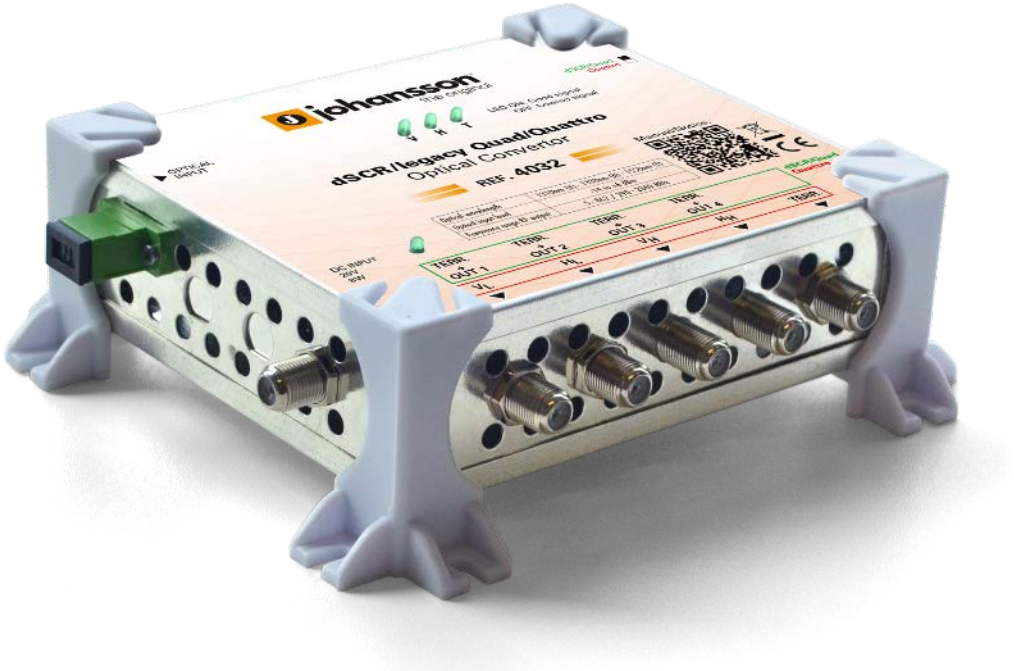
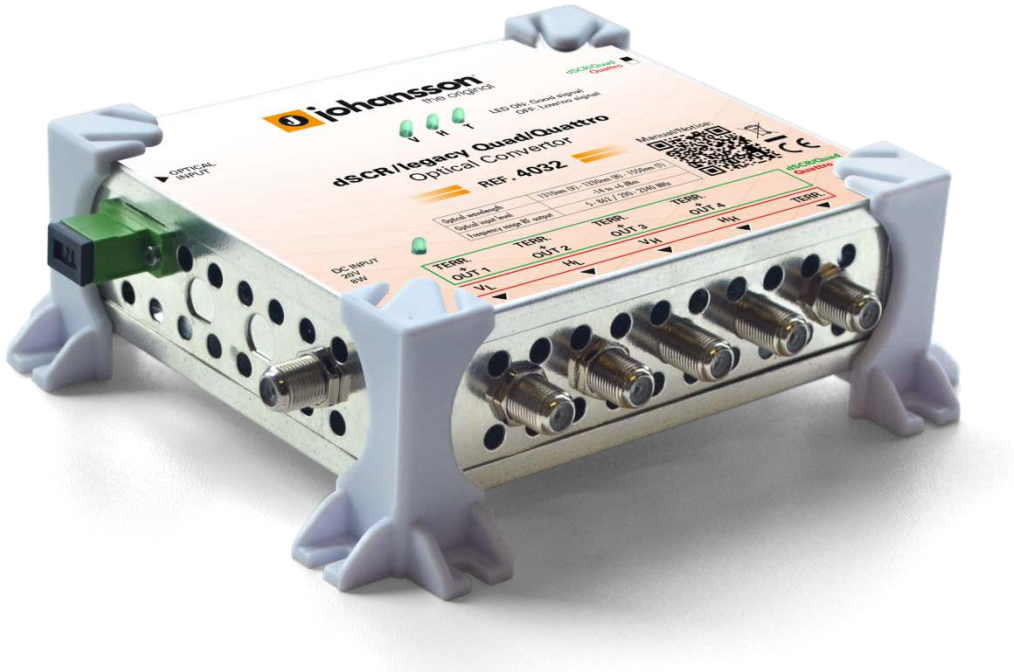
johansson®
the original

Fiber Optical Distribution



Fiber Optical Distribution



Johansson Fiber Presentation

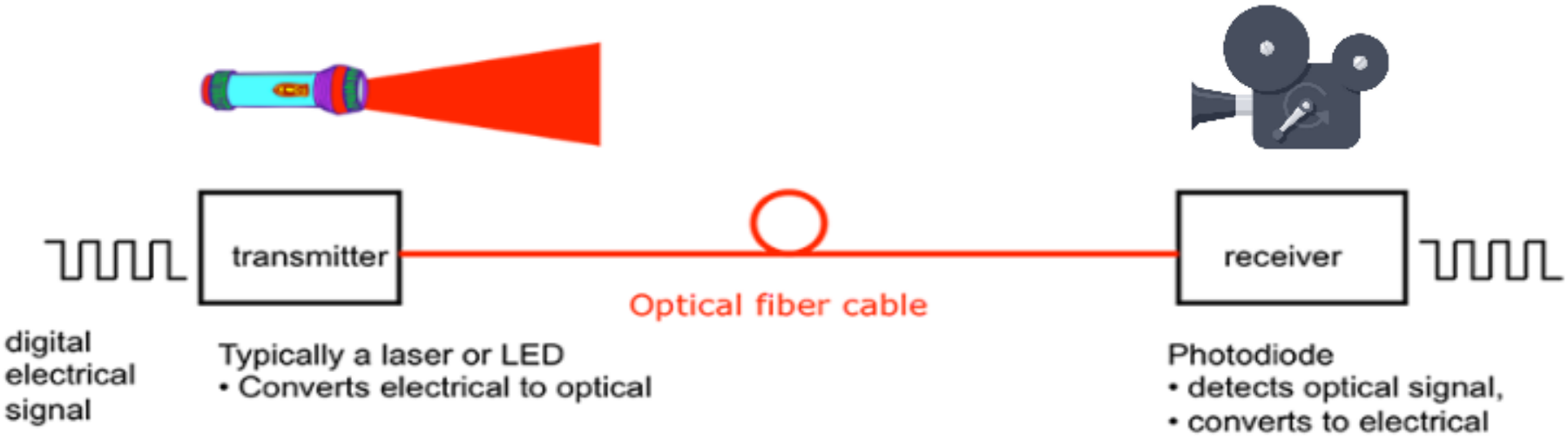
Part 1 Introduction and Fundamentals

Part 2 Fiber Distribution Product Range

Part 3 Using the Optical Configurator

Fiber Optical Distribution

The fundamentals



Fiber Optical Distribution

The fundamentals

A lot is similar to RF…

- dB (but 10 vs 20xLOG!!)

  Optical 3dB = RF 6dB

- Noise (Level too low)
- Distortion (Level too high)
- Dynamic range
- Splitters
- Amplifiers
- Light uses wavelengths (nm) like RF carriers (MHz)

  Optical 1310 and 1330nm ~ RF 474 and 482MHz

… but there are differences

- Almost no cable losses
- Return loss less an issue in fibre!

  Typically about 60dB
- No grounding loops
- No DC powering over cable
- **Limited dynamic range**

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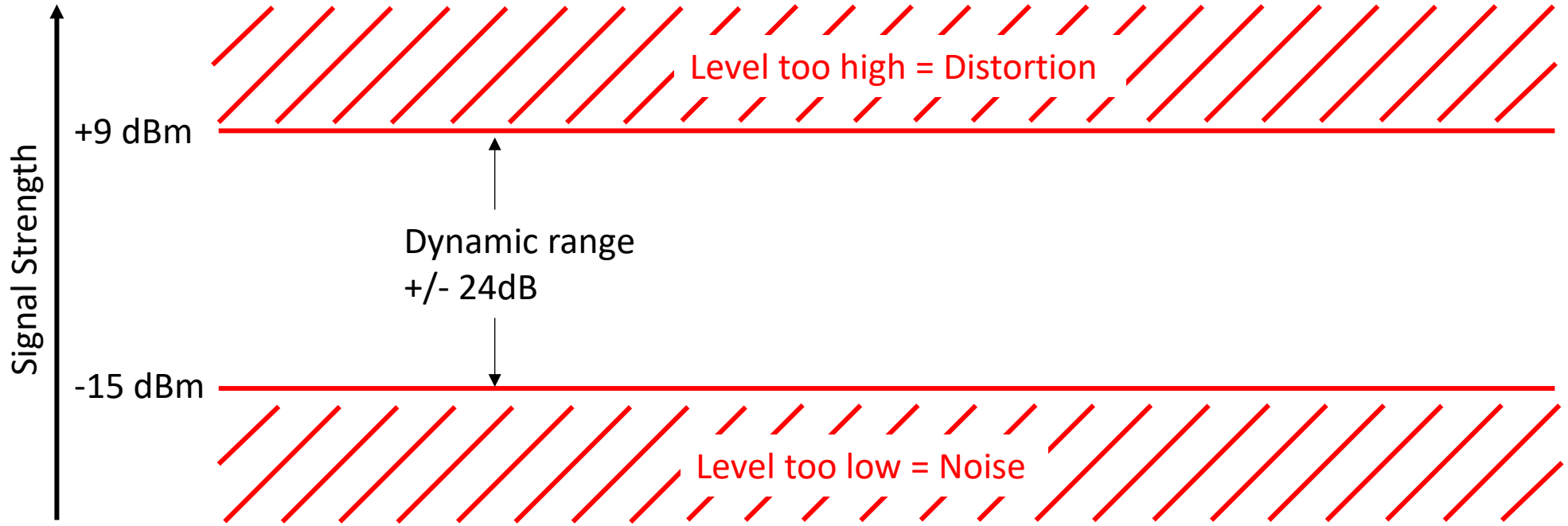
Fiber Optical Distribution

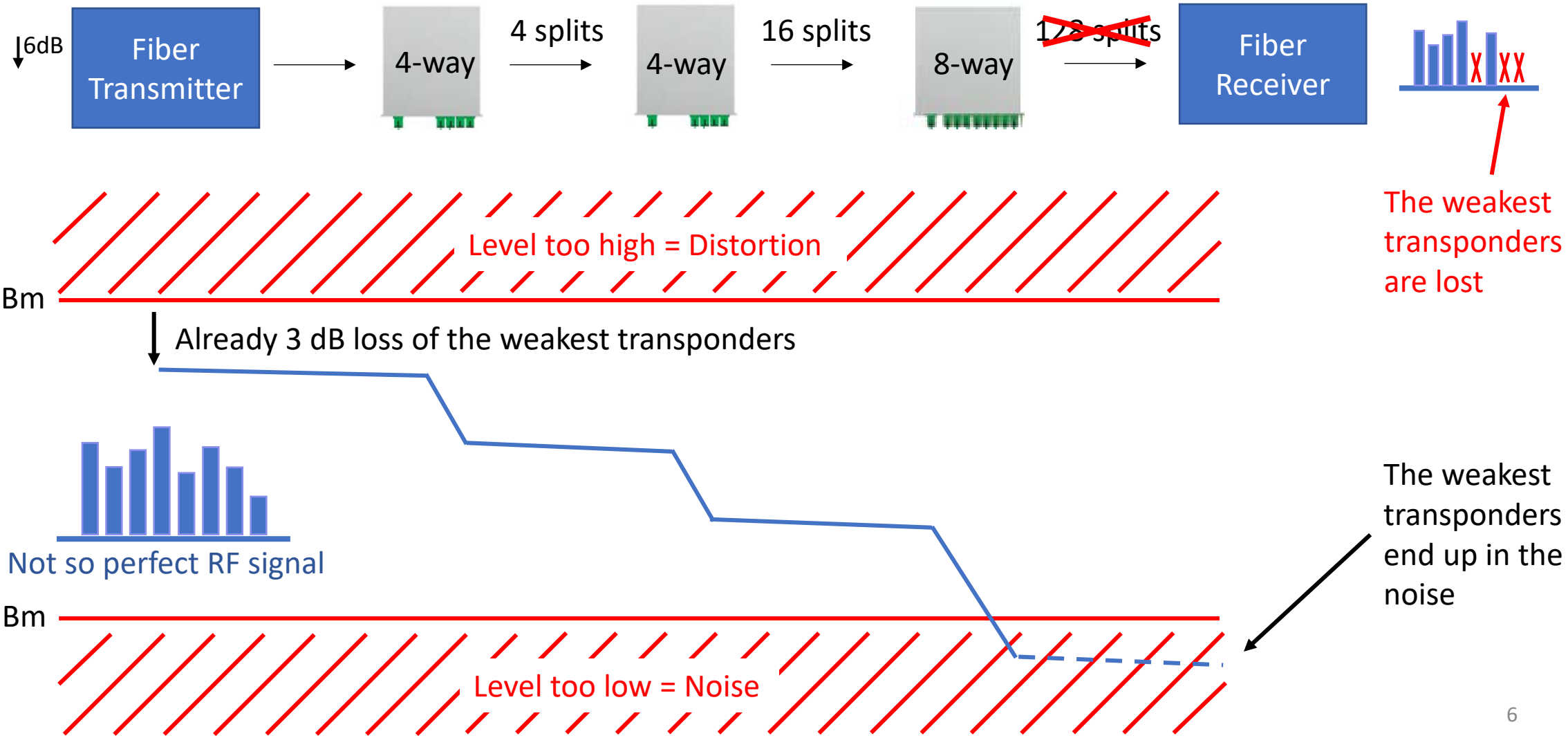
The fundamentals

Biggest challenge in optical :

This is the delta between the **weakest** and **strongest** optical signal in your system



Fiber Optical Distribution



Fiber Optical Distribution

4-way

4 splits

4-way

16 splits

8-way

128 splits

Perfect RF signal at output

Level too high = Distortion

+9 dBm

Perfect RF Signal

The weakest transponders still above the noise

-15 dBm

Level too low = Noise

Fiber Optical Distribution

The fundamentals

Our solution = optimal usage dynamic range

- +9 dBm high output optical output level -> 24 dB dynamic range
- Multiple wavelengths λ, no need to stack the RF signal
  - 1310nm = Satellite Vertical (290-2340 Mhz)
  - 1330nm = Satellite Horizontal (290-2340 Mhz)
  - 1550nm = Terrestrial (40 – 862 Mhz)
- Perfect RF alignment of each band with our accessories
  - Terrestrial: 6701 and 6711
  - Satellite: 9657 and 9780

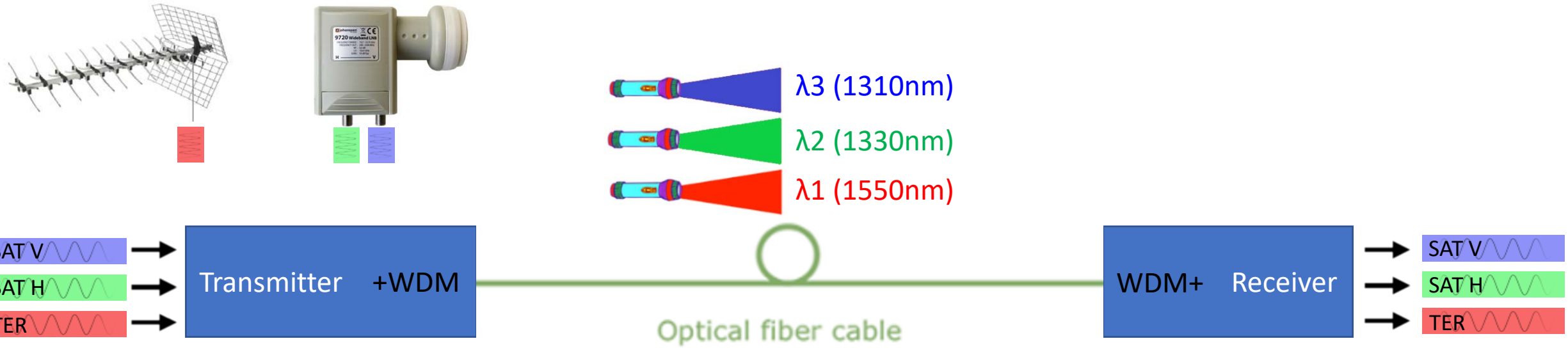
Our solution = more optical splits

Fiber Optical Distribution

The fundamentals

Our solution = Stacking wavelengths

- Each RF signal on its own wavelength λ
  - 1310nm = Satellite Vertical (290-2340 Mhz)
  - 1330nm = Satellite Horizontal (290-2340 Mhz)
  - 1550nm = Terrestrial (40 – 862 Mhz)



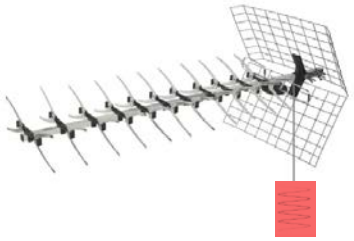
WDM = Wavelength Division Multiplex

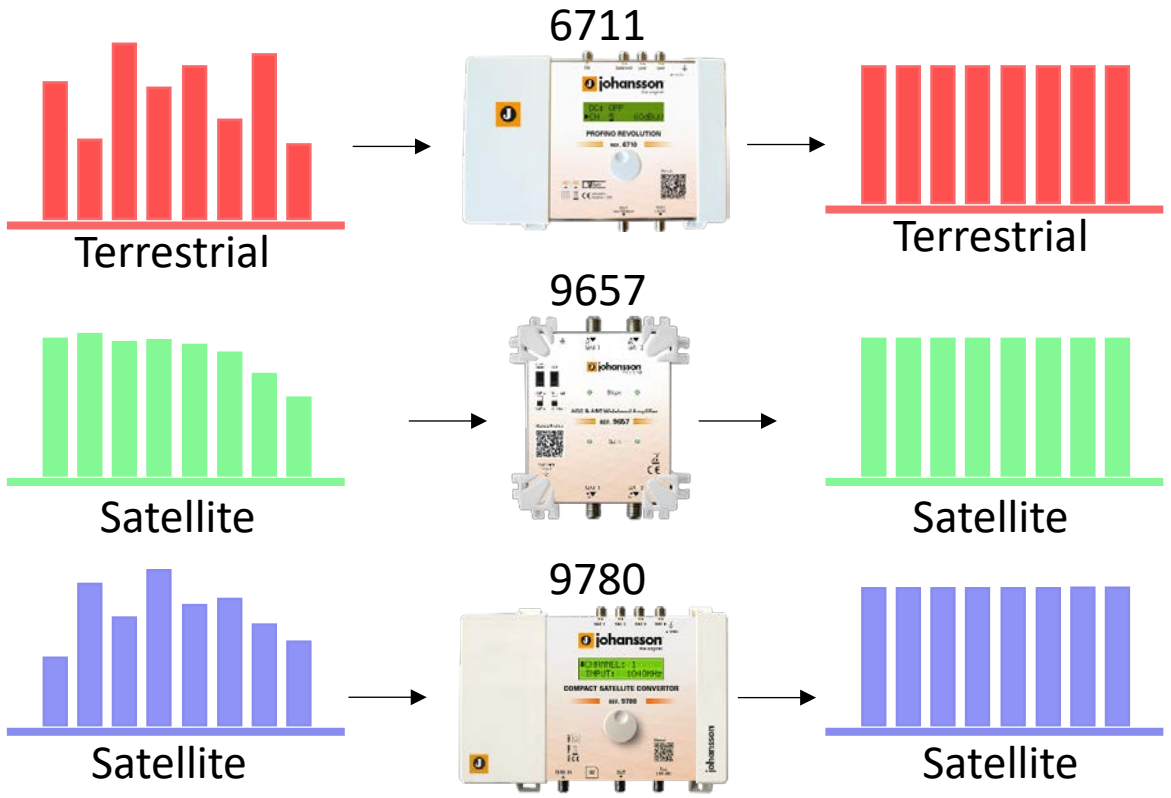
Fiber Optical Distribution

The fundamentals

Our solution = RF equalization

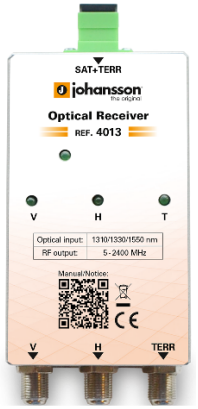
- Perfect RF alignment of each band with our accessories
  - Terrestrial: 6701 and 6711
  - Satellite: 9657 and 9780



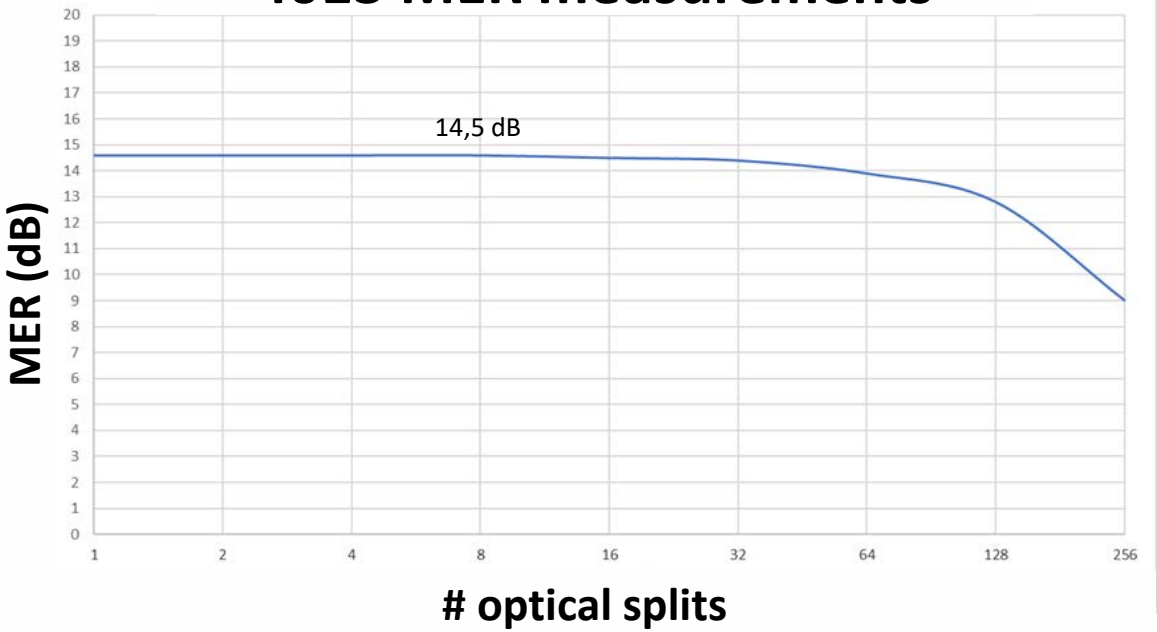


Fiber Optical Distribution

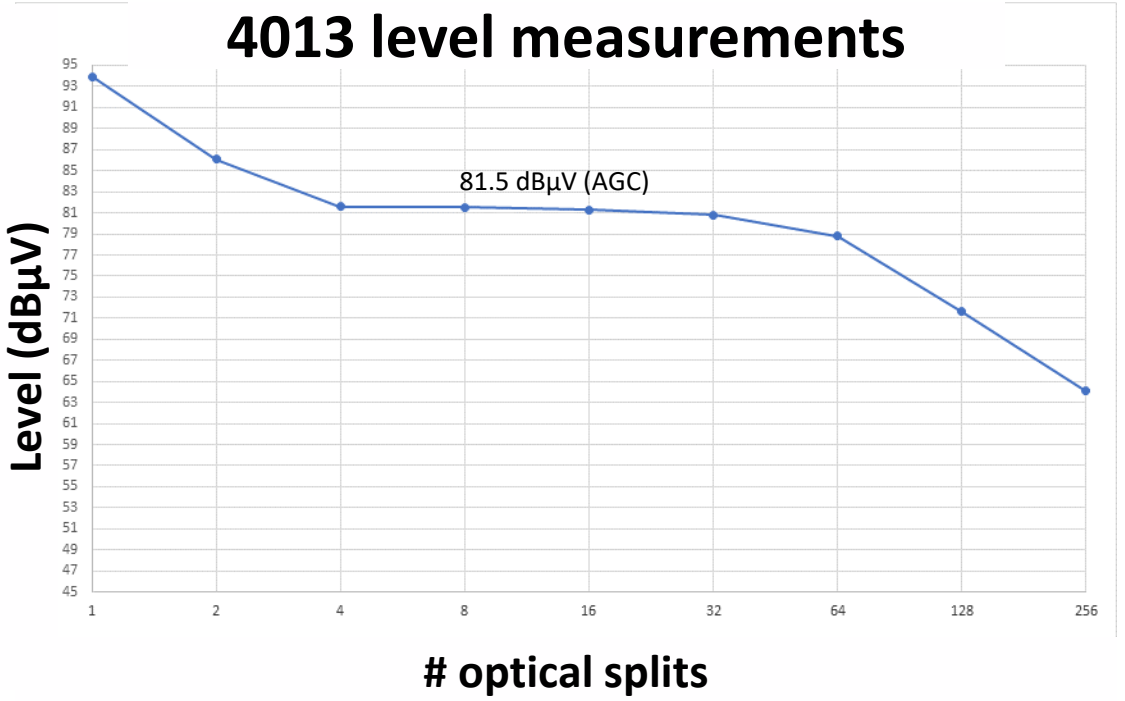
The fundamentals



4013 MER measurements

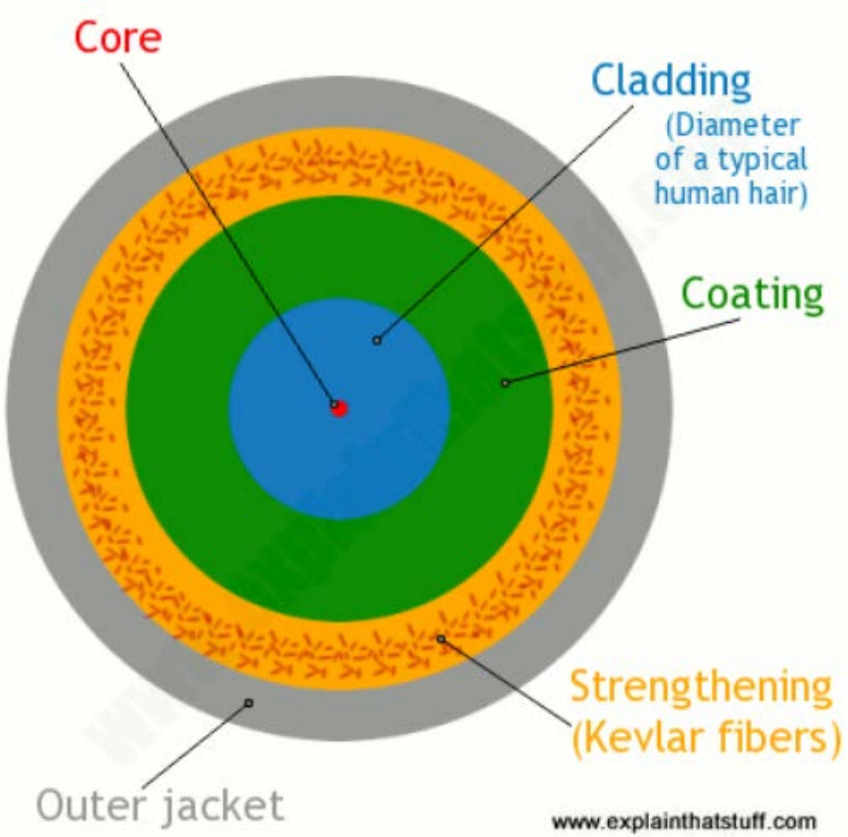


4013 level measurements



Fiber Optical Distribution

The fundamentals



- Fibre cable is basically a core and cladding, rest is reinforcement
- Type 9/125µm for single mode
  - Core 9µm!!
  - Cladding 125µm
  - Reinforcement 2mm

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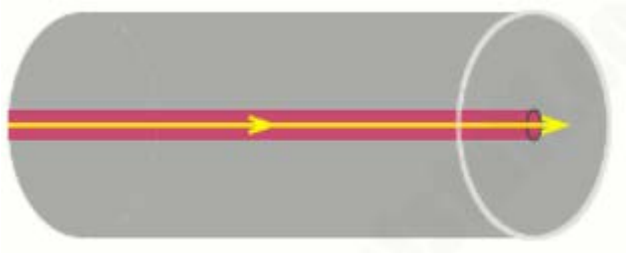
Fiber Optical Distribution

The fundamentals

Optical cable requirements

- Single mode fibre
- OS2 9/125µm
- Simplex
- SC APC connector



Single mode

Simplex cable

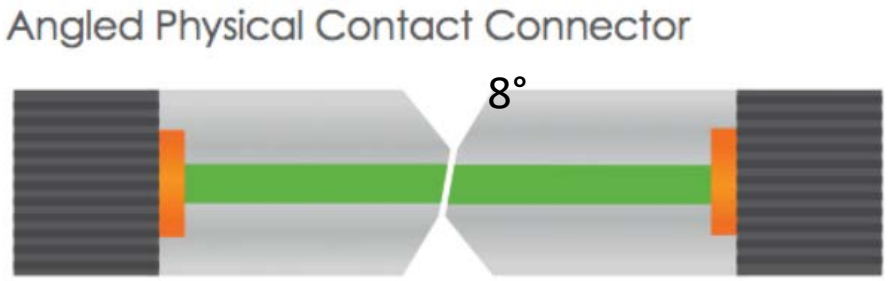
SC-SC APC OS2 9/125µm
Simplex Single Mode Fibre

SC APC connector

The fundamentals

SC/APC connectors = easiest to install and connect

- SC = **S**tandard **C**onnector, **S**ubscriber **C**onnector
- APC = **A**ngle-polished **P**hysical **C**ontact
  - Best optical return loss due to 8°angle
  - Most robust for multiple re-connections
- Green color connector

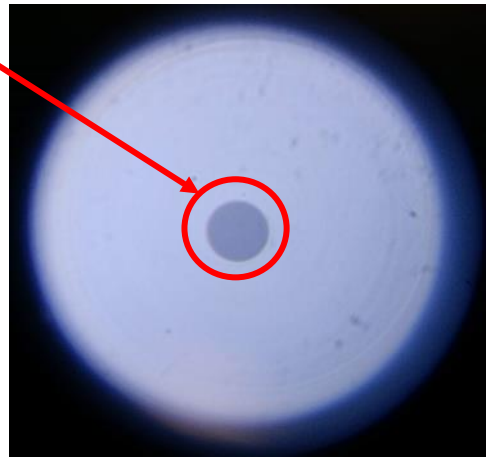


Fiber Optical Distribution

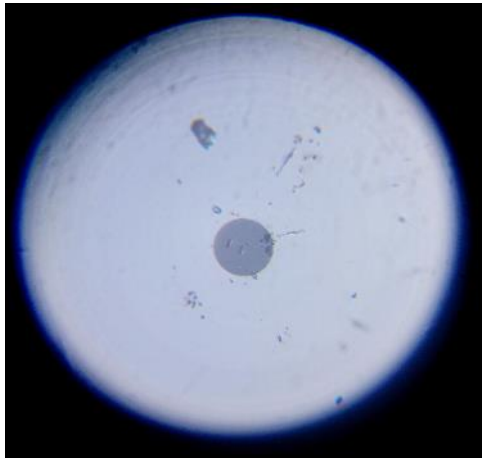
The fundamentals

Most important – CLEAN OPTICAL CONNECTOR

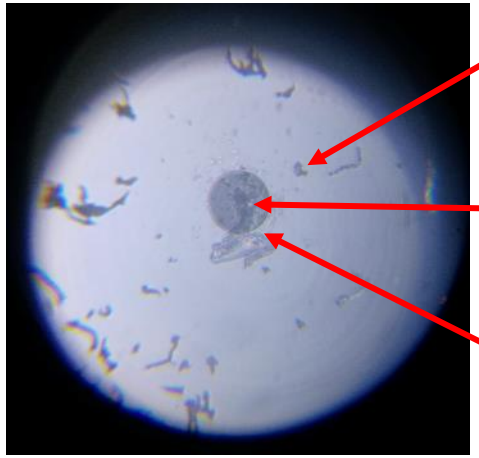
The centre is the most importance



Clean
Good signal quality

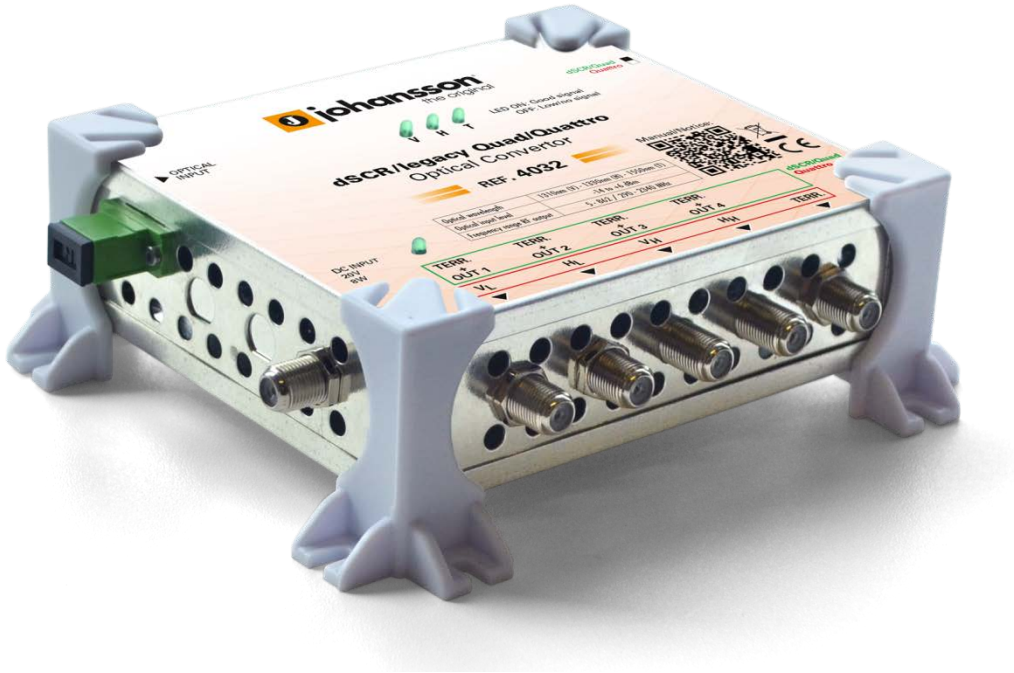


Dirty
Signal quality loss



Very dirty
Significant quality reduction

Fiber Optical Distribution



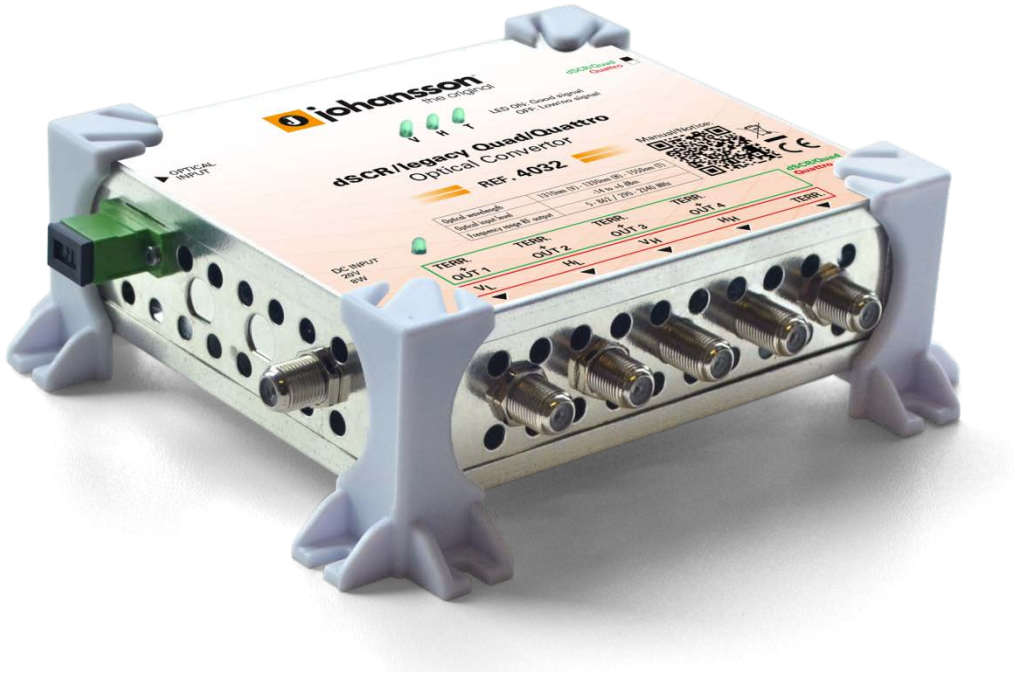
End Part 1 - Thank you.

Part 1 Introduction and Fundamentals

Part 2 Fiber Distribution Product Range

Part 3 Using the Optical Configurator

Fiber Optical Distribution



Part 1 Introduction and Fundamentals

Part 2 Fiber Distribution Product Range

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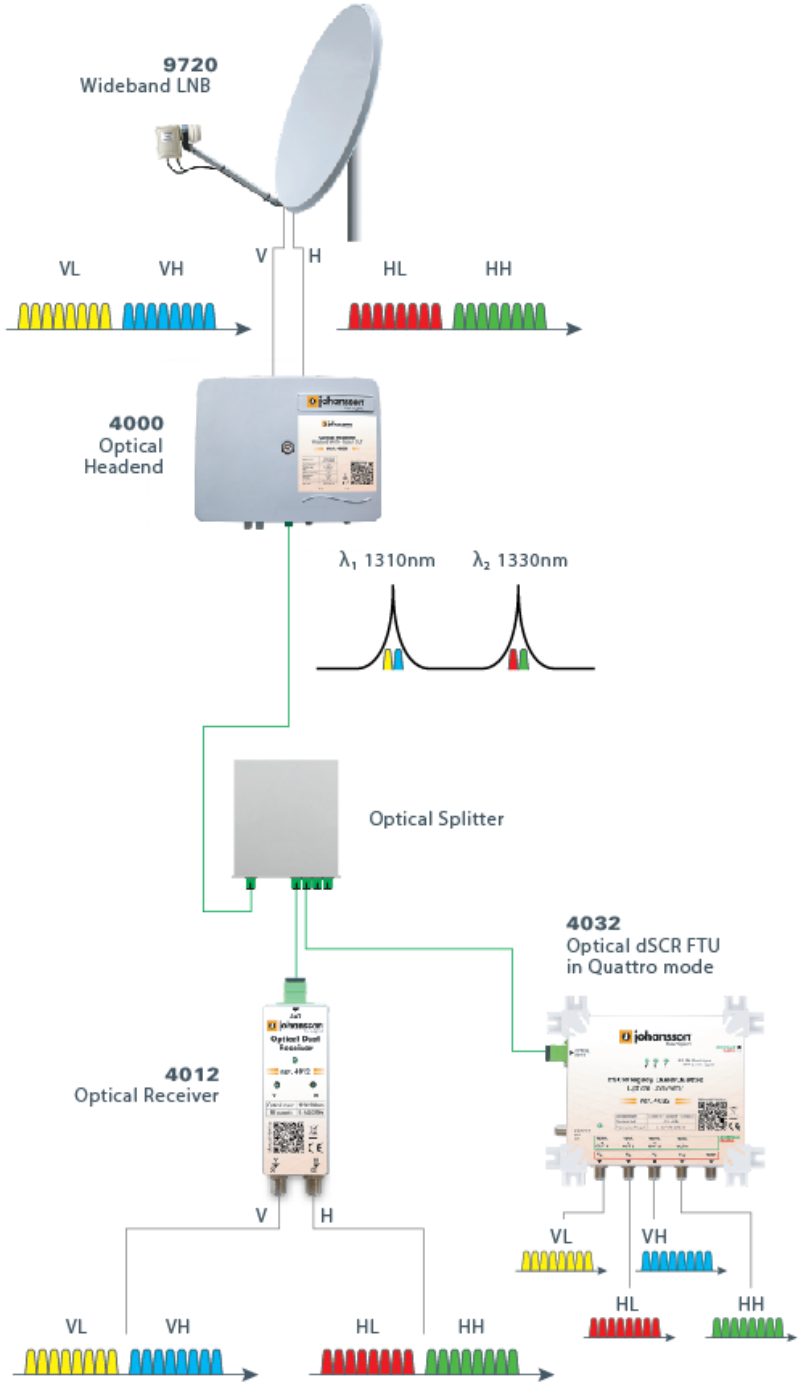
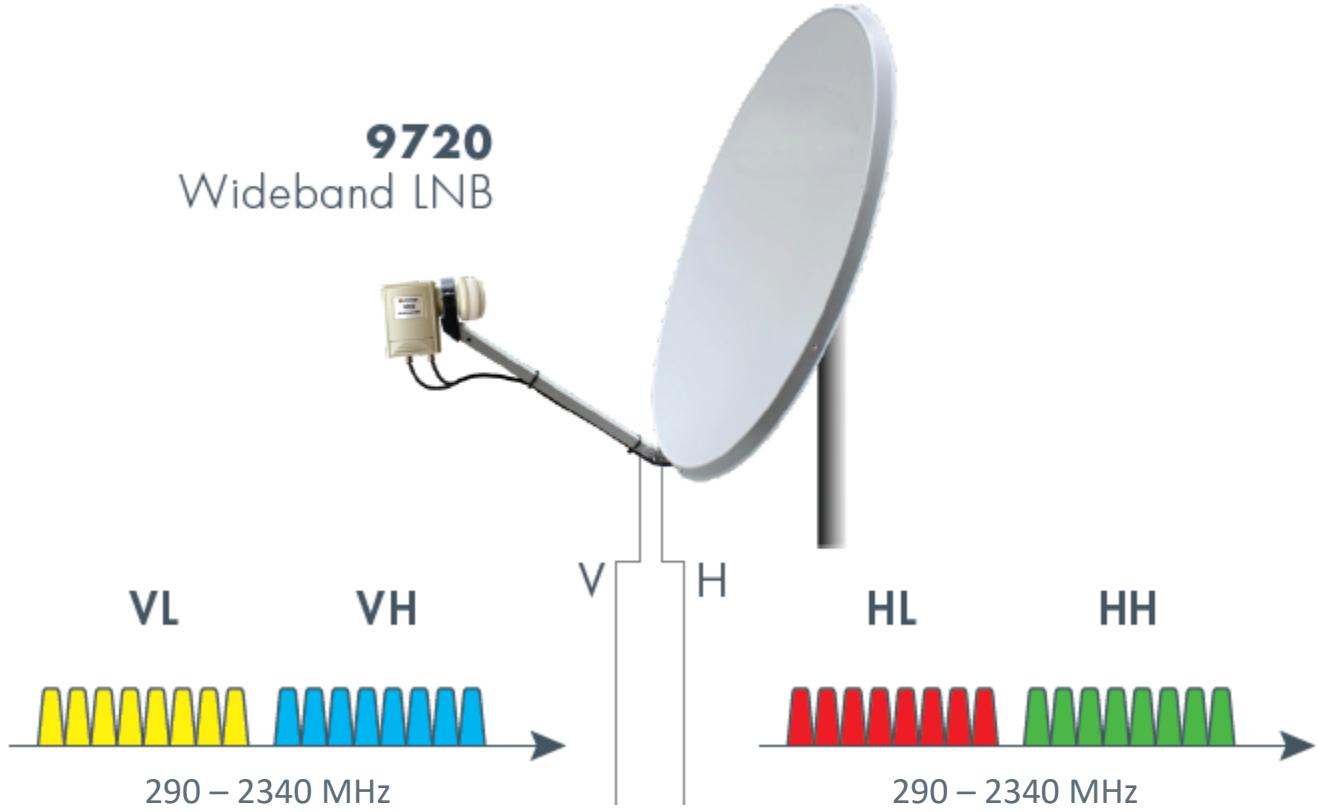
Fiber Optical Distribution

How our solution works?



Wideband LNB

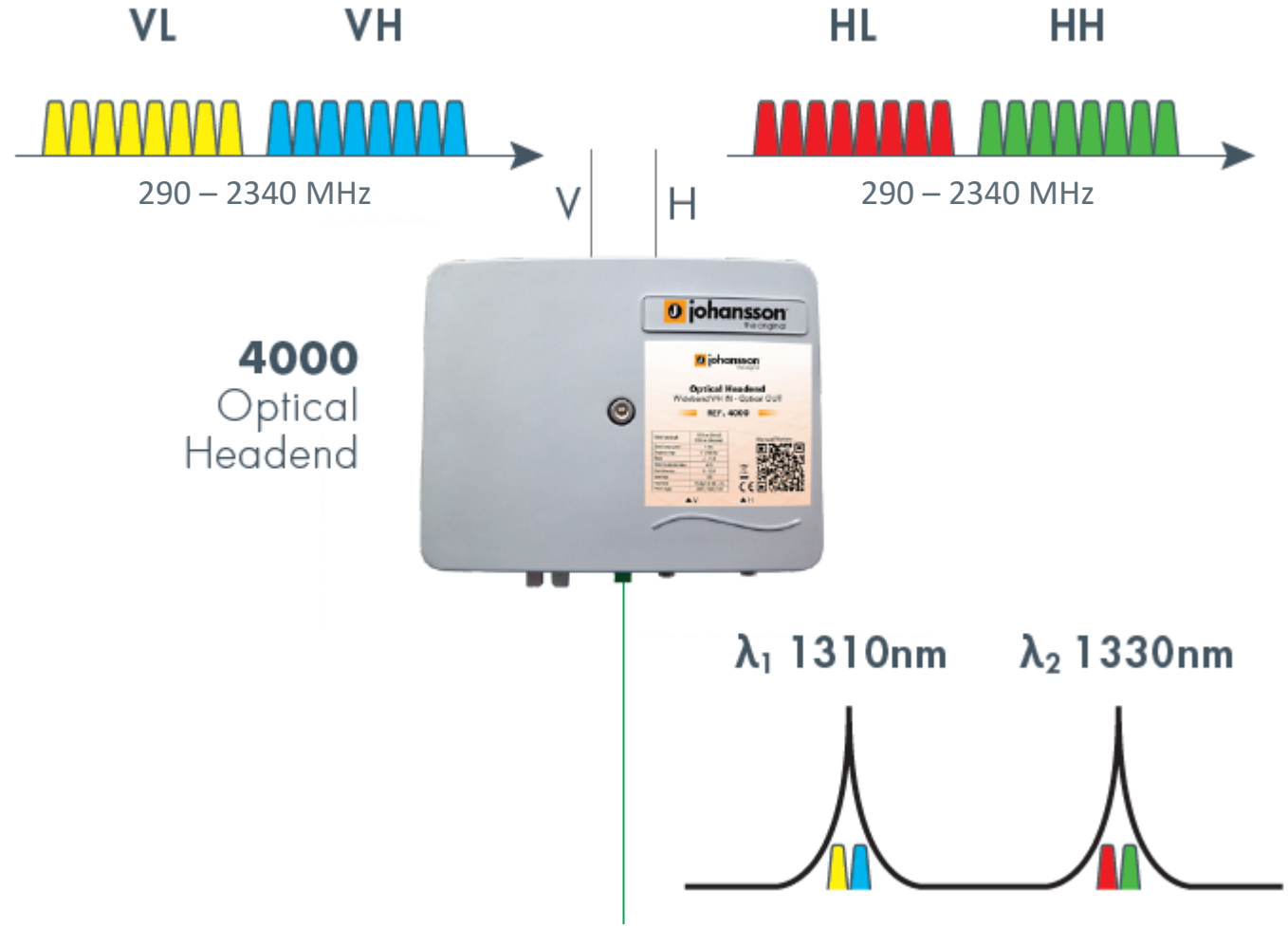
- Only 2 polarities (V & H) instead of 4 quadrants (VL, VH, HL, HH)
- Only 2 coax cables instead of 4 like Quattro LNB
- Full satellite band on a single cable (290 – 2340 MHz) using single local oscillator of 10410 MHz



Fiber Optical Distribution

Fiber Transmitter (Tx)

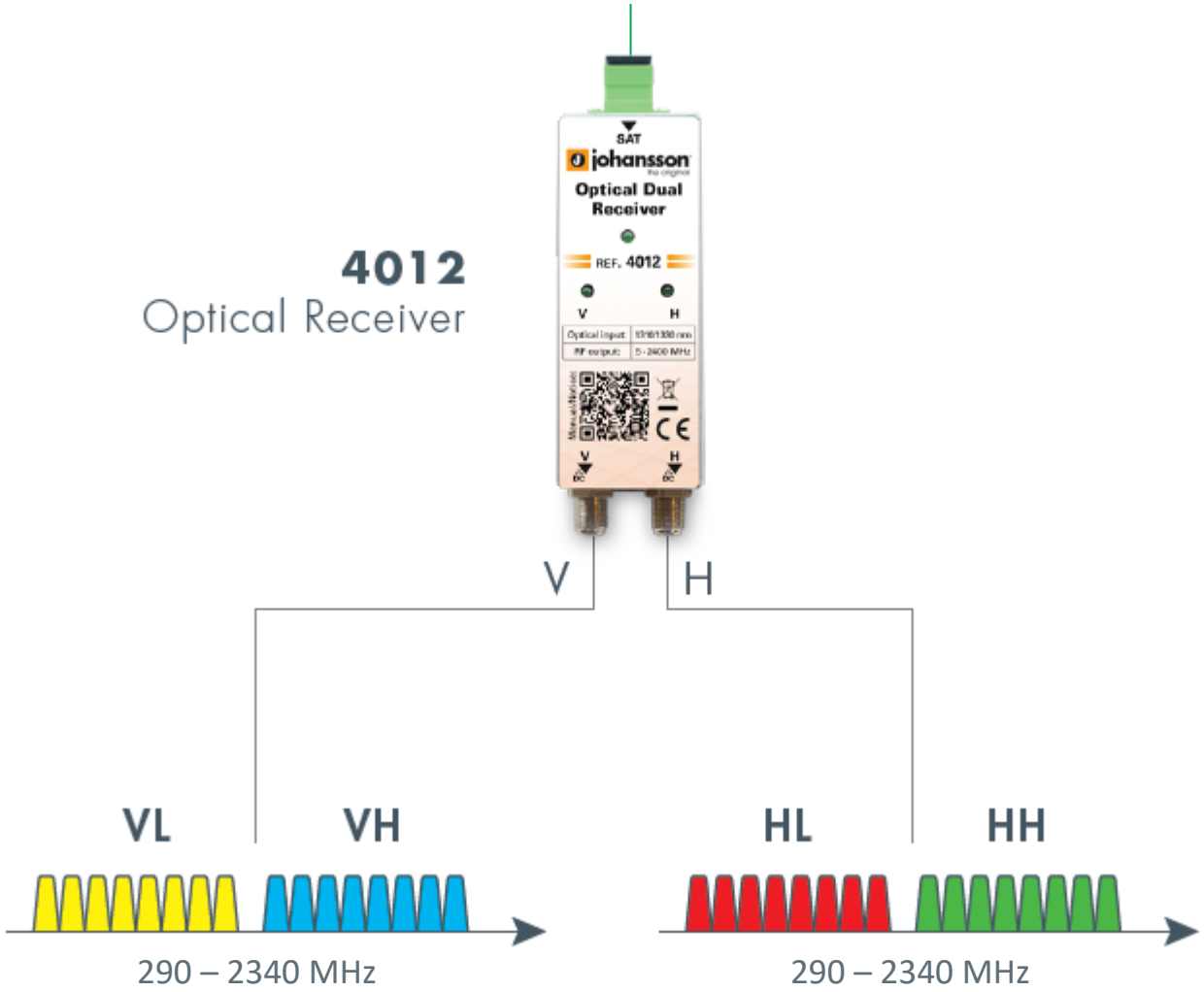
- Converts Wideband RF signal to Optical signal
  - λ1 (1310nm)
  - λ2 (1330nm)
  - λ3 (1550nm)
- Wideband inputs (5 – 2400 MHz) Can be used for:
  - Satellite (290 – 2340 Mhz)
  - Terrestrial (40 – 862 MHz)
  - Cable (5 – 1000 MHz)



Fiber Optical Distribution

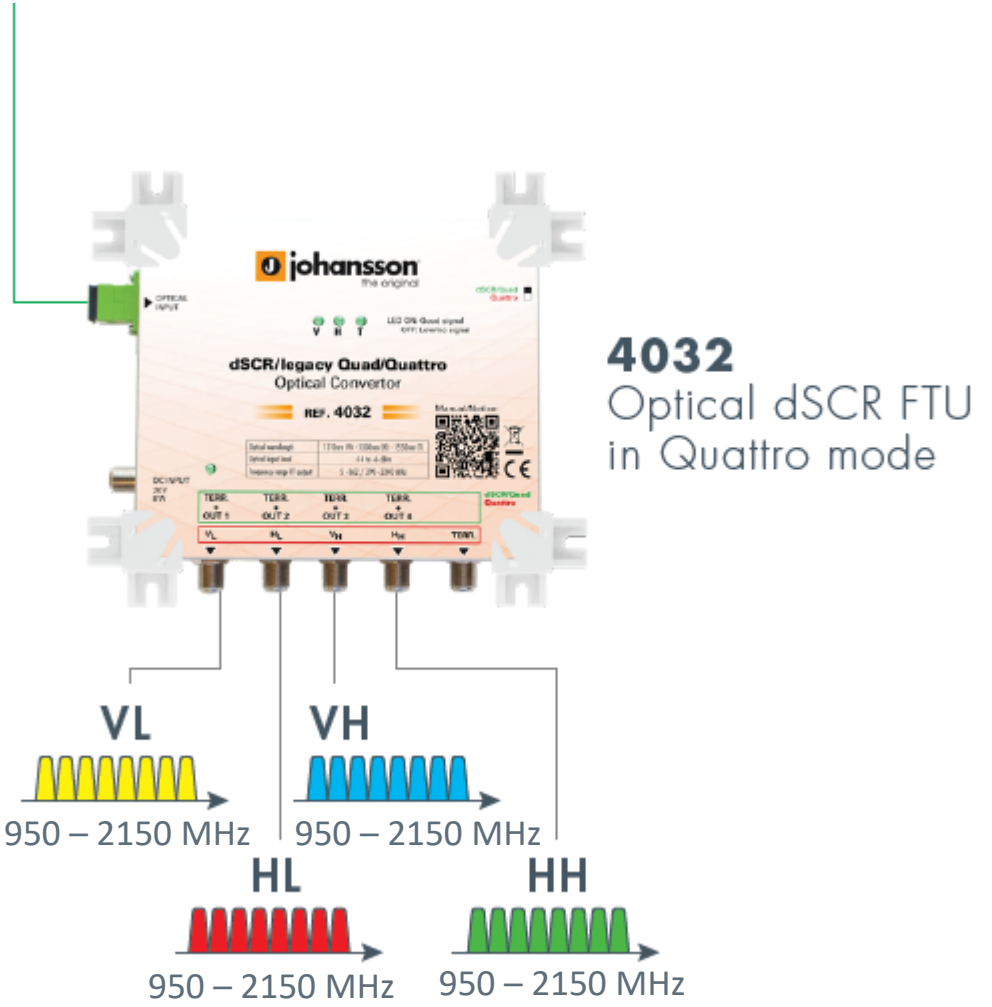
Fiber Receiver (Rx)

- Converts Optical signal back to Wideband RF signal
  - λ1 (1310nm)
  - λ2 (1330nm)
  - λ3 (1550nm)
- Wideband RF outputs (5 – 2400 MHz)
  Can be used for:
  - Satellite (290 – 2340 Mhz)
  - Terrestrial (40 – 862 MHz)
  - Cable (5 – 1000 MHz)



Fiber Termination Unit (Rx)

- Converts Optical signal back to Quad/dSCR/Quattro RF signal
  - λ1 (1310nm)
  - λ2 (1330nm)
  - λ3 (1550nm)
- Traditional RF outputs
  - Satellite (950 – 2150 Mhz)
  - Terrestrial (40 – 862 MHz)



Fiber Optical Distribution

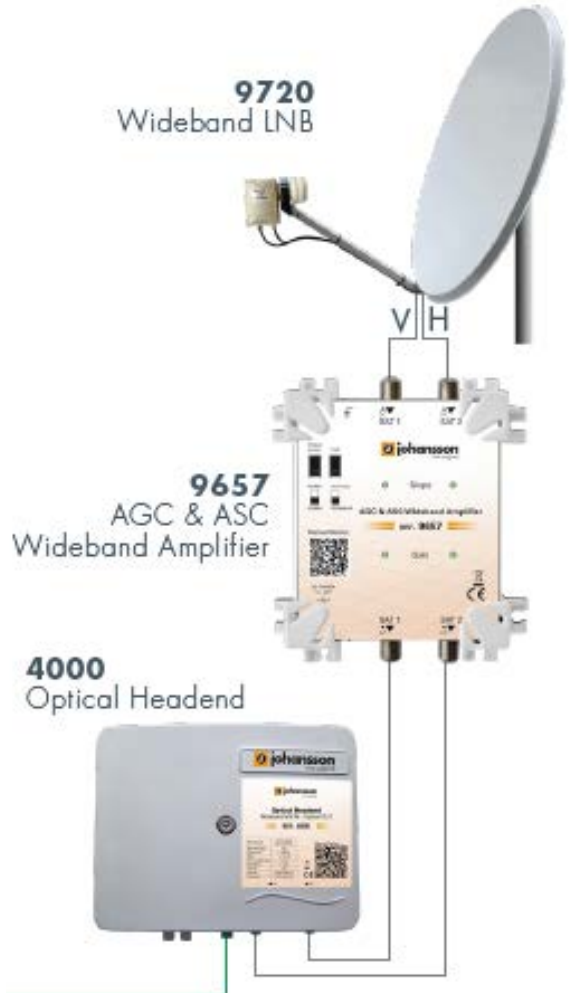
Overview Fiber Products

Fiber Optical Distribution

4000 Optical headend (Tx)

- 2x Wideband RF inputs (5 – 2400 MHz)
- 2x Wavelengths (1310 & 1330 nm)
- 1x Optical output (+9 dBm)

2 λ (1310 & 1330 nm)



To fiber network

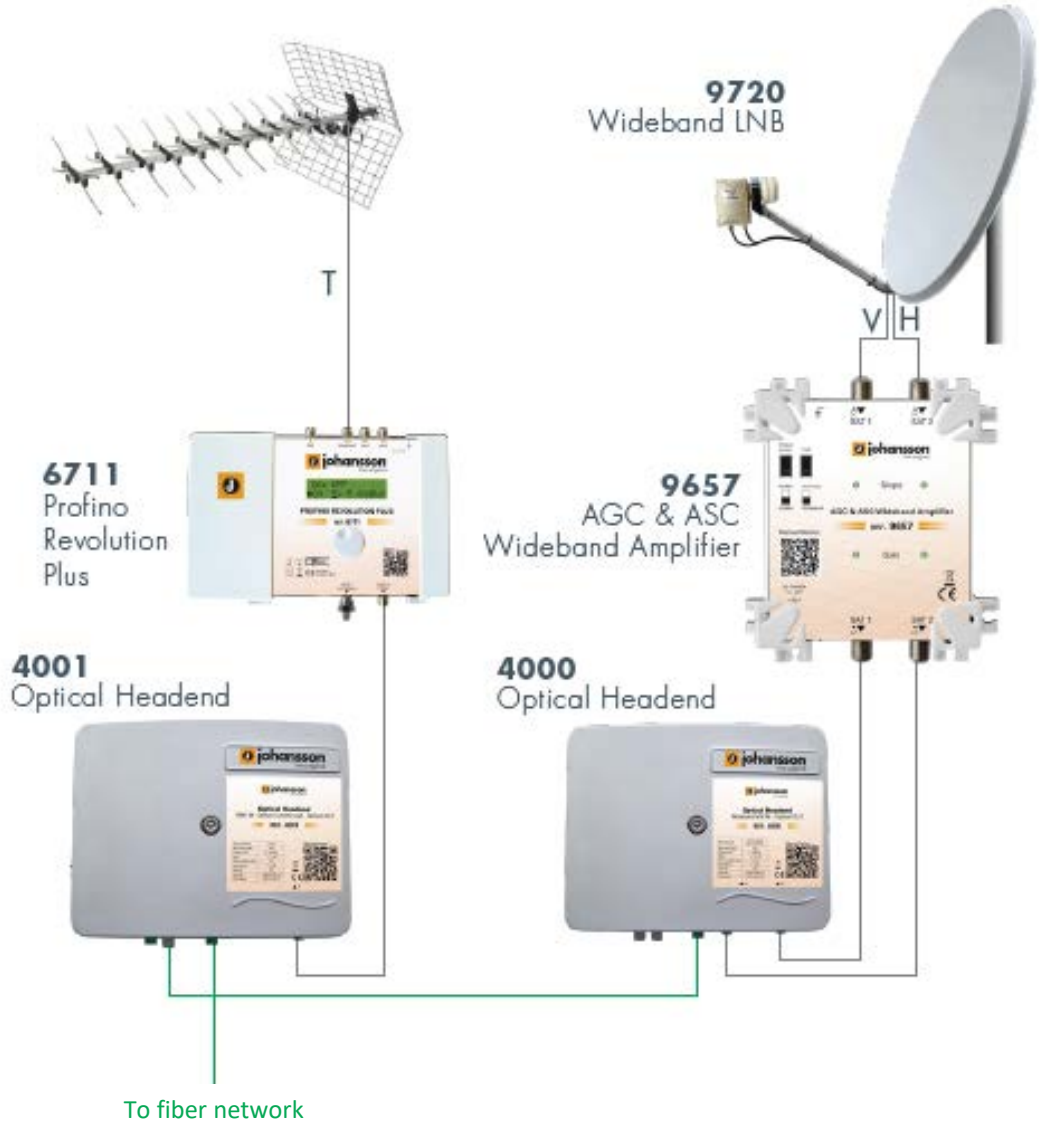
Fiber Optical Distribution

4001 Optical headend (Tx)

- 1x Wideband RF input (5 – 2400 MHz)
- 1x Wavelengths (1550 nm)
- 1x Optical input for loop through 4000
- 1x Optical output (+9 dBm)

2 λ (1310 & 1330 nm) from 4000 Tx

3 λ (1310 & 1330 & 1550 nm)



Fiber Optical Distribution

4011 Fiber receiver (Rx)

- 1x Optical input (-14 dBm)
- 1x Wavelengths (1550 nm)
- 1x Wideband output (5 – 2400 MHz)
- Active Gain Control (80 dBµV)

REF **4011**

AGC

4012 Fiber receiver (Rx)

- 1x Optical input (-14 dBm)
- 2x Wavelengths (1310 & 1330 nm)
- 2x Wideband output (5 – 2400 MHz)
- Active Gain Control (80 dBµV)

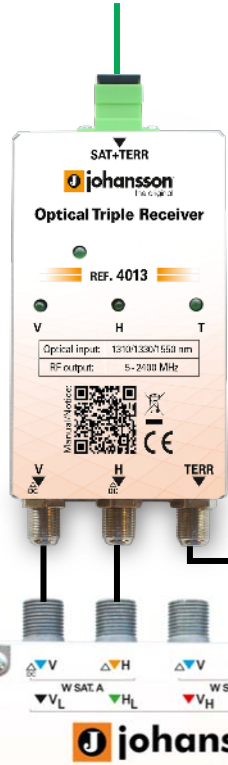
REF **4012**

AGC

4013 Fiber receiver (Rx)

- 1x Optical input (-14 dBm)
- 3x Wavelengths (1310 & 1330 & 1550 nm)
- 3x Wideband output (5 – 2400 MHz)
- Active Gain Control (80 dBµV)

REF **4013**



AGC

Fiber Optical Distribution

4031 FTU (Rx)

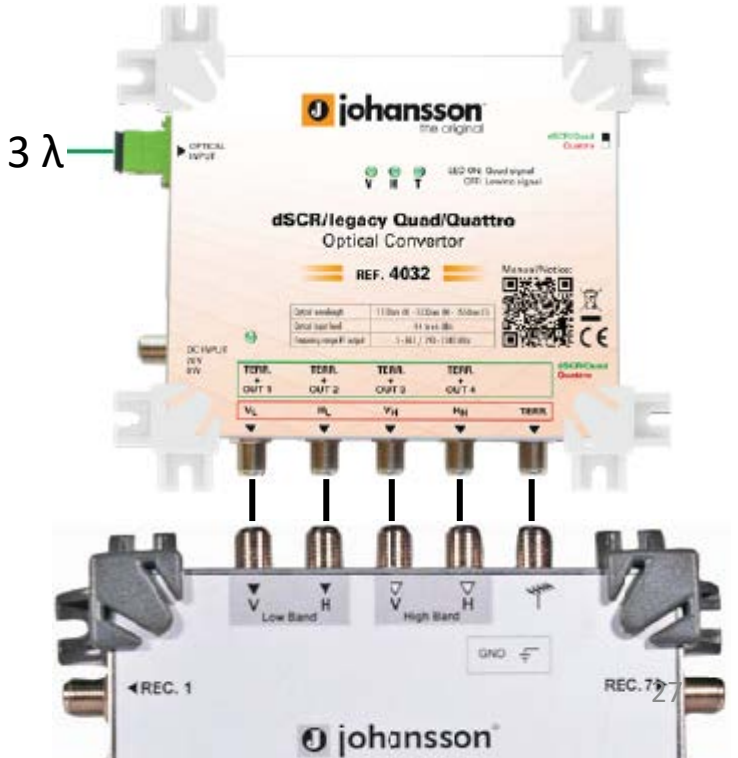
- 1x Optical input (-14 dBm)
- 3x Wavelengths (1310 & 1330 & 1550 nm)
- 2x Quad/dSCR outputs (950 – 2150 MHz)
- 16 dSCR User Bands per output
- Active Gain Control (80 dBµV)

4032 FTU (Rx) – Quad/dSCR mode

- 1x Optical input (-14 dBm)
- 3x Wavelengths (1310 & 1330 & 1550 nm)
- 4x Quad/dSCR outputs (950 – 2150 MHz)
- 16 dSCR User Bands per output
- Active Gain Control (80 dBµV)

4032 FTU (Rx) – Quattro mode

- 1x Optical input (-14 dBm)
- 3x Wavelengths (1310 & 1330 & 1550 nm)
- 4x Quattro output (950 – 2150 MHz)
- 1x Terrestrial output (40 – 862 MHz)
- Active Gain Control (80 dBµV)



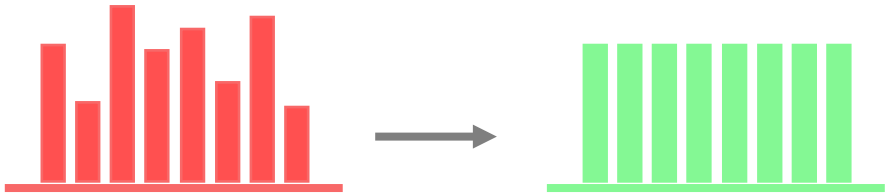
Fiber Optical Distribution

Overview accessories

Fiber Optical Distribution

SMART amplifiers to optimise your RF signal for fiber distribution

- Filter your signal
- Equalises your signal
- Amplifies your signal



Bad RF signal

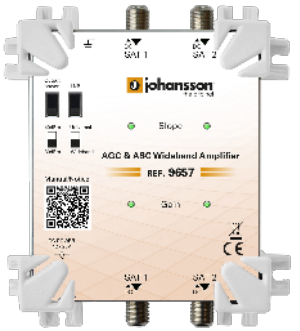
Perfect RF Signal

Terrestrial

REF **6701**
Profiler Revolution LITE

REF **6711**
Profino Revolution Plus

Satellite



64 splits

REF **9657**
AGC&ASC Wideband Amp

128 splits

REF **9780**
Compact Satellite Convertor

Fiber Optical Distribution

Wideband distribution accessories

- 290 – 2340 MHz
- LNB
- Amplifiers
- Splitters
- Taps

REF **9720**
Wideband LNB

REF **9653**
Wideband Line Amp

REF **9654**
Wideband Trunk Amp

REF **9655**
Wideband 2-Way Splitter

REF **9656**
Wideband 2-Way Tap

REF **9646**
Wideband to Quattro

Fiber Optical Distribution

Optical accessories

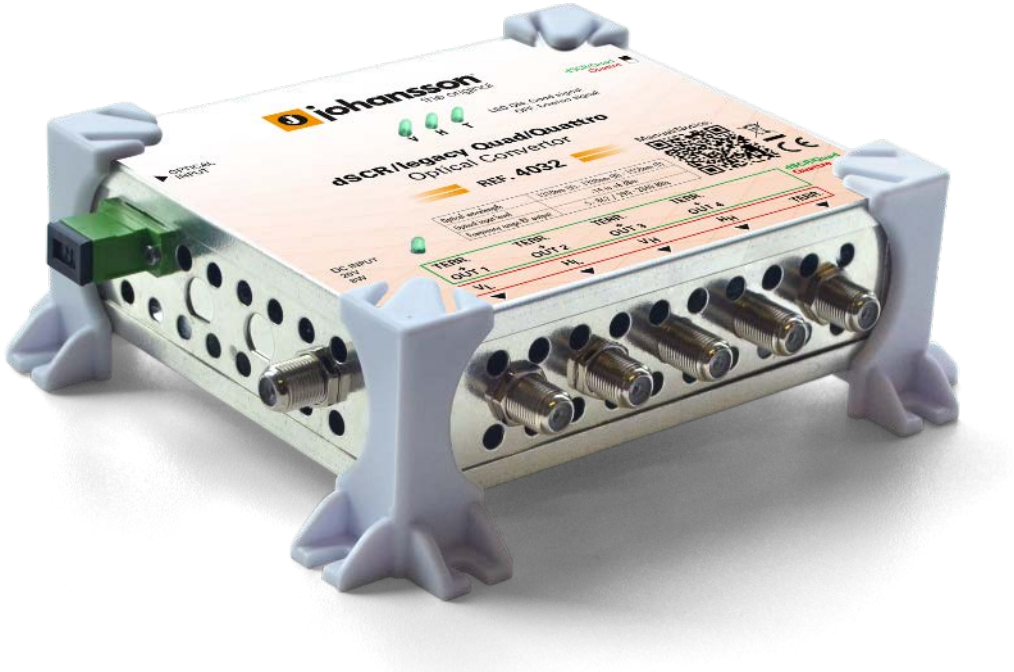
- Splitters
- Cables
- Attenuators

REF **4040** 2-way splitter
REF **4041** 4-way splitter
REF **4042** 8-way splitter
REF **4043** 16-way splitter

REF **4050** 1m optical cable
REF **4051** 10m optical cable
REF **4052** 50m optical cable
REF **4053** 100m optical cable

REF **4060** 5dB Attenuator
REF **4061** 10dB Attenuator
REF **4062** 15dB Attenuator

Fiber Optical Distribution

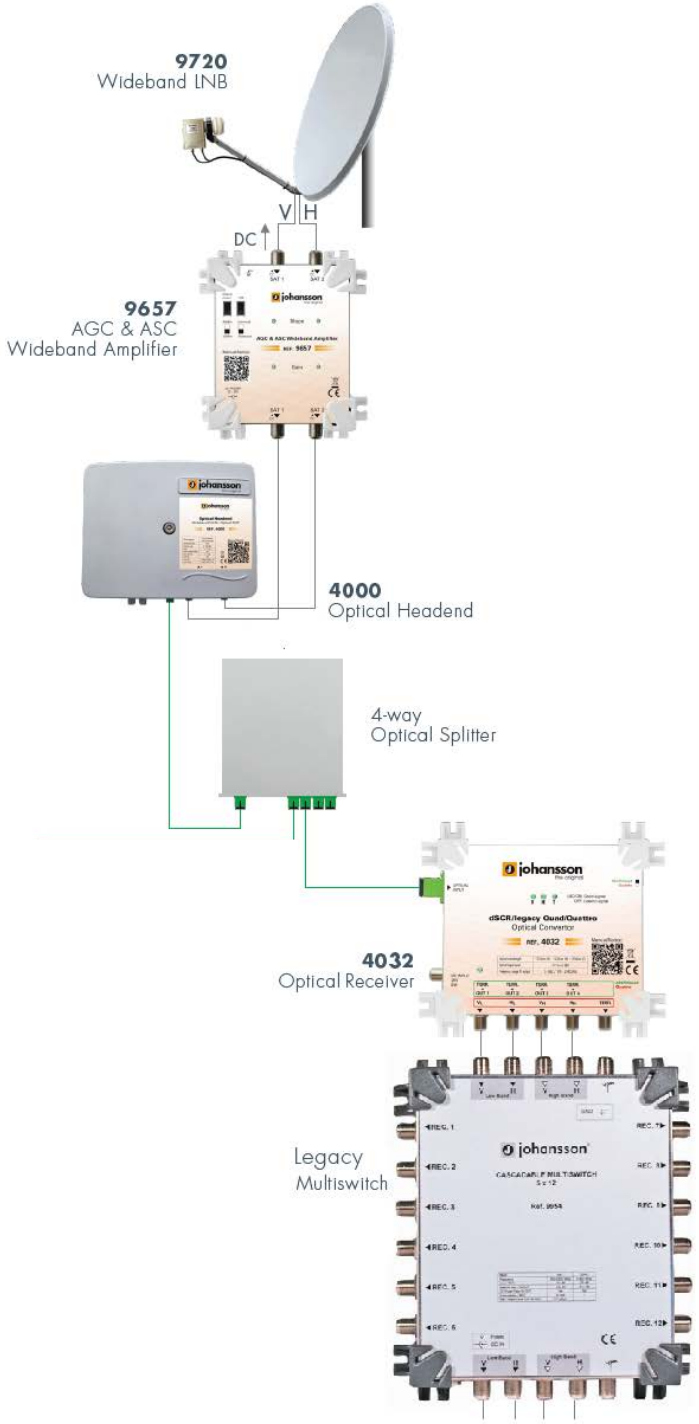


Use cases

Fiber Optical Distribution

Hybrid solution: Fiber + multiswitches

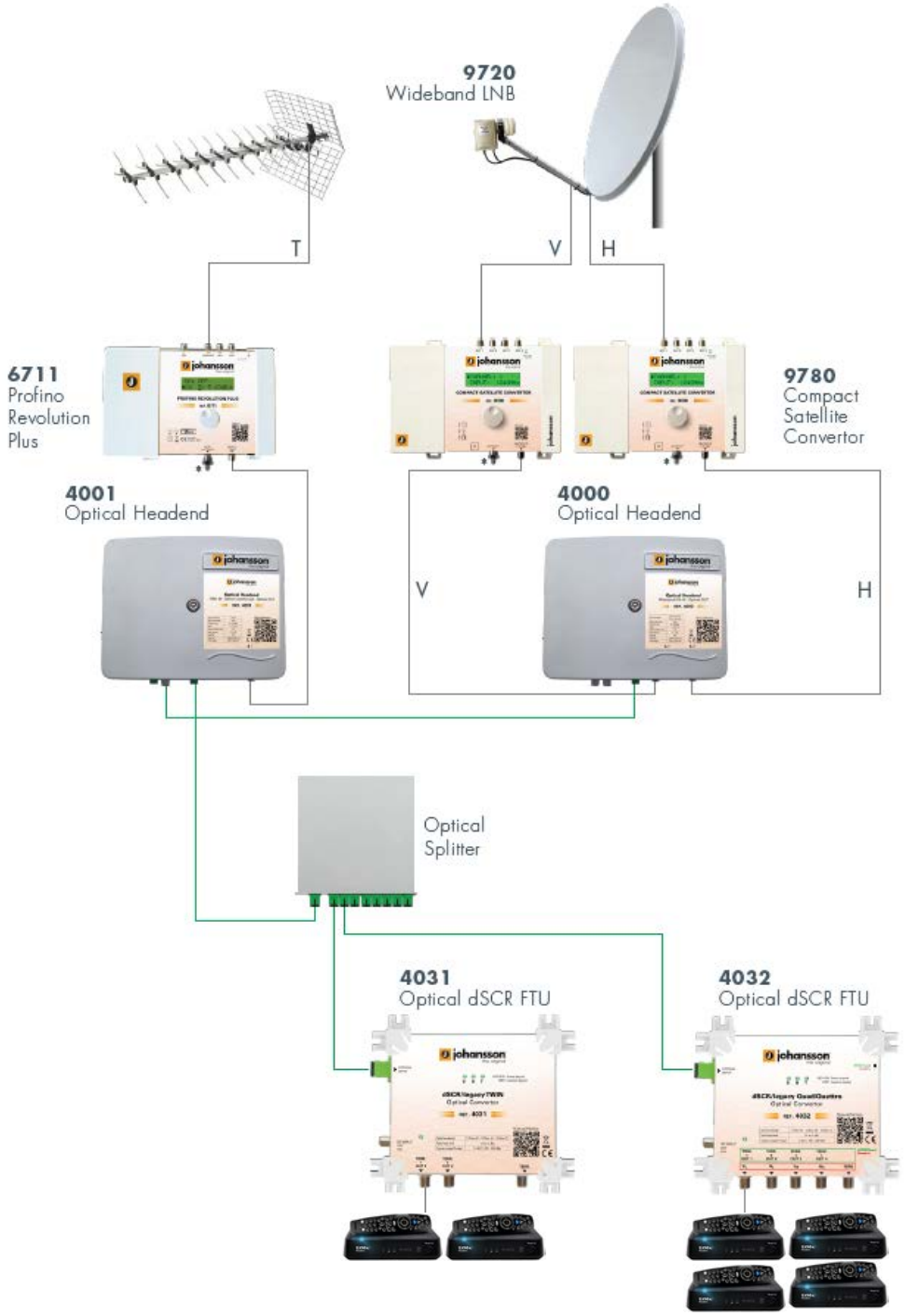
- Satellite (wideband)
- Optical + Coax distribution
- Fiber recievers
  - 4032: Quattro multiswitches
  - 4012: Wideband multiswitches
- Up to 64 splits (REF 9657)



Fiber Optical Distribution

FTTH solution: Fiber Termination Unit

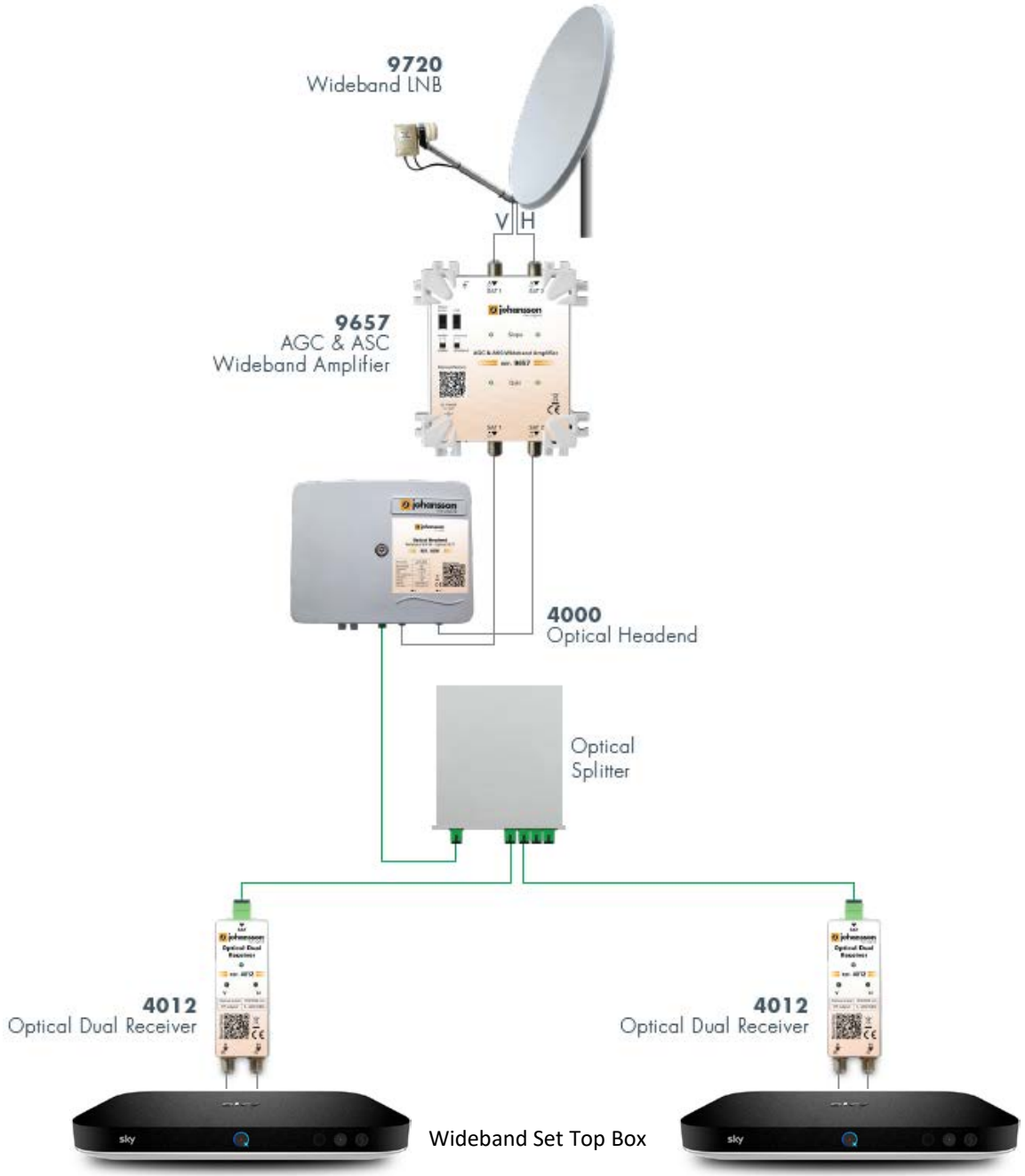
- Satellite (wideband) + Terrestrial
- Optical distribution to the home
- Fiber Termination Units
  - 4031: 2 outputs (Legacy/dSCR)
  - 4032: 4 outputs (Legacy/dSCR)
- Up to 128 splits (REF 9780)



Fiber Optical Distribution

Wideband solution

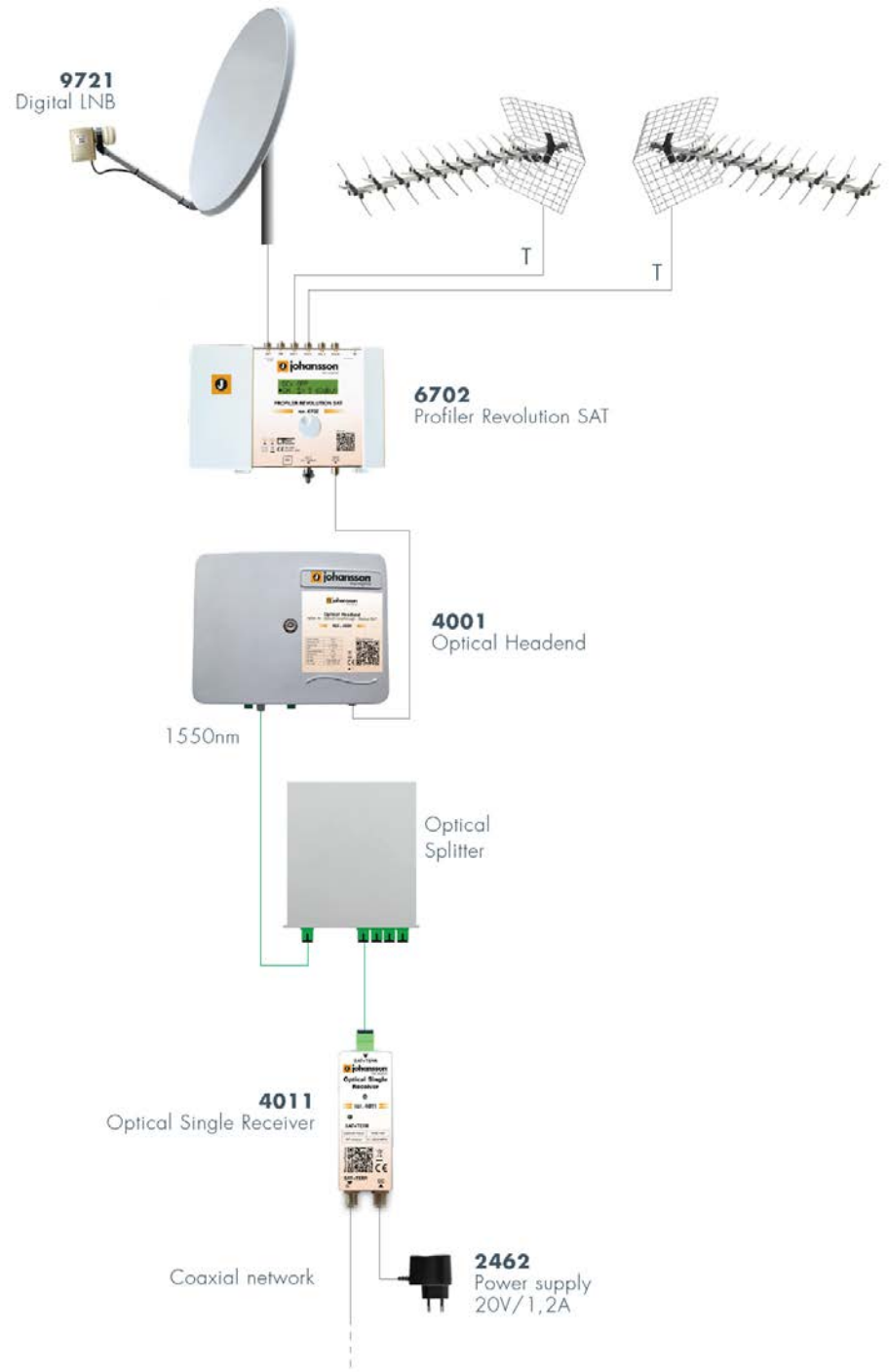
- Satellite (wideband)
- Optical distribution to the home
- Fiber Receivers
  - 4012: 2 outputs (Wideband)
- Up to 32 splits (REF 9657)



Fiber Optical Distribution

Single coax cable fiber distribution

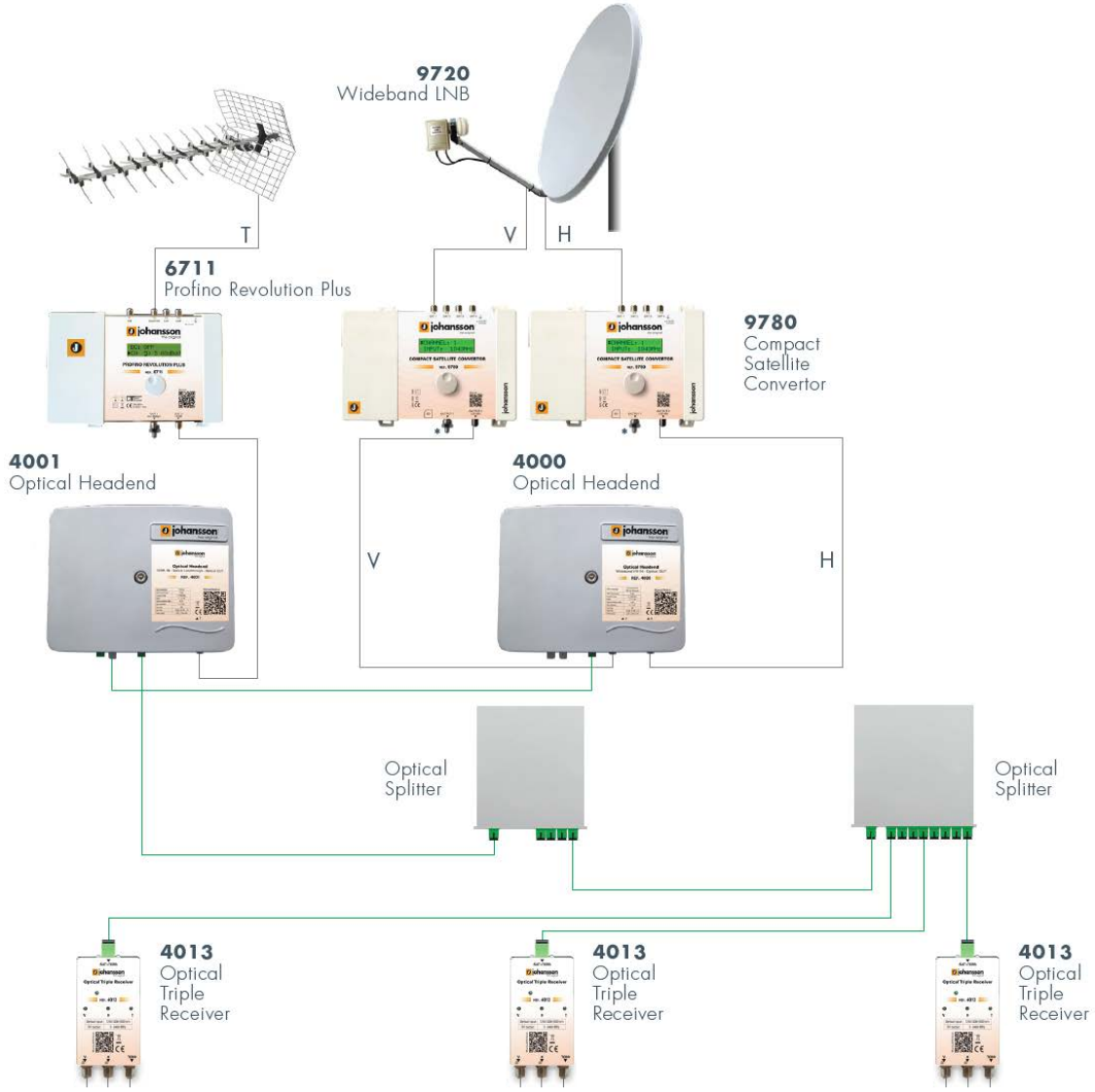
- Satellite (digital LNB) + Terrestrial
- All signals on a single coax cable
- Optical + Coax distribution
- Fiber Receiver
  - 4011: 1 output (Wideband)
- Up to 128 splits (REF 9780)



Fiber Optical Distribution

Cascading solution for huge projects

- 200 to 2000 splits
- Output 4013 (Rx) -> Input 4000 and 4001 (Tx)



Fiber Optical Distribution

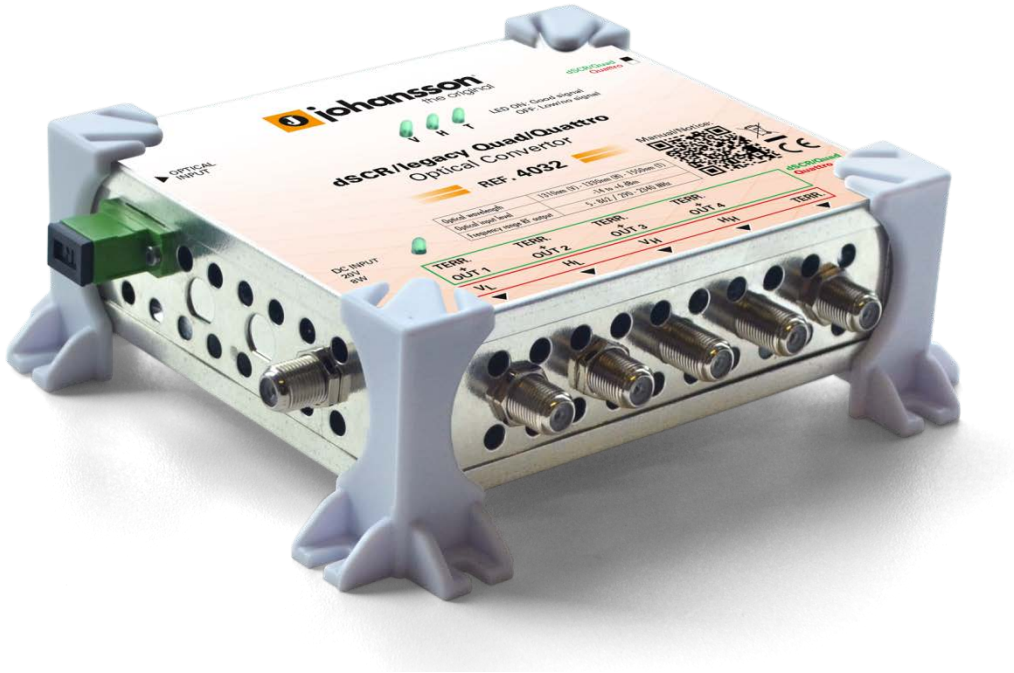
End Part 2 - Thank you.

Part 1 Introduction and Fundamentals

Part 2 Fiber Distribution Product Range

Part 3 Using the Optical Configurator

Fiber Optical Distribution



Part 1 Introduction and Fundamentals

Part 2 Fiber Distribution Product Range

Part 3 Using the Optical Configurator

Fiber Optical Distribution

Optical Configurator Tool

www.ucloudserver.com

ucloudserver.com

Optical Configurator Tool

www.ucloudserver.com

Easy configuration

- Visual presentation system diagram
- Automatic generation system diagram
- Drag and drop

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the original

Fiber Optical Distribution

Optical Configurator Tool

www.ucloudserver.com

Analyse diagram

VL (electrical output) - 4032 Quad dSCR		
Band	Level [dBµV]	MER [dB]
✔Satellite V	84.0	11.8
✔Terrestrial	74.0	24.9

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Fiber Optical Distribution

Optical Configurator Tool

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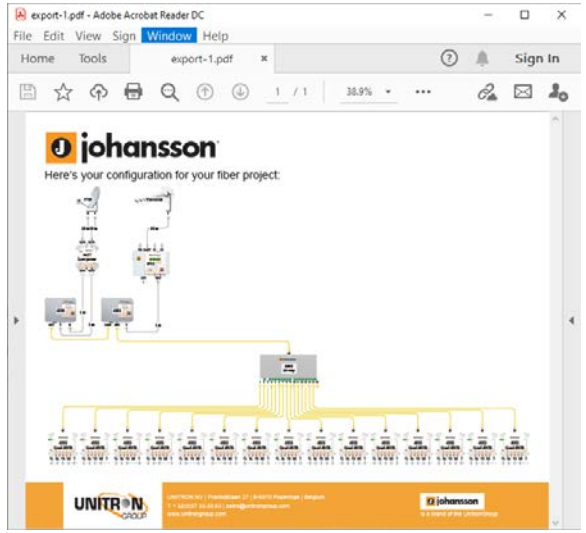
PDF export diagram



Fiber Optical Distribution

Optical Configurator Tool

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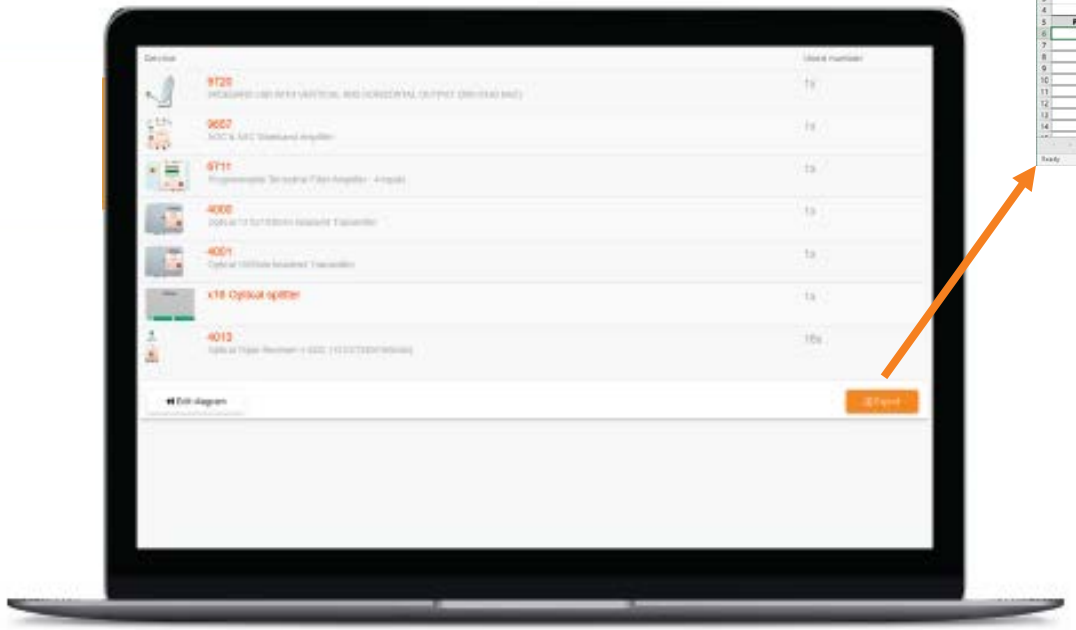
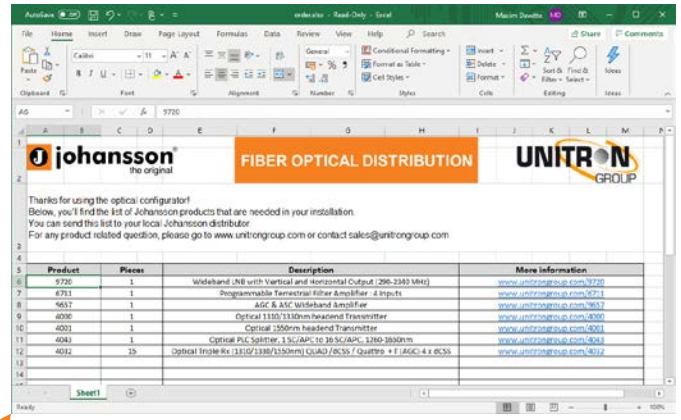
Export order list





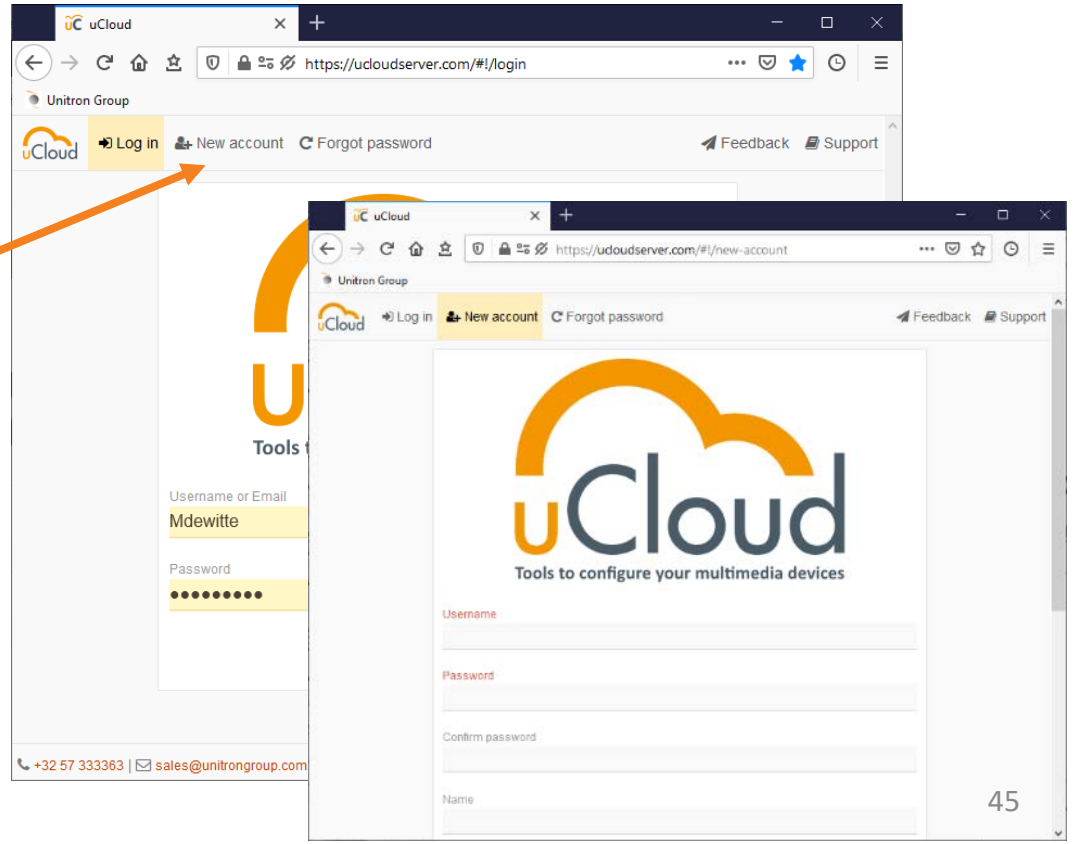
Fiber Optical Distribution

Optical Configurator Tool

www.ucloudserver.com

How to access Optical Configurator on uCloud server
Activation steps

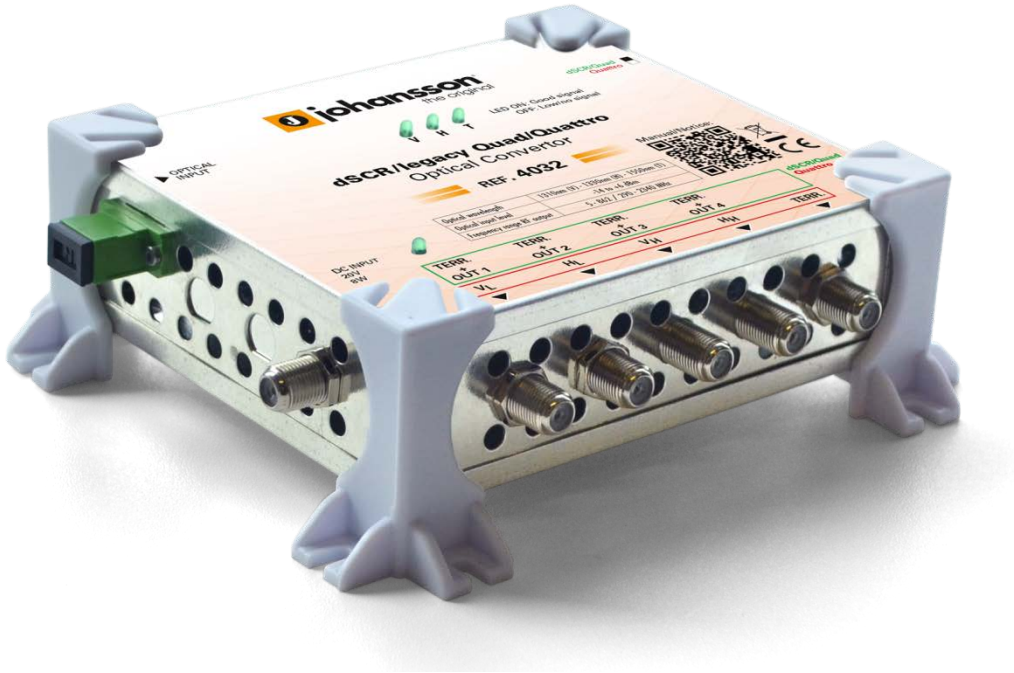
1. Browse to www.ucloudserver.com
2. Click “New account” button on home page
3. Enter the requested fields
4. A text message will be send with an activation code
5. Enter the activation code and acknowledge.
6. Now you are ready to log in and use the Optical Configurator



Live demo

www.ucloudserver.com

Fiber Optical Distribution



End Part 3 - Thank you.

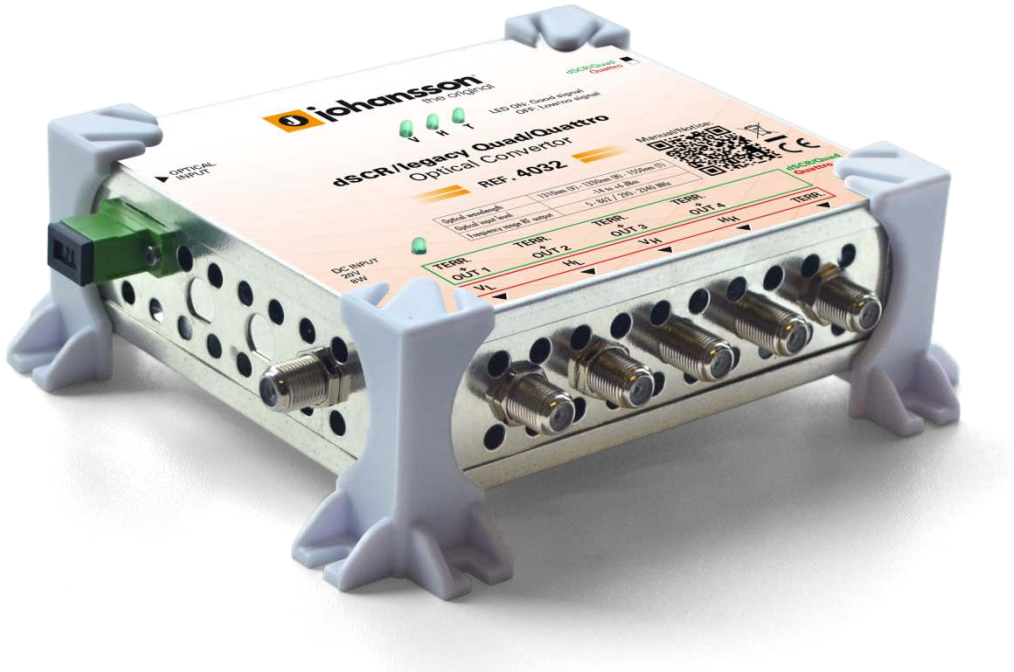
Part 1 Introduction and Fundamentals

Part 2 Fiber Distribution Product Range

Part 3 Using the Optical Configurator

johansson®
the original

Fiber Optical Distribution



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