

**MODEL 8144-EE CLOCK SELECTOR/
DISTRIBUTION AMPLIFIER
INSTALLATION AND
OPERATION MANUAL**

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1 Introduction

The 8144-EE is a CEPT Clock Selector/Distribution Amplifier. This product provides twelve individually buffered E1 Framed All Ones outputs derived from the selected E1 output. The Model 8144EE enhances reliability by providing manual or automatic switchover to a backup clock when the primary system clock has failed.

1.1 Features

The Model 8144-EE Clock Selector/Distribution Amplifier offers the following features:

- Manual or automatic switchover between two clock sources or single input operation.
- Local and remote alarm indicators, latching or non-latching, reset from the front panel.
- Selectable input impedance allows bridging or termination of the reference inputs.
- Twelve independent E1 CAS multiframe output signals.
- 19" rack mount options include slides or set-back mounting. Rack mount adapters for 23"/24" mounting are available.

1.2 Configuration Options

The Model 8144-EE Clock Selector/Distribution Amplifier can be ordered in a variety of power, and mounting configurations. When specific configurations are referenced in this Instruction Manual, the format 8144-EE -P-M is used, where P and M are the power and mounting option designations, respectively. These options are listed below in Table 1-1.

Option Type	Option	Designation
Power (P)	AC (Standard)	(none)
	12 to 24 VDC Power	52
	48 VDC Power	54
Mounting (M)	19" Rack (Standard)	(none)
	19" Rack with Slides	11
	23/24" Rack	102
	19" Setback Rack	103

Table 1-1: Configuration Summary

1.3 Specifications

This section lists the specifications for Model 8144-EE Clock Selector/Distribution Amplifier.

1.3.1 Inputs

The Model 8144-EE accepts one or two CEPT clock inputs. Alarm inputs are also available to remotely disable reference inputs.

1.3.1.1 CEPT CLOCK INPUTS

The CEPT clock inputs comply with CCITT G.703 as follows:

Line Rate:	2048 kb/s
Tolerance:	±50 ppm
Level:	1.0 to 3.0 V base-to-peak
Termination:	Balanced twisted pair
Impedance:	Selectable - Terminate 120 ohms ±5%, Bridging >1500 ohms
Pulse Shape:	per Figure 15/G.703

1.3.1.2 Alarm Inputs

The alarm inputs are configured to operate as RS-422/485 receivers as follows:

Line Rate:	DC
Level:	Sensitivity ±200 mV, hysteresis 50 mV typical
Termination:	Balanced twisted pair
Impedance:	Selectable - Terminated 120 ohms ±5% Unterminated > 4K ohms

Alarm inputs can also be configured for contact closure input. A contact closure between pins 1 and 3 on the Alarm Inputs connector disables the A channel. A contact closure between pins 4 and 6 alarms the B channel.

1.3.2 Outputs

The Model 8144-EE provides twelve CEPT clock outputs and Major and Minor Alarm relay outputs.

1.3.2.1 CEPT CLOCK OUTPUTS

The twelve CEPT clock outputs comply with CCITT G.703 as follows:

Line Rate:	2048 kb/s.
Tolerance:	Same frequency as input
Level:	3.0 V base-to-peak
Termination:	Balanced twisted pair
Impedance:	120 ohms
Pulse Shape:	per Figure 15/G.703
Framing:	CAS multiframe

1.3.2.2 Alarm Outputs

Major Alarm Output: Isolated Form C relay contacts rated at 2 amp, 30 VDC.
Minor Alarm Output: Isolated Form C relay contacts rated at 2 amp, 30 VDC.

1.3.3 Power Requirements

Standard power:	115/230 VAC \pm 15% 50/60 Hz, 6 watts
Option 52, 12 to 24 VDC:	\pm 11.0 to 32.0 VDC, 6 watts
Option 54, 48 VDC:	\pm 44.2 to 66.2 VDC, 6 watts

1.3.4 Mechanical and Environmental Specifications

Height:	2 rack units (3.50 inches)
Width:	EIA 19" rack
Depth:	10 inches
Weight:	6 lbs. maximum
Temperature:	0 to +50°C operating range
Humidity:	95% R. H. non-condensing

1.3.5 Status Indicators

The 8144-EE is equipped with status indicators as follows.

The red MAJOR ALARM lamp is turned on when any of the following three conditions occur:

LOS	Loss of CEPT reference signal on both inputs.
AIS	An Alarm Indication Signal (Unframed All Ones) on both reference inputs if AIS is enabled for both inputs.
EXTERNAL ALARM INPUT	An External Alarm Input on both alarm inputs.

The red MINOR ALARM lamp is turned on when any of the following three conditions occur:

LOS	Loss of CEPT reference signal on one input.
AIS	An Alarm Indication Signal (Unframed All Ones) on one reference input if AIS is enabled.
EXTERNAL ALARM INPUT	An External Alarm Input on one alarm input.

READY A/B The green lamps indicate that clock input at A and/or B is available and that the corresponding alarm input is not activated.

SELECTED A/B The green lamps indicate that the A or B clock input has been selected.

1.3.6 Operator Controls

RESET: A momentary contact switch that resets latched MAJOR and MINOR alarms

ACO: Alarm Cut Off. A momentary contact switch that removes the remote alarm condition (unlatches the alarm relays).

AUTO/MANUAL: Enables automatic switchover or manual selection of references.

PWR Turns power ON or OFF. Switch must be pulled out to toggle.

1.3.7 User-Configurable Options

Various options are configured using internal DIP Switches and headers. These options are:

- Channel A/B RS-422/485 Alarm Input Termination – selects the termination impedance for the alarm inputs.
- Channel A/B Clock Input Termination – selects the termination impedance for the input reference clocks.
- Disable Channel B – for installations where only Channel A input is used.
- Major Alarm Indicator/Relay Latch – selects whether a Major Alarm is latched, or reported only while the problem condition exists.
- Minor Alarm Indicator/Relay Latch – selects whether a Minor Alarm is latched, or reported only while the problem condition exists.
- A/B AIS - selects whether the unit recognizes or ignores an Unframed All Ones input as an alarm condition.

1.3.8 Alarm Outputs

Alarm relays allow remote monitoring of operational status. Relay contacts are provided for Major and Minor Alarms.

1.3.9 Alarm Classification

Major Alarm: A Major Alarm is asserted when detected faults compromise output function. The outputs are removed during a Major Alarm condition. The latched alarm relay is reset from the front panel ACO Switch. Faults and conditions listed below actuate a Major Alarm.

LOS	Loss of CEPT reference signal on both inputs.
AIS	An Alarm Indication Signal on both reference inputs.
EXTERNAL ALARM INPUT	An External Alarm Input on both alarm inputs.
POWER FAILURE	External power failure, fuse or internal power supply failure.

Minor Alarm: A Minor Alarm is asserted when failures detected do not affect output function. The latched alarm relay is reset from the front panel ACO switch. Faults and conditions listed below actuate a Minor Alarm:

LOS	Loss of CEPT reference signal on one input.
AIS	Alarm Indication Signal on one reference input
EXTERNAL ALARM INPUT	An External Alarm Input on one alarm input.

1.3.10 Alarm Interface

Alarm Outputs:	Major Alarm, Minor Alarm
Relay Contacts:	NO, NC and common.
Contact Rating:	30 VDC, 2 amps
Connector:	7-position terminal block (supplied)

2 Installation

Install and test your Spectracom equipment as described herein. In all cases, if any problems occur during installation and configuration, please contact Spectracom Technical Support at US +1 585.321.5800.

CAUTION:

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

2.1 Inventory and Parts List

Before installing this equipment, please verify that all material ordered has been received. If there is a discrepancy, please contact Spectracom Customer Service at US 585.321.5800.

2.2 Inspection

Unpack the equipment and inspect it for damage. If any equipment has been damaged in transit, please contact Spectracom Customer Service at US 585.321.5800.

There are several internal jumpers that allow configuration to suit your specific application.

2.3 Preparation for use

This section outlines the set-up procedure for the Model 8144-EE. The configuration jumpers described in this section are located inside the unit. Refer to Figure 2-2, Model 8144-EE Component Location.

2.3.1 AC Line Voltage Selection

The Model 8144-EE is factory set for 115 VAC $\pm 15\%$, 50/60 Hz power line operation. The instrument may also be operated from a 230 VAC $\pm 15\%$, 50/60 Hz power line. For 230 VAC operation, change the voltage selection drum and line fuse as illustrated in Figure 2-1, and as described below:

1. Remove the line cord (if installed) from the line voltage connector.
2. Open the fuse and selector drum cover with a small flat-bladed screwdriver. Insert the screwdriver blade into the cover notch and pry.
3. Pull the voltage selection drum from the power connector assembly. Insert the drum back into the assembly so that the desired line voltage appears through the cover cut-out.

4. Pull the fuse block from the power connector assembly. Replace the fuse with a 1/4 amp, 250V fast-blow fuse for 230 VAC operation.
5. Reinstall the fuse block into the lower fuse compartment. Make certain the arrow on the fuse block is pointing down.
6. Snap the cover door closed.

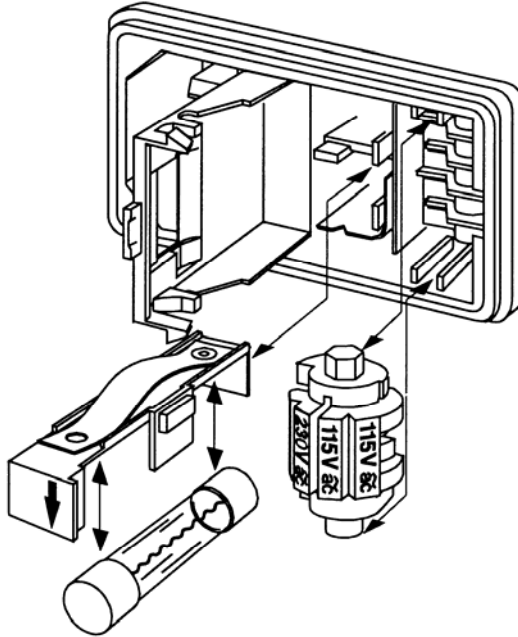


Figure 2-1: Line Voltage Selection/Fuse Replacement

2.3.2 DC Power Options

Check that the power options on the unit match the power available:

Option 52, 12 to 24 VDC:	± 11.0 to 32.0 VDC, 6 watts
Option 54, 48 VDC:	± 44.2 to 66.2 VDC, 6 watts

Check the fuse markings and fuses provided against the values in Section 5.1.

2.4 Configuration Jumpers

Internal selection jumpers determine the input alarm and clock termination, reaction to loss of primary (A) and secondary (B) inputs, whether a second clock input is used, and the latching of the alarm lamps and relays.

A summary of the configuration jumpers is below. A more detailed description follows on subsequent pages.

HEADER	FUNCTION	A	B
H1	B Alarm Termination	High impedance ¹	120 ohms
H2	A Alarm Termination	High impedance ¹	120 ohms
H3	B Clock Termination	120 ohms ¹	High impedance /bridging
H4	A Clock Termination	120 ohms ¹	High impedance /bridging
H7	B Input Alarm Enable	No B Input	B Input ¹
H8	Major Alarm Indicator Latch Select	Latched ¹	Not Latched
H9	Minor Alarm Indicator Latch Select	Latched ¹	Not Latched
H10	Major Alarm Relay Latch Select	Latched ¹	Not Latched
H11	Minor Alarm Relay Latch Select	Latched ¹	Not Latched
H14	A Channel AIS Alarm Select	Alarm on AIS ¹	No Alarm on AIS
H15	B Channel AIS Alarm Select	Alarm on AIS ¹	No Alarm on AIS
H16	Switching Priority	Non-revertive ¹	Revertive with A Priority
H17	Transmit Distant Multiframe Alarm	Enable	Disable ¹

¹ = 8144-EE Factory setting

Table 2-1: Switch and Header Settings Summary

Refer to Figure 2-2, Component Layout, to locate and identify functions of the jumpers.

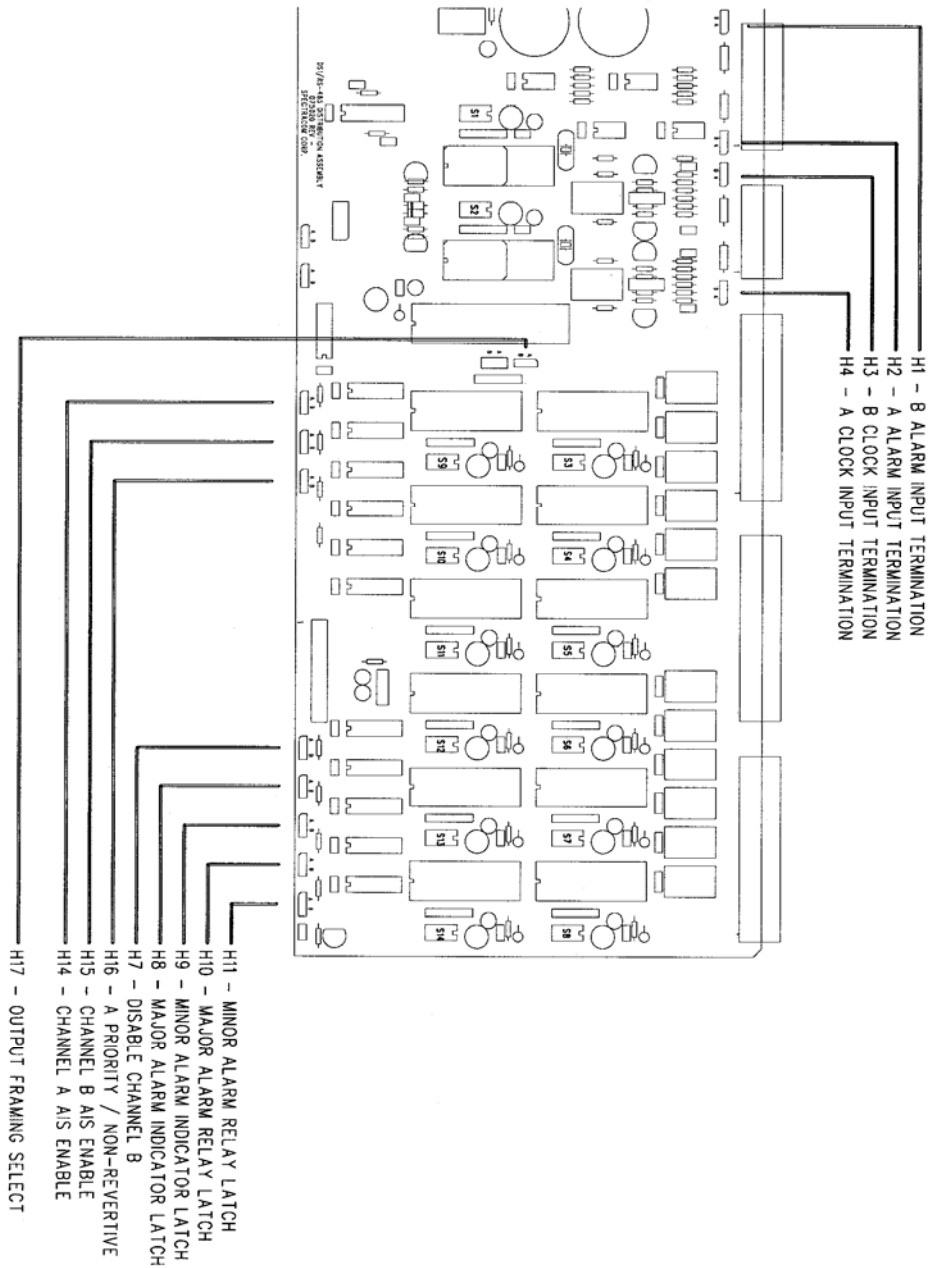


Figure 2-2: Model 8144-EE Component Layout

Remove the top cover of the unit to configure the internal jumpers as follows:

Header H1 B Alarm Input Termination

- Position A Terminates the B Alarm RS-422/485 input with 120 ohms between terminals 4 and 5.
- Position B Removes the 120-ohm termination from the B Alarm input. This position may be used as an RS-422/485 input between terminals 4 and 5, or a relay closure between terminals 4 and 6. Use position B unless RS-422/485 input line needs termination. If relay closure input is used, the header must be in the B position.

Header H2 A Alarm Input Termination

- Position A Terminates the A Alarm RS-422/485 input with 120 ohms between terminals 1 and 2.
- Position B Removes the 120-ohm termination from the A Alarm input. This position may be used as an RS-422/485 input between terminals 1 and 2 or a relay closure between terminals 1 and 3. Use position B unless RS-422/485 input line needs termination. If relay closure input is used, the header must be in the B position.

Header H3 B Clock Termination

- Position A Terminates the B Clock E1 input at terminals 4 and 5 with 120 ohms.
- Position B Removes the terminating resistor for high-impedance input at terminals 4 and 5 for bridging applications.

Header H4 A Clock Termination

- Position A Terminates the A Clock E1 input at terminals 1 and 2 with 120 ohms.
- Position B Removes the terminating resistor for high-impedance input at terminals 1 and 2 for bridging applications.

Header H7 B Input Alarm Enable

- Position A Configures the 8144EE for single input operation. Apply the reference to A clock input connections. Position A on header H7 disables the alarm inputs for the B clock input. Loss of the A reference or the assertion of the A Alarm input now results in a major alarm.
- Position B This is the normal connection using two clock input signals.

Header H8 Major Alarm Indicator Latch Select

- Position A The **MAJOR ALARM INDICATOR** on the front panel is *latched* on by a Major Alarm. A Major Alarm exists when both references are not ready (AIS, LOS), or when both external alarm inputs are asserted. The indicator is reset by the RESET switch when either fault is no longer present.
- Position B The **MAJOR ALARM INDICATOR** on the front panel does *not latch*. The indicator is ON only when a Major Alarm is present. The light extinguishes

automatically when the condition clears. The RESET switch does not reset the indicator.

Header H9 Minor Alarm Indicator Latch Select

Position A The **MINOR ALARM INDICATOR** on the front panel is *latched* on by a Minor Alarm. A Minor Alarm exists when one of the references is not ready (AIS, LOS), or when a single alarm input is asserted. The indicator is reset by the RESET switch when the fault is no longer present.

Position B The **MINOR ALARM INDICATOR** on the front panel does *not latch*. The indicator is ON only when a Minor Alarm is present. The light extinguishes automatically when the condition clears. The RESET switch does not reset the indicator.

Header H10 Major Alarm Relay Latch Select

Position A The **MAJOR ALARM RELAY** is *latched* on by a Major Alarm. A Major Alarm exists when both references are not ready (AIS, LOS), or when both external alarms are asserted. The relay is reset by the ACO switch, even though the fault may still be present.

Position B The **MAJOR ALARM RELAY** does *not latch*. The relay is actuated only when the fault is present. The ACO switch does not clear the MAJOR ALARM relay.

Header H11 Minor Alarm Relay Latch Select

Position A The **MINOR ALARM RELAY** is *latched* on by a Minor Alarm. A Minor Alarm exists when one of the references is not ready (AIS or LOS), or when a single alarm input is asserted. The relay is reset by the ACO switch even though the fault may still be present.

Position B The **MINOR ALARM RELAY** does *not latch*. The relay is actuated only when the fault is present. The ACO switch does not clear the MINOR ALARM relay.

Header H14 A Channel AIS Alarm Select

Position A An AIS (Unframed All Ones signal) on the A channel causes switchover to B and/or alarm.

Position B Unit will accept the Unframed All Ones signal on the A clock input.

Header H15 B Channel AIS Alarm Select

Position A An Unframed All Ones signal on the B channel causes an alarm.

Position B Unit will accept an Unframed All Ones on the B clock input.

Header H16 Switching Priority

Position A Non-revertive switching in automatic mode, unit stays on last input selected until an alarm causes a change to the other input.

Position B Revertive switching with the A input having priority in automatic mode, unit selects A input whenever it is ready.

Header H17 TDMA - Transmit Distant Multiframe Alarm

Position A Enable alarm. Bit 6 in Time slot 16 is set.

Position B Normal. Bit 6 in time slot 16 is clear.

2.4.1 Installation Checkout

1. If applicable, attach one of the optional mounting kits to the unit. Refer to Section 4.2, Mounting Options, for assembly instructions.
2. Check the unit for physical damage and ensure the **PWR** switch is OFF. Connect a good earth ground to the **CHASSIS GROUND** if desired.
3. Locate the terminal block connectors in the ancillary kit and install rear panel connectors as needed. Refer to Figure 2-3, 8144-EE Rear Panel, for locations.
4. Connect the A clock source to terminals 1 and 2 on the **CLKS IN** terminal block. All wiring to the rear panel terminal blocks can be twisted pair. A ground connection is provided for a shield if desired.
5. Connect the B clock source to **CLKS IN** terminals 4 and 5.
6. External alarm sources used to force an input switchover are connected to the **ALM INPUTS** terminal block. The alarm inputs can be either RS-422/485 levels or contact closures.

Pins 1 and 2 are the RS-422/485 A channel alarm inputs. Pins 4 and 5 are the RS-422/485 B channel alarm inputs. In the AUTO mode, a contact closure between 1 and 3 (GND) causes the unit to switch from the A clock source to the B clock source and causes a Minor Alarm. A contact closure between pins 4 and 6 (GND) causes an alarm on the B clock source. **The alarm termination headers H1 and H2 must be in Position B (high impedance) to use contact closure for alarm inputs.** An alarm on both inputs will cause a major alarm.

7. **ALM OUTPUTS** are relay contact closures used for remote indications of clock source failures. During a Major Alarm, Pin 1 on the alarm terminal block is connected to Pin 2 and Pin 3 is open. During a Minor Alarm, Pin 4 on the alarm terminal block is connected to Pin 5 and Pin 6 is open.
8. Up to twelve loads may be connected to the **CLOCK OUTPUTS**.
9. Connect the unit to the appropriate power source and switch **PWR ON**.
10. Check the front panel controls and indicators. Refer to Figure 2-4, 8144-EE Front Panel, for locations of these controls and indicators.
 - a. **ALARMS and INDICATORS:** The **Major** indicator is red if both clock sources have failed. The **Minor** indicator is red if there is a failure of one clock source. Front panel alarm indicators may be cleared with the **RESET** if the clock sources have been restored. The **ACO** clears remote fault indicators even though the alarm conditions still exist.
 - b. The **READY** indicators are green if the corresponding clock input is present.

- c. The green **SELECTED** indicator switch corresponds to the input currently selected.
- d. **AUTO/MAN** switch: In the **AUTO** position and when revertive A priority has been selected on H16, a ready A clock source has priority. Failure of the A clock switches the unit to the B clock input. When the A input returns, the unit will switch back to the A input.

In the **AUTO** position and when non-revertive switching has been selected on H16, selected input can be A or B. Unit stays on the selected input until an alarm causes a switch to the other input.

- e. In the **MAN** position, clock selection is operator-controlled
11. The Model 8144-EE is now operational.

3 Operation

This section describes the front and rear panel functions, switch functions, and operation information for the Model 8144-EE Clock Selector/Distribution Amplifier.

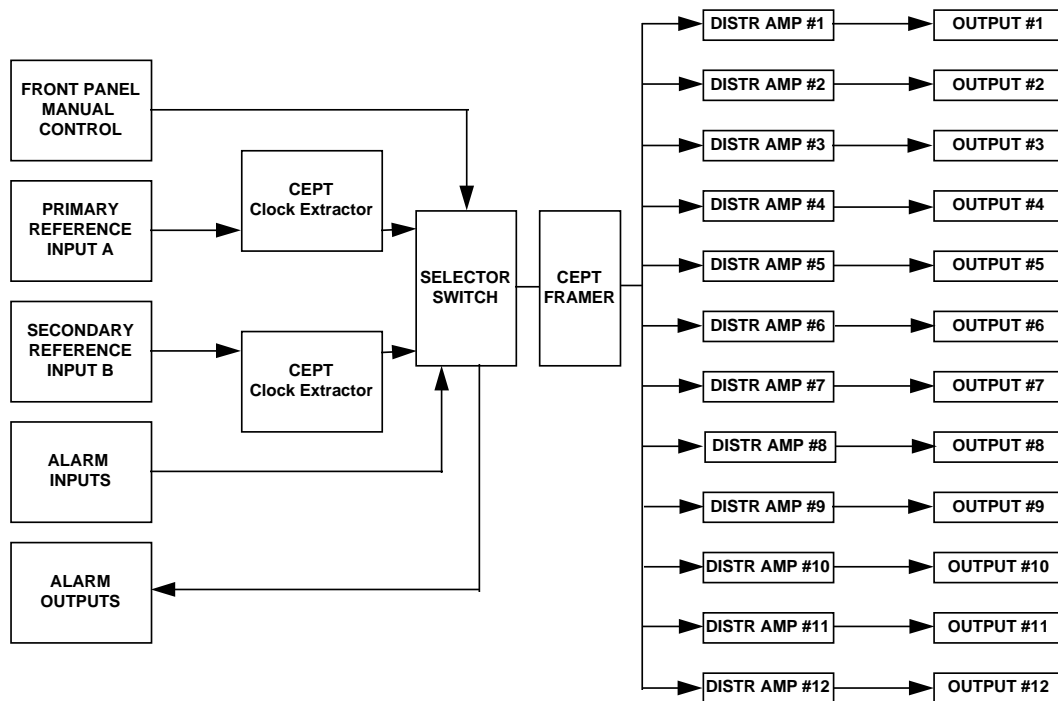


Figure 3-1: Model 8144-EE Block Diagram

3.1 Theory of Operation

The Model 8144-EE is an E1 Clock Selector/Distribution Amplifier. The input circuit can automatically or manually select a clock input, then send that clock to distribution amplifiers. The distribution amplifiers split the clock to twelve outputs and sends them to the rear panel connectors.

The Model 8144-EE can operate in two modes: Automatic or Manual. In automatic mode, the primary (A) clock has priority and is selected if it is present. If the A clock is not present, the secondary (B) clock is automatically selected. Unit default is “switch and stay” (non-revertive switching), but can be configured to “switch back “ (revertive switching) when the A channel returns. In manual mode, the front panel select pushbuttons determine which channel is selected.

In automatic mode, the channels can be selected remotely by asserting an alarm on the rear panel alarm inputs. Putting an alarm condition on the A channel causes the unit to select channel B. An alarm on channel B causes channel A to be selected.

In manual mode, if a channel is selected and an alarm input is asserted for that channel, the outputs are removed. In either mode, if an alarm is asserted on both rear panel outputs, the outputs are removed.

3.2 Front Panel Functions

The following paragraphs describe the front panel functions. Refer to Figure 3-2, 8144-EE Front Panel.

MAJOR ALARM Indicator:

A major alarm exists when both clock references are not ready (AIS or LOS) or both alarm inputs have been activated. This indicator can be either latched on after the occurrence of an alarm, or on only during the alarm condition. This option is selected by internal header H8. If there is only one reference and internal header H7 is set to the A position, the loss of the A reference or activation of the A alarm causes a major alarm.

A major alarm removes the outputs from the rear panel connectors.

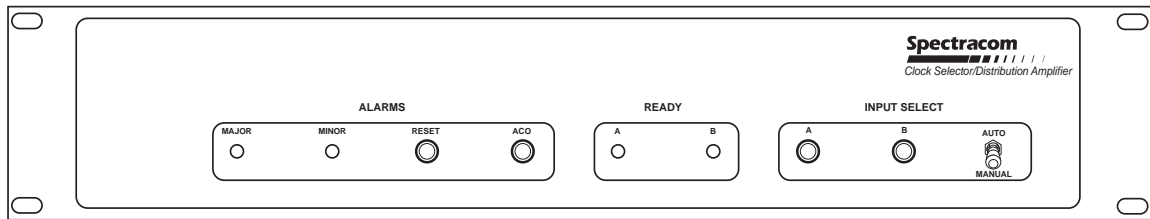


Figure 3-2: Model 8144-EE Front Panel

MINOR ALARM Indicator:

A minor alarm exists when one of the clock references is lost, or upon the activation of one of the alarm inputs.

When only one clock reference is being used, the MINOR ALARM indicator is on constantly, unless header H7 is set to the A position.

RESET Pushbutton:

This pushbutton turns off the alarm lamps if the fault causing the alarm has been corrected. If the lamps have been set to non-latching with internal headers H8 and H9, this button has no effect.

ACO Pushbutton:

Alarm Cut Off. This pushbutton unlatches the alarm relays if the fault causing the alarms has been corrected. If the relays have been set to non-latching with the internal headers H10 and H11, this button has no effect.

A READY Indicator:

This lamp is illuminated if the A reference is ready for use and the A alarm is not activated.

B READY Indicator:

This lamp is illuminated if the B reference is ready for use and the B alarm is not activated.

A SELECTED Indicator:

In manual mode, pressing this button selects the A reference. If the A reference is ready, the light remains on to show A is selected.

In automatic mode, if revertive (A priority) has been configured (H16), the lamp is on if the A READY indicator is on. If non-revertive switching has been configured (H16), the lamp will be on only if A is selected.

B SELECTED Indicator

In manual mode, pushing this button selects the B reference. If the B reference is ready, the light remains on to show B is selected.

In automatic mode, if revertive (A priority) has been configured (H16), the lamp is on only if the B READY indicator is lit and the A READY indicator is off. If non-revertive switching has been configured (H16), the lamp will light when B is selected, and remain on until A is selected.

AUTO/MANUAL Switch

This switch selects automatic switchover or manual control of the clock references. In the AUTO position, the unit will automatically switch to the backup channel if it is ready. In the MANUAL position, the SELECTED pushbuttons control which reference is used. With two ready inputs, if either channel is selected and the corresponding input is removed or goes unready, the output is disabled and the MINOR alarm indicator is lit.

3.3 Rear Panel Connections

Figure 3-3, 8144-EE Rear Panel, and the following paragraphs describe the rear panel functions. Each terminal block is a pluggable connector.

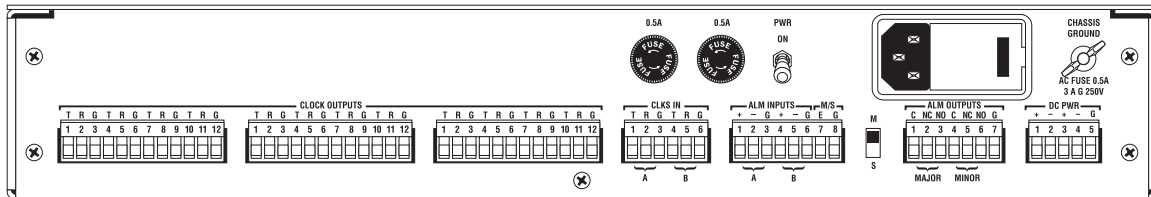


Figure 3-3: Model 8144-EE Rear Panel – AC and DC Connectors

3.3.1 Clock Outputs

There are three connectors with four clock outputs per connector. Each clock output consists of a Tip, Ring, and Ground triad.

Pin #	Function
1	Tip Output #1, 5, 9
2	Ring Output #1, 5, 9
3	Ground
4	Tip Output #2, 6, 10
5	Ring Output #2, 6, 10
6	Ground
7	Tip Output #3, 7, 11
8	Ring Output #3, 7, 11
9	Ground
10	Tip Output #4, 8, 12
11	Ring Output #4, 8, 12
12	Ground

Table 3-1: Clock Output Connector Pins

3.3.2 Clks In

The reference clocks are connected here. There are Tip, Ring, and Ground triads for each input. The A reference input is connected to pins 1, 2, and 3; the B reference is connected to pins 4, 5, and 6.

3.3.3 Alm Inputs

The alarm inputs are connected here. There is a + (plus), - (minus), ground triad for each alarm input. The A alarm is on pins 1, 2, and 3, and the B alarm is on pins 4, 5, and 6. The alarm inputs can be either RS-422/485 levels or contact closures. A contact closure between pins 1 and 3 activates the A alarm. A contact closure between pins 4 and 6 activates the B alarm.

The alarm termination headers must be in their high-impedance setting (H1 and H2 in Position A) to use contact closures for alarm inputs.

When using RS-422/485 levels, an A alarm is asserted whenever the voltage applied on Pin 2 is greater than Pin 1. During normal operation (no alarms) Pin 1 voltage is greater than Pin 2. A B alarm is asserted whenever Pin 5 is greater than Pin 4. During normal operation (no alarms) Pin 4 is greater than Pin 5.

3.3.4 Alm Outputs

Relay contacts are provided for remote alarm indications. Terminals 1 and 2 provide a contact closure for a MAJOR ALARM (loss of both clock inputs, power failure, etc.), and terminals 1 and 3 provide a contact open. Terminals 4 and 5 provide a contact closure and terminals 4 and 6 provide a contact open for a MINOR ALARM (loss of one reference input). Contacts are rated for 2 amps at 30 VDC and are isolated from ground.

3.3.5 Power Connections

Check the serial number tag to verify the power option(s) installed in your 8144-EE.

Standard: 115/230 VAC 50/60 Hz

Option 52, 12 to 24 VDC: ± 11.0 to 32.0 VDC

Option 54, 48 VDC: ± 44.2 to 66.2 VDC

DC options provide dual fused inputs and reverse polarity protection.

The DC PWR terminals are provided for two DC power sources and polarity is marked on the chassis. **Both sources must have the same polarity referenced to ground.**

If AC power is provided, check the voltage selector in the AC power connector and connect the power cord. If necessary, refer to Section 2.1.1, AC Line Voltage Selection, to change to 230 VAC power.

3.3.6 Chassis Ground

This ground stud allows connection of the Model 8144-EE chassis to earth ground. Connect the chassis ground to a known well-grounded frame or a ground stake using the largest cable conductor possible.

3.3.7 Pwr On/OFF

This switch turns power on to the internal DC to DC converter in the unit.

WARNING:

The AC section is ALWAYS on, if AC power is used.

The red LED inside the unit is illuminated whenever AC power is connected to the unit.

3.3.8 Fuses:

Two DC power fuses are provided if unit is configured for either of the DC power options (Option 52 or Option 54). Fuse requirements are listed in Section 5.1.

4 Options

4.1 DC power OPTIONS 52 and 54

DC Power Options allow the Model 8144-EE to operate from a DC voltage source. The DC power connection is made at the **DC PWR** terminal block. The optional input voltages are listed below:

OPTION 52	12 to 24 VDC	± 11.0 to 32.0 VDC, 6 watts
OPTION 54	48 VDC	± 44.2 to 66.2 VDC, 6 watts

The isolated inputs of the DC to DC converter permits either polarity of voltage to be used.

4.2 Mounting Options

There are three mounting options available in addition to the standard 19-inch rack mount.

4.2.1 Option 11, Slides

Option 11 allows the Model 8144-EE to be mounted in a 19-inch rack with slide-out capabilities. Table 4-1 lists the hardware supplied with Option 11. Verify that these items have been received.

Quantity	Description
1	Right-hand slide assembly
1	Left-hand slide assembly
2	Filler plates (not used)
2	Adjustable rear support bracket
1	Hardware Pack containing nut plates, small rear support brackets, and assorted hardware.
1	Hardware pack containing #10 nuts and #10-32 x 1/2 truss head screws
1	Hardware pack containing #10 nuts and #10-32 x 3/8 pan head screws

Table 4-1: Option 11 Checklist

Install Option 11 as follows:

1. Remove the chassis section from the right-hand slide rail assembly. The right hand assembly is designated with the letters *RH* after the manufacturer's date code label.

Attach the chassis section to the Model 8144-EE using #10-32 screws. The locking tab must be toward the rear of the unit.

2. Repeat Step 1 for the left chassis section.
3. Mount the right and left stationary sections into the rack using the appropriate rear support brackets, nut plates and required hardware.
4. Insert the unit into the rack assembly. Secure the Model 8144-EE to the rack using the front panel mounting holes.

4.2.2 Option 102, 23/24-inch Rack Mount

Option 102 provides the hardware to mount the Model 8144-EE in a 23- or 24-inch rack. Table 4-2 lists the parts supplied with Option 102. Verify that these items have been received.

Quantity	Description
2	23/24 Mounting Plate
4	#10-32 Hex Nut
4	#10 Split Lockwasher
4	#10 Flat Washer
4	#10-32 x 1/2 Philips Pan Head Screw

Table 4-2: Option 102 Checklist

A Philips screwdriver and a 3/8-inch nut driver are needed to assemble the rack mount kit. To assemble the kit, attach the mounting plates to each side of the Model 8144-EE with the hardware provided.

4.2.3 Option 103, Setback Mount

Option 103 provides the necessary hardware to mount the Model 8144-EE in a setback position. Table 4-3 list the parts supplied with Option 103. Verify that these items have been received.

Quantity	Description
2	Setback Mounting Bracket
4	#10 Split Lockwasher
4	#10-32 x 1/2 Philips Pan Head Screw

Table 4-3: Option 103 Checklist

A Philips screwdriver is needed to assemble the setback mounting kit. To assemble the kit attach the mounting brackets to each side of the Model 8144-EE with the hardware provided.

5 Maintenance and Calibration

There are no components that require periodic maintenance or adjustments.

5.1 FUSE REQUIREMENTS

115 VAC, 0.5 amp, 250V, Fast-Blo

230 VAC, 0.25 amp, 250V, Fast-Blo

DC options have different fuse requirements.

Option 52: 12 to 24 VDC 2.0 amp, 250V, Slo-Blo (2 required)

Option 54: 48 VDC input 0.5 amp, 250V, Fast-Blo (2 required)

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