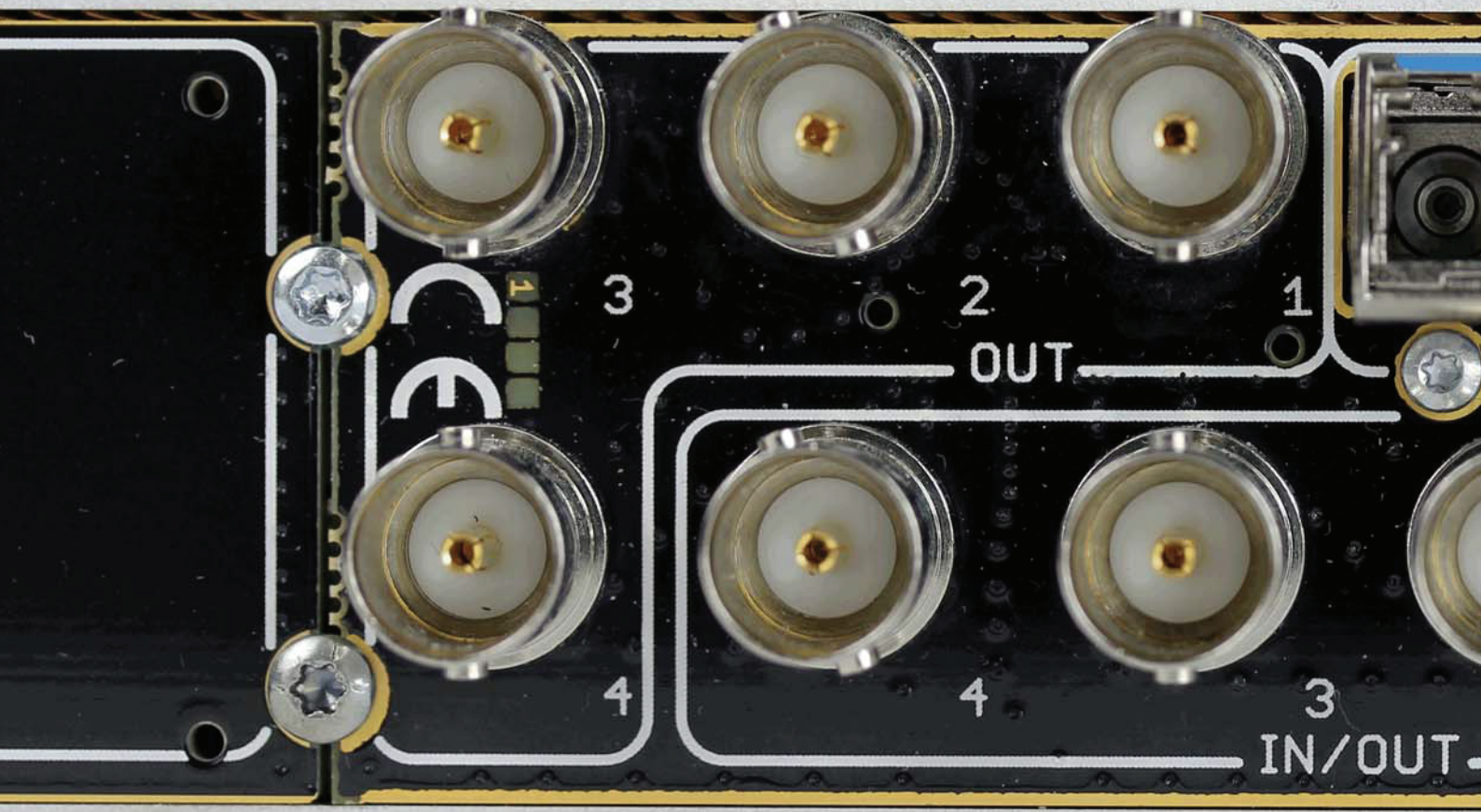
TEST AREA



Flexible

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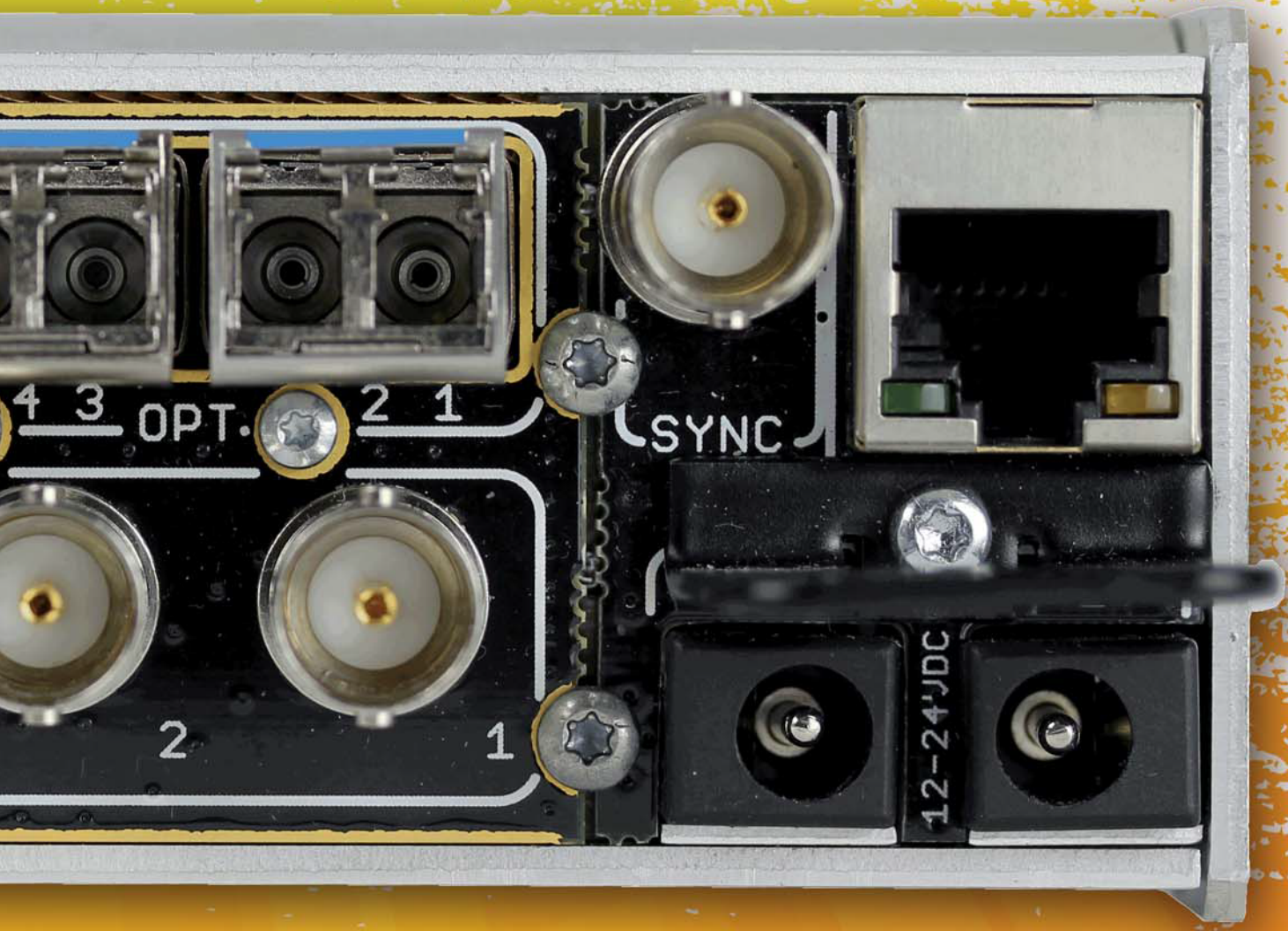

distribution

NORWIA MINIHUB FRAME, RCONMINI, OC-4B-SDI, SFP

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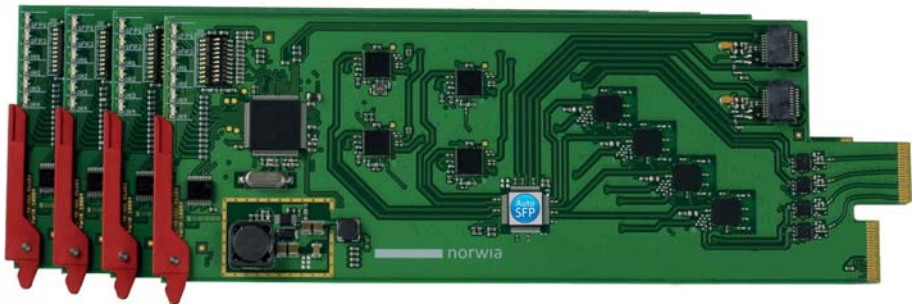
Test bench made by Pablo Martínez



In this month's edition of TM Broadcast we analyze one of the compact equipments with the greatest operating flexibility (within its sector) that I have analyzed so far. Doing a little background, for years now we have been working with optical fiber, and we have got to know about its virtues and drawbacks. Its use and benefits, specially standardized for voice/data systems, have been broadly discussed by our market, although this has not reflected effectively in our everyday work processes. Indeed, we have been dealing for years now with leading suppliers of collection video equipments, offering fiber systems with many advantages, but also significant disadvantages when having to repair cabling, especially on mobile unit systems. The market is increasingly implementing equipment with fiber connection, which is largely due to the miniaturization of the necessary components for its transmission/reception and to a substantial reduction in the prices of these components.

Within most structures we find optical fiber trunk lines (point-to-point, ring, etc.), which can be used with devices such as the one that we are to analyze in this test bench, to transfer/receive video/audio signals at a very low cost and with tremendous flexibility. Although we may start from scratch in our structure, moving into working with optical fiber processes is currently more cost-effective than conventional systems, thanks to the flexibility offered by equipments such as this one.

With short advance planning and few changes we can, for example, move from a one way distribution system with 16 video channels to two-way multiple video and Ethernet configuration systems

LEARNING ABOUT THE SYSTEM

In order to carry out this test bench, we have a Norwia's MiniHUB, where we can clearly see six different areas. The first of them corresponds to the power/management and the last one is where we find the cards for the passive optical fiber ports. We find the greatest innovation in the other areas, where we only need one type of card. This means that, for each area, we will only need one card and one rear card (the same in both), with which we can get different combinations for each slot of the MiniHUB. This is great advance with regard to similar products, which leads to important cost savings. To avoid any doubt, below are the main characteristics of the system, and some graphic examples on the possible uses provided by NORWIA.

Description on the MiniHub

I have carried out this test bench with a 1UR MiniHub, which includes, as I mentioned before, six different areas, with 4 slots to insert OC-4B-SDI cards. It has by default a main power supply, with a second

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optional redundant power supply, and a RCONmini controller card system.

Integrated into the RCONmini card, we find the possibility of assigning an external reference to the system through a BNC connector, and to control the whole MiniHub system by web management via TCP/IP, and within it, the most relevant characteristics are the configuration management of each card, the alarm management, and the monitoring of the different video channels and optical ports.

Description of the OC-4B-SDI card

With this card we can have 4 BNC outputs and 4 configurable ones as input/output, along with two ports for SFP modules.

Depending on our needs, we will configure (through web management) the system's behavior and its multiple configurations.

Description of the passive distribution optical module

The MiniHub enables 2 additional passive modules, offering the possibility of adding 2 CWDM modules of 8 channels.

Each CWDM filter has 10 ports, 8 of them work in CWDM wavelength multiplexing, and a common port that combines the 8 channels to give power supply to the optical network. These filters enable a connection in cascade, conforming up to 16 channels within a CWDM system.

The advantages offered by Norwia's MiniHub system in relation to the current proposals of different manufacturers are the following:

- Versatility of inputs/outputs with "AutoSFP" configuration
- All in 1 card with flexible configuration alternatives.
- Fiber link (Rx/Tx) with the same card, with the possibility of hot swaps in the SFP, according to the user's needs.
- Control software included in the MiniHub system
- Lower maintenance cost and stock of spare parts, as the whole system is developed with a all-in-one card solution.
- Support of video signals SD-SDI, HD-SDI, 3G-SDI, DVB-ASI, 4K.
- Through Norwia's SFP modules we can obtain composite video input and output, HDMI output, Gigabit Ethernet, always with AutoSFP patented technology in its modules, which enables auto-configuration of the different SFP modules within the system.
- Operating temperature range.

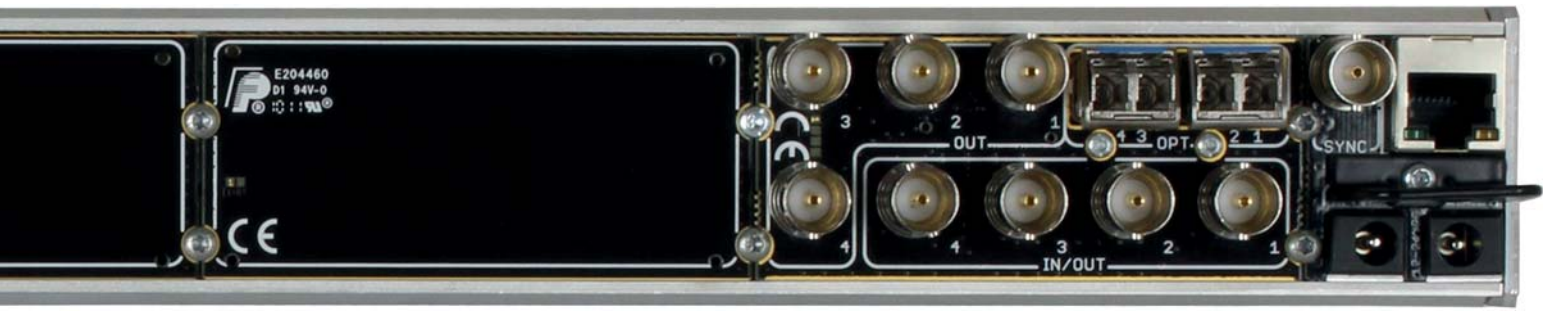
It's a system that is easy to implement and use, where control is intuitive thanks to the management software platform for each MiniHub. This, and the versatility it offers on the whole, makes it one of the most effective ones in the market. With short advance planning and few changes we can, for example, move from a one way distribution system with 16 video channels to two-way multiple video and Ethernet configuration systems among the different MiniHubs that have been implemented for CWDM solutions with multimode fibers.

TEST ON THE FIELD

As always, I believe that, for every test that I do, it is important to carry out field-testing in real environments. In this case, we worked in two different working environments: a real one, at a building with a structured optical fiber system, an equipment room and controlled temperature; and a second one, that was a behavior simulation outdoors. As we only had one MiniHub system, we carried out the test on a closed loop with the same MiniHub, and the test was conducted on an installation that pretended to be the union of two points of video contribution.

First test

The environment was radio-electrically and thermally controlled, with a trunk branch connection from a CWDM link, by configuring the MiniHub as a one-way signal distributor with HD-SDI format. The fiber link is done with the SFP of the different cards, by setting the four available cards: one of them as a sending card and the other three as receiving distributors for all BNC outputs, to verify the quality of the transmission with the different



information

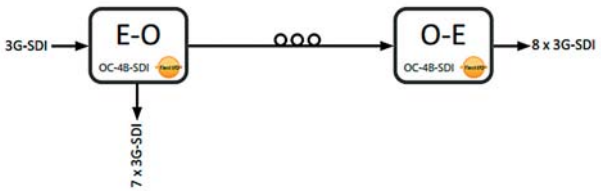
peaks in fiber patch. The first card, set as receiver/distributor, had an intermediate connection point. The second one had two intermediate points and the third one had three intermediate points. We had to take into account that each intermediate point added a distance of 200 meters from the MiniHub. This achieved a configured system with equal signals (in this specific test, though with this configuration it would be possible to have 3 different input signals, distributed in each tested point, with up to 8 equal outputs per card).

Taking into account that the balanced loss of the fiber circuits used (including the bridges in the different patches) is certified within the structured cabling that we used, and offers a maximum level of 0.0027 dB in the third case, with two bridges, the compared video signal between origin and destination of the three of them was in no way reduced.

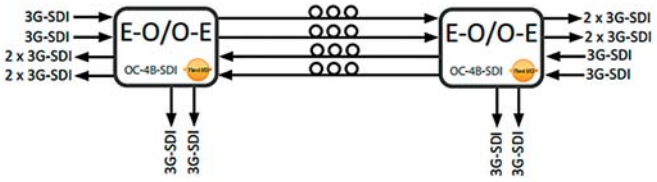
They provided me with two 16CH multimode fiber cables with a total distance of 1 km.

The system worked for 48 hours without any problems, having installed an air-conditioned rack, with temperatures below 25 degrees during the whole operation and maintaining at all times the stability of the video signal. Because of these results and before dismounting the system, we changed the work sequence in such a way that the farthest point (the forth card) contributed with a video signal to the initial point. We provided it with two outputs but maintained the farthest point, with the possibility of still working as a distributor of the main signal over the rest of the card's free points. Such intervention was carried out in less than 5 minutes, taking into account that most of that time was used to physically interact with the BNC's of both cards. This process may seem easy, but in nor-

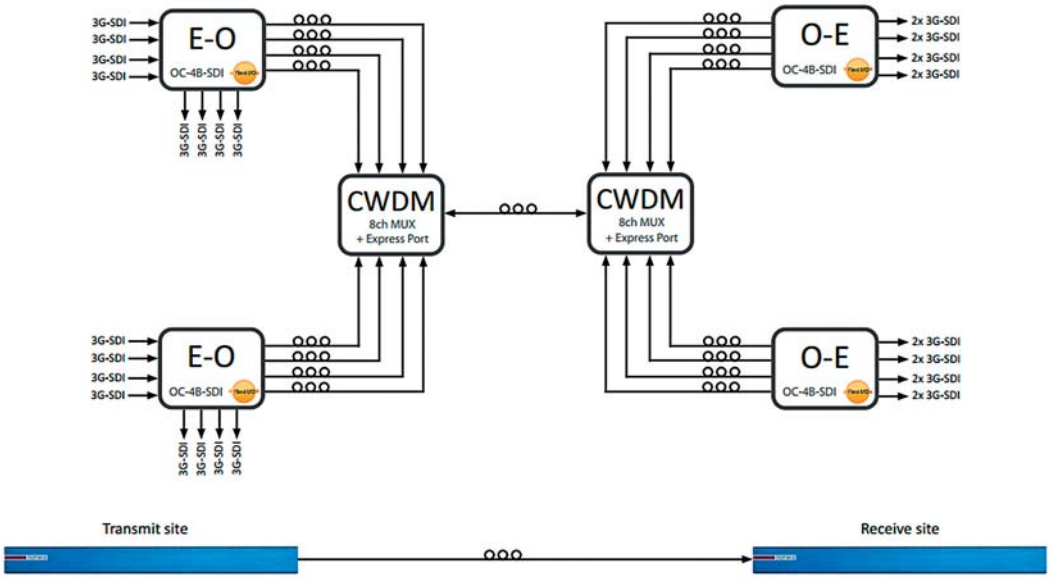
Configuration examples



Transmission through 1 fiber channel with distribution of 1 signal to 8 remote outputs



2 Rx channels + 2 Tx channels of fiber, transmission of 4 video signals with distribution



mal situations and depending on the redundancy of the system over the coax cable, it can be sometimes overwhelming for some, and even give rise to the need of adding new cabling to the existing system. In this case, and with a minimum intervention we achieve the same thing, which is one of the main advantages that I personally see in the integration of the MiniHub to our productive systems.

Second test

It was an outdoor environment, simulating the need to connect two mobile units, with a separation of 1 km between them, and with HD-SDI bi-directional signal contributions. A local company gave me the chance to use its lab to carry out this test. Plus, they provided me with two 16CH multimode fiber cables with a total distance of 1 km. This all enabled me to carry out this test bench on-site. After placing the MiniHub in a control cabinet with no refrigeration, and with electrical adjacent elements of medium voltage, we started the test that took place over 24 hours. During that period, the work temperature of the equipments was 27-45 degrees.

Configuration was done with the premise of sharing 4 different signals between the two "simulated" mobile units, and carrying out a programmed power cut of the equipment every 8 hours to evaluate its re-construction and any possible configuration errors.

Once the test was finished, the stability results of the HD-SDI signals, generated with charter standards and four movement image loops, were perfect, with no loss or noise in the signal. When making the controlled power cuts, the re-constitution and start up of the system was of around 40 seconds, which is an excellent result for these types of systems.

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WHAT WE MISS

Just to mention something, it does not have an on/off switch, and I have to admit that I put great emphasis on it when I analyze equipments. Though these systems are designed to run constantly, sometimes, during technical procedures where you need to stop the electrical system, we end struggling to try and find which one is the power cable, even to a greater extent when we take into account that this system has a main power supply and (as an option) a redundant one outside the case of the MiniHub.

CONCLUSIONS

We are dealing with a system that combines flexibility, robustness and quality, three important factors that have to be beard in mind in our future investments. Likewise, it has a price that, compared with other solutions that are currently on the market and given its flexibility, is below any of them.

The agility provided by this system is an important point when considering it, and it is important to know that it is a system with constant technological innovation, that will provide us with current technologies prepared for the future.

I personally have enjoyed and am very pleased with the results obtained in this test bench. The equipment has an excellent finish, it's easy to handle and more importantly, it's effective and useful for this sector in which we work, where due to production reasons, within minutes, the technical disposal of signals can change from the one that had initially been agreed.

I encourage you to take a look at NORWIA's website to get to know about the different possibilities that this system offers. You'll find a lot of useful information and detailed descriptions in it.

I want to thank XELTEC and Santiago for lending me the equipment, and IB3TV and Joan from Marratxi Xarxa for lending me their facilities and equipments to carry out this test bench.