

OPERATING INSTRUCTIONS

VDS-1306-1352 Frequency Synthesizer

1. PRODUCT DESCRIPTION

The VDS-1306-1352 is a remote controlled frequency synthesizer designed to operate from 60 MHz to 99.999 999 MHz with fine resolution (1 Hz) and very good spectral purity. This unit is derived from our VDS-1400 family of VHF synthesizer that employs a unique hybrid technology combining the fine resolution of a patented direct digital synthesizer (DDS) with the frequency coverage capabilities of a Phase Lock Loop (PLL) design. The DDS replaces the fine resolution loops of a more conventional synthesizer and is based on a patented Meret BCD design. The PLL section covers the overall operating range of the unit in 1 MHz steps. When combined these two synthesis techniques provide excellent spectral purity with fine resolution at frequencies in the VHF range.

The VDS-1306-1352 has been designed to replace the VDS-1400-300 and is both electrically and pin compatible with that older model number.

2. PERFORMANCE/SPECIFICATIONS

Frequency

Range 60 MHz to 99.999 999 MHz
 Resolution 1 Hz
 Control 32 bits, Parallel BCD Positive-true TTL logic

Frequency Switching

Switching Speed <10 milliseconds, typical

Main Output

Level 0 dBm into 50Ω
 Flatness ±2 dB

Spectral Purity

Harmonics <-15 dBc
 Spurious <-55 dBc
 Phase Noise
 1 kHz offset <-90 dBc/Hz
 10 kHz offset <-95 dBc/Hz
 100 kHz offset <-110 dBc/Hz

Frequency Ref 10.000 MHz, External

Level +5 dBm ± 6 dB



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2. PERFORMANCE/SPECIFICATIONS (continued)

Lock Indicator..... TTL "HIGH" for Out-of-Lock

Connectors

REF In..... SMA female

RF Out..... SMA female

Freq Control..... 37-pin and 15-pin subminiature "D" Connectors (male)

Power Supply +5V @ 400 mA; +15V @ 230 mA; -15V @ 150 mA

Environmental

Operating Temp 0°C to +50°C

Storage Temp -20°C to +70°C

Dimensions 5" x 7.08" x 2.125" (metal module)

Weight..... 2 lbs, net; 5 lbs, shipping

3. MECHANICAL CONFIGURATION

The VDS-1306 is manufactured in a two modules each measuring 5" x 7.08" x 1.125" with all digital and power connectors located on one 5" x 41.2.125" face and the RF SMA female connectors located on the opposite face. Mounting holes on both of the 7.08" x 1.125" faces are provided (4 holes @ 6-32 tapped holes).

4. INSTALLATION

The RF output can be obtained on the SMA female connector marked J7 and the 10 MHz reference input at +5 dBm ±6 dB must be supplied to the SMA marked J12. Only these two SMA connectors are provided.

All RF connectors use SMA female connectors while the mating connectors for the frequency control as well as the power connections are given in the following table:

Connector Function	Mating Connector Type	Part Number (Manufacturer)
Fine Frequency	37-pin Subminiature "D"	Amphenol 117DC-37S
Coarse Frequency	15-pin Subminiature "D"	Amphenol 117DA-15S
DC Power (2 ea)	9-pin Subminiature "D"	Amphenol 117DE-9S



5. POWER SUPPLY CONNECTIONS

Power is supplied on the 9-pin connector (J3 & J4) according to the following table:

Power Supply	Pin #
+5V	1 & 2
-15V	3 & 4
+15V	5 & 9
Ground	6, 7, 8

Note that duplicate pins for each supply are connected inside the module.

6. FREQUENCY CONTROL

All control lines should be driven with standard TTL levels ("0" = 0V to 0.4V for "low" and "1" = 2.4V to 5.5V for "high".) No registration of the signal is provided so the logic levels at each pin must be maintained in order for correct operation of the synthesizer.

All pin out designations for the fine resolution are listed below. The fine resolution steps are programmed on the 37-pin subminiature "D" connector (J1) as follows:

Frequency Control Programming Lines (J1)

BCD Weight ⇒ Decade ↓	1	2	4	8
100 kHz	3	4	23	5
10 kHz	1	20	2	21
1 kHz	10	29	11	22
100 Hz	26	8	9	28
10 Hz	27	6	25	7
1 Hz	30	12	31	13
GROUND	19			



6. FREQUENCY CONTROL (cont'd)

The coarse resolution steps are programmed on the 15-pin subminiature "D" connector (J2) as follows:

Frequency Control Programming Lines (J2)

BCD Weight ⇒ Decade ↓	1	2	4	8
10 MHz	12	3	4	5
1 MHz	1	9	2	10
GROUND	15			

7. PROGRAMMING EXAMPLES

Several examples will be presented to assist the user in determining the pin configurations for a desired frequency. The pin numbers shown in the examples should be pulled "HIGH" and all remaining pins should be pulled "LOW".

DESIRED FREQUENCY	ACTIVE PINS ("HIGH")
60.000 000 MHz	Pins 4 & 3 (J2 only)
75.000 000 MHz	Pins 4,3,12,2 & 1 (J2 only)
78.901 234 MHz	Pins 4,3,12 & 10 (J2) and 5,3,10,8,6,27,31 (J1)
99.999 999 MHz	Pins 12, 5, 1, 10 (J2) and 3, 5, 1, 21, 10, 22 ,26, 28, 27, 7, 30, 13 (J1)

8. LOCK INDICATOR

Connector J2, pin 7 (15-pin connector) also contains the lock indicator control line. This line provides access to the status of the PLL in the RF module. The signal is a TTL level voltage. The following table contains the logic state for Lock/Out-of-Lock indication.

INDICATION	LOCK LINE LEVEL
PLL Locked	TTL Low
PLL Out-of-Lock	TTL High

Lock Indicator Logic



8. WARRANTY

All Meret products are warranted against defects in material and workmanship for a period of one year after initial shipment. Meret will repair or replace any circuit or component that is found to be defective during this period if in Meret's sole opinion the product is deemed defective.

Any modifications or options performed by Meret during the initial one year period shall be included under the initial warranty, and such secondary warranties shall terminate one year after the initial shipment. Shipment of the product to Meret (San Diego, CA) shall be made prepaid and shall not be made without prior authorization by Meret.

This warranty is voided if the product is abused or if unauthorized modifications are made by the user.

This warranty is in lieu of all other warranties, expressed or implied, and no person is authorized to represent or assume for Meret any liability in connection with the sales of our products other than stated within this warranty.

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Serial Number

Options: _____

QC by _____ Date: _____

