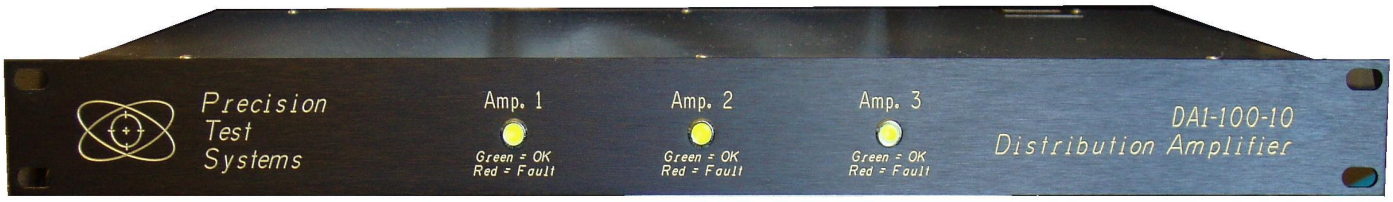
DA1-100-10-100kHz: 100 kHz Distribution Amplifier



Key Features

- 100 kHz Operation. Other frequencies from 1 MHz to 150 MHz are available.
- AGC Level Controlled. Output level remains stable to 0.02 dB even if input varies from -20 to +30 dBm.
- AGC can be disabled if required. Amplifier then has fixed gain. Different gains can be made upon request
- Five, Ten or Fifteen sinewave outputs. Each output can be independently set to 0 dBm to > +13 dBm.
- Alarm monitoring. All outputs have alarm monitoring. Indication by LEDS or rear panel DC outputs.
- Ultra low phase noise. Typically -115 dBm @ 1 Hz with floor noise to -155 dBc/Hz available.
- 60 dB channel isolation and 100 dB reverse isolation. Protects reference input and prevents cross-talk.
- Optional second frequency "Back-up" input. Automatically switched in, if first input fails.
- Optional internal back-up oscillator. Automatically switched in, if external input fails.
- Optional Redundancy (two units with automatic switchover)
- Many other options and customized options.

General Description

The DA1-100-10-100kHz is a 100 kHz distribution amplifier. It can be used to synchronize up to fifteen instruments to a frequency reference input. The reference input will typically be an OXCO, Rubidium, Caesium or Hydrogen Maser Frequency Standard.

The DA1-100-10-100 kHz has features not found in any competitive unit. This makes the DA1-100-10-100 kHz the industry's leading distribution amplifier.

The DA1-100-10-100 kHz has outstanding low phase noise. Therefore the DA1-100-10-100 kHz will not add any noise to the reference input.

Phase noise is typically <-135 dBc @ 1 Hz. This low phase noise enables units to be cascaded for over 1000 outputs.

Amplifier with Gain and Automatic Gain Control (AGC)

Unlike most competitive units, the DA1-100-10-100 kHz accepts inputs from +7 dBm to +20 dBm (-20 dBm to +30 dBm optional) and provides outputs from 0 dBm to > +13 dBm (up to +20 dBm optional). The output will not vary with input variations. This is very useful when long cable runs are being used or equipment have different input level requirements. The AGC can be disabled, if required, making the unit a fixed gain amplifier. Different gains are available upon request.

Outputs

There are five, ten, fifteen or twenty sinewave outputs. Each output is completely isolated from the input and each other. Therefore the reference oscillator connected to the DA1-100-10-100 kHz's input is protected against load variations, short circuits etc. that may be applied to the outputs.

Channel to channel isolation is > 90 dB at 100 kHz . Output to input isolation is > 130 dB at 100 kHz.

Each output port can be independently set to any level from 0 to > +13 dBm on the standard unit and outputs to +20 dBm are optional available. The ability to set every output to a different level is very useful when dealing with equipment that have different input level ranges. Over 1000 outputs can be obtained without any significant increase in close-in noise.

Phase Noise

The DA1-100-10-100 kHz has very low phase noise. This enables units to be connected in series without adding any appreciable noise to the reference input. With only three DA1-100-10-100 kHz's in series, up to 1000 outputs can be derived from one input.

Phase Stable with matched outputs

The wide frequency bandwidth allows the outputs to have stable phase. The phase stability is typically 5 ps/°C. Also the delay match between outputs is better than 2.2 ns overall and typically less than 350 ps between groups of five outputs.

Alarms

Every output has alarm monitoring. Should the RF level drop on any output, an alarm will be raised. Also front panel LED's shows the status of the alarms. The alarm signals are also available on the rear panel.

Applications

The DA1-100-10-100 kHz Distribution Amplifier is ideal for use in calibration or standard laboratories, space research, satellite systems, communication systems or anywhere where ultimate performance is needed.

Miscellaneous Information

The DA1-100-10-100 kHz is a highly reliable unit. The DA1-100-10-100 kHz is housed in a fully screened 19" rack mount case and operates from a 100 to 240 VAC supply (usable 90 to 260 VAC). The DA1-100-10-100 kHz is CE marked for sale within the EEC.

Options and Other Amplifiers available from Precision Test Systems

- Fully isolated outputs. Useful in preventing ground loops on long cable runs.
- Squarewave outputs. Either at the same frequency as the input, or at different frequencies.
- Multiplied or divided outputs. E.g. 10 MHz, input with 5 MHz output. 10 MHz input with 100 MHz output. Any type of multiplication / division can be incorporated.
- Low pass filter on outputs. This reduces the harmonic output.
- Guaranteed phase noise specifications. Measured phase noise specifications supplied with unit.
- Higher output levels, up to +20 dBm.
- Different amplifier gains allowing different input levels from -20 dBm to +30 dBm to be accommodated.
- Additional five or ten outputs, giving fifteen outputs in all
- External DC Power Input. The DA1-100-10-100 kHz can also have an external 12VDC input (12 - 15 VDC). This can be used to provide back up power. If AC power is lost, the DA1-100-10-100 kHz will immediately switch to the 12VDC supply.
- Redundancy. Two units operate together. If one unit fails, the outputs are automatically switched to the secondary unit.

- Internal backup oscillator. This oscillator is automatically enabled should the input signal fail.
- Two reference inputs. Each reference input with have five isolated outputs derived from it. So the DA1-100-10-100 kHz can operate at two different frequencies at the same time. E.g. 1 MHz and 5 MHz, 5 MHz and 10 MHz.

DA1-100-10-100 kHz Rear view (with option 04 TNC Connectors).

Precision Test Systems also manufacturers the PTS50 and DA1010 series of distribution amplifiers. These models are lower cost alternatives to the DA1-100-10-100 kHz but still give very good performance.

DA1-100-10-100 kHz SPECIFICATIONS

Specification Parameter	Specification	Comments
Input		
Frequency	100 kHz	Wideband Frequency Input
Bandwidth	± 250 kHz for ± 1 dB variation	
Impedance / Input VSWR	50 Ω / < 1.4:1	Typically < 1.2
Input Level	+7 dBm to + 20 dBm	AGC Controlled. Optional -10 to +30 dBm
Sinewave Outputs		
Output Waveform	Sinewave	50 Ω BNC Connector on rear panel
Output Frequency	Exactly the same as the input	
Output VSWR	< 1.15: 1 @ 100 kHz	
Output level (individually adjustable)	Adjustable 0 dBm to > +10 dBm	0 dBm to +13 dBm with > +10 dBm input
Output Level Stability	< 0.05 dB / °C	Typically < 0.02 dB / °C
Harmonic Distortion (10 dBm input)	-25 dBc	Typically -35 dBc @ 10 MHz
Spurious Outputs (> 500 kHz)	-125 dBc	Typical
Channel to Channel Isolation	> 90 dB @ 100 kHz	
Input to Output Isolation	> 130 dB @ 100 kHz	
Delay match between outputs	< 2.5 ns (<500 ps / 5)	< 500 ps within group of 5 outputs
Temperature Stability of delay	10 ps/°C	Typically 5 ps/°C
Slave Output		
Slave Output	Passive output derived from input	Level = input level - 7 dB.
Allan Deviation		
Allan Deviation	< 5 x 10^{-14} (1 sec)	Calculated from phase noise
Phase Noise		
Phase Noise (dBc/Hz)	-125 / -144 / -154 / -160 / -161 / -162	1 /10 / 100 /1k /10k/100k Hz offsets
Phase Noise (dBc/Hz) typical with +13 dB Input and +13 dBm Output	-134 / -148 / -157 / -165 / -167 / -167	1 /10 / 100 /1k /10k/100k Hz offsets. Options to -171 dBc available.
General		
Power (AC)	100 - 240 VAC (usable 90 - 260)	50 Watts max
Size and weight	483 x 300 x 44 mm and 2.8 kg	Width x Depth x Height
Ambient Operating Temperature	-10°C to +40 °C	
Alarm Output	Alarm Outputs on rear panel	

Options (Not all options can be fitted at the same time).		
Option 01	Dual changeover alarm relay	Activated in the event of an alarm
Option 02A	Ground Isolated Input	
Option 02B	Ground Isolated Outputs	
Option 03	Redundancy	Requires two units
Option 09	Additional five sinewave outputs	15 o/p's in all. AGC range 10-19dBm
Option 10	Squarewave outputs	TTL/CMOS or ECL output levels
Option 11	Divided frequency output	E.g. 2.048 MHz, 1MHz, 5 MHz, 1 pps etc.
Option 12	Multiplied output	E.g. X2, X5, X10, X100.
Option 13	Low Pass filter on output	Improved harmonic rejection
Option 14	External 12VDC input	Operates from 12.0 to 15.0 VDC
Option 15	Internal temperature controlled fan for increased ambient temp.	Allows operation to 50 °C
Option 16-XXX	Internal backup oscillator	XXX = frequency in MHz.
Option 17-XXX	Different Gain Levels	Customer to advise gain requirement
Option 19	Second External Input	Automatic switchover if 1st input is lost
Option 20	Two reference inputs	With two sets of five outputs

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Full specifications available from www.ptsyst.com. Specifications and features subject to change without notice (130611)