

Success Story: DA-35/36

pendulum

Large Frequency Distribution System to World Leading Telecom Manufacturer

Background

One of the worlds leading telecom manufacturers needed to build a frequency distribution system in a 10 floor high building, used only for R&D. The intention was to build a common system, for frequency distribution, both 10 and 2.048 MHz in the whole building, covering 13 existing labs.

Since the building only consisted of high-end technology labs, one of the most important requirements was a very high stability frequency signal, distributed to every lab bench. Another requirement was redundancy – to avoid, to most extent, any failure of the frequency signal or a total loss of signal. The system needed to be prepared for future expansions, and also needed to be easy to supervise.

The customer wanted one supplier to take responsibility of the whole configuration and all the instruments, with the purpose of only having one contact person, in case support was needed.

Summary of Requirements:

- The system needed to deliver two different frequencies; 2.048 MHz and 10 MHz, from the tenth floor to each floor and several labs on each floor.
- The system needed to be redundant.
- Possibility for future expansion – in new laboratories or in existing ones.
- Fiber optics distribution was preferred over coax, for reasons of long distance distribution without attenuation, limited cable space requirements, minimal noise pickup and lower cost.
- One supplier.
- Economical solution.

The Solution

We presented a solution using Pendulum instruments, a solution that was both flexible and economical for the customer. In the solution, we used:

- Two GPS-12R; GPS-controlled Rubidium Standards, each equipped with both 2.048 MHz (standard) and 10 MHz (optional) outputs. One unit acts as the master reference, the other as the slave.
- Four DA-36; Distribution Amplifiers, forming two independent redundancy switch-over units for 2.048 respectively 10 MHz.

- Two DA-35 racks; one equipped with 2.048 MHz output boards and one with 10 MHz output boards. These racks received the two master fibers from the redundancy switch system, and supplied all receiving rooms with a frequency reference over fiber.
- 21 DA-36; with either 2.048 MHz or 10 MHz output, at the receiving end of the fibers, in all individual lab rooms. These units supplied the end users with 4x coax reference outputs each.

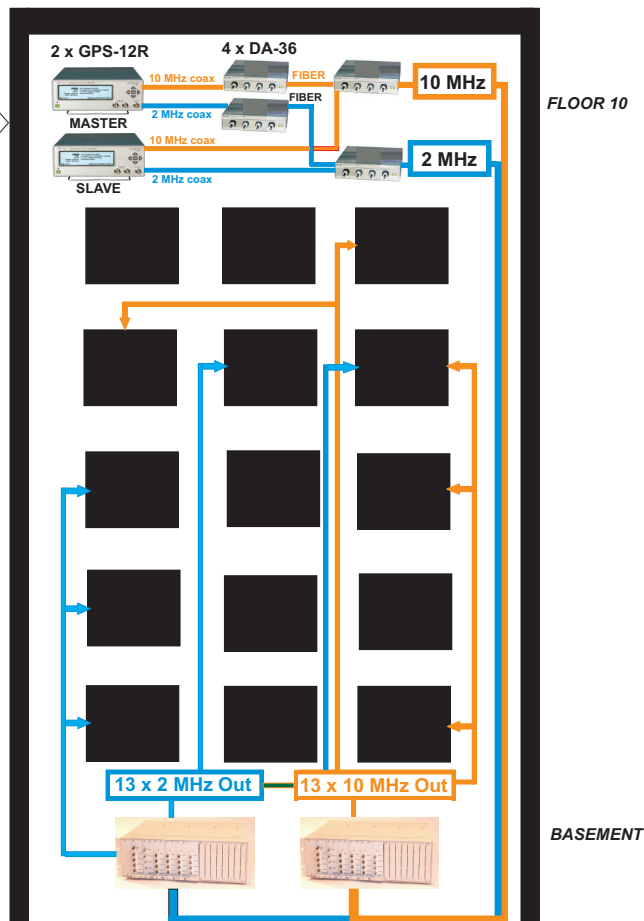
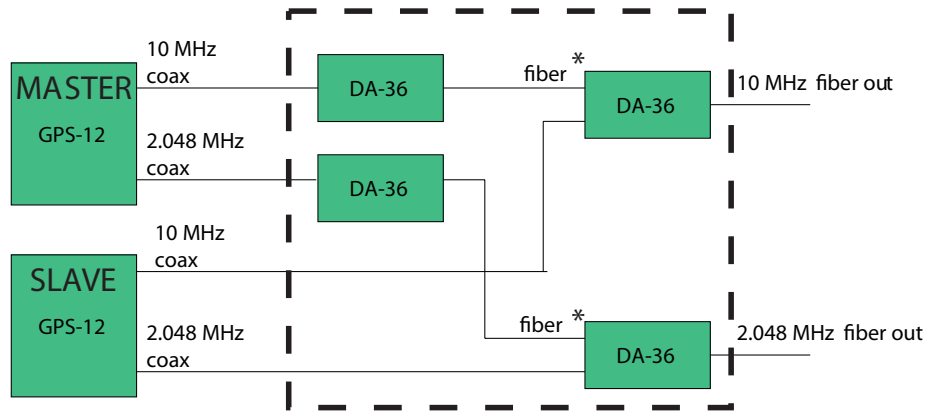


Figure 1



Redundancy switch for 10 and 2.048 MHz



* Fiber input to DA/36 has priority over coax input.
Automatic switch/over to coax input signal if fiber signal is lost.

Figure 2

As figure 1 shows, the two GPS-12R's was placed on the top of the building, where they were connected with two GPS-antennas on the building-roof. Both of the GPS-12R's were equipped with outputs for 2.048 MHz and 10 MHz.

Each one of these four main outputs were connected to an own DA-36, see figure 2. Each pair were configured as a redundancy switch, since the second DA-36 feeds the fiber input (master signal) to the output when the input signal is high enough, otherwise, the coax input (slave signal) is fed to the output.

From the DA-36's, fiber went down to the basement, where the two DA-35 distribution racks were placed. Each DA-35 rack was equipped with 1 pcs DA-35/23 (opto input card), and 4 pcs DA-35/24/10 or DA-35/24/2 (opto output card for 10 or 2.048 MHz), resulting in maximum 16 output fibers per rack, of which 13 were actually used.

The fibers were distributed to all labs in the building. In some labs, there were two DA-36 installed, one for 2 MHz and one for 10 MHz. Other labs only had one DA-36 for either 10 MHz or 2.048 MHz and one lab even had up to 5 pcs of DA-36, cascaded to give the number of outputs required.

The customer chose us as their supplier because of the ease of use, and the quality reputation of Pendulum Test & Measurement instruments.

Other important criteria's was the simplified calibration procedure of the frequency standards (yearly check of frequency at any output node, the DA-35/36 system requires no calibration at all), that the Pendulum solution was really flexible and expandable, and, last but not least, the performance and cost advantage of distribution via fiber, instead of coax cables.

The fiber network was installed in advance by the customer's normal subcontractor, and after that we delivered Pendulum instruments for the whole system in the building, and took responsibility for all the instrumentation installed.

Success Summary

The Customer's way to Success:

- Got a full system solution using Pendulum instruments, based on the need of redundancy, expansion possibilities of the system and the need of distributing a stable signal, via fiber, over a longer distance.
- Our flexibility and ability to present a full system solution, which was economical for the customer.
- One supplier.
- Invested in the instruments needed; two GPS-12R, two DA-35 and several DA-36.

Products

Product Features:

- GPS-12R; Frequency standards for ultra stable GPS-controlled Rubidium reference frequencies of 1, 5, 10, 1.544 and 2.048 MHz.
- DA-35; Point to multi-point frequency distribution system over optical fiber. The DA-35 is typically close to the frequency source at the transmitting end of the fiber, but can also be used at the receiving end when a large number of local outputs are needed (up to 40).
- DA-36; Economic point-to-point distribution system over fiber. The DA-36 is typically at the remote receiving end of the fiber, but can also be used at the transmitting end for single point-to-point distribution.