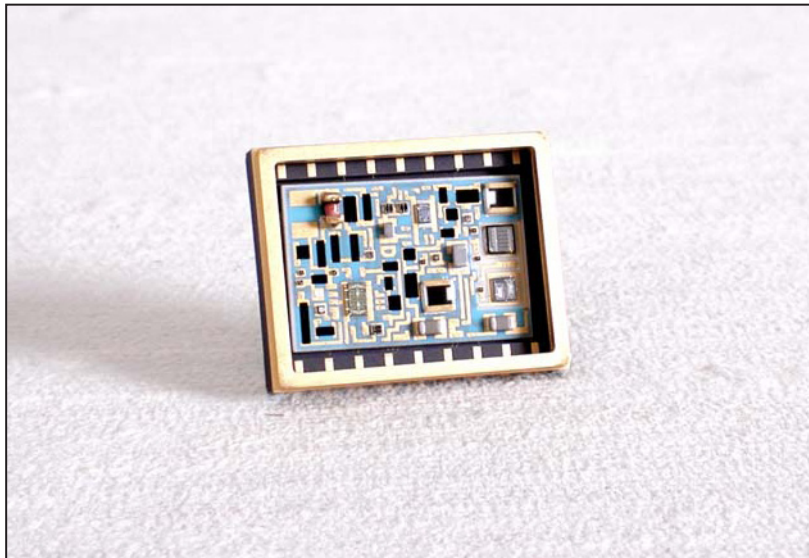


OSC-15803

RADIATION TOLERANT SYNCHRO/ RESOLVER/INDUCTOSYN[®] REFERENCE OSCILLATOR

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FEATURES

- Quadrature Reference Output Voltages for Inductosyn Applications
- Scalable Output Frequency from 400 Hz to 20 kHz
- Small 18-Pin DDIP
- Scalable Reference Output
- -55°C to 125°C Operating Temperature Range
- Radiation Tolerant. Contact Factory for Specifications on Total Dose and Single Event Effects

DESCRIPTION

The OSC-15803 is a quadrature power oscillator with two outputs that are 90° out of phase. These outputs provide both the reference and quadrature signals, simultaneously, making the OSC-15803 ideally suited for Inductosyn applications.

The oscillator's outputs are pin-scalable for both frequency and amplitude. The output frequency can be programmed from 400 Hz to 20 kHz by simply connecting two external capacitors. The Reference output voltage, 8.8 Vrms at 20 kHz, can be scaled down by connecting a single resistor.

APPLICATIONS

Packaged in an 18-pin hermetic DDIP, the OSC-15803 operates over a temperature range of -55°C to +125°C. This, combined with its small size and scalable output voltage and frequency capabilities, makes it an excellent choice for use in Inductosyn applications.

WARNING: EXPORT CONTROLLED PRODUCT

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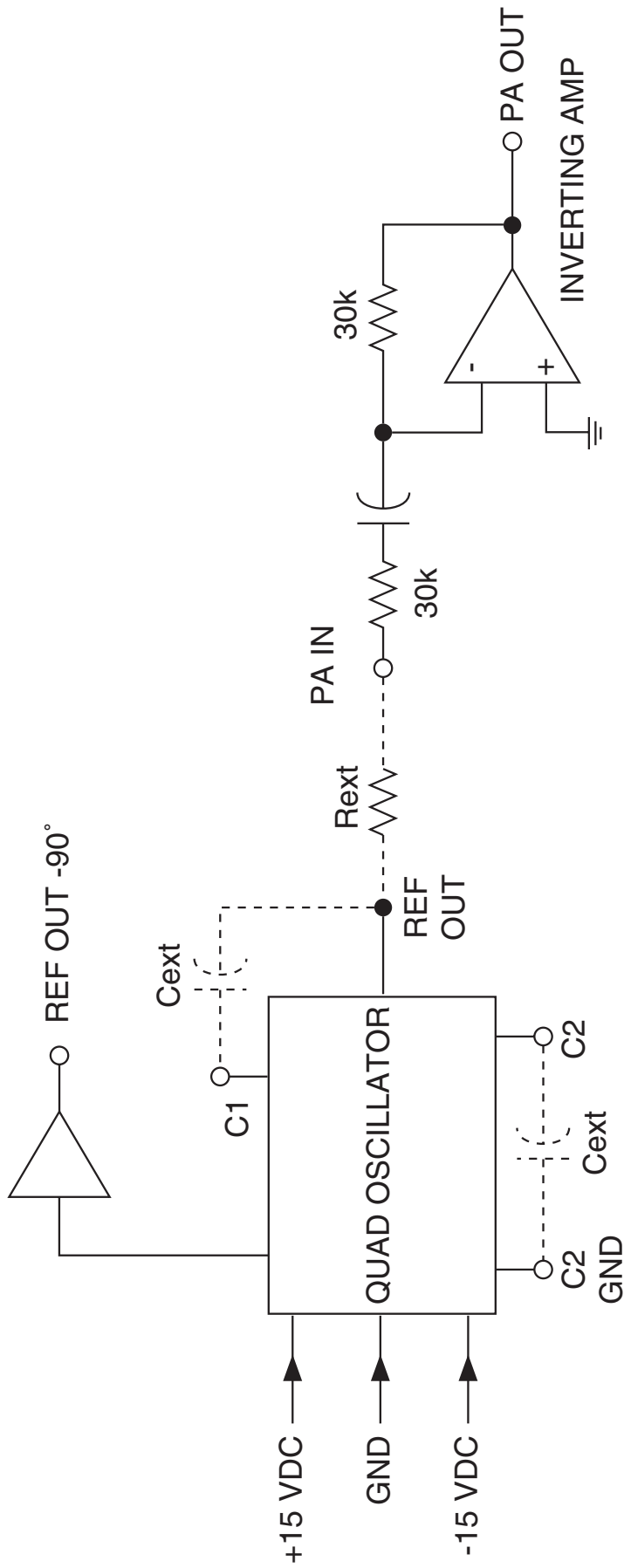


FIGURE 1. OSC-15803 BLOCK DIAGRAM

TABLE 1. OSC-15803 SPECIFICATIONS

Specifications apply over temperature range and power supply range.

PARAMETER	UNITS	VALUE
FREQUENCY	Hz	Scalable from 400 to 20k
OUTPUTS (Note 1) PA OUT Voltage Continuous Current Protection REF Voltage Continuous Current Protection REF -90° Voltage Continuous Current Protection Output Impedance	V rms mA rms V rms mA rms V rms mA rms Ω	6.2 to 8.8 215 max Momentary short circuit (1 sec. max.) 6.2 to 8.8 3 max Momentary short circuit (5 sec. max.) (Note 2) 3 max Momentary short circuit (5 sec. max.) 0.87 (typ)
POWER SUPPLIES Voltage Current Max Voltage without damage	Vdc mA Vdc	±15 ±5% 15 max plus current load ±18
TEMPERATURE RANGE Operating -10X -30X Storage JC (Junction to Case)	°C °C °C °C/W	-55 to +125 0 to +70 -65 to +150 8
PHYSICAL CHARACTERISTICS Size Package Type Weight (Max)	in (mm) oz (gm)	1.0 x 0.8 x 0.2 (25.45 x 20.32 x 4.83) 18-pin DDIP 0.4 (11.3)

Notes:

1. Output voltage tracks ±15 V supply levels.
2. Clipped sine wave for demodulator drive only, 10 Vrms typ.

OSC-15803 OPERATION

SCALABLE FREQUENCY OUTPUT

The output frequency of the OSC-15803 is scalable from 20 kHz down to 400 Hz. The frequency is programmed using two external equal value capacitors (see FIGURE 2). The value of the capacitors (C_{ext}) is calculated as follows:

$$C_{ext} = (2,400,000/f) - 100$$

where: C_{ext} is capacitance in picofarads,
f is frequency in Hertz.

TYPICAL SCALABLE REFERENCE VOLTAGE OUTPUT ($R_{EXT} = 0$)

The PA OUT (REF), pin 13, provides from 7.0 to 7.3 Vrms, depending on the operating frequency. TABLE 2 lists the PA OUT voltages at the (programmed) operating frequency. These voltages are typical voltage values obtained at these frequencies, when $R_{ext} = 0$ Ohms (pin 7 jumped to pin 3). For actual voltages at the user's frequency, the value of PA OUT can be measured on pin 13.

TABLE 2. PA OUT/FREQUENCY	
PA OUT	FREQUENCY
7.3 Vrms	20 kHz
7.1 Vrms	10 kHz
7.0 Vrms	.4 kHz

To scale down the PA OUT voltage, an external resistor (R_{ext}) is connected between pins 3 and 7. The value of R_{ext} is calculated as follows:

$$R_{ext} = 30 [(PA\ OUT/desired\ voltage) - 1]$$

where: R_{ext} is in kOhms,
desired voltage is in Vrms,
PA OUT is dependent on frequency used.

FOR EXAMPLE, to scale down PA OUT to 5 Vrms at 10 kHz, the value of R_{ext} would be calculated as follows:

$$R_{ext} = 30 [(PA\ OUT/desired\ voltage) - 1]$$

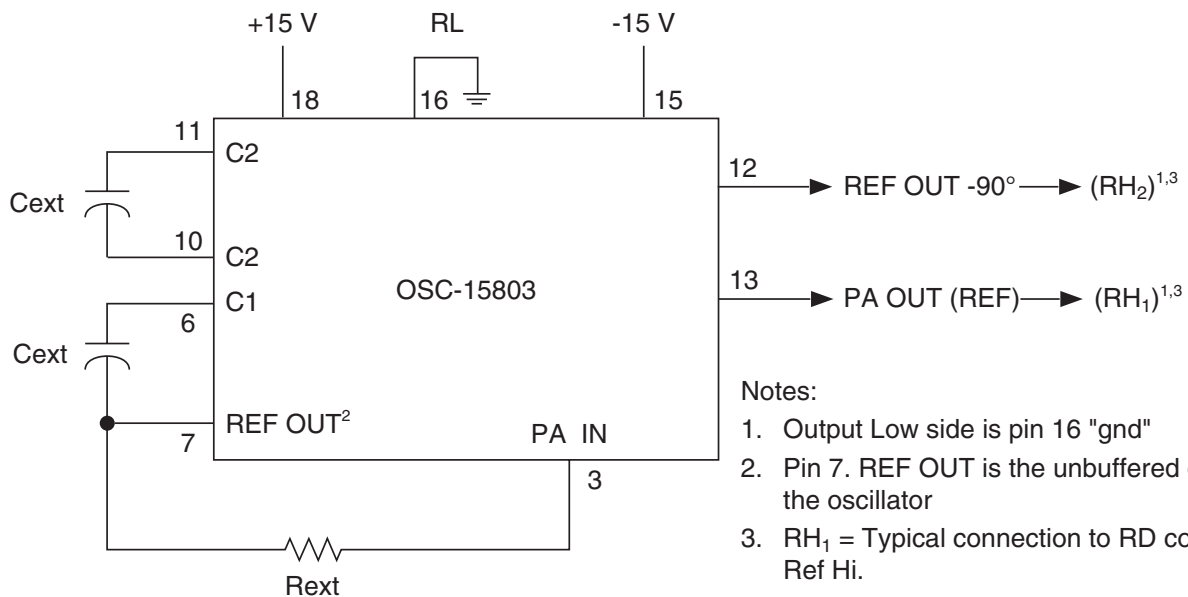
$$R_{ext} = 30 [(7.1/5) - 1]$$

$$R_{ext} = 12.6k\Omega$$

For connection to converters connect as follows:

Ref Lo (RL) connect to pin 16

Ref Hi (RH) connect to pin 13 or 12.



Notes:

1. Output Low side is pin 16 "gnd"
2. Pin 7. REF OUT is the unbuffered output of the oscillator
3. RH₁ = Typical connection to RD converter Ref Hi.
RH₂ = Low power -90 degree phase shifted signal for use with inductosyns.

FIGURE 2. PROGRAMMING RESISTOR AND CAPACITOR CONNECTIONS

TABLE 3. OSC-15803 PIN FUNCTIONS		
PIN	NAME	FUNCTION
1	NC	No connection ¹
2	NC	No connection ¹
3	PA IN	Power amplifier inverting input
4	NC	No connection ¹
5	NC	No connection ¹
6	C1	Capacitor connection (pin-scalable frequency)
7	REF OUT	Reference output
8	NC	No connection ¹
9	NC	No connection ¹
10	C2	Capacitor connection (pin-scalable frequency)
11	C2 GND	Capacitor connection (pin-scalable frequency)
12	REF OUT -90°	-90° reference output signal
13	PA OUT	Power amplifier output
14	NC	No connection ¹
15	-15 V	-15 Vdc power supply voltage
16	GND	Ground
17	NC	No connection ¹
18	+15 V	+15 Vdc power supply voltage

NOTES:

1. NC = No connection to anything inside chip (open pin).

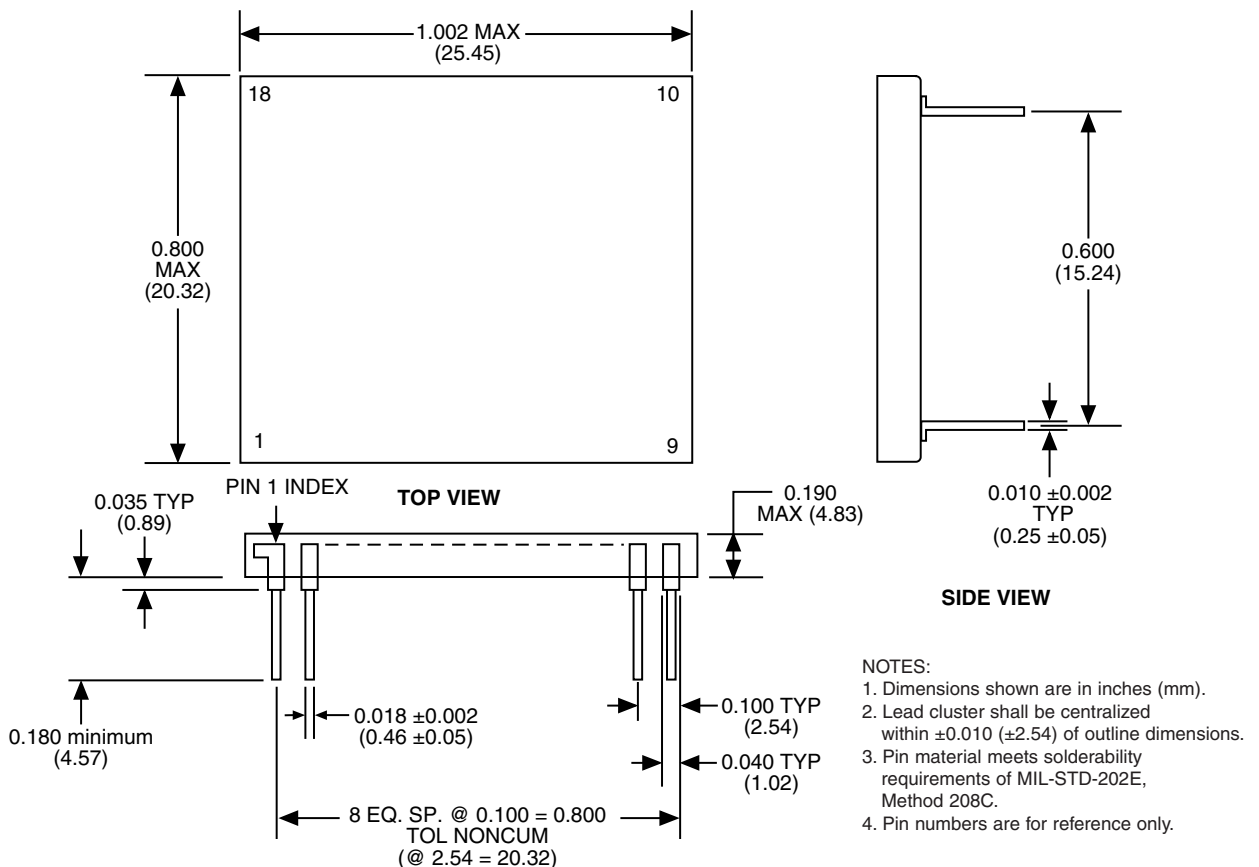


FIGURE 3. OSC-15803 MECHANICAL OUTLINE

INDUCTOSYN[®] TYPICAL CONNECTION

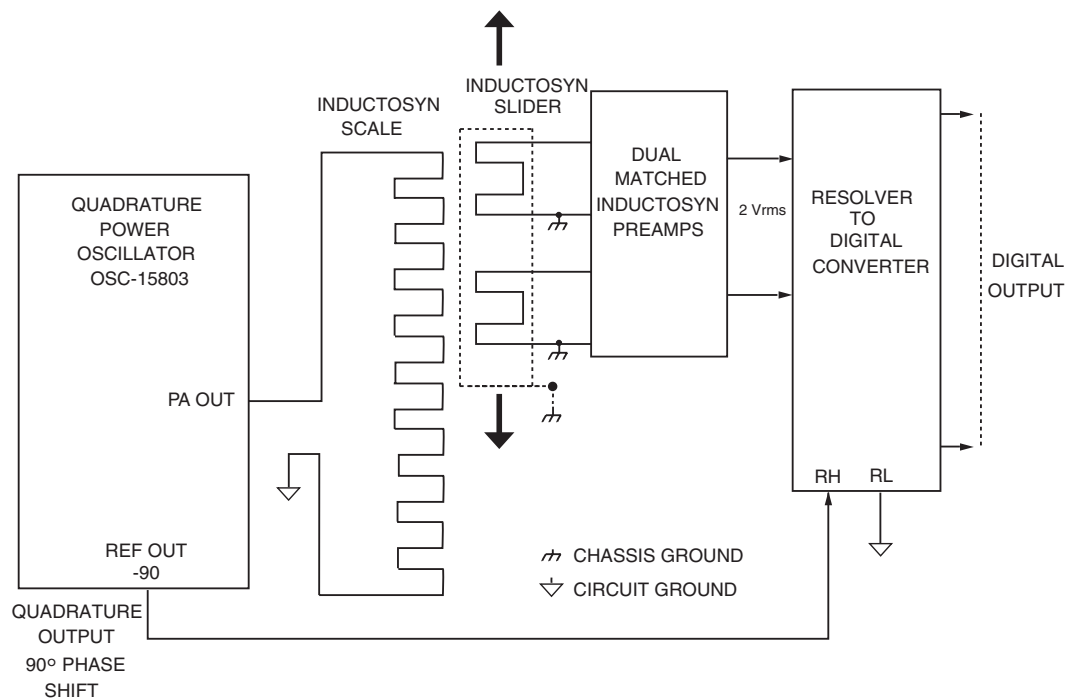
A linear or rotary Inductosyn[®] consists of a slider and a scale. As the slider moves over the scale there is a low voltage electrical output proportional to the distance moved. Inductosyns usually are excited by a 5 kHz to 20 kHz frequency. The OSC-15803 is an oscillator that was designed with a high frequency output and a -90° phase shift, which is needed for Inductosyn[®]-to-digital conversion (see figure below).

The figure below will convert each pitch to 360° of digital data. A means to track counts will be needed for multiple pitches. Using an RD-19230 and A quad B zero index pulse for counting pitches is one possible solution.

Note that inductosyns typically have a + or - 90 degree phase shift from input to output. This requires an oscillator with a 90 degree phase shifted second output to be connected to the RD converter reference so that the RD input and reference will now be in phase.

See the OSC-15802 data sheet if +90° phase shift is needed.

Note: See DDC's Synchro/Resolver Conversion Handbook "Using an R/D with an inductosyn" for further information.



INDUCTOSYN[®]-TO-DIGITAL CONVERTER SYSTEM

ORDERING INFORMATION

OSC-15803-XXXX

Supplemental Process Requirements:

S = Pre-Cap Source Inspection
 L = 100% Pull Test
 Q = 100% Pull Test and Pre-Cap Inspection
 K = One Lot Date Code
 W = One Lot Date Code and Pre-Cap Source
 Y = One Lot Date Code and 100% Pull Test
 Z = One Lot Date Code, Pre-Cap Source and 100% Pull Test
 Blank = None of the Above

Additional Process Requirements:

0 = None
 1 = X-ray

Process Requirements: (note 4)

0 = Standard DDC Processing, no Burn-In
 1 = MIL-PRF-38534 Compliant (note 3)
 2 = B (note 1)
 3 = MIL-PRF-38534 Compliant with PIND Testing (note 3)
 4 = MIL-PRF-38534 Compliant with Solder Dip (notes 2 & 3)
 5 = MIL-PRF-38534 Compliant with PIND Testing and Solder Dip (notes 2 & 3)
 6 = B with PIND Testing (note 1)
 7 = B with Solder Dip (note 1, 2)
 8 = B with PIND Testing and Solder Dip (note 1, 2)
 9 = Standard DDC Processing with Solder Dip, no Burn-In (note 2)

Temperature Grade/Data Requirements:

1 = -55°C to +125°C
 4 = -55°C to +125°C with Variables Test Data

Type:

3 = Radiation Tolerant Version

Notes:

1. B = Standard DDC Processing with burn-in and full temperature test - see table below.
2. These products contain tin-lead solder finish as applicable to solder dip requirements.
 Lead finish = The standard part, not solder dipped, lead finish is 50 micro inches of Gold (minimum) over 50-350 micro inches of Nickel. The solder dip option lead finish is, Tin (63%)/Lead (37%)
3. MIL-PRF-38534 product grading is designated with the following dash numbers:
 Class H is a -11X, 13X, 14X, 15X, 41X, 43X, 44X, 45X
4. Contact Factory for Class K part number and lead time.

STANDARD DDC PROCESSING FOR HYBRID AND MONOLITHIC HERMETIC PRODUCTS		
TEST	MIL-STD-883	
	METHOD(S)	CONDITION(S)
INSPECTION	2009, 2010, 2017, and 2032	—
SEAL	1014	A and C
TEMPERATURE CYCLE	1010	C
CONSTANT ACCELERATION	2001	3000g
BURN-IN	1015 ^(Note 1) 1030 ^(Note 2)	TABLE 1

Notes:

1. For Process Requirement "B"* (refer to ordering information), devices may be non-compliant with MIL-STD-883, Test Method 1015, Paragraph 3.2. Contact factory for details.
2. When applicable.

The information in this data sheet is believed to be accurate; however, no responsibility is assumed by Data Device Corporation for its use, and no license or rights are granted by implication or otherwise in connection therewith.
Specifications are subject to change without notice.



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