BIG BOARD SED460 (EPSILON)
USER'S MANUAL

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ABOUT THIS PRODUCT

Thanks!

Congratulations on your purchase of a Systems Associates BIG BOARD scoreboard. We are certain you will love the ease of application, the minimal maintenance, and the durability of this product.

All of us here at Systems Associates are dedicated to making this product work. Our engineering, programming, and manufacturing people working hand-in-hand with our Sales Department to make this the best product for your application. If you have trouble connecting this board or getting the right data displayed then call our Technical Support. There is no charge for phone support. If you have a special application, call our Sales or Engineering people. Like an old fashioned company, we are here to take your call and give all the help you need.

We have lists of supported indicators and other devices that are available for the asking. Though the product was designed to enhance our scale products line, this scoreboard has other applications when connected to PC computers or PLC controllers. Please let us know how you have applied this scoreboard and what indicators you have connected it to, so that we might enhance our list of supported devices.

Spare parts are in stock for immediate delivery which should reduce your requirements for stocking spares. If you feel you have a bad component, please let us know and we will see that another one is shipped out immediately. If your BIG BOARD is out of warranty, we offer exchange prices on all components to allow swapping of parts, an economical and quick fix in field repair situations.

Finally, you must be satisfied! If our Sales, Engineering, or Technical Support has not answered your questions about this product or your BIG BOARD is not working as you feel it should, please give me a call and I will help.

Sincerely,

SYSTEMS ASSOCIATES, Inc.

Steven J. Beitzel

Steven J. Beitzel
President

ABOUT THIS PRODUCT

I. "BIG BOARD" SETUP

UNPACKING

Our Shipping Department is very careful about packing the scoreboards properly so there is no damage in shipment.

Should you find damage because of shipping, please keep the original shipping container and contact our Technical Support Department immediately so that we might take action to get your scoreboard repaired. If the damage is extensive, we will ask you to contact the freight company to place a claim. Remember that all packing material must be kept to substantiate a claim.

SCOREBOARD PLACEMENT

There are some obvious decisions to be made when locating your scoreboard, such as in-line and within viewing distance of those required to see the information. Refer to the specifications later in this manual for the viewing distance for your particular display. Below are some of the less obvious requirements for locating your scoreboard.

Your BIG BOARD is equipped with a fluorescent light (except the SED style) to provide illumination to the digits during night time hours. If you are locating the display where there is sufficient ambient light or the board will not be used during dark hours, the lamp can be removed to conserve power. Sunshine and other light sources can cause a reflected glare problem with the scoreboards glass. Often these problems can be reduced or eliminated by tilting the board either horizontally or vertically. The scoreboard does not need to be mounted exactly level for the digits to function properly, but it should be mounted within 5° degrees of vertical. Note: The SED has no mounting limitations as the digits are leds, not mechanical digits. A sun shield is provided to help eliminate the problems associated with glare.

This scoreboard is intended for indoor or outdoor use. In indoor applications, care should be taken not to subject the scoreboard to intense heat or unusually corrosive or explosive atmospheres. This board is not explosion proof. Though this board is intended for direct mounting outdoors, it is always good practice to keep it under shelter when possible.

When choosing a location for your scoreboard, keep in mind that it will potentially need service. All service that needs to be performed will be from the front of the board, which allows you to mount it in tight places, leaving only enough clearance for the door to open. Holes in the mounting bracket allow the use of standard wall fasteners. Special mounts are available for pole mounting. Please, locate your board with your serviceman in mind.

Be careful when you're mounting these scoreboards as they can often be heavy and awkward to handle in the locations where they are typically installed. Check for overhead power lines before standing ladders for installation or maintenance of the scoreboard.

Get help and always place **safety first.**

DIGIT SETUP

Each of the digits inside your scoreboard, except the SED style, has a dip switch which selects that digits address. Take care not to set two digits to the same address and to not select two addresses for the same digit. In other words, only one switch should be closed on each digit and no two selections should be the same.

In most applications, the right most digit (least significant digit) should be set with Switch #8 closed. This will select this digit as the least significant digit. The digit immediately to the left of that digit would be selected as digit #7 and you would continue selecting digits in this order. Unless specifically noted, your scoreboard was shipped with this configuration. Up to 6 digits can be selected using this procedure.

AUTOMATIC SCOREBOARD SET-UP

This display uses a scoreboard processor board that will automatically learn all that is required to interpret and show the incoming data. We have taught the program all of the popular formats for the weight indicators in use today. There are no switch settings required to determine digit size, baud rate, protocol, or data format. With that said, we have also allowed all of these settings to be manually set and locked in the processors memory for applications where the automatic learn feature is not appropriate. The manual setup procedure follows this section.

The **digit size** is automatically sensed and the appropriate power is sent to operate the digits . Jumpers may be installed on the processor boards to force the digit size. Though this is not required on production scoreboards, it may be required if older (unidentified) digits are used as replacements or if this scoreboard processor is used to replace the 2702640 scoreboard processor in an older scoreboard.

The automatic learn feature is initiated each time the scoreboard is powered up. The **baud rate** is the first variable to be determined. Allowed baud rates include 300, 600, 1200, 2400, 4800, and 9600. Once the baud rate is learned, the data can be properly read and analyzed.

The system will accept most **data protocols** including one start bit, seven or eight data bits, one or two stop bits, even, odd, and no parity checking. We do not handle a nine bit code which would include 8 data bits and a parity bit. This format is not popular and should not be of concern.

The serial data stream coming from the weight indicator, PC, or PLC will be analyzed to determine which of the popular formats is being sent. Some common data streams are recognized from Analogic, Cardinal-Detecto, Consolidated Controls, Fairbanks, Mettler Toledo, and Weigh-tronics.

MANUAL SCOREBOARD SET-UP

If, after connecting the weight indicator, the correct data doesn't display, you are likely connecting an instrument that is not in our database. This is not a problem, you'll just need to setup your display processor manually. You can change various setup functions including baud rate, instrument type, etc.

To do so, press and hold SW1 on the display processor for four seconds, the display will read:

SET

Press and hold SW1 again, the display will read:

d - 4

As you press (don't hold down) SW1, the digit size will toggle between 4 inch, 6 inch, 9 inch, and LED (for the SED style). Once you are done with the digit size, press and hold down SW1 again, the display will read:

9600

As you press (don't hold down) SW1, the baud rate will toggle between 300, 600, 1200, 2400, 4800, and 9600 baud. Once you are done with the baud rate, press and hold down SW1 again, the display will read:

F - 08

As you press (don't hold down) SW1, the format type will toggle between the various format types:

01 - Toledo Remote 02 - Nova 04 - Consolidated Control 05 - Toledo 8530 06 - UMC 2000 / 7000 07 - Weightronix WI-120 08 - Toledo 814009 - Fairbanks 9201 10 - Cardinal 738 (Scoreboard) 11 - Cardinal 738 (Computer) 12 - Analogic 5316 13 - Weightronix WI	15 - Offset Mode 16 - Multi-Drop Mode 17 - Pulse Counting Mode 18 - WI-125 (and higher) 19 - Western M2000 20 - Weight only 21 - GSE 465 22 - Fairbanks 2500 23 - Fairbanks 5200 24 - Toledo Multi Drop

Once you are done with the format type, press and hold down SW1 again, the display will read:

A - 08 or **o - 03**

If the format parameter is set to multidrop mode (format 16) this parameter will show up as “A” for address.

You can set the address from 00 to 15. As you press (don’t hold down) SW1, the address will toggle from 0 to 15. If the format parameter is set to anything other than multidrop mode, this parameter shows up as “o” for Offset. As you press (don’t hold down) SW1, the number of characters to offset will toggle from 0 to 15. An explanation of how offset works follows this setup procedure. Once you are done with this parameter, press and hold down SW1 again, the display will read:

As you press (don’t hold down) SW1, the display will toggle between “LOC” and “Auto”. Select “LOC” to save the parameters you have just set or “Auto” to revert back to the Auto Learn function. When done, press and hold down SW1. The display will cycle through the settings and will be in the Run mode.

Offset Mode

If you select “Offset Mode” for the Format Type, you will not be selecting a specific type of weight indicator. Instead, you’ll be selecting how many characters to ignore, starting from the beginning of your data string. For example, if your data string looked like this:

AXD256000LB c/r

You would want to ignore the AXD. Therefore, you would want to set your offset characters to 3.

Pulse Counting Mode

If you select “Pulse Counting Mode” for the format type, you will no longer be selecting a serial interface. Instead, the scoreboard display will increment by one, each time the “count” input is triggered. There are four inputs (active low) on the extension port (J2) :

Count	Pin 1 on J2	As the “count” input is activated, the scoreboard will increment by one.
Clear	Pin 4 on J2	As the “clear” input is activated, the scoreboard will display “0”.
Count on rising edge	Pin 5 on J2	If this input is activated, the scoreboard will increment on the rising edge of the input instead of the falling edge.
Filter	Pin 6 on J2	If the “filter” input is activated, the “count” input has to be active for at least ½ of a second for the scoreboard to increment.

II. CONNECTIONS

117 VOLT POWER

Your scoreboard is set up to operate with 117 volt, 60 cycle, single phase power. This power can vary by as much as +15% to -10%. At full load, your scoreboard will draw about 1 amp of power and it does not need to be on a separate or protected circuit unless required by local code. The use of a ground fault breaker in outdoor applications is recommended. Consult the factory regarding additional protection if long runs are anticipated on the power wires.

THE NATIONAL ELECTRICAL CODE PROHIBITS AND IT IS NOT GOOD PRACTICE TO RUN SERIAL OR OTHER LOW VOLTAGE DATA SIGNALS WITH 117 VOLT POWER. ALWAYS RUN SERIAL CABLES AND OTHER LOW VOLTAGE CABLES IN SEPARATE CONDUIT FROM THE 117 VOLT POWER.

STANDARD SERIAL INPUTS/OUTPUTS

The "Big Board" scoreboard has a number of serial input options. The standard scoreboard includes a terminal strip for connecting RS232, RS422, RS485, or 20mA loops data. The terminal strip includes +5 volts to be used where the scoreboard provides the power for the 20mA loop, known as Active Current Loop applications.

A 26 pin dual-in-line connector makes other data inputs and outputs available as an option. This connector contains jumper positions to force the digit size, output RS232 data, and allow control of external devices such as traffic lights, gates, or vehicle sensors. Consult the factory for information on the use of these optional input and output signals.

The processor has two indicating LEDs to help troubleshoot your scoreboard. The first LED, labeled “OK”, indicates that the processor is operating by flashing at a one second rate. The second LED, labeled “RX” illuminates momentarily as data is received. If this LED is constantly on, the serial connection probably has a fault.

RS232 SERIAL DATA INTERFACE

A standard RS232 input port is included with each scoreboard with data on Pins 1 and 2 of the terminal strip. The receive line, connected to pin 1 of the terminal strip, should idle at a positive voltage with respect to common on pin 2. RS232 requires a negative voltage of -3 to -25 volts to represent an idle line. Data is represented by positive pulses of voltage in the range of +3 to +25 volts with respect to common. Remember when measuring the RS232 voltage with a volt meter, the voltage will normally be at a negative level and only twitch high. This is due to the short time duration of the positive pulses at most baud rates.

RS422 SERIAL DATA INTERFACE

This scoreboard has a standard RS422 serial data input. The RS422 data input is very similar to the RS232 data input with the exception that data is transmitted using a differential voltage input. This type of
data transfer allows for longer distance communications. It is typically used at distances from 50 to 2,000 feet but can be used at distances up to 10 miles.

The RS422 port on the scoreboard is a receive only port. Transmitted data is not converted to the RS422 data format. Line drivers and short haul modems are common names for RS232 to RS422 converters. These devices would be used at the transmitting end to convert an RS232 output from the transmitting device into a RS422 signal to be transmitted over long lines to the scoreboard. It is important to note that only one serial connection may be made to the scoreboard. If an RS232 input is provided, the RS422 output should not be connected. The same is true of the 20mA current loop serial data input. There are no jumpers or special settings to enable any of the input ports. The scoreboard monitors all of the inputs for data at all times.

The RS422 data input should be connected to Pins 3 and 4 of the seven pin terminal strip. On this terminal, positive received data should be tied to Pin 3 and negative receive data should be tied to Pin 4. The "RX" LED will be constantly on if the line is broken and flicker on whenever data is received.

RS485 MULTIDROP SERIAL DATA INTERFACE

A multidrop network allows more than one scoreboard to be tied to a single transmitter. The transmitter will typically be a computer, a PLC, or a dedicated processing system. The advantage of a multidrop network is in the reduction of serial output ports and cabling from the processing system. Each scoreboard in the system would be tied to the same serial data and each scoreboard responds only to information that has its specific address.

Any of the serial input protocols may be used in the multidrop mode. RS485 is an extension of the RS422 differential voltage input and is the preferred data type. RS232 was not meant for multidrop applications, though in many applications it will work. When using 20mA current loop data, you must connect the scoreboards in series and not in parallel. The baud rate may be set as required, however, all scoreboards must be set to the same baud rate as the transmitter.

Each scoreboard on the network will have an assigned address. Data to be displayed on a particular scoreboard must lead with that scoreboard's address. An example transmission would be as follows:

<STX>03263000<cr><lf>

The preceding message would have been received only by a scoreboard set to address "03". Data leading with any other address would not be displayed by a scoreboard selected at address "03". Up to 99 unique addresses can be selected and locked into the scoreboard setups.

20mA LOOP SERIAL DATA INTERFACE

Data may be transmitted to the scoreboard using a 20mA loop. Again, the scoreboard interprets the data the same regardless of the transmission media. A 20mA loop is typically used for transmission of data

without the expense of line drivers. You must determine whether your transmitting device supplies current or simply controls current. A transmitter that supplies current, is said to be "active" and therefore, the scoreboard must be "passive". A passive scoreboard uses the current supplied by the transmitter. A passive transmitter would control the current supplied by the scoreboard. If the scoreboard supplied the current to power the line then the scoreboard is considered an active receiver and the transmitter is passive.

In an application where the scoreboard is to be passive (transmitter supplies the current), the positive received data should be tied to Pin 5 and the negative received data should be tied to Pin 6.

In applications where the scoreboard must be active (scoreboard provides the current loop power), a power output has been provided to power the loop. The connections for the active current loop are made on the seven pin terminal strip. Tie Pin 7 (+5v) to Pin 5 (+20m) to provide power for the loop. The positive receive data should be tied to Pin 6 and the negative receive data should be tied to Pin 2.

The LED is a useful tool, again, in troubleshooting the system. If the LED burns steady, a broken wire may exist or the connections are improperly made. In normal operation, the LED should be out and flicker whenever data is received.

III. OPERATION

POWER UP CHECK

When power is first applied to the BIG BOARD, the digits will go through a self test. After momentarily displaying SAI, the scoreboard parameters will be displayed. The following parameters are displayed: software version, digit size, baud rate, format, offset or address, and Auto or Loc mode. When this test is complete, the scoreboard will blank and wait for serial data. The self check mode will be interrupted if serial data is received during the start up cycle. To view the self check cycle, disconnect the input data before powering the scoreboard. This feature allows rapid start up in applications where power interruptions are frequent.

SPECIAL ASCII CHARACTERS

The character HEX 1E (CTRL^) will cause the scoreboard to reset and perform the initial verification cycle as done during power up. This self test will display SAI followed by all of the scoreboard parameters. When the self test is completed, the display will update with the next valid serial string.

IV. CLEAN-UP

MAINTENANCE

Your scoreboard should require very little maintenance to keep it in good operating condition. The board is painted with an industrial enamel that can be cleaned with most household cleaners. The front panel glass can be cleaned with a window cleaner and if dust build-up is a problem, spray with an anti-static material such as 3M's static guard. In outdoor applications, the scoreboard should be checked for water entry. In indoor applications where dust is a factor, periodic checks to insure that the door is closed, will prevent dust build-up that may cause damage to internal components.

The internal components should require very little maintenance. Be careful when manually operating the digit vanes (except the SED style), if they become bent, they may not work properly. If digits appear to be sticking, do not spray them with oil or a liquid cleaner. Try blowing them out with compressed air before any kind of liquid cleaner is used.

WARRANTY

SAI equipment is warranted to be free of defects in workmanship and materials for a period of two years from date of shipment from the factory. We shall repair or replace, at our discretion, products returned to us within the warranty period, with shipping charges prepaid, and which are found to be defective upon our examination. Products subject to misuse, abuse, accidental damage or tampering will not be honored.

SPECIFICATIONS AND FEATURES

Display

- 4, 5, or 6 digits
- 4" and 6" digit height
- Minus sign and "lb" annunciator standard
- "lb"/"kg" and "gross"/"net" segments are optional

Input

- ASCII Interface with Learn Feature
- RS232, RS422, RS485, 20ma current loop standard
- 20ma current loop active or passive
- Pulse input with clearable counter

Connections

- 7 pin terminal strip for ASCII interfaces
- Radio Modem ASCII connection (optional)

Baud Rate

- Auto selectable with Learn Feature
- Available rates 300, 1200, 2400, 4800, 9600
- One start bit, one or two stop bits, Even/odd/no parity

Power

- 117VAC at 25 watts is standard
- Power cord kit (optional)
- Flourescent bulb adds 15 watts or 40 watts on 9" models
- 12VDC at 20 watts without illumination (optional)

Enclosure

- Painted steel enclosure includes sun shield standard
- Stainless Steel housing optional
- Acrylic Display face standard, tempered glass optional

Environment

- Temperature -40 degrees F to +170 degrees F
- Humidity 5% to 95% relative humidity (non condensing)

SED460 Bill of Materials Six 4" digits

QUANTITY	PART NO.	DESCRIPTION
1	2116021	Epsilon 460 Scoreboard Assembly

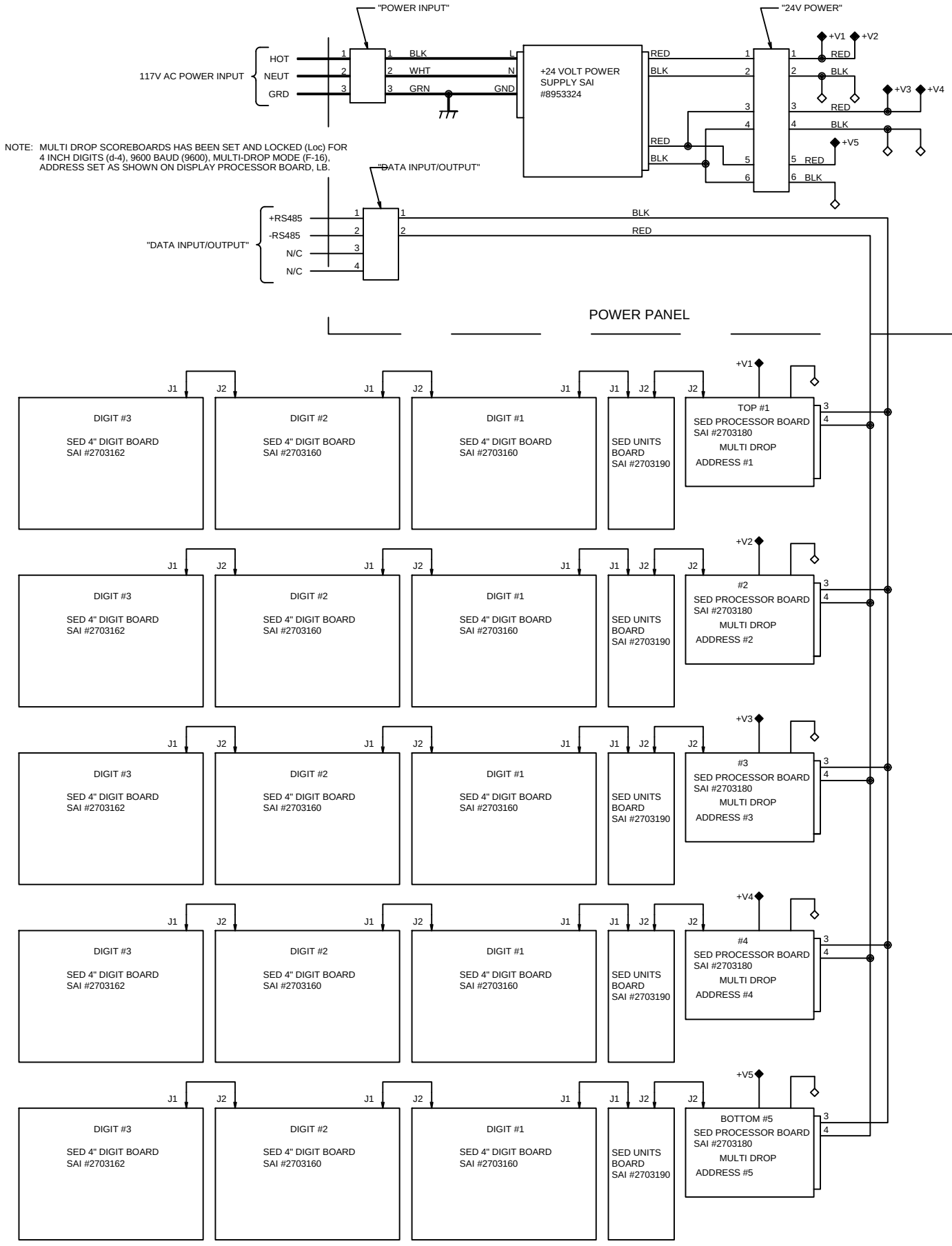
SED460 Spare Parts List

QUANTITY	PART NO.	DESCRIPTION
2	2703160	SED 4" Display Board
1	2703162	SED 4" Display Board - MSD
1	2703180	SED46 Processor Board
1	2703190	SED Units Board
1	8953324	24 Volt Power Supply

SPARE PARTS

We try to keep these parts in stock at all times, however, you may find a part out of stock temporarily. It is wise to maintain your own stock of critical parts to prevent downtime.

The fluorescent tube used in our scoreboards is of a special design and is not available in most hardware stores. These bulbs can take up to three weeks to supply from your local electrical supplier and should be maintained in stock if the fluorescent lighting is required for your operation.



DATE	REV		
28 AUG. 14			2116021
			SED460 X 5 SCOREBOARD WIRING