

*EPSILON SWITCH  
& AMPLIFIER SYSTEM (ESAS/EAS)  
USER'S MANUAL*

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Spectracom warrants each new product manufactured and sold by it to be free from defects in software, material, workmanship, and construction, except for batteries, fuses, or other material normally consumed in operation that may be contained therein AND AS NOTED BELOW, for five years after shipment to the original purchaser (which period is referred to as the "warranty period"). This warranty shall not apply if the product is used contrary to the instructions in its manual or is otherwise subjected to misuse, abnormal operations, accident, lightning or transient surge, repairs or modifications not performed by Spectracom.

The GPS receiver is warranted for one year from date of shipment and subject to the exceptions listed above. The power adapter, if supplied, is warranted for one year from date of shipment and subject to the exceptions listed above.

THE TIMEVIEW ANALOG CLOCKS ARE WARRANTED FOR ONE YEAR FROM DATE OF SHIPMENT AND SUBJECT TO THE EXCEPTIONS LISTED ABOVE.

THE TIMECODE READER/GENERATORS ARE WARRANTED FOR ONE YEAR FROM DATE OF SHIPMENT AND SUBJECT TO THE EXCEPTIONS LISTED ABOVE.

THE WIRELESS CLOCK SYSTEM TRANSMITTERS AND/OR TRANSCEIVERS AND CLOCKS ARE WARRANTED FOR TWO YEARS FROM DATE OF SHIPMENT AND SUBJECT TO THE EXCEPTIONS LISTED ABOVE.

THE EPSILON CLOCKS, BOARDS, AND SYNCHRONIZATION UNITS ARE WARRANTED FOR TWO YEARS FROM DATE OF SHIPMENT AND SUBJECT TO THE EXCEPTIONS LISTED ABOVE.

The Rubidium oscillator, if supplied, is warranted for two years from date of shipment and subject to the exceptions listed above.

All other items and pieces of equipment not specified above, including the antenna unit, antenna surge suppressor and antenna pre-amplifier are warranted for 5 years, subject to the exceptions listed above.

## **WARRANTY CLAIMS**

Spectracom's obligation under this warranty is limited to in-factory service and repair, at Spectracom's option, of the product or the component thereof, which is found to be defective. If in Spectracom's judgment the defective condition in a Spectracom product is for a cause listed above for which Spectracom is not responsible, Spectracom will make the repairs or replacement of components and charge its then current price, which buyer agrees to pay.

Spectracom shall not have any warranty obligations if the procedure for warranty claims is not followed. Users must notify Spectracom of the claim with full information as to the claimed defect. Spectracom products shall not be returned unless a return authorization number is issued by Spectracom.

Spectracom products must be returned with the description of the claimed defect and identification of the individual to be contacted if additional information is needed. Spectracom products must be returned properly packed with transportation charges prepaid.

**Shipping expense:** Expenses incurred for shipping Spectracom products to and from Spectracom (including international customs fees) shall be paid for by the customer, with the following exception. For customers located within the United States, any product repaired by Spectracom under a "warranty repair" will be shipped back to the customer at Spectracom's expense unless special/faster delivery is requested by customer.

Spectracom highly recommends that prior to returning equipment for service work, our technical support department be contacted to provide trouble shooting assistance while the equipment is still installed. If equipment is returned without first contacting the support department and "no problems are found" during the repair work, an evaluation fee may be charged.

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## **EXTENDED WARRANTY COVERAGE**

Extended warranties can be purchased for additional periods beyond the standard five-year warranty for those products covered under five-year warranty. Contact Spectracom no later than the last year of the standard five-year warranty for extended coverage.



## **Table of Contents**

<b>1</b>	<b>INTRODUCTION .....</b>	<b>1-1</b>
<b>1.1</b>	<b>Inventory</b>	<b>1-1</b>
<b>1.2</b>	<b>Inspection</b>	<b>1-2</b>
<b>1.3</b>	<b>ESAS 1U Synoptic</b>	<b>1-3</b>
<b>1.4</b>	<b>EAS 1U Synoptic</b>	<b>1-4</b>
<b>1.5</b>	<b>Dimensions and Weight</b>	<b>1-4</b>
<b>1.6</b>	<b>Front and Rear Panel</b>	<b>1-6</b>
1.6.1	ESAS 1U Version	1-6
1.6.2	ESAS 2U Version	1-7
1.6.3	EAS 1U Version	1-8
1.6.4	EAS 2U Version	1-9
<b>2</b>	<b>FEATURES.....</b>	<b>2-1</b>
<b>2.1</b>	<b>Main Power Supply</b>	<b>2-1</b>
<b>2.2</b>	<b>DC Power Supply</b>	<b>2-1</b>
<b>2.3</b>	<b>Environmental Parameters</b>	<b>2-1</b>
<b>2.4</b>	<b>ESAS/EAS Input Signals</b>	<b>2-3</b>
<b>2.5</b>	<b>ESAS Output Signals</b>	<b>2-4</b>
<b>2.6</b>	<b>EAS Output Signals</b>	<b>2-5</b>
<b>3</b>	<b>INSTALLATION .....</b>	<b>3-1</b>
<b>3.1</b>	<b>Preliminary Connections</b>	<b>3-1</b>
<b>3.2</b>	<b>Signal Monitoring</b>	<b>3-1</b>
<b>3.3</b>	<b>Switch on the EPSILON</b>	<b>3-2</b>
<b>3.4</b>	<b>Switch off the EPSILON</b>	<b>3-2</b>
<b>4</b>	<b>USER INTERFACE.....</b>	<b>4-1</b>
<b>4.1</b>	<b>Source Selector (ESAS only)</b>	<b>4-1</b>
<b>4.2</b>	<b>Status LEDs</b>	<b>4-2</b>
<b>4.3</b>	<b>Alarm LED</b>	<b>4-2</b>
<b>5</b>	<b>MAINTENANCE.....</b>	<b>5-1</b>
<b>6</b>	<b>INTERFACING THE ESAS WITH TWO EPSILON CLOCKS .....</b>	<b>6-1</b>
<b>7</b>	<b>INTERFACING THE EAS WITH ONE EPSILON CLOCK.....</b>	<b>7-1</b>



# 1 Introduction

This document is the User's Manual for the EPSILON Switch and Amplifier System (ESAS) and the EPSILON Amplifier System (EAS).

The ESAS achieves redundant Time & Frequency source monitoring with intelligent and automatic switching. It amplifies signals from the selected source and offers a large quantity of output channels.

The ESAS receives, and monitors continuously, signals from 1 or 2 external clocks:

- Frequency sine wave signal (from 1 MHz up to 20 MHz)
- 1 pulse per second time synchronization (TTL/50□)
- Time Of Day message (RS232C serial line)
- External signals
- External clock status (relay contact)

Monitoring results (lost signal and minimal period detection) are reported to the user through dedicated LEDs. When 2 external clocks are connected, the ESAS offers a powerful redundant function by selecting, automatically, the better source. This automatic selection may be bypassed by the user to allow maintenance or for single clock operation.

In all cases, the distributed signals — Frequency, 1 Pulse Per Second (pps), Time of Day (ToD), and Status — are issued from the same source clock. In automatic mode, when the current selected source is detected faulty, the ESAS switches all the distributed signals to the other source.

The ESAS is available in two heights to adapt the output capacity to the user's requirements:

## **1U high version:**

8 x frequency outputs, 8 x 1pps outputs, 1 x ToD output, 2 x external signals.

## **2U high version:**

16 x frequency outputs, 16 x 1pps outputs, 4 x ToD outputs, 8 x external signals.

## 1.1 Inventory

Before installing your Spectracom product, please verify that all material ordered has been received. If there is a discrepancy, please contact Spectracom Customer Service. Customer service is available by telephone at +33 (0) 1.64.53.39.80 (France), or +1.585.321.5800 (United States). Updated contacts information are available on web site, see "Support" page.

### **CAUTION:**



*Electronic equipment is sensitive to Electrostatic Discharge (ESD). Observe all applicable ESD precautions and safeguards when handling the Spectracom equipment.*

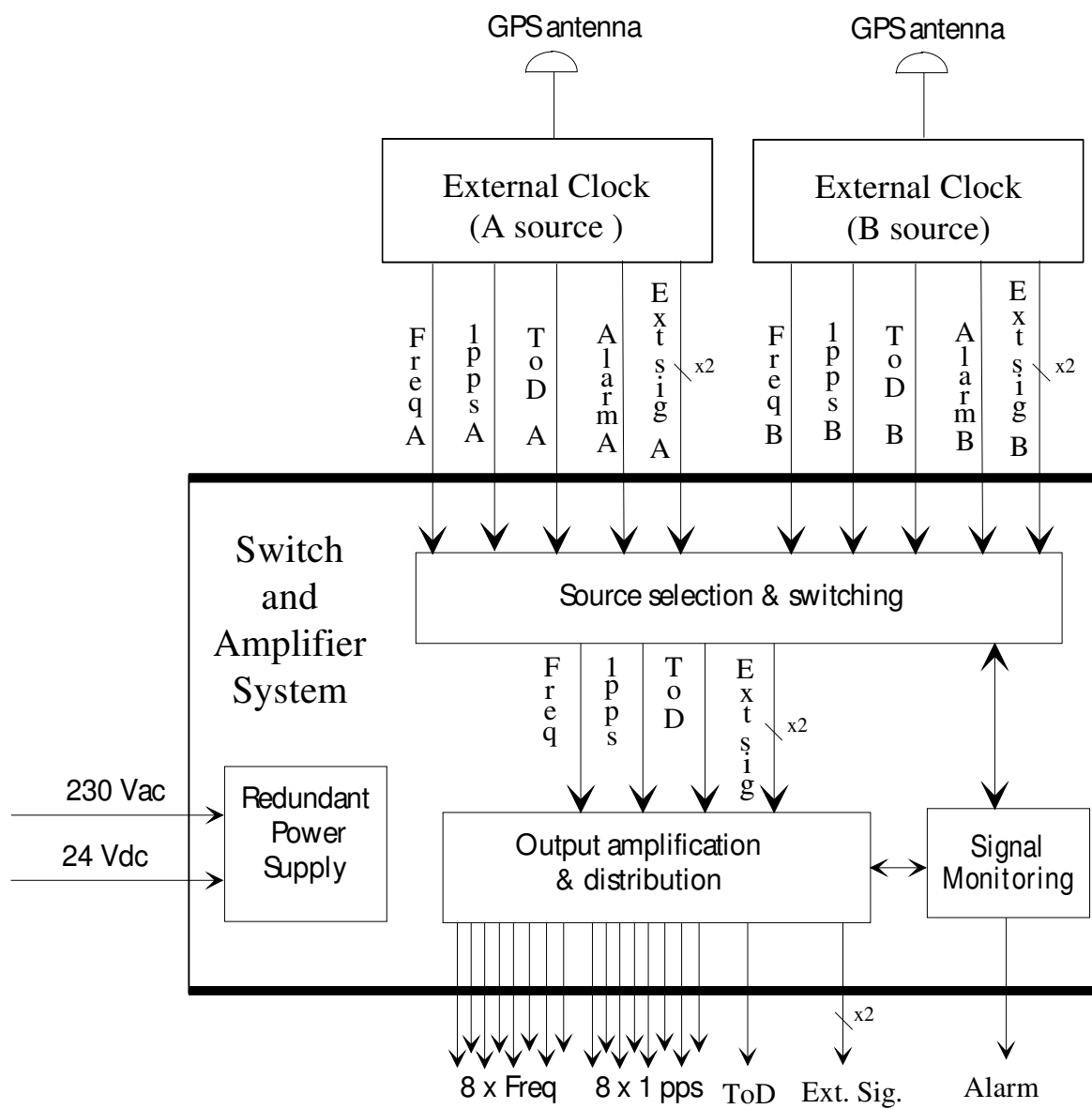
**NOTE:** If equipment is returned to Spectracom, it must be shipped in its original packing material. Save all packaging material for this purpose.

## ***1.2 Inspection***

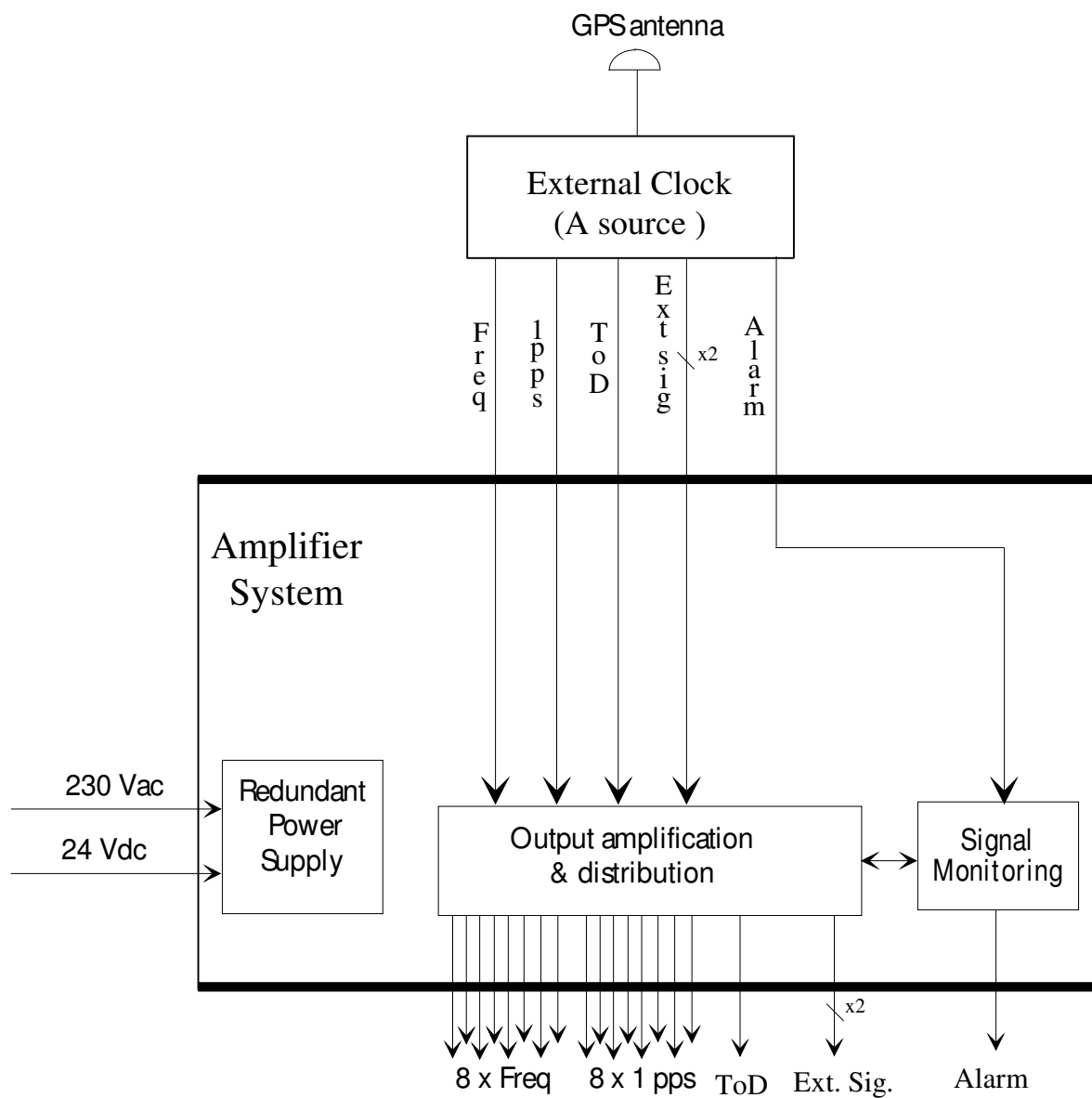
Unpack the equipment and inspect it for damage. If any equipment has been damaged in transit, please contact Spectracom Customer Service. Customer service is available by telephone at +33 (0) 1.64.53.39.80 (France), or +1.585.321.5800 (United States). Updated contacts information are available on web site, see "Support" page.



### 1.3 ESAS 1U Synoptic



## 1.4 EAS 1U Synoptic



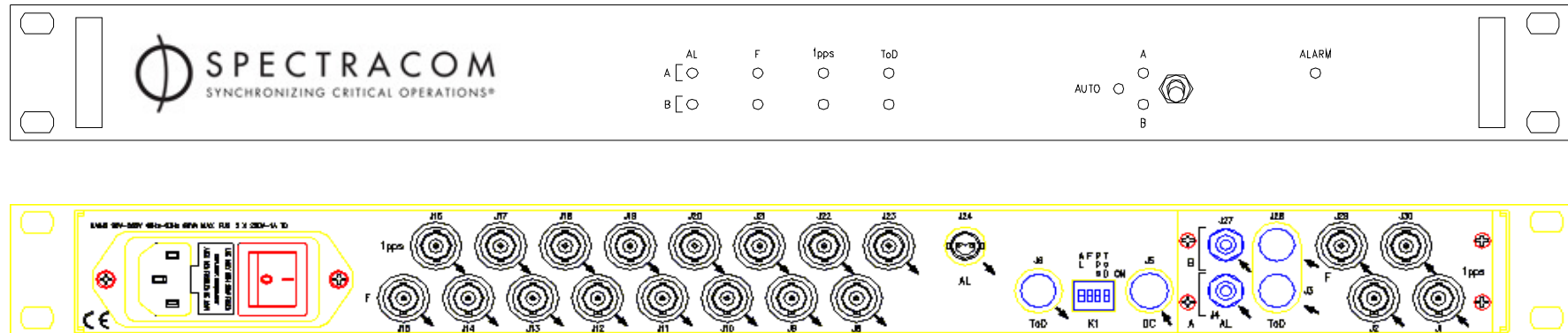
## 1.5 Dimensions and Weight

	ESAS & EAS 1U version	ESAS & EAS 2U version
<b>Height</b>	≈ 44 mm	≈ 89 mm
<b>Width</b>	19" ≈ 483 mm	19" ≈ 483 mm
<b>Depth</b>	≈ 340 mm	≈ 340 mm
<b>Weight</b>	< 5 kg	< 7 kg



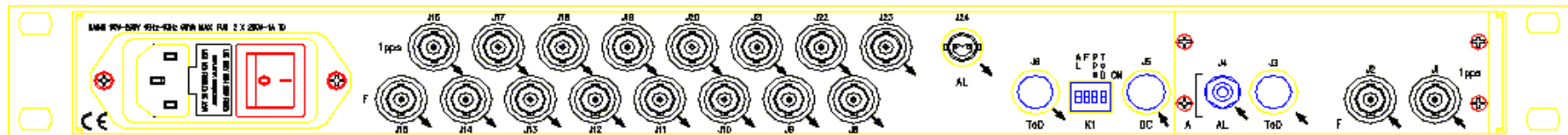
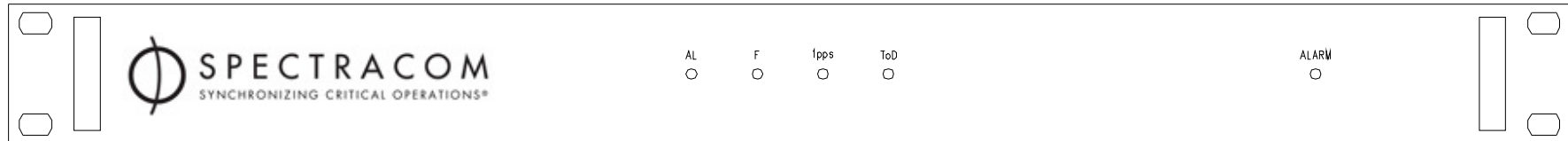
## 1.6 Front and Rear Panel

### 1.6.1 ESAS 1U Version

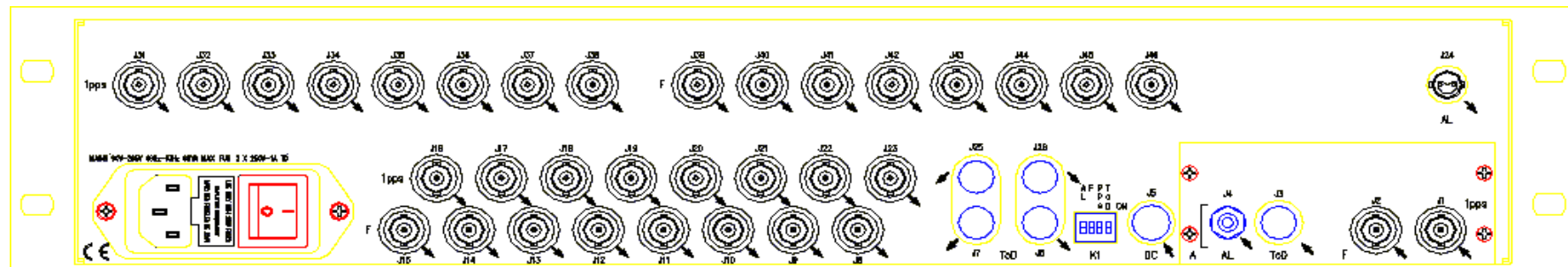


The rear panel of the Spectracom 1550B-14 TD features a variety of connectors and labels. At the top, the Spectracom logo and model name are displayed. Below this, there are two rows of connectors labeled A and B, each with four ports for AL, F, 1pps, and ToD. To the right, there are two rows of connectors labeled A and B, each with one port for ALARM. In the center, there are two rows of connectors labeled A and B, each with one port for AUTO. At the bottom, there are two rows of connectors labeled A and B, each with four ports for AL, F, 1pps, and ToD. The panel also includes a power switch, a power jack, and a power connector.

### 1.6.3 EAS 1U Version



### 1.6.4 EAS 2U Version







## 2 Features

### 2.1 Main Power Supply

Main power connector CCE22 with ON/OFF switch.

Input voltage: 90 to 265 V / 48 to 63 Hz (60VA max.)

Fuses: 2 x 250 V – 1A TD (Time Delay)

Consumption: < 50 W typical

### 2.2 DC Power Supply

Input power (VDC): 18 to 32V

Consumption: < 1A typical.

Protection against polarity inversion.

Protection against short-circuit: polyswitch ensures the isolation of the module in relation to the DC power supply in the event of a short-circuit of the EPSILON's power supply.

Connector: J5 Mini Din 7 pins Female

Pins settings:

Pin Number:

1	+VDC
2	+VDC
3	+VDC
4	+VDC
5	Electrical ground
6	Electrical ground
7	Electrical ground

### 2.3 Environmental Parameters

Operating temperature: -5 °C to +60 °C

Storage temperature: -40 °C to +85 °C

Relative humidity: 90% non-condensing, at +40 °C

#### EMC:

Radiated and conducted Emissions: In accordance with EN 55022 class B

Radiations immunity and conducted disturbances: In accordance with EN 50082-1

Electrostatic discharges: In accordance with EN 50082-1 level B

Low-voltage security:

In accordance with EN 60950

## 2.4 ESAS/EAS Input Signals

	Connector ESAS	Connector EAS	Electrical Characteristics
Frequency_In external clock A	J2	J2	BNC Female: - Core: Sine-wave signal Frequency: 1MHz up to 20MHz Level : 0dBm up to +17dBm - GROUND: electrical ground
Frequency_In external clock B	J29	none	
1PPS_In external clock A	J1	J1	BNC Female: - Core: periodic pulse period : 1s High Level : > 2.4V load 50 Ω low Level : < 0.7V load 50 Ω - GROUND: electrical ground
1PPS_In external clock B	J30	none	
ToD_In external clock A	J3	J3	Mini Din 6 pins Female: Pin number: 1: Reserved                      4: Electrical ground 2: Reserved                      5: Message input (*) 3: Electrical ground          6: NC (*): level RS232C, ASCII message
ToD_In external clock B	J28	none	
ALARM_In external clock A	J4	J4	Jack 3,5mm Mono Female: Input for open collector (current drive: 0,5mA) or for relay contact Ground: Electrical ground
ALARM_In external clock B	J27	none	
External Signals_In external clock A	J3	J3	Mini Din 6 pins Female: Pin number: 1: External_signal 1          4: Electrical ground 2: External_signal 2          5: Reserved 3: Electrical ground          6: NC Characteristic: 30VA / 250V max.
External Signals_In external clock B	J28	none	

## 2.5 ESAS Output Signals

	Connector ESAS 1U	Connector ESAS 2U	Electrical Characteristics
<b>Frequency_Out</b>	J8 , J9 , J10, J11, J12, J13, J14, J15	J8 , J9 , J10, J11, J12, J13, J14, J15, J39, J40, J41 J42, J43, J44 J45, J46	BNC Female: - Core: Sine-wave signal if external clock A selected: J2 input frequency J2 input level $\pm$ 1 dBm if external clock B selected: J29 input frequency J29 input level $\pm$ 1 dBm - GROUND: electrical ground
<b>1PPS_Out</b>	J16, J17, J18, J19, J20, J21, J22, J23	J16, J17, J18, J19, J20, J21, J22, J23 J31, J32, J33, J34, J35, J36, J37, J38	BNC Female: - Core: Periodic pulse if external clock A selected: J1 input periodic pulse if external clock B selected: J30 input periodic pulse High Level : > 2.4V load 50 $\Omega$ Low Level : < 0.7V load 50 $\Omega$ - GROUND: electrical ground
<b>ToD_Out</b>	J6	J6, J7, J25, J26	Mini Din 6 pins Female: Pin number: 1: Reserved 2: Reserved 3: Electrical ground 4: Electrical ground 5: if external clock A selected: J3 input ToD (RS232C) if external clock B selected: J28 input ToD (RS232C) 6: NC
<b>External Signals_Out</b>	J6	J6, J7, J25, J26	Mini Din 6 pins Female: Pin number: 1: if external clock A selected: J3 input External_signal 1 if external clock B selected: J28 input External_signal 1 2: if external clock A selected: J3 input External_signal 2 if external clock B selected: J28 input External_signal 2 3: Electrical ground 4: Electrical ground 5: Reserved 6: NC
<b>Alarm</b>	J24	J24	BR2 Female Resistive Contact Rating (DC Load): 30VA / 250V Ground: Electrical ground

## 2.6 EAS Output Signals

	Connector EAS 1U	Connector EAS 2U	Electrical Characteristics
<b>Frequency_Out</b>	J8 , J9 , J10, J11, J12, J13, J14, J15	J8 , J9 , J10, J11, J12, J13, J14, J15, J39, J40, J41 J42, J43, J44 J45, J46	BNC Female: - Core: Sine-wave signal J2 input frequency J2 input level $\pm 1$ dBm - GROUND: electrical ground electrical ground
<b>1PPS_Out</b>	J16, J17, J18, J19, J20, J21, J22, J23	J16, J17, J18, J19, J20, J21, J22, J23 J31, J32, J33, J34, J35, J36, J37, J38	BNC Female: - Core: Periodic pulse J1 input periodic pulse High Level : > 2.4V load 50 $\Omega$ Low Level : < 0.7V load 50 $\Omega$ - GROUND: electrical ground
<b>ToD_Out</b>	J6	J6, J7, J25, J26	Mini Din 6 pins Female: Pin number: 1: Reserved 2: Reserved 3: Electrical ground 4: Electrical ground 5: J3 input ToD (RS232C) 6: NC
<b>External Signals_Out</b>	J6	J6, J7, J25, J26	Mini Din 6 pins Female: Pin number: 1: J3 input External_signal 1 2: J3 input External_signal 2 3: Electrical ground 4: Electrical ground 5: Reserved 6: NC
<b>Alarm</b>	J24	J24	BR2 Female Resistive Contact Rating (DC Load): 30VA / 250V Ground: Electrical ground



## 3 Installation

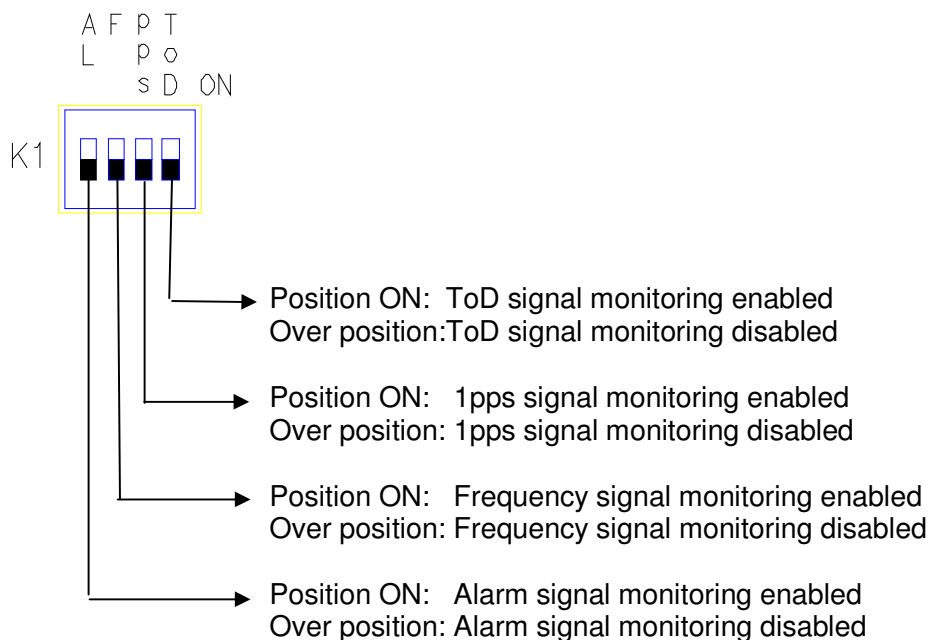
### 3.1 Preliminary Connections

Before using the ESAS or the EAS, the following tasks should be performed:

- The equipment should be positioned with the upper and lower air vents not be obstructed.
- Ensure that the connections between the external clocks and the equipment are compatible with the table in Section 2.4.

### 3.2 Signal Monitoring

Configure the K1 switch to set up the monitoring signals.



When a signal is monitored:

- The loss of input signal generates an alarm. The red LED "ALARM" is on, and the relay contact on the connector AL (J24) is closed.
- The loss of output signal generates also an alarm. The LED "ALARM" is blinking and the relay contact on the connector AL (J24) is closed.

**NOTE:** When signal monitoring is disabled, signal loss does not rise an alarm. The inputs/outputs external signals are not monitored.

### ***3.3 Switch on the EPSILON***

If the EPSILON is connected to the main power supply, place the ON/OFF switch to the “I” position.

**NOTE:** The ON/OFF switch does not act on the DC power supply (J5).

Once switched ON or when DC power supply is plugged on J5, the EPSILON is operative after 5 seconds.

### ***3.4 Switch off the EPSILON***

To switch-off the EPSILON, place the main power switch to the 0 position and/or unplug the DC (J5) power supply.



## 4 User Interface

The user interface consists of by a group of LEDs and a source selector.

### 4.1 Source Selector (ESAS only)

The selector has three locking positions with three yellow LEDs: “A”, “B”, and “AUTO”.

#### **Middle Position: AUTOMATIC MODE**

When this mode is selected, the LED “AUTO” is always on.

The selection of the source A or B (external clock A or external clock B) depends on the results of the signal monitoring process. The following table indicates the source selection versus fault detection:

Source A	Source B	Selected source (*)	LED A	LED B	LED ALARM	Relay contact on J24
OK	OK	A	On	Off	Off	Open
OK	NOK	A	On	Off	On	Open
NOK	OK	B	Off	On	On	Open
NOK	NOK	A	On	Off	Blinking	Close

(\*): the source selection is identical for all outputs signals.

#### **Upper Position: Source A Forced**

When this mode is selected, the LED “AUTO” is always off and the LED “A” is on. This mode forces the selected source A, whatever the results of the signal monitoring process.

Source A	Source B	Selected source	LED A	LED B	LED ALARM	Relay contact on J24
OK	OK/NOK	A	On	Off	Off	Open
NOK	OK/NOK	A	On	Off	Blinking	Close

#### **Lower Position: Source B Forced**

When this mode is selected, the LED “AUTO” is always off and the LED “B” is on. This mode forces the selected source B, whatever the results of the signal monitoring process.

Source A	Source B	Selected source	LED A	LED B	LED ALARM	Relay contact on J24
OK/NOK	OK	B	Off	On	Off	Open
OK/NOK	NOK	B	Off	Off	Blinking	Close

## ***4.2 Status LEDs***

There are 4 green status LEDs for each source:

**AL:** Result of Alarm input monitoring,

**F:** Result of Frequency input monitoring,

**1PPS:** Result of 1PPS input monitoring,

**ToD:** Result of ToD input monitoring.

Leds are ON when signal is monitored and present.

If the signal is absent or not monitored, the corresponding LED is off.

## ***4.3 Alarm LED***

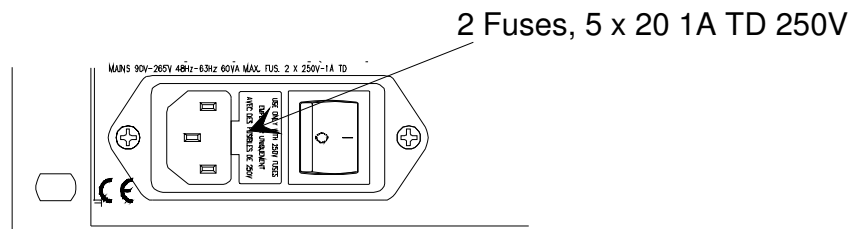
The alarm LED is on when one source *only* is detected faulty. This is a non-urgent alarm because the output signals are still nominal. The relay contact is open.

The alarm LED is blinking when at least 1 output is detected faulty or both sources are detected faulty. This is an urgent alarm because at least one output signal is no longer supplied. The relay contact is closed.

## 5 Maintenance

The ESAS and the EAS are fully automatic. They require no preventive maintenance.

The only curative maintenance operation that may be performed in the field is the main power fuse change.



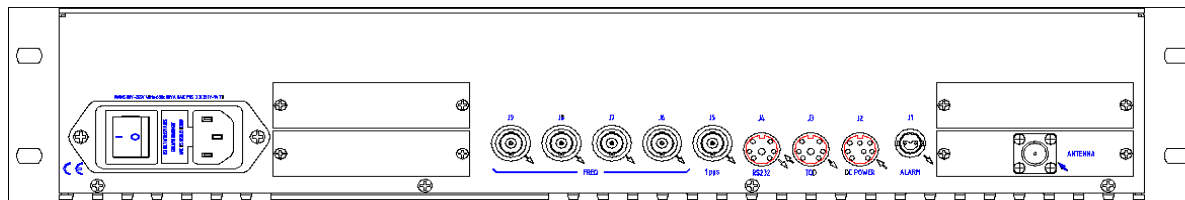




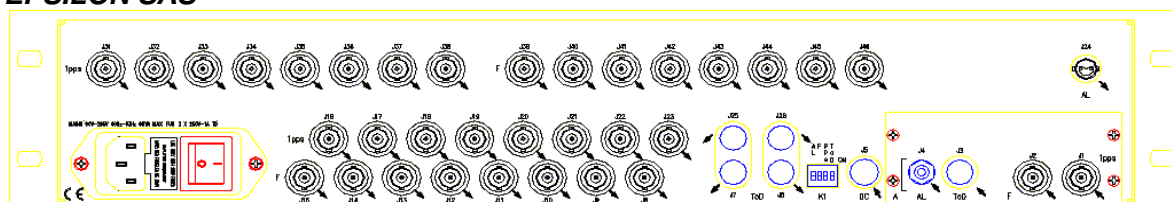


## 7 Interfacing the EAS with One EPSILON CLOCK

***EPSILON clock (Series 2 or Series 3)***



***EPSILON SAS***



## CONNECTIONS

EPSILON Clock	EPSILON SAS	Type of Cable	Function
J6	J2	50 $\Omega$ coax cable	Frequency
J5	J1	50 $\Omega$ coax cable	1PPS
J3	J3	Mini DIN 6 pins male to Mini DIN 6 pins male pin to pin	ToD
J1	J4	BR2 to mono Jack Plug 3.5mm 1 → core 2 → ground	ALARM

Configuration of K1: All enable (refer to *Installation*).





## *REVISION HISTORY*

<b><i>Revision Level</i></b>	<b><i>ECN Number</i></b>	<b><i>Description</i></b>
A	31/01/00	<i>Creation</i>
B	19/04/02	<i>Alarm</i>
C	06/06/	<i>Update, specification improved</i>
D0	29/04/08	First iteration of this Spectracom documentation, converted from previous documentation.
D1	14/10/08	Update marking on rear panel

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