

# DA-36

## RF/FO Frequency Distribution Amplifier

pendulum

### DATA SHEET

- Low-noise and long-distance distribution of reference frequencies
- Drive up to 2 km of optical fiber
- Eliminate ground current loop problems
- Low-loss distribution
- No noise and interference pick-up
- Easy to install – flexible, lightweight and small-diameter cable
- EMP-proof
- Flexible solution
- Economical solution
- RF → FO conversion and FO → RF conversion



The Pendulum DA-36 frequency Distribution Amplifier offers an economical solution to the problem of low-jitter transfer of frequency reference signals over longer distance. Whether the need is to distribute between remote buildings, floors or rooms, or whether the need is a big point-to-multipoint system with thousand of receivers, or just one single point-to-point distribution, DA-36 will do the job.

The Distribution Amplifier DA-36 solves the problem of distributing a reference frequency from a central frequency standard to one or several receiving points.

It offers frequency distribution via optical fiber, or coax cable, with minimal jitter and is designed for reference signals of 10 MHz (sine). The distribution is completely analog, without the use of PLLs or other types of frequency recovery circuits that may introduce jitter or wander. The signal is reconstructed with the help of a narrowband, high-Q filter, which heavily suppresses noise and distortion.

### Advantages of Using Fiber Optics

By using a fiber optic cable as the transmitting medium, a galvanic isolation is created between the transmitting element and the receiving element, which totally eliminates ground current loops - a common problem with coax distribution systems.

The fiber is insensitive to crosstalk and ESD, and will not pick up any noise or interference like long-line coax cables do. Optical fibers are easy to install, with their small diameter and highly flexible structure, compared to expensive, bulky and stiff low-loss coax cables.

### System Structure

The DA-36 is designed to work with any Pendulum Frequency Standard (GPS-12R, 6688, 6689, GPS-88, GPS-89), with any Spectracom clock, but will also fit all other brands that produce a sine wave reference with an amplitude between 0.2 and 2Vrms.

## DA-36 Point-to-Point Distribution

DA-36 is designed for point-to-point distribution of frequency from one room to another, from one floor to another or from one building to another. The unit is a combined transmit/receive module and has one fiber and one coax input and one fiber plus 4 coax outputs.

This compact unit is very easy to operate. There are no front panel controls, but status LEDs that give the user immediate feedback about the status of the distribution link. The DA-36 can be bench or wall mounted. The system is very flexible. 1 piece of DA-36 acts as a local coax distribution amplifier with 4 coax outputs. The typical standard configuration for long distance distribution involves 2 pieces of DA-36, see figure 2.

And when you need a multi-point distribution, you can cascade more DA-36:s. See figure 3.

## Designed for Safety and Redundancy

The DA-36 has two reference inputs, one electrical and one optical. In a typical situation, the central reference frequency (from e.g. a Cesium, GPS or Rubidium clock) has been distributed by fiber to the receivers optical input. At the receivers electrical input you could connect a secondary back-up standard e.g. an oven controlled crystal oscillator (OCXO). As long as there is a valid input signal, the optical reference has priority and will be distributed. If it should fail for some reason, the back-up clock at the electrical input will automatically take over and assure that a clock signal is distributed to the outputs, see figure 4

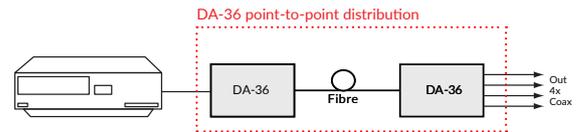


Figure 2: Point-to-point distribution.

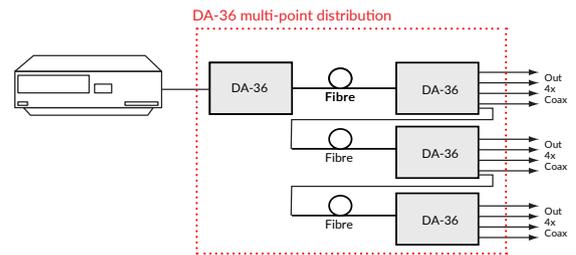


Figure 3: Multi-point distribution via cascading.

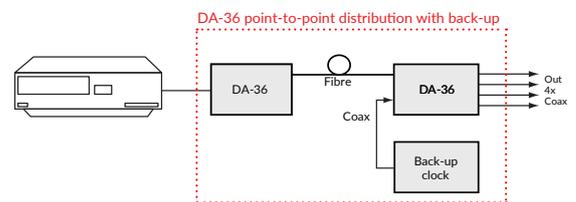


Figure 4: Point-to-point distribution with back-up clock.

## Technical Specifications: DA-36

### Input and Output Specifications

#### Inputs

**Electrical:** BNC coax connector

**Optical:** ST connector

**Priority (DA-36):** Optical input signal has priority over electrical input signal

#### Input Signal Range

**Frequency:** 10 MHz

**Impedance:** 50  $\Omega$  nominal

**Amplitude (BNC input):** 200 mVrms to 2Vrms (sine)

#### Outputs

**Electrical:** BNC coax connector

**Optical:** ST connector

**Period-to-period Jitter:** <(50 ps + optical jitter)

Optical jitter is due to optical attenuation and depends on quality and length of fiber used and = 0 ps for 1 m and is typically <100 ps for 1km fiber of good quality

**Amplitude (coax output):** 1Vrms nominal

#### Fiber Characteristics

**Fiber type:** Multimode fiber

**Connector type:** ST

**Max length:** 2 km

**Max optical attenuation:** <3.5 dB

### Configuration

DA-36 is a combined transmit/receive unit with no other configuration possible.

**Inputs:** 1x opto in; 1x BNC-in

**Outputs:** 1x opto out; 4x BNC-out

### User Interface

**Coax Status LED:**

**Green:** A valid electrical signal is present on the input.

**Red:** Input signal is lost or too weak

**Opto Status LED:**

**Green:** A valid optical signal is present on the input

**Red:** Received light level below threshold

### Power Supply

**Safety:** EN60950, UL 1950, CE

**Line voltage:** 100-240 V, 47-63 Hz

**Power Consumption:** <35 W

### General Specifications

#### Environmental Conditions

**EMC:** EN55022, CE

**Operating Temperature:** 0°C to +50°C

**Storage Temperature:** -40°C to +70°C

#### Dimensions and Weight

**WxDxH:** 125x170x30 mm (4.9x6.7x1.2 in)

**Weight:** 650 g (1.4 lb),

(1.1 kg (2.2 lb) incl power adapter)

**Shipping weight:** <2kg (4.4 lb)

### Ordering Information

#### 10 MHz Standard Configuration

**DA-36:** Distribution amplifier incl power supply

**Included with instrument:** 3-year warranty<sup>1</sup>, wall mount kit, users Manual on CD

**NOTE:** Fiber cable is not included

<sup>1</sup>The warranty period may be dependent on country.

