

# DDSPAxx - DRFAxx

## VARIABLE FREQUENCY DRIVERS

AA OPTO-ELECTRONIC proposes two types of variable frequency drivers.

VCOs are analog devices and are suitable for general purpose applications (raster scan, or random access...). The VCO can be modulated (amplitude) from an analog external signal. The frequency is externally controlled by an analog signal. An external power amplifier will be required to generate the RF power levels required by the AO device.

DDS models offer high frequency accuracy and stability and extremely fast switching times less than 100ns. They will be preferred to VCOs when high stability and accuracy is necessary. They can be modulated (amplitude) from an analog or digital external signal. The frequency is externally controlled by a digital signal (15 to 31 bits). An external power amplifier will be required to generate the RF power levels required by the AO device.

### DDSPAxx

#### Based on DDS (Direct Digital Synthesizers)

##### DDSPA - Product Overview

These Direct Digital Synthesizers are dedicated to high accuracy applications for which high resolution is the key factor.

A PC interface board will be used to control the frequency (15-31 bits) as well as the latch of the frequency (1 bit E/D). These drivers are used in combination with AA amplifiers. They are suitable for agile frequency shifters and deflectors.

##### DDSPA - Features

- Variable frequency [20..400MHz]
- AM control: analog 0-5V/ digital 8 bits
- FM control: digital 15/23/31 bits
- Rack available with 2 outputs (XY deflection)

### DRFAxx

#### Based on VCO (Voltage Controlled Oscillators)

##### DRFA - Product Overview

These Voltage Controlled Oscillators are the simplest way to control a deflector or a variable frequency shifter, in random access or raster scan mode.

A voltage between 0 and 10V is applied on the frequency control input for sweeping between Fmin and Fmax and here the sweeping time can be as low as 1µs. The typical stability of the VCO driver is 50 to 100 KHz/°C. For sharpest application, the DDS driver will be preferred. These drivers need to be associated with AA amplifiers (OEM version only).

##### DRFA - Features

- Variable frequency: up to one octave
- AM control (Analog)
- FM control (Analog)
- Rack available with 2 outputs (XY deflection)
- RoHS



DDS OEM version



DDS Laboratory version - 1X



DDS Laboratory version - 2X



VCO OEM version



VCO Laboratory version

Access to your operating manual



## Technical Specifications

| Parameter                            | DDSPAxx                                                                                                        | DRFAxx                                                                                                             |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Carrier frequency                    | 10 to 400 MHz                                                                                                  | Up to one octave<br>(50-110, 60-150, 90-210, 150-300, 180-470) MHz<br>Matched to AO device at factory              |
| Frequency Stability                  | Nom +/- 1 ppm/°C                                                                                               | Nom +/- 50 to 100 kHz/°C                                                                                           |
| Frequency step / Accuracy            | LR: 15.259 KHz (15 bits) – MR: 59.6 Hz (23 bits)<br>HR: 0.23 Hz (31 bits)                                      | Continuous / typ 50 ppm                                                                                            |
| Commuation/sweeping time             | ≤ 40 ns (LR) - ≤ 64 ns (MR) - ≤ 80 ns (HR)                                                                     | ≤ 1μs (from Fmin to Fmax or Fmax to Fmin)                                                                          |
| Output RF Power (@1dB compression)   | Nom – 30 to 0 dBm (to be associated with AA Amplifier)                                                         | Nom – 30 to 0 dBm (to be associated with AA Amplifier)                                                             |
| Power supply                         | 24 VDC, nom 0.25A                                                                                              | 24 VDC, nom 0.15A                                                                                                  |
| Frequency Input Control              | Digital 15 bits (LR), 23 bits (MR), 31 bits (HR)<br>+ 1 bit Enable/disable                                     | Analog 0-10V/ 1k Ω (linearity Nom +/- 5 %)                                                                         |
| Modulation Input Control<br>Video In | Analog 0-5 V / 50 Ω                                                                                            | Analog 0-5 V / 50 Ω                                                                                                |
| Rise Time / Fall time (10-90%)       | Nom 10 ns                                                                                                      | Nom 10 ns                                                                                                          |
| Harmonics                            | H2 > 30 dB, H3 > 20 dB                                                                                         | Nom >20 dBc                                                                                                        |
| Input / Output impedance             | 50 Ω                                                                                                           | 50 Ω                                                                                                               |
| VSWR                                 | < 1.2/1                                                                                                        | < 1.5/1                                                                                                            |
| Extinction Ratio                     | Nom 45 dB (for F<250MHz)                                                                                       | nom 45 dB                                                                                                          |
| Input / Output Connectors            | HD44 / SMA                                                                                                     | SMA / SMA                                                                                                          |
| Size / Weight                        | <b>OEM:</b> 129 x 61 x 28 mm <sup>3</sup> (OEM) / 275 g<br><b>Lab version:</b> 19", 2U nom 4 Kgs (Lab version) | <b>OEM:</b> 84 x 69 x 15.8 mm <sup>3</sup> / 150 g<br><b>Lab version:</b> 310 x 250 x 105 mm <sup>3</sup> / 3.8 Kg |
| Heat Exchange                        | Conduction through baseplate for OEM versions                                                                  | Conduction through baseplate for OEM versions                                                                      |
| Operating Temperature                | 10 to 40 (max Tcase 55 °C)                                                                                     | 10 to 40 (max Tcase 55 °C)                                                                                         |
| Storage Temperature                  | -40 to +50 Non condensing                                                                                      | -40 to +50 Non condensing                                                                                          |

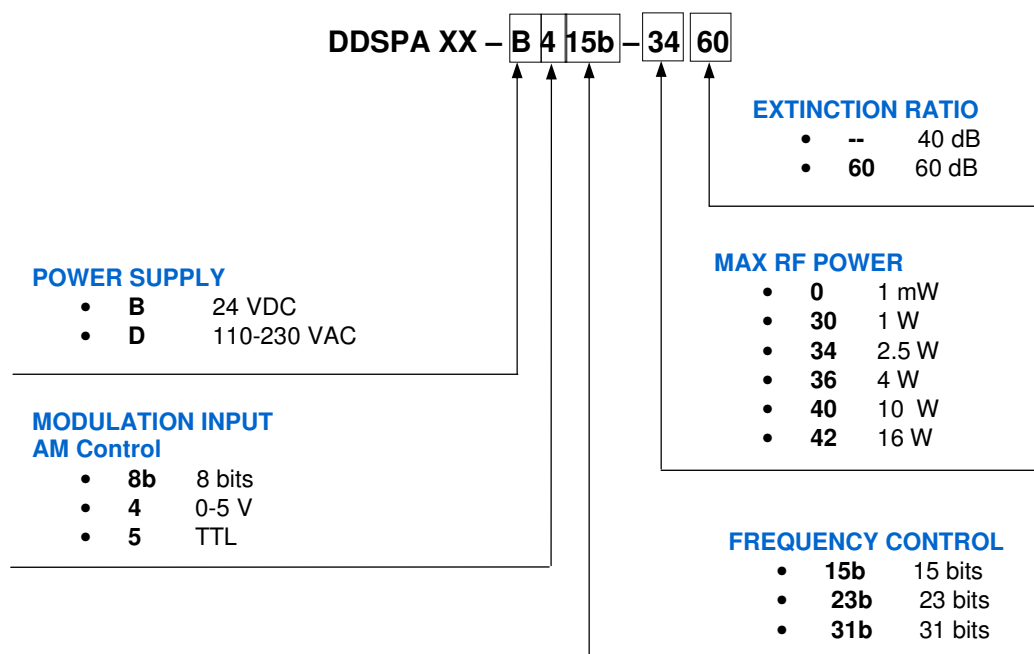
### DDSPAxx - Options / On request

|                                                                                      |                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HIGH EXTINCTION RATIO                                                                | <input checked="" type="checkbox"/> 60dB                                                                                                                                                                                                                                                                                                |
| MOD IN                                                                               | <input checked="" type="checkbox"/> 8 bits digital, 256 levels – Rise/fall time 25ns – DAC conversion time 100ns                                                                                                                                                                                                                        |
| LABORATORY VERSION<br><i>complete turn key systems with<br/>minimum set up time.</i> | POWER SUPPLY <input checked="" type="checkbox"/> 110-230 VAC<br>SIZE <input checked="" type="checkbox"/> 340x235x90 mm<br>WEIGHT <input checked="" type="checkbox"/> 3.6kg-3.8kg<br>HEAT EXCHANGE <input checked="" type="checkbox"/> standalone (fan integrated)<br><input checked="" type="checkbox"/> Build in amplifier 1, 2, 4...W |
| PHASE LOCKED Versions                                                                | 2 DDS outputs with common Reference for high stability frequency difference                                                                                                                                                                                                                                                             |

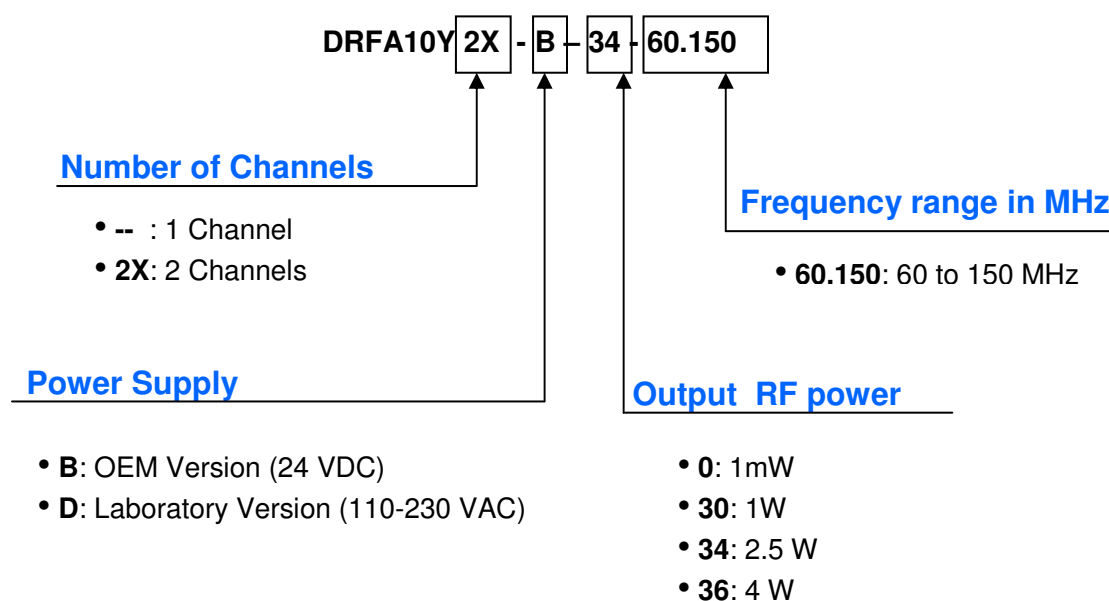
### DRFAxx - Options / On request

|                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HIGH EXTINCTION RATIO                                                                                                                                                                                              | <input checked="" type="checkbox"/> 60dB                                                                                                                                                                                                                                                                                                 |
| MOD IN                                                                                                                                                                                                             | <input checked="" type="checkbox"/> 0-5 V/500 Ω                                                                                                                                                                                                                                                                                          |
| LABORATORY VERSION<br><i>complete turn key systems with<br/>minimum set up time.</i>                                                                                                                               | POWER SUPPLY <input checked="" type="checkbox"/> 110-230 VAC<br>SIZE <input checked="" type="checkbox"/> 310x250x105 mm<br>WEIGHT <input checked="" type="checkbox"/> 3.6kg-3.8kg<br>HEAT EXCHANGE <input checked="" type="checkbox"/> standalone (fan integrated)<br><input checked="" type="checkbox"/> Build in amplifier 1, 2, 4...W |
| <b>NB:</b> For laboratory version, the frequency source + the convenient amplifiers are integrated in a box supplied with 110-230 VAC. A switch on the front panel allows the user to select both operating modes: |                                                                                                                                                                                                                                                                                                                                          |
| - <b>CW mode:</b> internal CW modulation of RF power with front panel cursor<br>- <b>EXT mode:</b> external amplitude modulation controlled through external modulation input                                      |                                                                                                                                                                                                                                                                                                                                          |

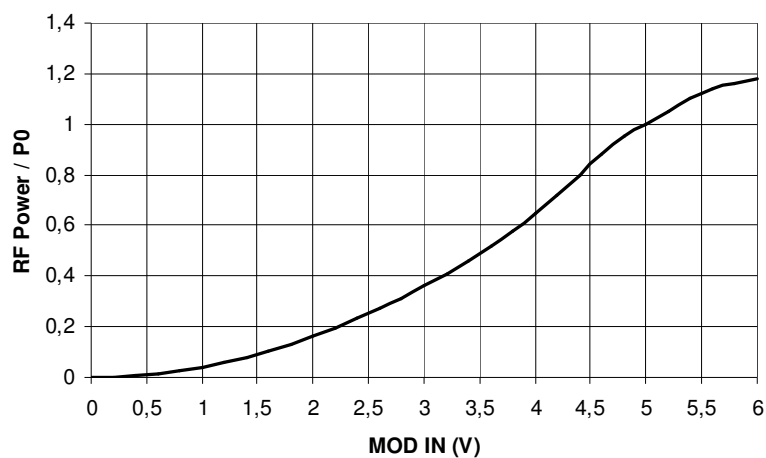
## How to determine your DDS model



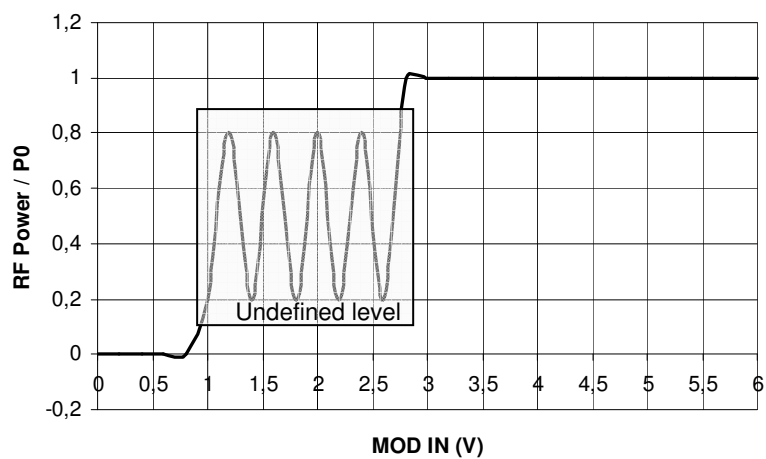
## How to determine your VCO model



Typ Relative Output RF power vs ANALOG MOD IN (0-5V)

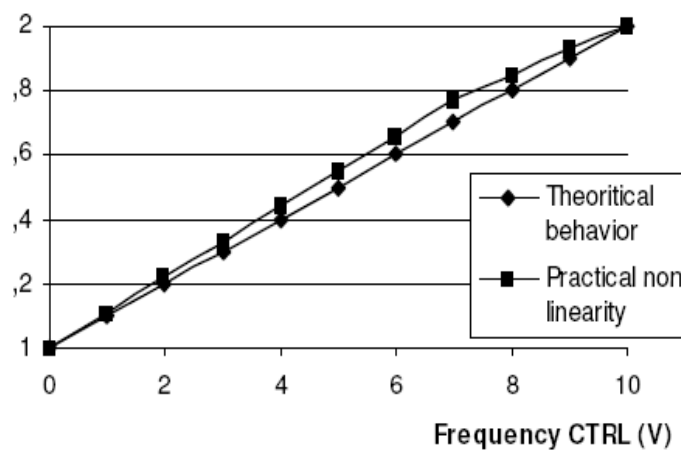


Relative Output RF power vs DIGITAL MOD IN (TTL)



Frequency versus Input voltage control

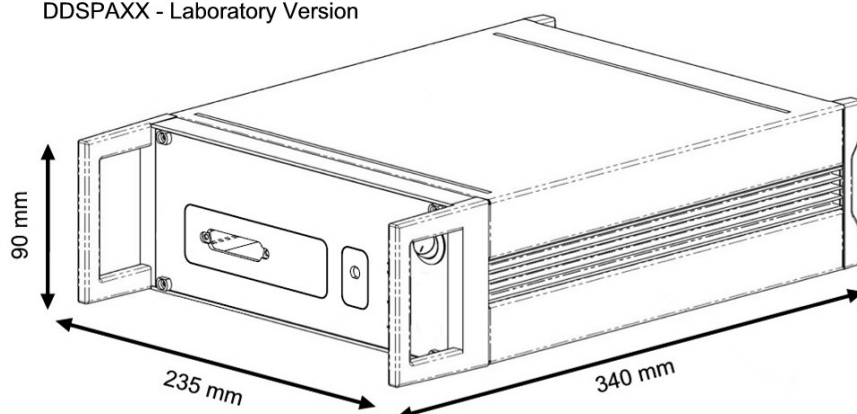
for a VCO



[illegible]



DDSPAXX - Laboratory Version

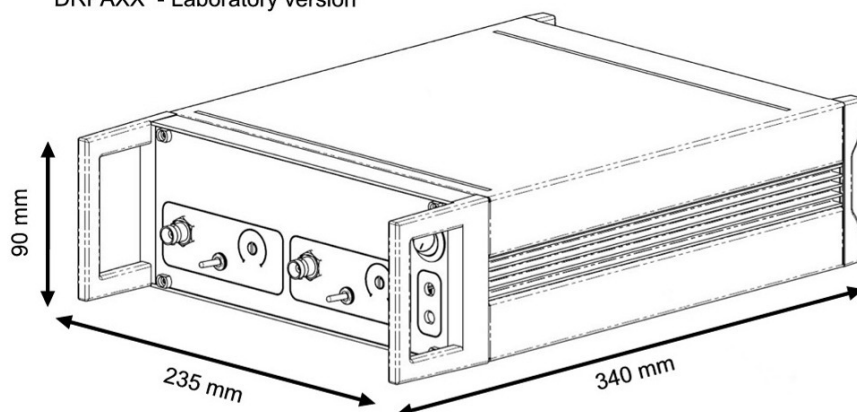


\*Handles available on request



Version 1x Output  
RF power amplifier integrated inside Rack

DRFAXX - Laboratory version



\*Handles available on request



Version 1x Output  
RF power amplifier integrated inside Rack