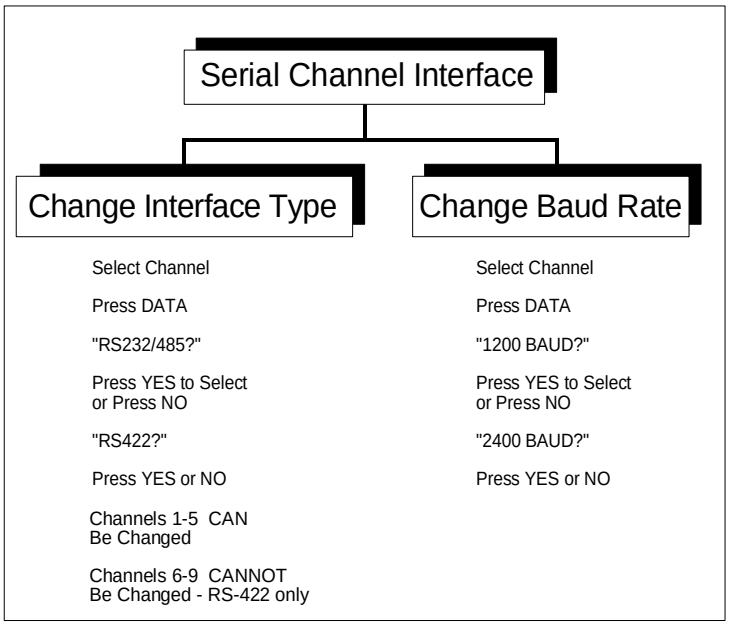

Figure 4-6 Configure Serial Channels and Baud Rates Menu Tree

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 = pppp

where:

CH	=	Channel
x	=	Channel number 1-9
pppp	=	TBOS (host or data collection port)

Note that Channel 1 is used to communicate with the Control Center, while Channels 2 through 9 are used to collect data via the TBOS Input Displays.

Note: When a channel's protocol is changed, all displays mapped to that channel are made spare.

The next screen format for this function displays the electrical interface specification. The format for the screen is as follows:

CHx = RSeeee

where:

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

The final screen for each channel displays the baud rate for that channel. The format for the screen is as follows:

CHx = yyyy BAUD

where:

CH	=	Channel
x	=	Channel number (1-9)
yyyy	=	1200 or 2400
BAUD	=	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, CONFIG
Modify data	CONFIG mode 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.
4. To exit this function, press the DSPY or CMD key.

View Serial Channel Configuration Data

5. After the SEL key is pressed, the function displays the protocol type of the current channel (Channel 1 - "TBOS").
6. Press the UP key to display the interface type of the current channel.

7. Press the UP key again to display the baud rate of the current channel.

8. Press the UP key again to make the next channel the current channel and to display its protocol type. Note that the channel numbers automatically "wrap" from 9 to 1.

9. Press the UP key again to display the interface type for the new current channel.

10. Press the UP key again to display the baud rate for the new current channel.

11. Repeat steps 7 through 10 to display the interface type and baud rate data for the other channels.

    The DOWN key works similarly to the up key. By pressing the DOWN key the previous display for the current channel is accessed 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 6 to view the baud rate of the selected channel.

Change Interface Type

13. Select the desired channel using the step 5 or 12. Make sure that the interface type is being displayed.

14. Press the DATA key. The WESMAINT screen will prompt "RS-232/485?".

15. Press the YES key to select RS-232/RS-485 interface.

16. Otherwise, press the NO key. The display will prompt "RS-422?".

17. Press the YES key to select RS-422 interface, or the NO key to re-display RS-232/485 prompt.
    Note: Channels 6-9 cannot be configured to the RS-232/485 interface.

Change Baud Rate

18. Select the desired channel using step 5 or 12. Make sure that the baud rate is being displayed.

19. Press the DATA key. The WESMAINT screen will prompt "1200 BAUD?".

20. Press the YES key to select 1200 BAUD.

21. Otherwise, press the NO key, and the display will prompt "2400 BAUD?".

22. Press the YES key to select 2400 BAUD or the NO key to re-display the 1200 baud prompt.

4.5.5 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, 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

4. Press the ON key to force the carrier ON.
5. Press the OFF key to force the carrier OFF (return to normal operation).

Exit the Function

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

4.5.6 Loop Back Test

The following describes how to do a loop back test on the input serial ports of the WS2000.

Menu

CMD

Purpose

To perform diagnostics on the serial ports. The serial port transmits a set of bytes and expects to receive the data back on the same serial port. The wiring for loop back connectors is indicated in Table 4-4.

Table 4-4 Wiring for RS-422 and RS-232 Loop Back Connectors

Pin	**RS-422** (Note 1)	**RS-232** (Note 2)
1	Not Used	Tx
2	Not Used	RTS
3	Not Used	CTS
4	Common	Common
5	Rxï	Rx
6	Rx+	DCD
7	Txï	Not Used
8	Tx+	Not Used

Notes:

34. To loop back an RS-422 connection, jumper pin 5 to pin 7 and jumper pin 6 to pin 8.

35. To loop back an RS-232 connection, jumper pin 1 to pin 5 and jumper pins 2 and 3 to pin 6.

Screen Format

The screen format for this function is:

CHxx Px Fx

where,

CH = Channel
xx = Channel number 2-9
Px = Pass x number of times
Fx = Fail x number of times

Keys Used

The following keys are active while this function is selected:

- **UP:** Advance to the next channel.
- **DOWN:** Backup to the previous channel.
- **ON:** Press to start the test.
- **OFF:** Press to stop the test.
- **CLEAR (CLR):** Resets the pass and fail counters.

Valid Modes

CONFIG only

Operation

Following connection of the appropriate wires on the serial port, the following steps are required to perform the loop back test.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "LOOP BACK TEST" appears on the screen.
3. Press the SEL key.

Select Channels

4. Press UP key to go to the next channel.
5. Press the DOWN key to go to the previous channel.
6. Press the PT key to select a specific channel. The WESMAINT screen will prompt with "CHANNEL=". Enter the desired Channel number using the hex keypad. Then press the ENTR key.

Run Loop Back Test

7. Connect the appropriate loop back connector to the serial channel.
8. Press the ON key to start the test. Either the pass or fail count will increment.
9. To turn off the test press the OFF key. The test will also be turned off if the UP or DOWN key is pressed, or the function is changed.
10. Pressing the CLR key resets the pass and fail counts to 0 without stopping the test.

Exit the Function

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

4.5.7 Logout

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. See also 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, CONFIG

Operation

The following steps should be performed to log out of the WS2000 when a password is used.

Select the Function

1. Press the CMD 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 DSP or the CMD key.

4.5.8 Change 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 and the prompt "PASSWORD" appears.
4. Answer the prompt with a four digit number, using any of the keys on the hex keypad (0-9, A-E).
5. Answer the prompt "CONFIRM:" by reentering the same four digit number.
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.
7. 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

8. 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), it will require the operator to login if passwords are enabled. If security is desired, the LOGOUT command must be used.

4.5.9 Initialize DB

This section describes steps required to initialize the WS2000 data base function. It resets the WS2000 data configuration back to the factory default.

Menu

CMD

Purpose

To reset the EEPROM data configuration back to the factory default.

Screen Format

The following function will be displayed:

"INITIALIZE DB"

Valid Modes

CONFIG only

Operation

The following steps explain how to activate the "Initialize DB" function.

Select the Function

1. Press the CMD key.
2. Press the UP key until the function title "INITIALIZE DB" appears on the screen.
3. Press the SEL key
4. Answer the prompt "ARE YOU SURE?" with YES or NO.
5. If YES was chosen "WRITING..." will appear on the screen. This will take 1 to 30 seconds.
6. "INITIALIZE DB " will appear on the screen.

Exit the Function

7. To exit this function, press the DSPY or CMD key.
   Note: Before making changes to the configuration, go to NORMAL mode (see WESMAINT MODE) to verify unit initialization. Return to the CONFIG mode to insert new configuration(s).

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