ENVIRONMENTAL CONTROL

USER'S MANUAL

Liebert

ECA2

Environmental Communications Adapter

Including Modem Connections

Liebert

TABLE OF CONTENTS

ILLUSTRATIONS

1.0 INTRODUCTION

The optional ECA2 (Environmental Communications Adapter) allows a dumb terminal or a PC with an RS-232 port to communicate with Liebert Level 0 and Level 10 microprocessor controllers in environmental units. By accessing the ECA2 board through a modem, users can monitor unit status from a remote location, observe alarms, and change setpoints. A security password can be required for system control, but is not required for status information.

The ECA2 can communicate with up to two Liebert microprocessor boards using RS-422 (proprietary) links. Each RS-422 link is called a channel. The ECA2 converts the data on each RS-422 channel to an RS-232 signal (ASCII) for transmission to a monitor (local or remote). The RS-232 port on the ECA2 connects to the terminal, PC, or modem, and the cable wiring must comply with the application.

The ECA2 board is field installed in the environmental unit electronics control box, wired to a +5 VDC power supply and to the RS-422 (proprietary) port of the microprocessor board. This RS-422 connection is made to channel 1 of the ECA2 board; if you connect a second environmental unit, it must be wired to channel 2 of the ECA2 board.

2.0 INSTALLATION

2.1. POWER CONNECTION

Connect the ECA2 board to a +5 VDC, 1 amp power supply. The ground connection is at P2-4 and the +5 VDC connection is at P2-3. Refer to the connection diagram.

2.2. RS-422 CONNECTION(S)

Connect Channel 1 to a Liebert environmental unit. Connect Channel 2 to a second Liebert environmental unit if this ECA2 board will be monitoring and controlling two units. Refer to the connection diagram. Use a two-wire twisted pair for each RS-422 connection.

2.3. RS-232 CONNECTION

Connect an RS-232 cable (customer supplied) from the modem or terminal to the male 25-pin connector labeled P1 on the ECA2 board. For connection to a modem, the RS-232 cable must be a straight-through cable: pin 2 goes to pin 2, pin 3 to pin 3, etc. For connection to a local terminal or PC, the cable must be a null modem cable: pins 2 and 3 are crossed in the cable, and pins 4 and 5 are crossed also. The connections are:

Pin	Function
2	Data from the ECA2 board.
3	Data to the ECA2 board.
4	RTS out. This signal is high while ECA2 is transmitting. It is low when ECA2 is ready to receive.
5	CTS in. A high on this signal enables the ECA2 to transmit. A low will stop transmission.
7	Ground.

Some devices use CTS to implement flow control (so that data from the ECA2 does not overrun the attached device). If you are using CTS flow control, then CTS must be high from your device before the ECA2 can transmit; if CTS is low, the ECA2 will not transmit. CTS can be ignored by setting DIP switch 3 to ON (see Switch Settings for more information). DTR and DSR are not implemented on the ECA2 RS-232 port. It may be necessary to jumper these lines at the RS-232 port of the device you are using to communicate with the ECA2.

The RS-232 port P1 on the ECA2 uses the following communications settings:

- baud rate: 300, 1200, or 9600
- start bits: 1
- data bits: 8
- stop bits: 1
- parity: none

The RS-232 line is half-duplex (it cannot send and receive data at the same time). The RTS line is high when the channel has data to send, and is low when the channel is ready to receive data from the attached device.

Note that modem or terminal must be set to operate at the same baud rate as the ECA2.

2.4. SWITCH SETTINGS

Eight (8) DIP switches (SW1) and one (1) slide switch (SW2) on the ECA2 are used to make customer selections. Determine your requirements, then set these switches according to the table below.

DIP Switches

1	2	baud
Off	Off	300
On	Off	1200
On	On	9600

3 On – ignores the CTS signal
Off – uses the CTS signal

4 On – no password required
Off – security password required for some control functions

5 Spare – not used

6 On – auto alarm polling on channel 1
Off – no alarm polling of channel 1

7 On – auto alarm polling of channel 2
Off – no alarm polling of channel 2

8 On – auto alarm reporting
Off – no alarm reporting

Slide Switch

Terminal – ECA2 reads the CTS signal (pin 5) from the RS-232 port

Modem – Not used. This switch must be in the Terminal position even if your connection is to a modem.

3.0 OPERATION

When the ECA2 board is first powered up or resets, it transmits a message which includes the version of software in this board. Next, the ECA2 checks both RS-422 (proprietary) channels and reports the type of unit connected to each. If no unit is connected or if there is a communications fault, the ECA2 will report NO RESPONSE.

Then it will transmit the prompt 1> to indicate that it is currently communicating with channel 1. The prompt will change to 2> if you are communicating with channel 2.

```
*** LIEBERT ECA2 *   RS232 INTERFACE *** (164D)
CHAN 1 LEVEL 10      SOUTH_WALL
CHAN 2 NO RESPONSE


1>
```

Note that most times when you connect to the ECA2, this screen will not appear. Press the Return key to get an INVALID REQUEST message followed by the 1> prompt. Then enter a command or enter HELP for a list of commands.

Most messages are sent directly from the ECA2 to the attached device (local or remote terminal or PC). The ECA2 receives data from the microprocessor and reformats that data before sending it to the device. However, some messages come directly from the microprocessor board and are not reformatted by the ECA2. These messages are preceded with a "u:" to indicate that they come directly from the unit.

Command lines up to 80 characters in length may be sent to the ECA2. Each command lines is terminated with a carriage return (usually labeled Enter, Return, or with a left-facing arrow). You can use the backspace key (or ctrl-h) to make corrections at any time before pressing Enter. Press Escape to abort a command.

Commands to the ECA2 can be divided into two types:

1. **Present Status** – display information on the present status of the unit and all setpoint values. Status of the ECA2 can also be reported (ID, communications, and DIP switch settings).
2. **Control commands** – allow you to change channels, define a password, turn unit OFF or ON, change setpoints, and reset the ECA2 board.

You may either type out the entire command, or simply use the first three letters of each word. You should type all commands in upper case because a few commands require it.

3.1. HELP SCREEN

A help screen is available for display at the terminal. This screen lists available commands. Note that some commands are not applicable to Level 0 units.

```
1>HELP
SUM                 SET                 STA
ALA                 ALA REV             ALA RES
TEM                 HUM                 TH
TEM HUM             TEM SET             TEM TOL
HUM SET             HUMTOL              HI  TEM ALA
LO  TEM ALA         HI  HUM ALA         LO  HUM ALA
WIN STA DEL         WSK                 RES DEL
HUM FLU RAT         CHI WAT FLU CYC     CW  FLU CYC
ZER COM HOU         TIM                 TEM CAL
HUM CAL             PER                 %
HUM STA             DEH STA             COM 1   HOU
COM 2   HOU         GLY HOU             COM CHE
CUS ALA 1           CUS ALA 2           ID
MID SYN             FC                  DEG
1                   2                   CHECK
ONOFF               RESET IF            NAME
OPT                 PSW                 NEWPSW
```

3.2. COMMANDS AVAILABLE

The following commands are available on the ECA2. Note that some commands apply to Level 10 units only.

TO OBTAIN		ENTER
BLOCK of SUMMARY DATA	*	SUM
BLOCK of CONTROL SETPOINTS		SET
BLOCK of STATUS DATA		STA
ALL ALARMS (ALARM BLOCK)		ALA
TEMPERATURE READING		TEM
HUMIDITY READING		HUM
TEMP AND HUM READINGS		TH or T H or TEM HUM
TEMPERATURE SETPOINT		TEM SET
TEMPERATURE SENSITIVITY		TEM TOL
HUMIDITY SETPOINT		HUM SET
HUMIDITY SENSITIVITY		HUM TOL
HIGH TEMPERATURE ALARM	*	HI TEM ALA
LOW TEMPERATURE ALARM	*	LO TEM ALA
HIGH HUMIDITY ALARM	*	HI HUM ALA
LOW HUMIDITY ALARM	*	LO HUM ALA
POSITIVE START DELAY	*	WIN STA DEL or WSK
RESTART DELAY	*	RES DEL
HUMIDIFIER FLUSH RATE		HUM FLU RAT
CHILLED WATER FLUSH CYCLE	*	CHI WAT FLU CYC or CW FLU CYC
ZERO COMPRESSOR RUN HOURS	*	ZER COM HOU
TIME	*	TIM
TEMPERATURE CALIBRATION	*	TEM CAL
HUMIDITY CALIBRATION	*	HUM CAL
PERCENT COOLING/HEATING		PER or %
HUMIDIFIER/DEHUMIDIFIER STATUS		HUM STA or DEH STA
COMPRESSOR #1 RUN HOURS	*	COM 1 HOU
COMPRESSOR #2 RUN HOURS	*	COM 2 HOU
GLYCOOL HOURS	*	GLY HOU
COMMUNICATIONS CHECK		COM CHE
ALARM RESET		ALA RES
CUSTOMER ALARM 1	*	CUS ALA 1
CUSTOMER ALARM 2	*	CUS ALA 2
IDENTIFY UNIT		ID
MIDNIGHT SYNC	*	MID SYN
DEGREES		DEG or FC

* Available on Level 10 only

3.3. PRESENT STATUS COMMANDS

The following commands can be used to monitor the status of the unit and the current setpoint values. You may type out the entire command or use the three-letter abbreviation shown.

STATUS (STA)

Displays the current operating status of the Liebert unit.

```
1>STA
  COOLING          GLYCOOL OFF
  HUM/DEHUM OFF
  TEMP READING              73          F
  HUM READING               45
  % HEAT/COOL               000
  STAGES HEAT/COOL          0
  DEGREES (F/C)             F
```

TEMPERATURE READING (TEM)

Displays the current room temperature reading. The output of this command is identical to the TEMP READING portion of the STA command.

HUMIDITY READING (HUM)

Displays the current relative humidity of the room. The output of this command is identical to the HUM READING portion of the STA command.

TEMP AND HUM READINGS (TH or T H)

Displays both the current room temperature and relative humidity.

HUMIDIFIER/DEHUMIDIFIER STATUS (HUM STA or DEH STA)

Displays the status (ON or OFF) of the system dehumidifier (and optional steam humidifier, if installed).

SETPOINTS (SET)

Displays the values of all control and alarm setpoints.

```
1>SET
  TEMP SETPT          72
  TEMP TOL            1.0
  HUM SETPT           50
  HUM TOL             05.0
  HI TEMP ALARM       87
  LO TEMP ALARM       62
  HI HUM ALARM
```

In this example, the ECA2 is communicating with channel 1 (as indicated by the 1> prompt). The output from the ECA2 indicates that the temperature setpoint (TEMP SETPT) is 72°, the temperature sensitivity (TEMP TOL) 1°, the humidification setpoint (HUM SETPT) is 50%, and the humidity sensitivity (HUM TOL) is 5%.

Note that the temperature values do not indicate whether they are degrees Fahrenheit or Celsius. Use the STA command to determine which temperature scale is selected in the Liebert unit.

SPECIFIC SETPOINT

Each setpoint can be displayed individually by entering the first three letters of each word in the SET screen. For example, TEM SET, HUM SET, TEM TOL, or HUM TOL.

ALARMS (ALA)

The ALA command displays all the alarms (if any) that are presently active in the unit.

```
1>ALA
  CHANGE FILTERS
```

This example shows that the only alarm presently active is CHANGE FILTERS.

ALARM RESET (ALA RES)

Alarms will automatically reset when the alarm condition is cleared.

SUMMARY DATA (SUM)

This command is available only for Level 10 units.

```
1>SUM
 COMP #1 RUN HRS     000000
 COMP #2 RUN HRS     000000
 GLYCOOL HRS         000000
 TEMP READING            73   F
 HUM READING             45
 DAILY HI TEMP           73   F    00:12:23
 DAILY LO TEMP           73   F    00:54:23
 DAILY HI HUM            45        00:10:00
 DAILY LO HUM            45        00:10:00
```

IDENTIFY UNIT (ID)

Displays the name of the unit on your current channel. The ECA2 displays LEVEL 10 or Level 0 then the channel name (no-name if none entered). You can use the NAME = command, described in the Control Commands section, to enter a descriptive name for your unit.

CHECK

Used to check both ECA2 channels to the Liebert unit(s). Both channels (RS-422, proprietary) will be checked and the type of unit connected will be displayed, followed by the channel name.

```
1>CHECK
 CHAN 1   LEVEL 10     SOUTH_WALL
 CHAN 2   LEVEL 0      WEST_WALL
```

The messages displayed are identical to the channel entry messages seen when using the 1 and 2 commands; however, the CHECK command does not switch channels.

COMMUNICATIONS CHECK (COM CHE)

Performs a diagnostic check of the communications between the microprocessor board and the ECA2 board.

```
1>COM CHE
 u: **COMMUNICATION OK**
```

The message **COMMUNICATION OK** indicates that the RS-422 link between the microprocessor board and the ECA2 board is functioning properly. The "u:" preceding the message indicates that this message came directly from the Liebert microprocessor board.

OPTIONS (OPT)

The settings of the DIP switches on the ECA2 board are displayed.

```
1>OPT
 DIPSW(1-8) = 10101111
```

A 1 indicates that the switch is ON (closed), while a 0 indicates that the switch is OFF (open). In this example switch 1, 3, and 5-8 are on; and switches 2 and 4 are off.

3.4. CONTROL COMMANDS

Control commands allow you to make changes to the Liebert unit(s).

CONNECT TO CHAN 1 (1)
CONNECT TO CHAN 2 (2)

This selects (changes) ECA2 channels. Typing 2 at the 1> prompt will select channel two; typing 1 at the 2> prompt will select channel one. If the active channel has been assigned a name, it will be displayed. Refer to the NAME command.

```
1>2
  CHAN 2 LEVEL 0          WEST_WALL
2>
```

In this example the 2 command was used to switch to channel two. This channel was given the name WEST_WALL, and this is displayed when channel two is selected.

PASSWORD

Use DIP switch 4 on the ECA2 board to enable or disable the password function. Refer to **2.4 Switch Settings**. If password is selected, the password must be entered before control changes can be made. A password is not required to obtain system status.

PSW = string

Use this command to enter the security password. When password protection is enabled, you must use the PSW = command to enter the password before you can change any of the setpoints. The ECA2 will respond with USE PSW if a password is required but was not entered. String is the password string, which is 3 to 6 characters in length and may include only upper case (capital) letters A through Z, and numbers 0 through 9.

The default password for the ECA2 is LIEBRT. Note that the second E is left out because of the 6 character limit. To provide security for system control, use the NEWPSW = command to change the password for your installation.

The ECA2 will respond with INCORRECT or OK. Once the correct password is entered, you have 60 seconds to change a setpoint. If you make a change, you have 60 seconds to make another one. After any 60 second pause, the ECA2 board will require you to re–enter the password. This keeps your Liebert system secure if you leave your terminal while still connected.

NEWPSW = string

Assigns new security password required for making control changes. Note that DIP switch 4 on the ECA2 board must be Off to enable password protection. Then, enter the NEWPSW = command, replacing string with the new password. Your new password may be 3 to 6 characters in length and may include only upper case (capital) letters A through Z, and numbers 0 through 9.

The password can be changed remotely using the NEWPSW = command, but you must first enter the present password. Use the PSW = command to enter the existing password. Then, use the NEWPSW = command to enter the new password. Do not use a password that can be easily guessed, such as a name or number associated with you or your corporation. Combinations of letters and numbers are difficult to guess. To maintain control of your system, you must also control your password. If the password has been forgotten, local access to the ECA2 is required. Set DIP switch 4 to On, use NEWPSW = to enter a password, then set DIP switch 4 to Off to enable password protection.

NAME = string

Assigns a descriptive name to each ECA2 channel. This name is displayed when you issue an ID or CHECK command, or whenever you change channels. String is a text name, 12 characters maximum, including spaces. Entering one space, followed by a return, will result in a blank name.

For example, the command NAME = WEST_WALL entered at the 2> prompt assigns the name WEST_WALL to channel two.

ON and OFF

These commands turn the Liebert unit on and off. When you issue either command, the ECA2 responds first by telling you the run status of the unit. The run status may be:

- SWITCH OFF (the unit has been turned off with its own ON/OFF switch)
- OFF BY REMOTE CTRL (the unit has been turned off by remote control, through the ECA2 interface)
- ON (the unit is running)

If the run status is SWITCH OFF, then you cannot turn the unit on by remote control. If the run status is OFF BY REMOTE CTRL, the ECA2 board will ask if you want to turn it on. If the run status is ON, the ECA2 board will ask if you want to turn it off.

When using this command the ECA2 reports the present status, then asks if you want to change the status. When asked if you want to change the status (turn the unit on or off), you have 7 seconds to respond YES or NO. If you enter YES then the run status is changed accordingly. The YES must be in upper case (capital) letters. Responding NO leaves the run status unchanged. Any response other than YES, including a 7-second time out, is assumed to be a NO response.

```
1>OFF
  UNIT IS ON
  TURN OFF? (YES/NO)
1>N
  UNIT IS ON
```

In this example the user typed the OFF command. The ECA2 board responded with the run status of the unit (ON) and asked the user to confirm the off command. The second 1> prompt is the ECA2 board waiting for a YES or a NO from the user. Responding N is interpreted as a NO, and the unit remains on.

CHANGE SETPOINTS

Setpoint change commands allow you to change all mode 1 and mode 2 setpoints in the Liebert unit remotely through the ECA2.

Setpoint change commands include the setpoint, an equal sign, and a value.

"COMMAND = VALUE"

Example: TEM SET = value

Changes the value of the temperature setpoint. Value must be a number representing the new setpoint in degrees. For example, the command TEM SET = 71 changes the temperature setpoint to 71 degrees. The ECA2 automatically reports the new setpoint. Note that if you enter a value that exceeds the allowable range, the ECA2 will not change the setpoint.

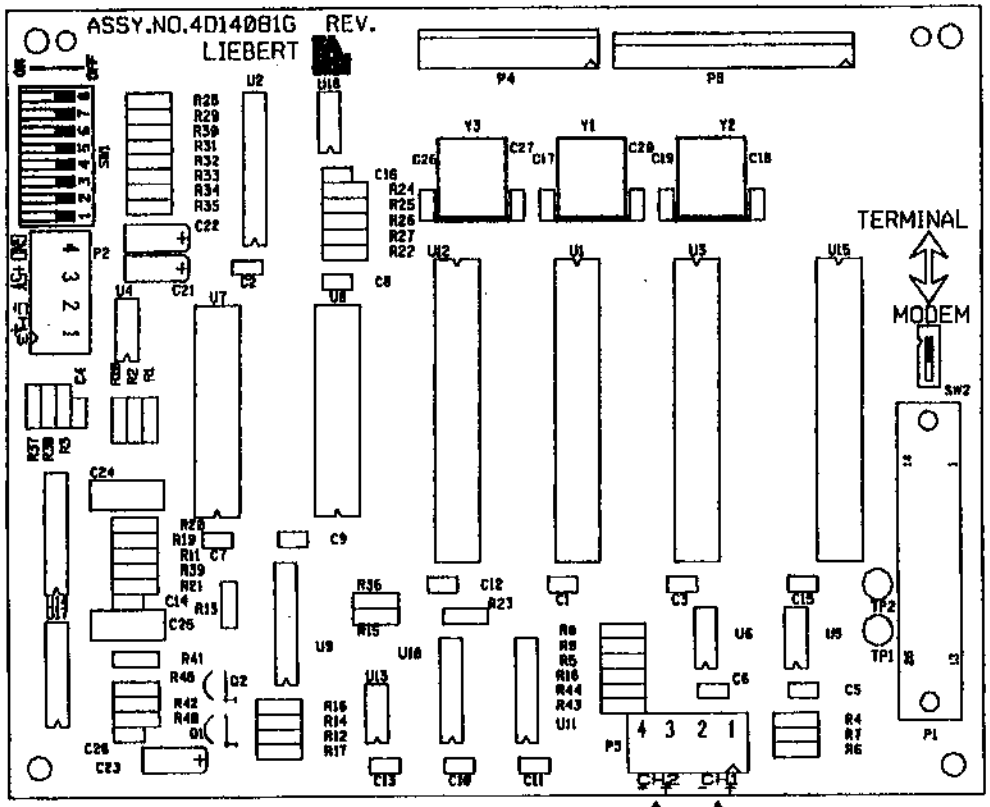
RESET INTERFACE BOARD (RESET IF)

The RESET IF command causes a hardware reset of the ECA2 interface board. After approximately 5 seconds the ECA2 board displays the message LIEBERT ECA2 RS-232 INTERFACE followed by four hexi-decimal digits indicating the software version in the board. Note that a reset will occur automatically if DIP switch 3 on the ECA2 board is OFF (monitor CTS) and CTS goes low for longer than 2.5 seconds. If you do not need CTS, set DIP switch 3 on the ECA2 board ON.

MIDNIGHT SYNC (MID SYN)

This command resets the timer on a Level 10 board to 00:00:00.

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED



DIP SWITCHES
REFER TO INSTALLATION INSTRUCTIONS

INPUT POWER
+5 VDC @ 1 AMP

SLIDE SWITCH
MUST BE IN
TERMINAL POSITION

RS-232 PORT
REFER TO INSTALLATION
INSTRUCTIONS FOR
CONNECTIONS

RS-422 (PROPRIETARY) PORT
FOR CHANNEL 2 TO LIEBERT
ENVIRONMENTAL UNIT

RS-422 (PROPRIETARY) PORT
FOR CHANNEL 1 TO LIEBERT
ENVIRONMENTAL UNIT

Liebert

TITLE
ECA2
CONNECTION
DIAGRAM

PROD NO. 55455	DWG REL NO.	CLASS 2
DRAWN BRUCE MCCORMICK	DATE 03-05-92	
DESIGNED LEE McBRIDE	DATE 03-06-92	
CHKD BRUCE MCCORMICK	DATE 03-06-92	
APPD	DATE	

SCALE NONE
PARTS LIST
DRAWING NO. SS50030
SHEET
REV.

THIRD ANGLE PROJECTION

Liebert

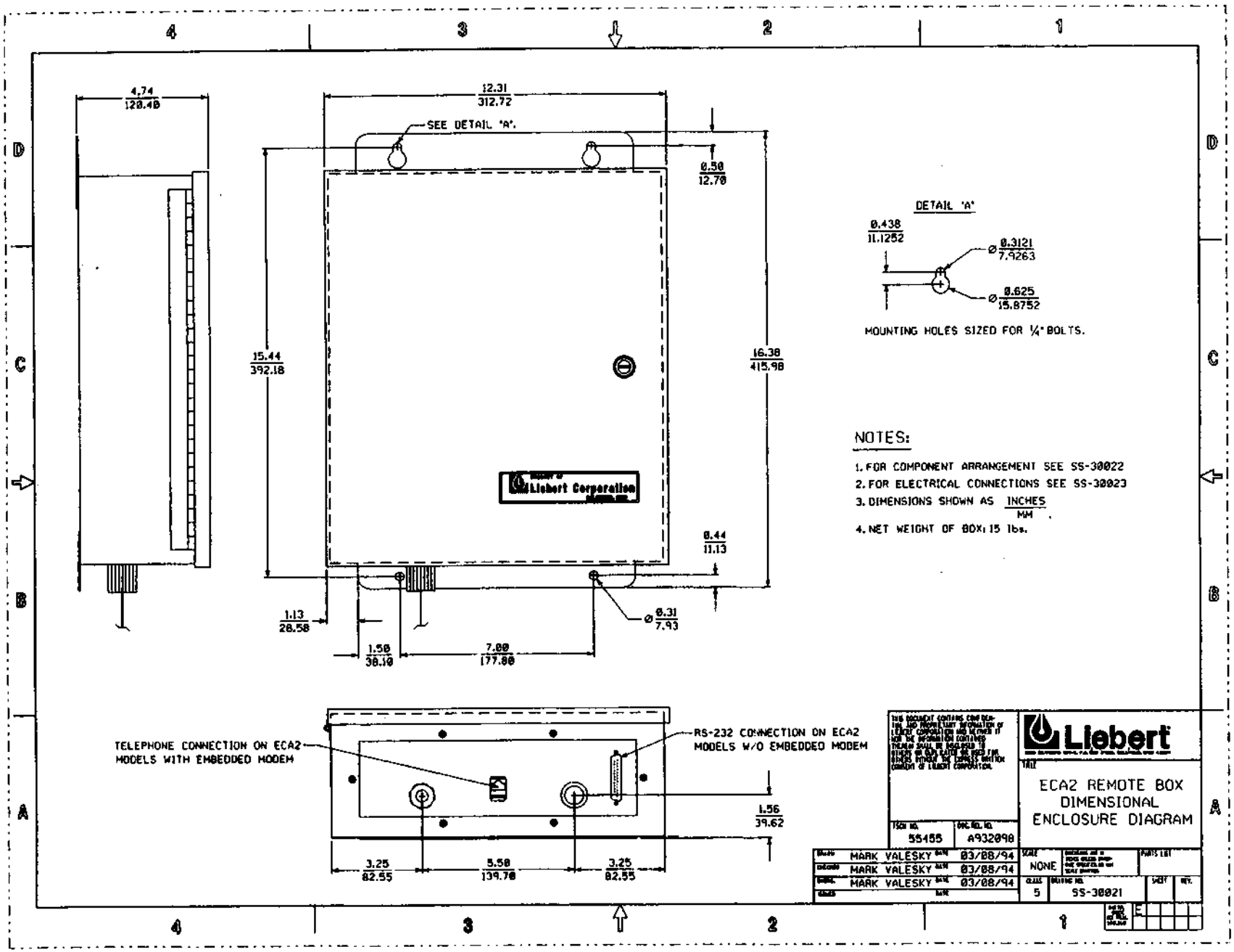
ECA2

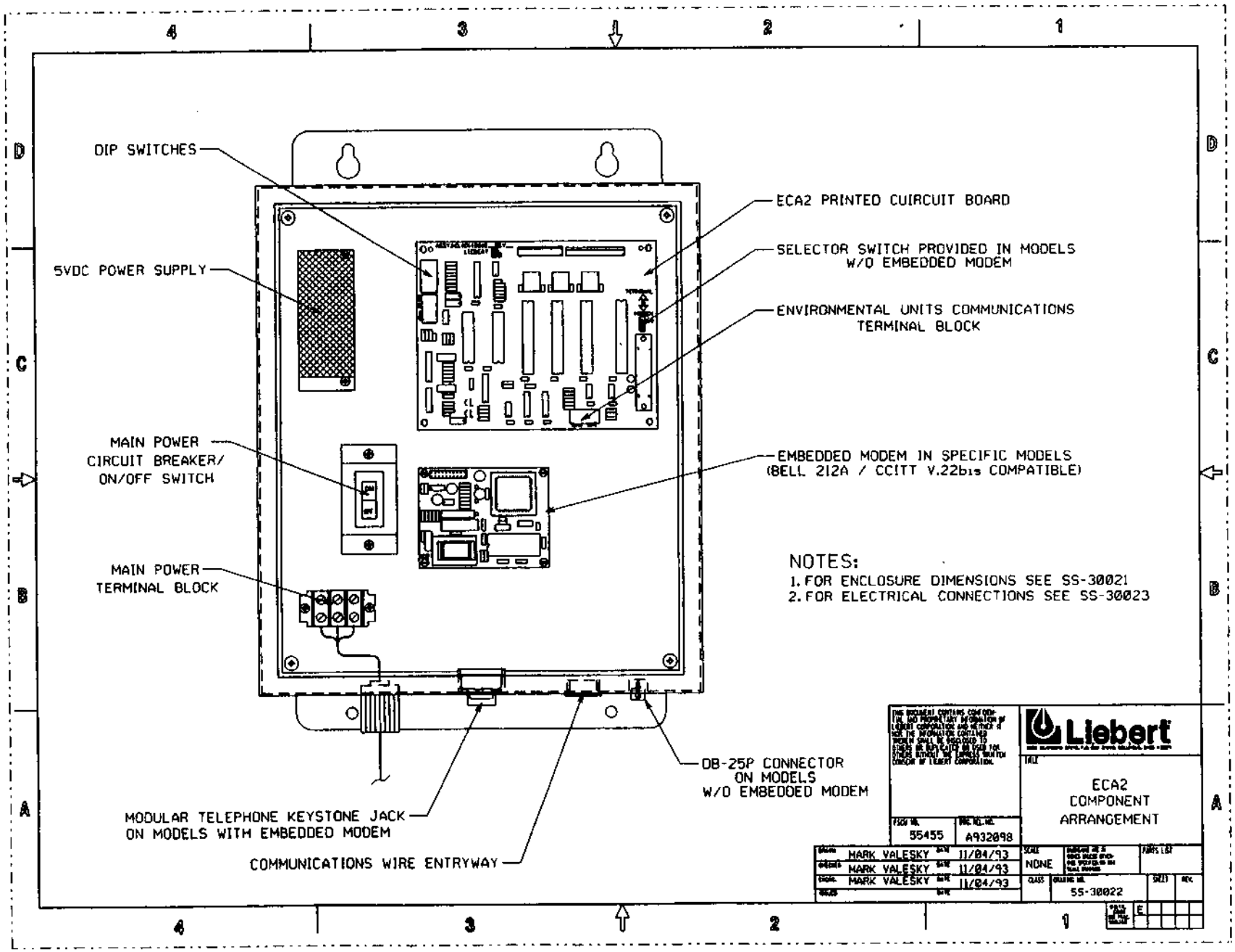
User's Manual

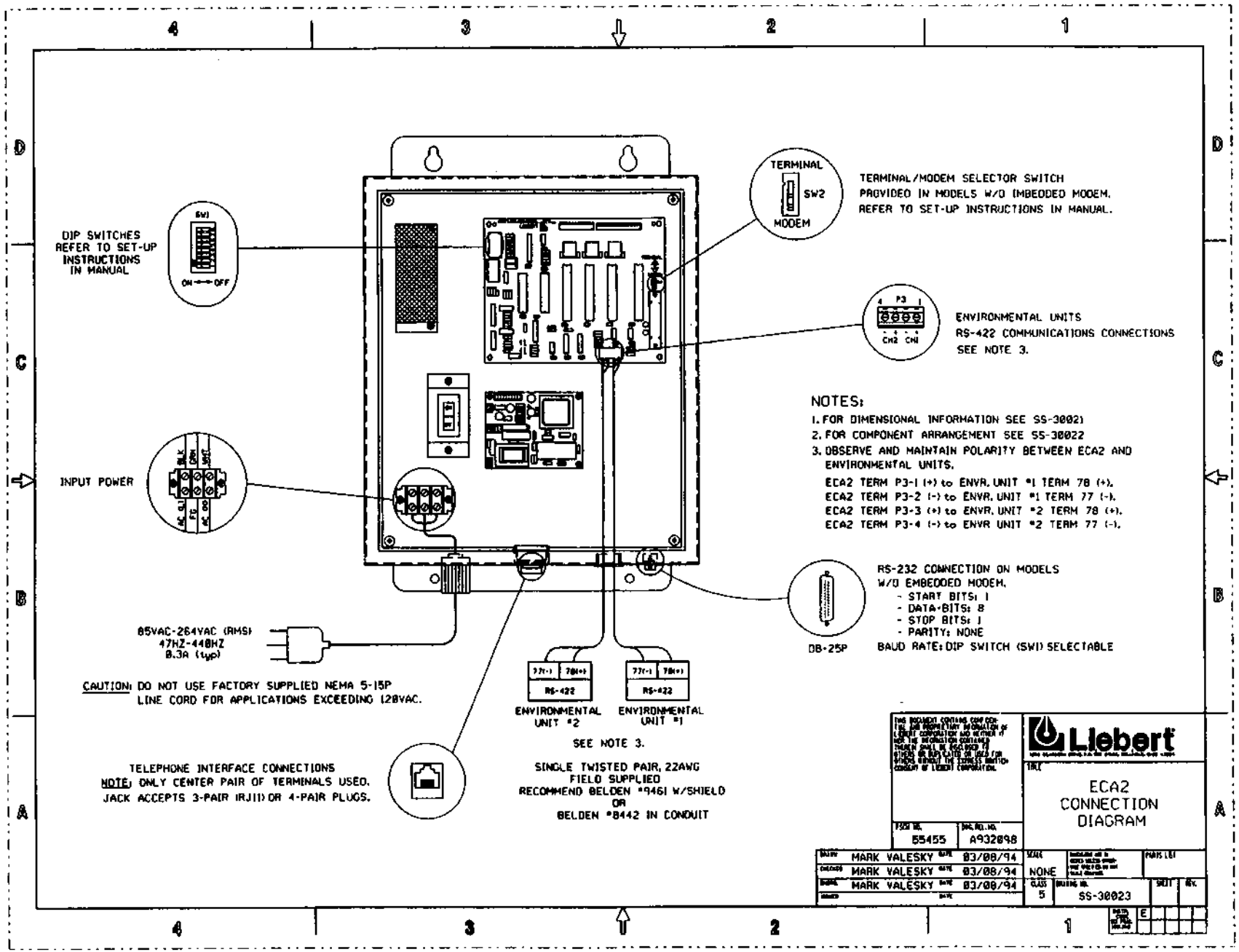
Supplement

Use these drawings of the ECA2 enclosure, with or without optional modem, along with the User's Manual (SL-31032).

(3/94)







ECA2

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