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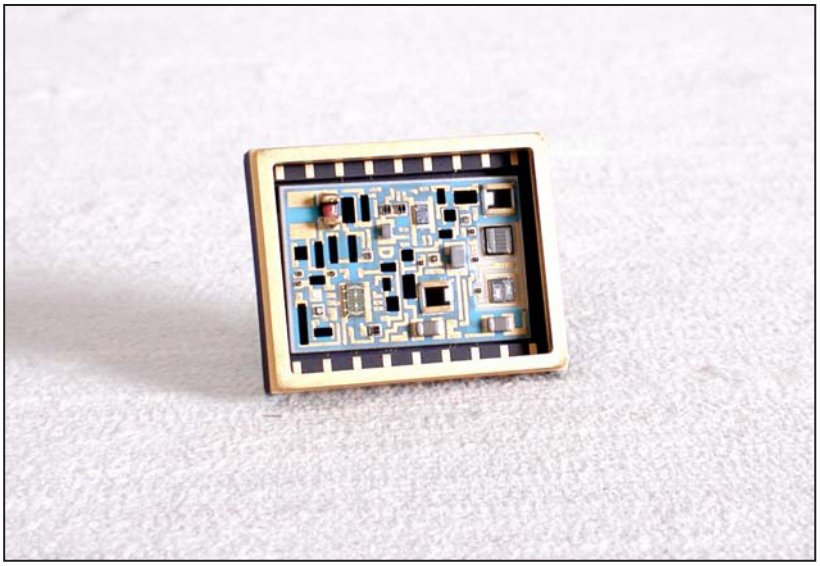
DDC on Board®

OSC-15801
SYNCHRO/RESOLVER/INDUCTOSYN® REFERENCE OSCILLATOR



FEATURES

- Quadrature Reference Output Voltages for Inductosyn Applications
- Programmable Output Frequency from 400 Hz to 20 kHz
- Small 18-Pin DDIP
- Scalable Reference Output
- -55°C to 125°C Operating Temperature Range

DESCRIPTION

The OSC-15801 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-15801 ideally suited for Inductosyn applications.

The oscillator's outputs are pin-programmable 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-15801 operates over a temperature range of -55°C to +125°C. This, combined with its small size and programmable output voltage and frequency capabilities, makes it an excellent choice for use in Inductosyn applications.

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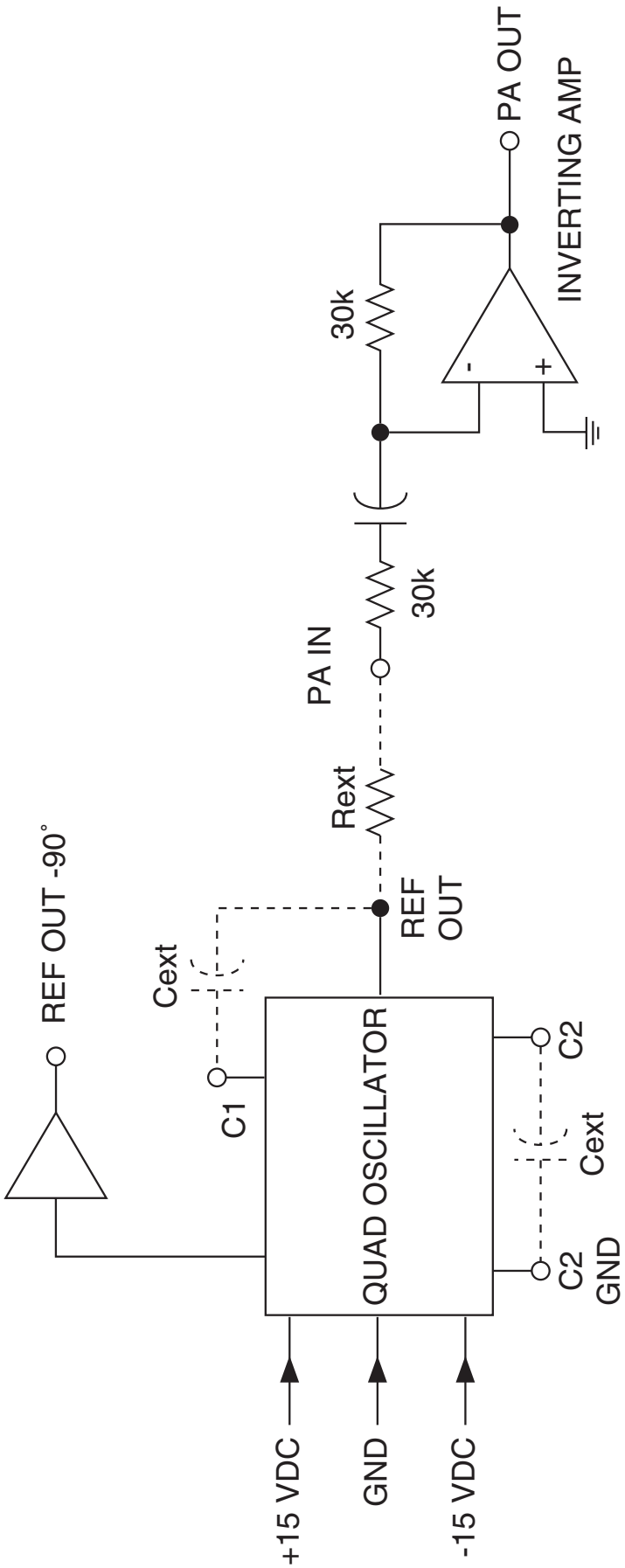


FIGURE 1. OSC-15801 BLOCK DIAGRAM

TABLE 1. OSC-15801 SPECIFICATIONS		
Specifications apply over temperature range and power supply range.		
PARAMETER	**UNITS**	**VALUE**
FREQUENCY	Hz	Programmable 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-15801 OPERATION

PROGRAMMABLE FREQUENCY OUTPUT

The output frequency of the OSC-15801 is programmable 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 PROGRAMMABLE 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).

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:

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

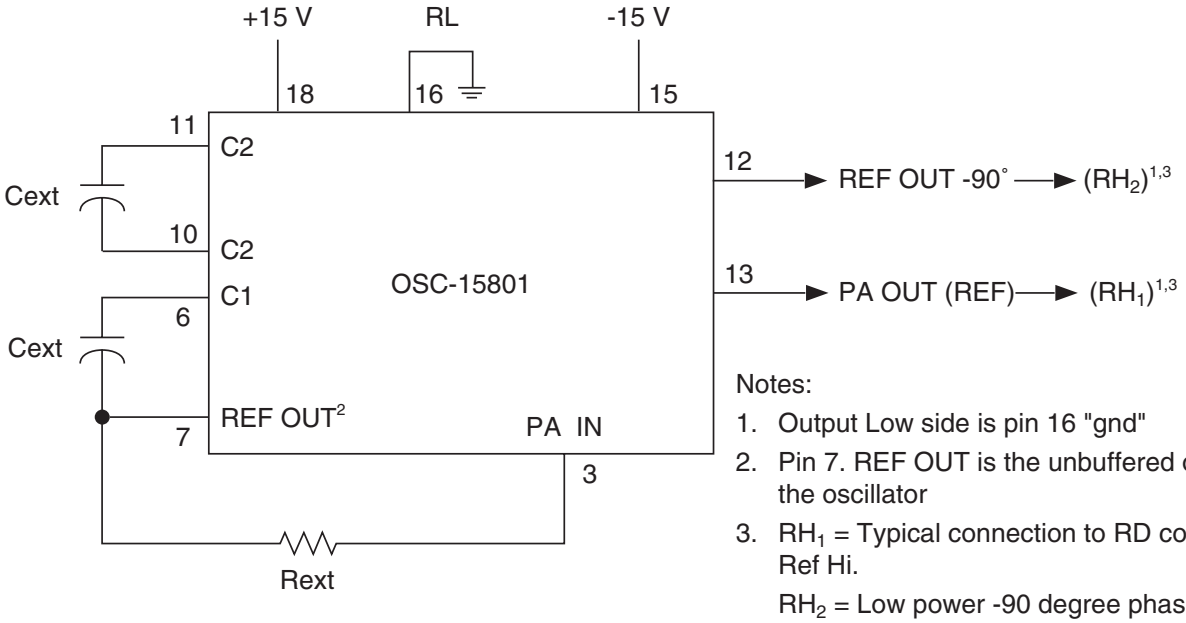
where: R_{ext} is in kOhms,
desired voltage is in Vrms,
PA OUT is dependent on frequency used.

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

$$R_{ext} = 30\ [(\text{PA OUT/desired voltage}) - 1]$$
$$R_{ext} = 30\ [(7.5/5) - 1]$$
$$R_{ext} = 15k\Omega$$

For connection to converters connect as follows:

Ref Lo (RL) connect to pin 16
Ref Hi (RH) connect to pin 13 or 12.



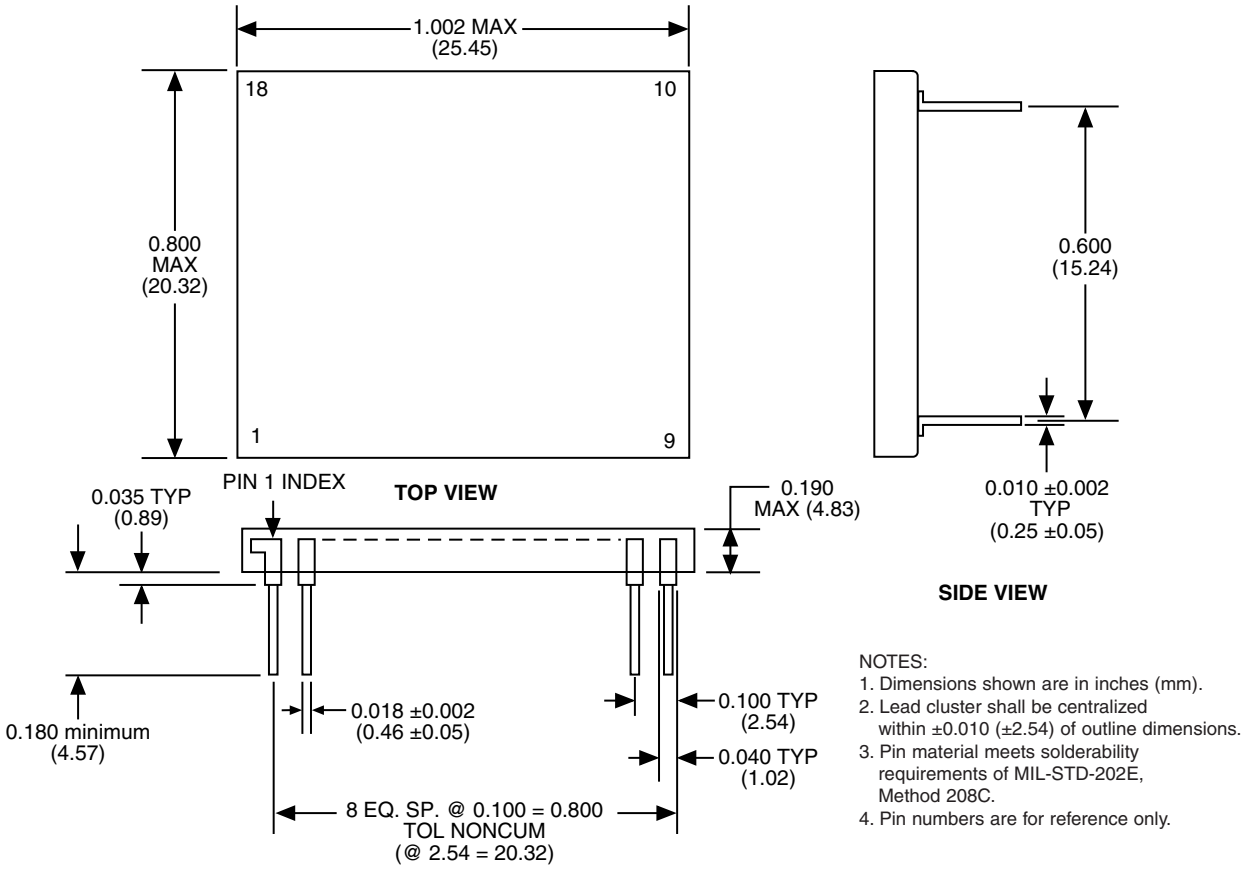
Notes:

1. Output Low side is pin 16 "gnd"
2. Pin 7. REF OUT is the unbuffered output of the oscillator
3. RH_1 = Typical connection to RD converter Ref Hi.
   RH_2 = Low power -90 degree phase shifted signal for use with inductosyns.

FIGURE 2. PROGRAMMING RESISTOR AND CAPACITOR CONNECTIONS

TABLE 3. OSC-15801 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-programmable frequency)
7	REF OUT	Reference output
8	NC	No connection[1]
9	NC	No connection[1]
10	C2	Capacitor connection (pin-programmable frequency)
11	C2 GND	Capacitor connection (pin-programmable 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).



NOTES:
1. Dimensions shown are in inches (mm).
2. Lead cluster shall be centralized within ±0.010 (±2.54) of outline dimensions.
3. Pin material meets solderability requirements of MIL-STD-202E, Method 208C.
4. Pin numbers are for reference only.

FIGURE 3. OSC-15801 MECHANICAL OUTLINE

INDUCTOSYN® TYPICAL CONNECTION

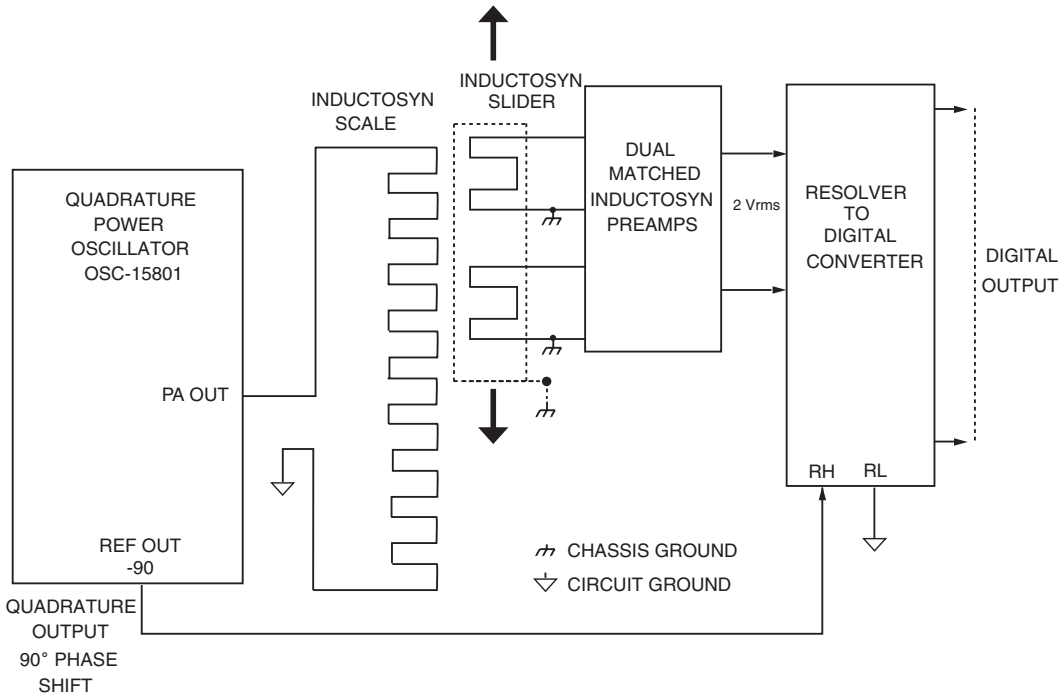
A linear or rotary Inductosyn® consists of a slider and a scale. As the slider moves over the scale there is a low voltage electrical output proportional to the distance moved. Inductosyns usually are excited by a 5 kHz to 20 kHz frequency. The OSC-15801 is an oscillator that was designed with a high 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 ouptut to be connected to the RD converter reference so that the RD input and reference will now be in phase.

DDC has two oscillators to cover the +90 or -90 phase shift needed. See the OSC-15801 for -90 phase shift and the OSC-15802 for +90 phase shift.

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-15801-XX0X

Supplemental Process Requirements:

S = Pre-Cap Source Inspection
L = Pull Test
Q = 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

Process Requirements:

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

Temperature Grade/Data Requirements:

1 = -55°C to +125°C
2 = -40°C to +85°C
3 = 0°C to +70°C
4 = -55°C to +125°C with Variables Test Data
5 = -40°C to +85°C with Variables Test Data
8 = 0°C to +70°C with Variables Test Data

1. 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.
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
   Class G is a -21X, 23X, 24X, 25X, 51X, 53X, 54X, 55X
   Class D is a -31X, 33X, 34X, 35X, 81X, 83X, 84X, 85X

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.

Please visit our web site at **www.ddc-web.com** for the latest information.

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