

SSM-2000

100 MHz Standard Temperature OCXO Source Module



Key Features

- Four 100 MHz sine wave outputs and two 100 MHz LVDS outputs
- Integrated power supplies, filters, and distribution amplifier
- Disciplined or free-running operation
- Very low phase noise of -118 dBc/Hz at 100 Hz offset, and noise floor of -160 dBc/Hz

Applications

- Unmanned Aerial Vehicles (UAV's)
- Radar systems
- Military satcom terminals
- Tactical radios
- Test equipment

The Symmetricom® SSM-2000 is a compact, self-contained module that provides six 100 MHz outputs with high stability and very low phase noise, over a wide operating temperature range of -25°C to $+75^{\circ}\text{C}$.

The SSM-2000 is based on a 10 MHz single-oven OCXO with low g-sensitivity and low tilt sensitivity. This is used to phase lock a 100 MHz VCXO with excellent phase noise characteristics: <-118 dBc/Hz phase noise at a 100 Hz offset, and a noise floor of <-160 dBc/Hz. An onboard microprocessor provides aging and tempco correction for the SSM-2000, and the entire unit can be disciplined by an external 1 PPS or 10 MHz input.

Outputs are four separate 100 MHz sine wave signals with $+6$ dBm amplitude, and two LVDS-compatible 100 MHz signals. The SSM-2000 also provides an LVDS-compatible

1 PPS output.

The SSM-2000 supports SCPI commands for status, control, and monitoring, and it also has TTL LOCK/ALARM status indicators. The built-in serial interface is user-selectable between TTL or RS-232-compatible levels.

The SSM-2000 consumes <3.2 W steady state at $+25^{\circ}\text{C}$, and it has a low profile height of only 0.66." As a free-running source, it has a holdover stability of ± 20 μs over a 3-hour period at $+25^{\circ}\text{C}$.

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Specifications

ELECTRICAL SPECIFICATIONS

MODULE

1 PPS Accuracy	±35ns rms to external reference, 16.666ns resolution
Frequency Accuracy	Better than ±8E-10 to external reference after 20 minutes
Holdover Stability	±20µs/3 hrs @25.0°C, no airflow or motion, with 2 hrs reference lock
ADEV	1s: <1E-11, 10s: <4E-11
1 PPS Outputs (OCXO Flywheel Generated)	LVDS rising-edge aligned, ultra low jitter, sawtooth removed
100MHz Outputs GPO/MMCX	2x LVDS 100MHz, 4x 100MHz 50 Ω ±6dBm sine
RS-232 Control	Full control via SCPI-99 control commands, TTL or RS-232
External Reference Input	1PPS LVDS or 10MHz sine, auto-switchover or manual select
TTL Alarm Output	Holdover and hardware failure indicator (low active, 3.3V CMOS)
Warm Up Time / Stabilization Time	<15 min to <1.0E-09 accuracy at +25°C, with onboard reference only (typical)
Supply Voltage (Vdd)	13.8V to 15.5V DC, 15V nominal, <=100ms rise-time
Power Consumption	< 3.2W at +25°C, steady-state
Operating Temperature	-25°C to +75°C
Environmental Conformance	MIL-STD-202, method 204, condition I-A
Storage Temperature	-55°C to +90°C
Weight	< 55 grams

OSCILLATOR SPECIFICATION

Frequency Output	4x 100MHz, GPO connectors, 2x LVDS Samtec connector
100MHz Retrace	±5E-08 after 1 hour, no reference lock, 24 hours off
Frequency Stability	±1.2E-08 temperature coefficient ±2.5E-9/g/axis, acceleration sensitivity, 10MHz ±3.0E-09/g/axis acceleration sensitivity, 100MHz
Output Amplitude	6dBm ±2dB
Frequency adjustment range (SCPI control or to external reference)	At least ±40Hz @ 100MHz
Harmonics (Sine Output)	<-45dBc
Aging	<0.5ppm in 10 years
Warm Up Time at 25°C	< 8 min to ±2E-8 (ref. to frequency after 1 Hr)

PHASE NOISE 100MHz OUT

1Hz	-65dBc/Hz
10Hz	-85dBc/Hz
100Hz	-118dBc/Hz
1kHz	-140dBc/Hz
10kHz	-155dBc/Hz
100kHz	-160dBc/Hz

Connector Type: Samtec, PN: TFML-115-01-S-D-LC

PIN	DESCRIPTION	LEVEL	IN/OUT
1	GND	GND	IN
2	GND	GND	IN
3	+15V Power	13.8V to 15.5V	IN
4	+15V Power	13.8V to 15.5V	IN
5	GND	GND	IN
6	GND	GND	IN
7	SCPI TXD TTL	3.3V CMOS	OUT
8	SCPI TXD RS232	RS232	OUT
9	GND	GND	IN
10	SCPI RXD RS232	RS232	IN
11	SCPI RXD TTL	3.3V CMOS	IN
12	GND	GND	IN
13	RESET#	3.3V Open Collector	IN
14	100MHz LVDS-A P	LVDS	OUT
15	EVENT#	3.3V CMOS	OUT
16	100MHz LVDS-A N	LVDS	OUT
17	GND	GND	IN
18	GND	GND	IN
19	TTL#/RS232	3.3V CMOS	IN
20	100MHz LVDS-B P	LVDS	OUT
21	ENTER ISP#	3.3V CMOS	IN
22	100MHz LVDS-B N	LVDS	OUT
23	GND	GND	IN
24	GND	GND	IN
25	1PPS REF-IN P	LVDS	IN
26	1PPS OUT P	LVDS	OUT
27	1PPS REF-IN N	LVDS	IN
28	1PPS OUT N	LVDS	OUT
29	GND	GND	IN
30	GND	GND	IN

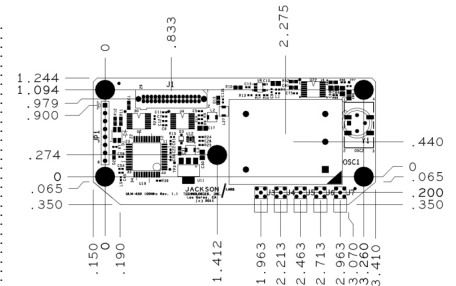


Figure 1: Connector Pinout Schematic

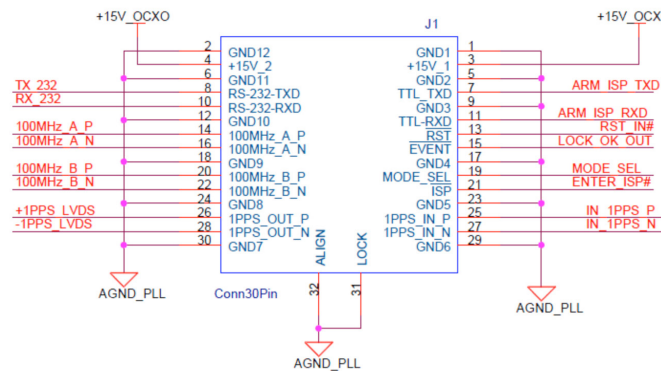


Figure 2: Connector Pinout Schematic