LAVERSAB

MODEL 2900

USER'S MANUAL

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REVISION HISTORY

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9065	12/15/2006	2900 User's Manual

WARNING

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THE 2900 USES LINE VOLTAGES FOR ITS OPERATION WHICH ARE POTENTIALLY DANGEROUS. IMPROPER OPERATION OF THIS EQUIPMENT MAY RESULT IN PERSONAL INJURY OR LOSS OF LIFE. HENCE THE EQUIPMENT DESCRIBED IN THIS MANUAL SHOULD BE OPERATED ONLY BY PERSONNEL TRAINED IN PROCEDURES THAT WILL ASSURE SAFETY TO THEMSELVES, TO OTHERS AND TO THE EQUIPMENT.

BEFORE PERFORMING ANY MAINTENANCE, TURN THE POWER OFF AND DISCONNECT THE POWER CORD FROM THE POWER SOURCE.

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SECTION 1

INTRODUCTION

The model 2900 Industrial computer is a PC-compatible computer that is specifically designed for use in hazardous locations that are classified as Class I Division 1, groups C and D. Typical applications include rig-floor monitoring and use in chemical plants. The rugged yet compact design of the 2900 makes it easy to install and remove off rig-floors and makes it suitable for use under all weather conditions. The 2900 is shown if Figure 1.1

Features:

- Celeron-M @ 600 MHz CPU
- 15.0" TFT Color Ultra-Hibrite sunlight readable display with 1024 x 768 resolution
- Auto-dimming of display brightness based on ambient light
- Intrinsically safe fully sealed keyboard and mouse, CSA C22.2 No. 157-92 certified for use in Class I division 1 locations Groups C and D, temp code T4
- 512 Mbyte System RAM
- 2.5" 40 Gbyte Hard drive
- 4 Gbyte solid state drive (optional)
- 110/220 VAC 50/60Hz nominal operating voltage
- Two RS232 serial ports, barrier protected (optional)
- One Ethernet port, barrier protected
- One external USB 1.1 port, barrier protected
- Internal heaters operating on 110/220 VAC allow operation between –20°C and +50°C
- Total weight of 45 lbs makes it easily portable
- Dimensions of 16.0" wide, 16.0" high and 5.0" deep provide a small form factor
- Explosion-proof sealed enclosure CSA C22.2 No. 30-M1986 certified for use in Class I Division 1 locations Groups C and D, Temp code T6.
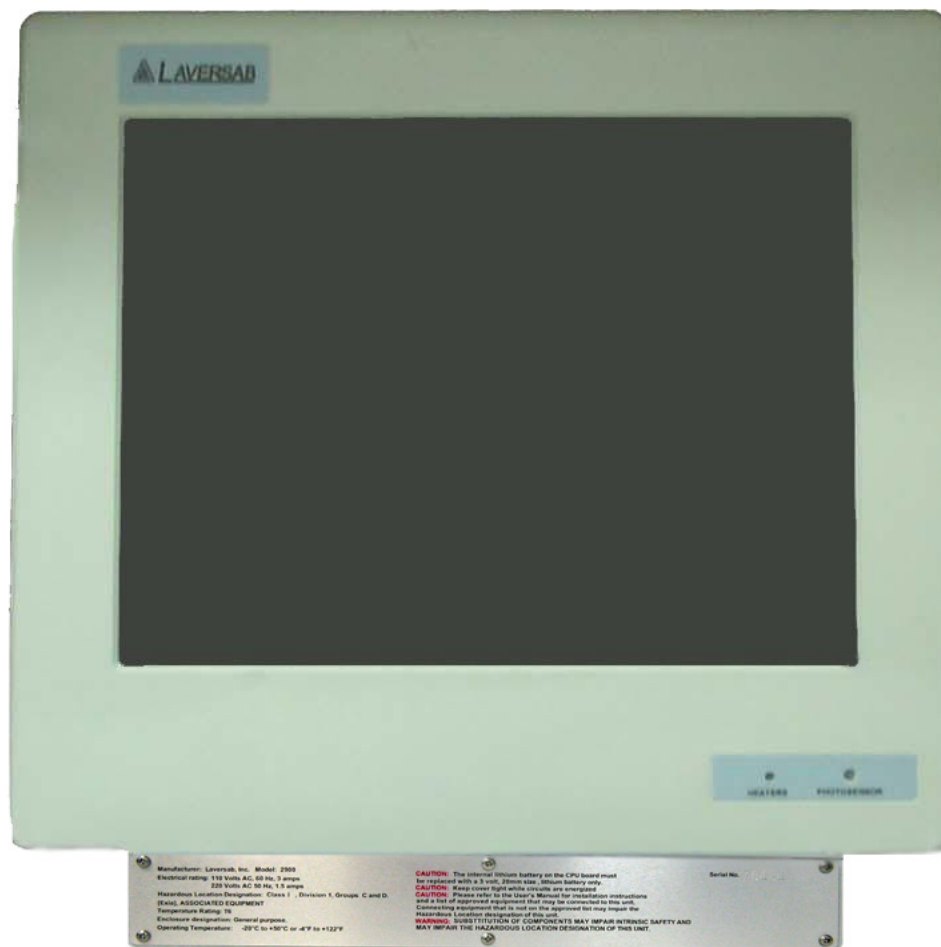
Figure 1.1

SECTION 2

SAFETY

The following safety instructions must be followed to prevent possible hazards of fire, electrical shock and bodily harm.

1. **WARNING :** The model 2900 must be connected to an appropriate power source, end user should provide a Class I division 1 Groups C and D rated connector with a 20mm thread mounting, it must be capable of withstand a minimum of 432 PSI burst pressure; power cable must be Class I division 1 approved, it is required to run two separate wires from the unit to the earth ground rod, one will be connected to the intrinsically safe ground while the other will be attached to the earth ground of the unit.

2. **WARNING:** The unit must never be opened or left open in a hazardous location. The rear panel must be completely fastened with a torque of 16 to 17 Ft-lb (21.7 to 23 Nm) measured at every bolt before the unit is introduced into a hazardous location.

3. **WARNING:** Do not install or operate this unit in an area where the temperature is outside the limits indicated on the information label of the unit.

4. **WARNING:** Only the provided KBM-IS keyboard/mouse assembly can be connected to the main unit, the use of any other device is strictly prohibited.

6. **WARNING:** All connections made to the unit must strictly adhere to the rules set forth in Section 3.3 of this manual.

7. **WARNING:** There are no user-serviceable components inside this unit. The unit must not be opened to repair or replace any components. If components are repaired or replaced by the user, the unit may no longer be suitable for use in hazardous locations and may become an explosion hazard.

8. **WARNING:** The Model 2900 is suitable for use in Class I Division 1 (Groups C and D) hazardous locations and non-hazardous locations only.

9. **CAUTION:** Do not cover or obstruct the slots and fins on the back heat sink in a manner that would restrict air flow between the slots or across the fins.

10. **CAUTION:** Do not install the unit in an unstable manner that could cause it to tip over.

11. **CAUTION:** Follow all instructions and warnings marked on the unit and also those included in this manual.

Approvals:

The Model 2900 conforms to the following standards:

        CSA C22.2 No 142-M1987

        CSA C22.2 No. 30-M1986

The Model KBM-IS keyboard/mouse module conforms to the following standards

        CSA C22.2 No 142-M1987

        CSA C22.2 No. 157-92

SECTION 3

INSTALLATION

The installation process consists of

     a.   Loading the application software onto the 2900
     b.   Mounting the 2900 on-site using an appropriate mounting bracket.
     c.   Making the connections to the 2900

3.1   Loading software

The 2900 is provided with a Windows operating system that is pre-installed with the network enabled. All software must be loaded through the network port on the rear panel of the unit. It is not necessary to open the unit to load the software.

If software modifications require that the unit be opened to have access to internal connectors, this must be done at the Laversab facility. If the unit is opened by the user then it may severely impair the hazardous location classification of the unit.

3.2   Mounting the 2900

A suitable mounting bracket may be fabricated by the user based on the user's mounting requirements. Figure 3.1 shows a suggested mounting bracket for mounting the 2900 on a pipe stand. The mounting bracket should be fastened to the four mounting studs provided on the rear panel of the unit. The studs are ¾ inch in length with a thread size of 5/16 – 18.

WARNING: The mounting bracket should not cover any of the markings and warnings on the rear panel of the 2900.

WARNING: The mounting bracket should not restrict air-flow between the fins of the back heat-sink.

CAUTION: The mounting bracket should not cover the photo-resistor lens on the front of the 2900.

Figure 3.1

3.3 Connections to the 2900

The 2900 requires the installation of a power connector prior to its use, this connector must be a Class I division 1 Groups C and D rated capable of withstand a minimum of 432 PSI of burst pressure, it should be mounted on the 20mm threaded opening and it must be tighten to a torque between 20 to 21 Ft-lb (27 to 28.5 Nm).

There is a significant difference on how connections may be made to the 2900 based on whether the location of use is hazardous or non-hazardous.

3.3.1 Non-hazardous locations

The unit is provided with two external cables.

1. "USB" adapter cable
2. "LAN" cable

WARNING: All the above cables are for use in **non-hazardous locations only**. Using these cables in hazardous locations may impair the hazardous location classification of the unit.

The LAN cable is terminated in a standard RJ-45 plug which must be connected to any 10/100 M-bit Ethernet LAN device that adheres to the IEEE 802.3 standard.

The USB cable is terminated in a standard USB-A socket which will accept any standard USB device; due to the safety barriers the USB can only support full speed standard (USB 1.1) and they are current limited, it is recommended to use externally powered devices when possible.

The drawings and pin-outs of these cables is provided in Appendix B.

There is a third connector to be used with the provided KBM-IS keyboard/mouse module.

WARNING: Only the provided KBM-IS keyboard/mouse module can be connected to the main unit, the use of any other device is strictly prohibited.

3.3.2 Hazardous locations

The user is required to provide all the external cables for use in hazardous locations. The cabling and connection methods and restrictions are detailed below. The Control Drawing for all connections to the 2900 is shown in Figure A-1.

1. Power cable:

WARNING: The power cord must be Class I Division 1 groups C and D rated, with a Class I Division 1 Groups C and D connector end, this connector will mate with the one installed in the unit, cable and connector must have minimum of four lines.

WARNING: It is required to have two separate lines going to the earth ground rod, one will be connected to the intrinsically safe ground while the second one will be attached to the unit's earth ground.

2. LAN cable

The pin-out for the LAN connector on the rear panel of the 2900 is provided in Appendix A. The mating connector is also listed in Appendix A.

WARNING: The LAN cable may only be terminated into a 10/100 M-bit Ethernet LAN device that adheres to the IEEE 802.3 standard and is barrier-protected by Laversab Model BP-1000 Barrier Module. The Control Drawing for this connection is shown in Figure A-1

A shielded CAT-5 cable may be used to provide this connection to the 2900. Although no special cable protection is required in a hazardous location, it is recommended that the LAN cable be run in the same rigid conduit used for the DC Power cable.

3. COM1, COM2

The pin-out for the COM1, COM2 connector on the rear panel of the 2900 is provided in Appendix A. The mating connector is also listed in Appendix A.

WARNING: The COM1, COM2 cable may only be terminated into a connection that adheres to the EIA RS-232C standard and is barrier protected by the Laversab Model BP-1000 Barrier Module.   The Control Drawing for this connection is shown in Figure A-1.

WARNING: Do not connect or disconnect the COM1, COM2 connector when the circuits are energized.

SECTION 4

TYPICAL USE

After the 2900 has been installed per the instructions provided in Section 3 of this manual, the unit may be turned ON for operation, the 2900 does not provide an On/Off switch or any other way of removing power to the unit, the end user should make any provisions for a remote switch in the safe area.

If the ambient temperature is below 5oC then the 2900 may not boot up immediately. The internal heaters and fans will start operating and attempt to bring the temperature inside the 2900 above 5oC. While this process is on-going, there will be a signal send to the front LED to indicate that the heaters are operating. The heaters may operate for up to 30 minutes before the internal temperature rises above 5oC, at which point the computer section of the 2900 will boot up, as the unit keeps warming the heaters may go off and after a period of time turn back on, this is completely normal and expected to happen in very cold environments.

When the computer section of the 2900 is starting to boot up, the backlight on the display will turn on and the display will be completely white for a period of about 2 to 5 seconds. Thereafter, the boot-up screen will be displayed and normal operation will start, the display's backlight are design to deliver a very high intensity, they are therefore controlled to provide only the necessary amount of light needed according to the environmental conditions, this is achieved through a photo-resistor installed at the front of the unit, this photo-resistor must be kept un-obstructed and clean during normal operation.

The 2900 comes with preloaded O.S., during normal use the application software will communicate through the LAN and/or the Serial ports and show the necessary information on the display. The keyboard and the mouse on the provided KBM-IS module are the only input devices used.

The mouse on the KBM-IS is configured such that the circular button in the center is the cursor movement button, and the two buttons on either side of it are the left and right click keys. The circular button is pressure sensitive. The harder it is pressed, the faster is the cursor movement.

WARNING: Only the provided KBM-IS keyboard/mouse module can be connected to the main unit, the use of any other device is strictly prohibited.

WARNING: During normal operation the user must not alter any of the connections to the 2900, including the KBM-IS connection. Before altering (connecting or disconnecting) any connection,the unit must be turned OFF so that all internal circuits are de-energized. Failure to do so may create an explosion hazard.

SECTION 5

REMOVAL

While removing (de-installing) the 2900 from normal operation, follow the sequence shown below:

WARNING: Do not disconnect ANY connectors while circuits are energized.

1. Turn OFF the AC POWER going to the 2900.
2. Turn OFF the devices in the non-hazardous area that provide the LAN and RS232 interfaces to the 2900.
3. Disconnect the AC POWER INPUT connector from the 2900
4. Disconnect the LAN connector
5. Disconnect the COM1, COM2.
6. Remove the 2900 from its mounting stand and move it out of the hazardous location.

WARNING: Not following the above sequence may induce an explosion hazard

SECTION 6

MAINTENANCE & SERVICING

6.1   MAINTENANCE

The only regular maintenance required on the 2900 is:

a. Clean the display protective Lexan with water or any commercial window cleaner, using a clean, soft, lint-free cloth. Care must be taken not to scratch the screen protective Lexan during the cleaning process. Do not use any abrasive substance, or any organic solvents.

b. Clean the photo-resistor lens in the same manner as described in 'a.' above.

c. Clean the back heat-sink to remove all dirt and foreign objects that may be stuck between the fins of the heat-sink.

WARNING: Do NOT pressure-wash the 2900.

6.2   SERVICING

CAUTION: Risk of explosion if battery is replaced by an incorrect type. Dispose off used batteries in the prescribed manner.

WARNING: Substitution of components is strictly prohibited

WARNING: The Model 2900 does not contain any user-serviceable or user-replaceable components. The 2900 must not be opened by the user in an attempt to repair or service the unit. Doing so may severely impair the hazardous location classification of the unit. All repairs and servicing of the unit can only be performed at the Laversab facility.

APPENDIX A

EXTERNAL CONNECTIONS IN HAZARDOUS LOCATIONS

The external connectors, pin-outs and connection details shown below reference the Control Drawing shown in Figure A-1. Connectors picture shown in Figure A2.

"A" : USB Connector on 2900

Connector type :   ITT Cannon KPT02A8-4S

Mating connector **"J"** :   ITT Cannon   KPT06J8-4P

Pin-out:

Pin #	Signal
A	D-
B	D+
C	GND
D	+5V

"B" : LAN Connector on 2900

Connector type :   ITT Cannon KPT02A12-8S

Mating connector **"K"** :   ITT Cannon   KPT08B12-8P

Pin-out:

Pin #	Signal
A	TD+
B	TD-
C	RD-
D	RD+
E	N.C.
F	N.C.
G	N.C.
H	N.C.

"C" : COM1, COM2 Connector on 2900

Connector type :   ITT Cannon KPT02A14-19S

Mating connector **"L"** :   ITT Cannon   KPT06J14-19P

Pin-out:

Pin #	Signal
A	RX (COM2)
B	N.C.
C	N.C.
D	N.C.
E	N.C.
F	N.C.
G	RX (COM1)
H	TX (COM1)
J	GND (COM1)
K	N.C.
L	N.C.
M	N.C.
N	TX (COM2)
P	GND (COM2)
R	N.C.
S	N.C.
T	N.C.
U	N.C.
V	N.C.

"D" : Keyboard/mouse Connector on 2900 (Reference only)

Connector type :   ITT Cannon KPT02A12-10S

Mating connector :   **ONLY THE PROVIDED KBM-IS CAN BE CONNECTED.**

Pin-out:

Pin #	Signal
A	CLK (KBD)
B	DATA (KBD)
C	GND (KBD)
D	+5 volts (KBD)
E	CLK (MOUSE)
F	DATA (MOUSE)
G	N.C.
H	I.S. GND
J	N.C.
K	N.C.

"E" : USB connectors in non-hazardous location

Connector type :   Standard USB-A socket

Mating connector :   Standard USB-A plug.

Pin-out:

Pin #	Signal
1	+5V
2	D-
3	D+
4	GND

"F,G" : RS232 connectors in non-hazardous location

Connector type :   Standard DB-9 male

Mating connector :   Standard DB-9 female

Pin-out:

Pin #	Signal
1	N.C.
2	RX
3	TX
4	N.C.
5	GND
6	N.C.
7	N.C.
8	N.C.
9	N.C.

"H" : LAN connector in non-hazardous location

Connector type :   Standard RJ-45 plug

Mating connector : Standard RJ-45 socket

Pin-out:

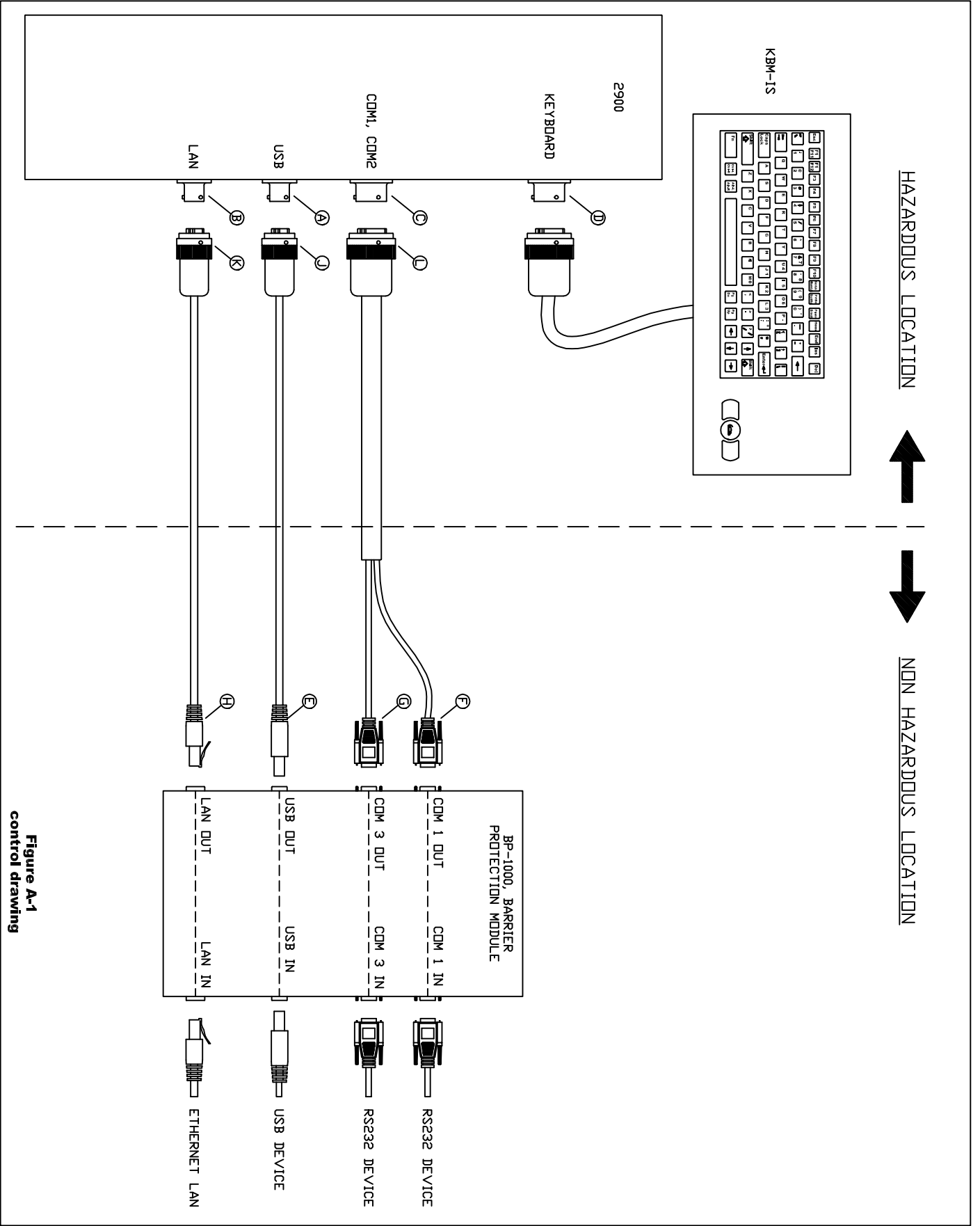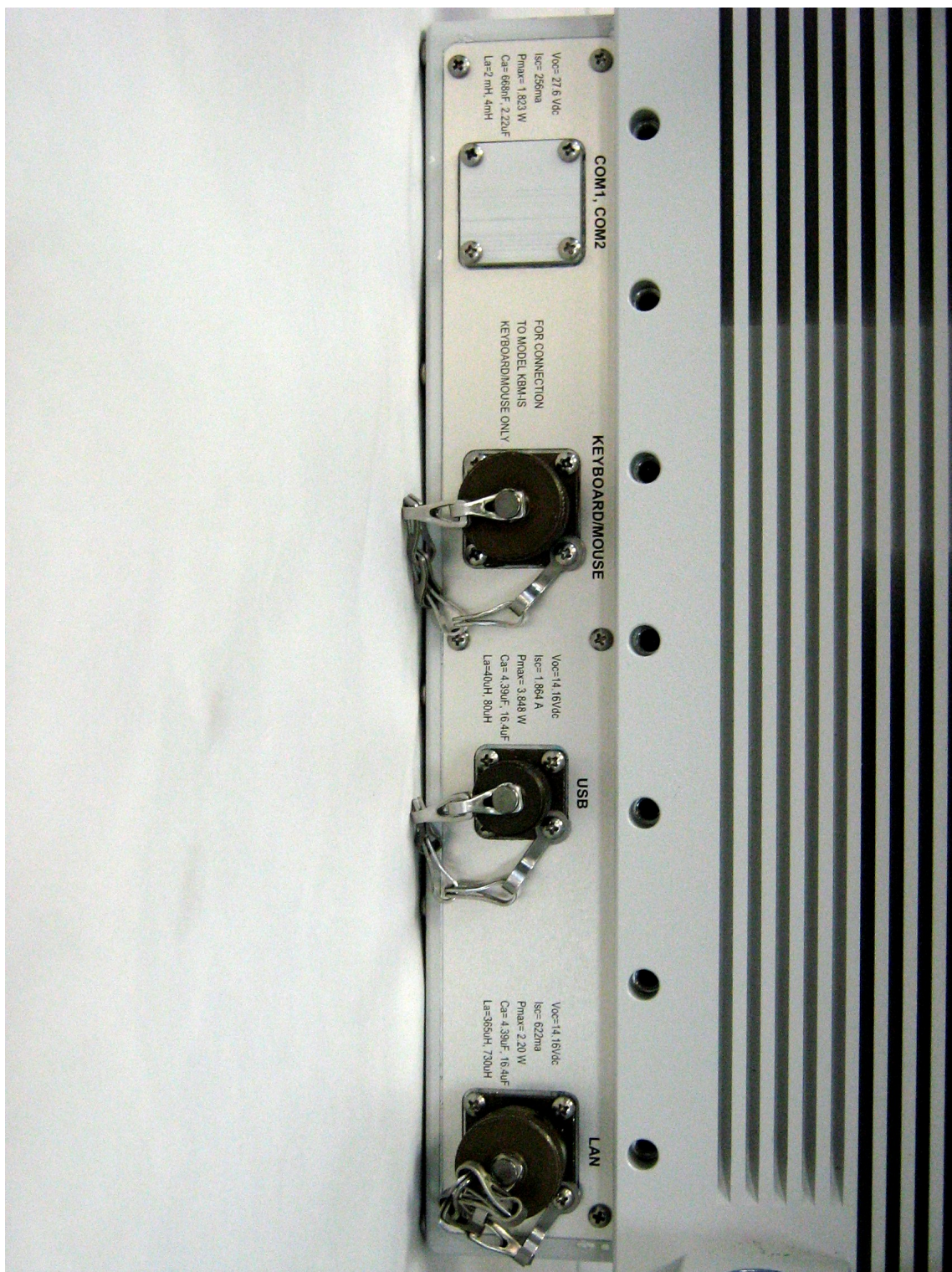| Pin #	Signal
1	TD +
2	TD -
3	RD +
4	N.C.
5	N.C.
6	RD -
7	N.C.
8	N.C.

Figure A-1
control drawing

Figure A-2

APPENDIX B

CABLES FOR NON-HAZARDOUS LOCATIONS

Three cables are provided with the 2800 for use in **non-hazardous** locations only.

1. COM1, COM2 cable. Please refer to Figure B-1

2. LAN cable. Please refer to Figure B-1

3. USB cable. Please refer to figure B-1

Figure B-1

APPENDIX C

REPAIR AND RETURN POLICIES

If it is determined that the product is defective, please call Laversab customer service department: (281) 568 8394 or e-mail <service@laversab.com> for further assistance.

Before shipping any equipment to Laversab for repair, please call the customer service department at (281) 568 8394 or e-mail to <service@laversab.com> . Please include a description of the problem that has been identified when returning defective equipment.

Ship equipment to :

LAVERSAB, INC.
10618 Rockley Rd.
Houston, Texas 77099
U.S.A.