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3.4 DS1/E1 Output Module

3.4.1 Module Description

The DS1/E1 PLL Output Module is an optional output distribution module that provides ten balanced outputs for use with AMI type signals. Usually, this module is paired with a second module. In that configuration, the outputs of each module tie together forming ten redundant pairs. They can be used as a redundant pair in output slots A4 and A5 of the Main Shelf. The output can also be used as redundant pairs in output slots A2 through A11 of an expansion shelf. Table 3.4-1 lists the Item Number for this module and Figure 3.4-1 shows the module's front panel.

Table 3.4-1: Module Item Numbers

ITEM NUMBER	DESCRIPTION
23413057-000-0	Module, DS1/E1PLL Output Module

3.4.2 Indicators

Table 3.4-2 provides a description of the indicators on the panel of the DS1/E1 Output Module.

Table 3.4-2: Indicators, DS1/E1 Output Module

INDICATOR	COLOR	DESCRIPTION
Power	Green	On = Module is receiving power Off = Module is not receiving power
Status	Green / Amber	Green = Module in normal operation Amber = Module has input or output failure
Source A	Green / Amber	Green = Input to module is present and selected Amber = Input to module is faulted Off = Input to module is not present, or not selected
Source B	Green / Amber	Green = Input to module is present and selected Amber = Input to module is faulted Off = Input to module is not present, or not selected

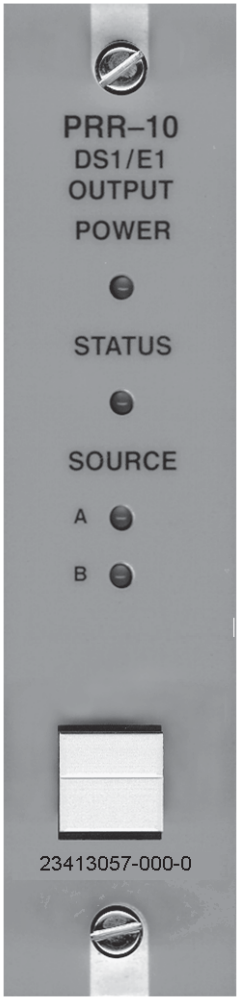


Figure 3.4-1: DS1/E1 Output Module Front Panel

3.4.3 Functional Description

The following discussion refers to Figure 3.4-2 Block Diagram, DS1/E1 Output Module.

The A and B –48 V Power are combined to supply power to the DC to DC converter that converts the input power to the required levels for powering the circuits.

This module accepts two clock source inputs, A or B, from separate Reference Controller Modules via the PRR-10 clock bus. The Source A or B indicator will be illuminated green indicating which clock source is selected and being used. In normal operation, the Status Indicator is illuminated green.

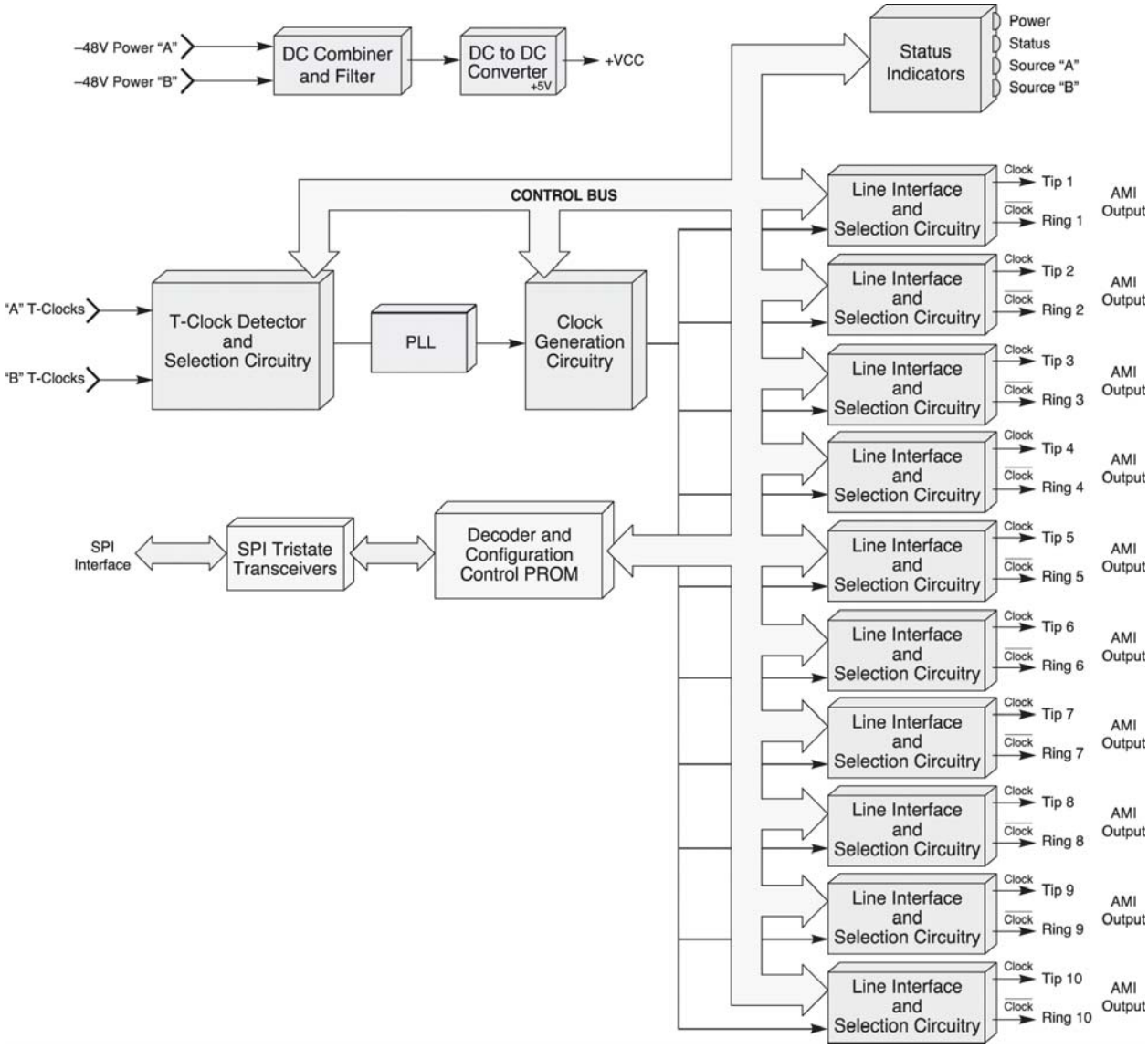
The module selects one of the clock sources (normally clock source A), converts it to an AMI format and amplifies it. This signal couples to the output ports through line interface drivers. The DS1 line interfaces are user selectable to compensate for line lengths in five increments, 0-133 ft (0-40 m), 133-266 ft (40-80 m), 266-399 ft (80-120 m), 399-533 ft (120-160 m) and 533-655 ft (160-197 m). There is no compensation for E1 line interfaces.

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If clock source A fails, the module detects its loss and switches to clock source B. Source A indicator will be illuminated yellow and Source B indicator will be illuminated green. The user may also select which clock source is to be used. The outputs are checked for signal presence. Should a clock source or output fail, the front panel status indicator will be illuminated yellow, and the failure is reported to the Reference Controller Module.

Configuration control information for each module is stored at the factory in non-volatile memory on the card. This information is accessed via tristate transceivers and decoder circuitry using the Serial Peripheral Interface (SPI) bus by a Reference Controller Module. The user can request this information via one of the PRR-10 communications ports using the commands described in the Operation Section of this user guide.

Figure 3.4-2: Block Diagram, DS1/E1 Output Module



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3.4.4 Specifications

Table 3.4-3 lists the specifications for the DS1/E1 Output Module.

Table 3.4-3: Specifications, DS1/E1 Output Module

CHARACTERISTIC	SPECIFICATION
DC Voltage	42 Vdc to –72 Vdc
Module Power @ 48Vdc	< 9 watts, nominal
Serial Peripheral Interface	Data & Clock, EIA are RS-485 levels Address Lines are logic levels logic 0 = .5 V logic 1 = 4.5 V
Clock Bus	A/B T-pos, A/B T-neg & A/B T-clock, EIA RS-422 levels
DS1 Outputs	
Signal	D4/SF or ESF (user selectable)
Format	Framed, All Ones, Alternate Mark Inversion (AMI)
Waveshape Rise Time Pulse Width Pulse Interval Duty Cycle	Per ANSI T1.102 < 100ns < 324 ns, nominal < 648 ns, nominal 50/50
Amplitude	3 ± 0.6 Volts base to peak
Overshoot	< 10% of base to peak amplitude
Jitter	< 0.01 UI
Drive Capability	0 to 655 feet, 22 AWG ABAM cable or similar
Termination Impedance	100 ohms ± 5%
E1 Outputs	
Signal	HDB3
Format	Framed, All Ones, Alternate Mark Inversion (AMI)
Waveshape Rise Time Pulse Width Pulse Interval Duty Cycle	Per ITU-T Rec. G.703/6 < 100 ns. < 244 ns, nominal 488 ns, nominal 50/50
Amplitude	3 ± 0.6 Volts base to peak
Overshoot	< 10% of base to peak amplitude
Jitter	< 0.01 UI
Drive Capability	Per ITU-T Rec. G703
Termination Impedance	120 ohms ± 5%

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3.4.5 Installation and Operation

The user can modify selectable perimeters of the module via one of the PRR-10 communications ports using the commands described in the Operations Section of this user guide.

The Factory Default setting, unless otherwise specified, for all outputs:

Line Length: 0-133 ft (0-40 m)

3.4.5.1 Module Insertion

To install an output module in the PRR-10, insert it into the card guides located in the top and bottom of the shelf. Slide the module into the guides until it seats into the connector on the backplane. Tighten the captive screws located at the top and bottom of the module's panel.

Caution Be careful to completely insert the module into the slot and tighten the captive screws. A partially inserted module may be damaged or may not function properly.

3.4.5.2 Connections

Verify that output signal connections to the corresponding output channel connectors have been done. These connectors contain tip, ring and sleeve connections, and are on the rear of the instrument. Refer to the Installations Section, Output Signals, for detailed instructions for connecting output signals.

3.4.5.3 Operational Check

1) After installing the module and with power applied to the instrument, verify the POWER indicator lights.
2) Verify the module is set up properly for the signals the signal outputs.
3) Verify the module is receiving the input signals by observing the indicators.
4) For normal operation, the indicators should be as follows with redundant Reference Controller Modules:

INDICATOR	STATE
POWER	Green
STATUS	Green
SOURCE "A"	Green
SOURCE "B"	Off

Note Indicators may take a few seconds after module insertion to reach proper status.

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