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9010, 9011, 9014, PSA, PSR		


## MC series

	Analog			Digital				
								
Type	OneVideo	OneVideo	OneVideoData	OneVideo	OneVideoData	OneVideoPlus	FourVideo	FourVideoData
Model	Pic	VBS 2000	VDS 220	UTF 400	UTF 420	VAD 530	TETRA 400	TETRA 4200
Video format	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL
SNR	≥ 60 dBw	≥ 60 dBw	≥ 60 dBw	≥ 63 dBw	≥ 63 dBw	≥ 67 dBw	≥ 63 dBw	≥ 63 dBw
Fiber type	MM/-	MM/SM	MM/-	MM/SM	MM/SM	MM/SM	MM/SM	MM/SM
System Budget (dB)	16/-	18 <sup>2</sup> /12	16 <sup>2</sup> /-	23 <sup>2</sup> /23	15 <sup>2</sup> /23	9 <sup>2</sup> /21	20 <sup>2</sup> /26	18 <sup>2</sup> /23
Fiber length (km)	5/-	5/24	5/-	6 <sup>1</sup> /46	6 <sup>1</sup> /46	4 <sup>1</sup> /42	4 <sup>1</sup> /65	4 <sup>1</sup> /57
Connector type	ST/-	ST/ST	ST/-	SC/SC	SC/SC	ST/FC	ST/SC	ST/SC
Data	-	-	1xRS422/485 (Full duplex)	-	1xRS422/485 (Full duplex)	1xRS422/485 and 1xRS232 (Full duplex)	-	1x RS232/ RS422/485 (Full duplex)
Data formats	-	-	Current Loop/TTL/ TTY/Manchester/ Bi-Phase	-	Current Loop/TTL/ TTY/Manchester/ Bi-Phase/Bilinx	Current Loop/TTL/ TTY/Manchester/ Bi-Phase	-	Current Loop/TTL/ TTY/Manchester/ Bi-Phase
Easy C-s	-	-	-	•	•	-	-	-
Audio	-	-	-	-	-	2 (Full duplex)	-	-
Contact closures	-	-	-	1 (Simplex)	1 (Simplex)	2 (Full duplex)	-	-
Ethernet ports	-	-	-	-	-	-	-	-
Network Managements	-	SNM	-	SNM	SNM	SNM	-	-
Operating temperature	-40° F/-40° C to +165.2° F/+74° C			-40° F/-40° C to +165.2° F/+74° C				

## Product Line Card - Fiber

Digital		
		
FourVideoPlus	EightVideo	EightVideoPlus
TETRA 4300	OCTA 4000	OCTA 4300
NTSC, PAL	NTSC, PAL	NTSC, PAL
≥ 63 dBw	≥ 63 dBw	≥ 63 dBw
MM/SM	MM/SM	MM/SM
18 <sup>2</sup> /20 <sup>3</sup>	18 <sup>2</sup> /22	16 <sup>2</sup> /20
2 <sup>1</sup> /36 <sup>3</sup>	2 <sup>1</sup> /54	2 <sup>1</sup> /40 <sup>3</sup>
SC/SC	ST/SC	SC/SC
2xRS422/485 and 2xRS232 (Full duplex)	-	2xRS422/485 and 2xRS232 (Full duplex)
Current Loop/TTL/ TTY/Manchester/ Bi-Phase	-	Current Loop/TTL/ TTY/Manchester/ Bi-Phase
-	-	-
2 (Full duplex)	-	2 (Full duplex)
2 (Full duplex)	-	2 (Full duplex)
1x10/100BaseTx	-	1x10/100BaseTx
SNM	-	SNM
-40° F/-40° C to +165.2° F/+74° C		

MC Accessories

XSNet™ switches
The XSNet switches from Optelecom-NKF provide exceptional performance under industrial conditions, characterized by mechanical stress (vibration and shock) and a wide range of operating temperatures. The compact switches offer Rapid Spanning Tree and advanced IGMP to ensure rapid switchover times and to secure reliable transport of video, audio and data streams.
19" Power cabinets
Up to 11 slots Dual redundant power supply (MC 10 version)
The MC 11 power supply cabinets can house and power up to 11 single-width rack-mount modules. The heart of the MC 11 is a powerful, efficient power supply unit, based on the latest switched-mode techniques, which can supply up to 165 watts. The MC 11's built-in fans provide sufficient cooling for full-load operation over a wide temperature range. A power redundant version is available in the MC 10 power supply cabinet.

9000 Accessories

Data modems
Optelecom-NKF offers a comprehensive range of data modems ranging from point-to-point to drop and insert fault-tolerant ring operating data solutions.
Network Management
With the 9900 Network Management Software Optelecom-NKF introduces a sophisticated SNMP based network management concept for all video, audio and data communication equipment. This concept enables you to manage, control and monitor all connected modules. All vital parameters in the system are accessible and the equipment will generate an alarm if necessary.
19" Power cabinets
The model 9002 19-inch 4RU chassis is designed for rackmounting 18 cards (15 are available with two supplies installed). Individual cards can be hot swapped without affecting the operation of other cards in the chassis. The 9002 may be equipped with one or two power supplies.

## 9000 series

### Digital

Type	OneVideo	OneVideoData	OneVideoData	OneVideoData	OneVideoData	OneVideoPlus	TwoVideo
Model	9111D	9221D	9229D	9281D	9241D	9711D	9191D
Video format	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL
SNR	≥ 63 dBw	≥ 63 dBw	≥ 63 dBw	≥ 63 dBw	≥ 63 dBw	≥ 63 dBw	≥ 63 dBw
Fiber type	MM/SM	MM/SM	MM/SM	MM/SM	MM/SM	MM/SM	MM/SM
System Budget (dB)	12 <sup>2</sup> /23	23 <sup>2</sup> /23	23 <sup>2</sup> /23	22 <sup>2</sup> /25 <sup>3</sup>	22 <sup>2</sup> /23	12 <sup>2</sup> /23	17 <sup>2</sup> /23
Fiber length (km)	5 <sup>1</sup> /57	19 <sup>1</sup> /57	19 <sup>1</sup> /57	1.5 <sup>1</sup> /62 <sup>3</sup>	19 <sup>1</sup> /57	6 <sup>1</sup> /57	25 <sup>1</sup> /57
Connector type	ST/ST	ST/ST	ST/ST	ST/ST	ST/ST	ST/ST	ST/ST
Data	-	1xRS422/485/232 Manchester/Bi-Phase (Full duplex)	1xRS422/485/232 Manchester/Bi-Phase (Full duplex)	Up-the-coax Panasonic/Pelco/TAC (selectable)	1xRS422/485/232 Manchester/Bi-Phase (Full duplex)	-	○
Option module	-	-	-	-	2 (Full duplex)	-	-
High-Speed port	-	-	-	-	-	-	1 (Simplex)
Audio	-	-	-	-	○	2 (Full duplex)	-
Contact closures	-	-	-	-	○	-	○
Ethernet ports	-	-	-	-	-	-	○
Network Managements	9900 NMS	9900 NMS	9900 NMS	9900 NMS	9900 NMS	9900 NMS	9900 NMS
Operating temperature	-40° F/-40° C to +165.2° F/+74° C						

### Digital

Two VideoPlus	TwoVideoPlus	FourVideo	FourVideo	FourVideoData	FourVideoData	FourVideoPlus	EightVideo	EightVideoPlus	16 128-Channel
9292D	9421D	9701D	9341D	9741D	9442D	9762D	9752D	9782D	SpectraStream
NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL
≥ 67 dBw	≥ 63 dBw	≥ 68 dBw	≥ 63 dBw	≥ 68 dBw	≥ 63 dBw	≥ 68 dBw	≥ 68 dBw	≥ 68 dBw	≥ 67 dBw
MM/SM	MM/SM	MM/SM	MM/SM	MM/SM	MM/SM	MM/SM	MM/SM	MM/SM	- /SM
16 <sup>2</sup> /27 <sup>3</sup>	19 <sup>2</sup> /18	25 <sup>2</sup> /25	21 <sup>2</sup> /22	18 /23	16 /25	18 <sup>2</sup> /23	21 <sup>2</sup> /21	14 <sup>2</sup> /20	- /18
7 <sup>1</sup> /68 <sup>3</sup>	13 <sup>1</sup> /47	8/65	5 <sup>1</sup> /54	7/57	7 <sup>1</sup> /62 <sup>3</sup>	7/57	3/54	3.5/48	- /60
ST/ST	ST/ST	ST/ST	ST/ST	ST/ST	ST/ST	ST/ST	ST/ST	ST/ST	- /FC
○	○	1xRS422/485/Manchester and 1xRS232 and 1x RS485-2W (Simplex)	○	2xRS485/422 1xRS232 (Full duplex)	1xRS422/485/Manchester/Bi-phase and 1xRS232 and 1xRS485-2W(Duplex)	1xRS422/485/Manchester/Bi-phase and 1xRS232 and 1xRS485-2W(Duplex)	1xRS422/485/Manchester and 1xRS232 and 1x RS485-2W(Simplex)	1xRS422/485/Manchester/Bi-phase and 1xRS232 and 1xRS485-2W(Duplex)	○
2 (Full duplex)	2 (Full duplex)	-	-	-	-	4 (Full duplex)	-	-	-
1 (Full duplex)	1 (Full duplex)	-	1 (Simplex)	-	1 (Full duplex)	-	2 (Simplex)	1(Simplex),1(Duplex)	○
○	○ <sup>4</sup>	-	○ <sup>4</sup>	-	○ <sup>4</sup>	○ ○	○ <sup>4</sup>	○ <sup>4</sup>	
○	○ <sup>4</sup>	-	○ <sup>4</sup>	-	○ <sup>4</sup>	○ ○	○ <sup>4</sup>	○ <sup>4</sup>	
4x10/100BaseT	○ <sup>4</sup>	-	○ <sup>4</sup>	-	○ <sup>4</sup>	-	○ <sup>4</sup>	○ <sup>4</sup>	○
9900 NMS	9900 NMS	9900 NMS	9900 NMS	9900 NMS	9900 NMS	9900 NMS	9900 NMS	9900 NMS	9900 NMS
-40° F/-40° C to +165.2° F/+74° C									

<sup>1</sup> Range may be limited by fiber quality  
<sup>2</sup> For 50/125 fiber, subtract 4 dB

<sup>3</sup> Extended range model  
<sup>4</sup> High Speed port expansion card (9961/9971)

- Not available ● Standard ○ Optional  
 All products mentioned come with 5 years warranty.



## Features

- Miniature optical video transmitter
- Cost-effective camera connection kit for all-in-one, plug-and-play installation
- Suitable for indoor and outdoor applications
- Direct camera mounting
- Easy to install
- Adjustment-free installation (AGC) and operation
- Video SNR >60 dBw for short link



## Description

Optelecom-NKF's Pico™ Camera Kit includes everything you need to transmit a camera signal over multimode fiber. The miniature Pico™ transmitter may be connected directly to the camera's BNC output. A multimode optical fiber is used to transmit the camera signal to the Pico™ RX receivers, which convert it back into a standard video signal. The Pico™ RX is equipped with Automatic Gain Control (AGC) with a wide dynamic range, ensuring rapid deployment and adjustment free installation of your fiber optic camera link.

The optional Pico™ video adapter cord offers additional flexibility in mounting. For even more flexibility, the Pico™ transmitter and Pico™ RX receiver are interoperable with Optelecom-NKF's VBS 2000 series.

## Ordering Information

### Models

Pico  
Pico RX  
Pico Camera Kit /x2  
Pico AC-25

### Description

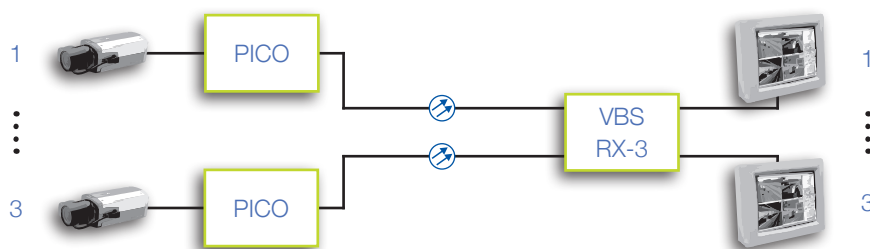
Miniature video transmitter  
Video receiver  
1x Pico, 1x stand-alone receiver (Pico RX), 1x power adapter  
Pico adapter cord, BNC(M)-BNC(F), 25 cm



# Pico™ Series

## Technical specifications

## Miniature video system



### Video

Video format	NTSC, PAL, SECAM
Input/output level	1 Vpp (±3 dB)
Bandwidth	10 MHz (-3 dB)
Differential phase	<5.0°
Differential gain	<5.0%
SNR	
Short link	>60 dBw
Over optical budget	>45 dBw
Connector type	BNC 75Ω (gold-plated center pin)

### Powering

Power consumption	
Pico™	<1.5W
Pico™ RX	1.8W
Power supply voltages	
Pico™	11 to 24 VDC
Pico™ RX	11 to 16 VDC (PSA-12 DC, PSA-12 DC/25, or PSR-12 DC)

### Recommended supplies

Recommended supplies for 9555	9014PS, 9011PS, PSR-12 DC
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### Indicators

9551	Sync, Not Sync, Loop, Loopback
9555	Power, Sync, Loop, Received Data (x8)

### Managment

LED status indicators (RX only)	
DC	Power-on indicator (green)
Video present	Video present (green)
Network Management	No

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation
MTBF	>100,000h
Safety and EMC	IEC/EN 60950, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, IEC/EN 55022, FCC part 15

### Mechanical

Dimensions (h x w x d)	
Pico™	23 x 31 x 60 mm (0.9 x 1.2 x 2.3 in.), including connector
Pico™ RX	110 x 78 x 28 mm (4.3 x 3.1 x 1.1 in.), including connector
Weight (approx.)	
Pico™	50g (1.76 oz.)
VBS 20xx RX	200g (7.05 oz.)

Optical	Pico™ - Pico™ RX	Pico™ - VBS 2010 RX
Fiber type	MM (62.5)	MM (62.5)
Output wavelength	850 nm	1310 nm
Output power	>-20 dBm	>-20 dBm
Input sensitivity	<-36 dBm	<-36 dBm
System link budget	16 dB*	16 dB*
Connector Type	ST	ST

\* For 50/125 μm fiber, subtract 4 dB.

## Features

- High quality 9-bit video  $\geq 63$  dBw SNR over any type of fiber
- Miniature transmitters <2x2x1 inch
- High density receivers
- DC and AC camera powering
- Alarm contact



## Description

On an extremely small footprint, Optelecom-NKF's Up-the-Fiber™ digital line of equipment provides high quality, 9-bit digitized video transmission at an exceptionally low price. Up-the-Fiber™ 4000 series receivers can handle one or two video/CC channels. The Up-the-Fiber™ system also provides an isolated alarm contact closure output (door contacts, anti-tamper contacts, etc.).

Their wide operating temperature range makes these compact, stand-alone transmitters suitable for use in outdoor camera housings and camera connection boxes. UTF receivers are also available as stand-alone units. All miniature stand-alone models can be powered by the camera power supply (12 VDC or 24 VAC); a PSR-12 DC is recommended in case of extreme environmental conditions.

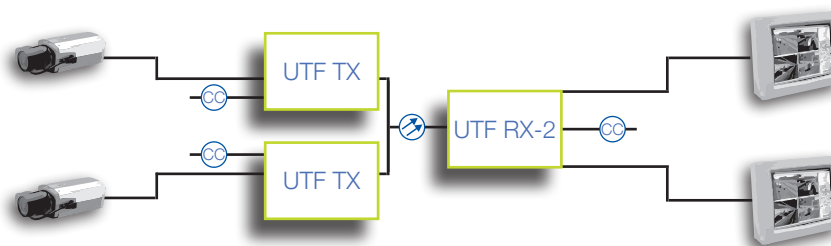
## Ordering Information

Model	Description	Fiber Type
UTF 4000 RX	Digital video receiver with alarm contact	1xMM
UTF 4000 RX-2	Dual digital video receiver with alarm contact	2xMM
UTF 4000 TX-MSA	Miniature digital video transmitter with alarm contact	1xMM
UTF 4040 RX	Digital video receiver with alarm contact	1xSM
UTF 4040 RX-2	Dual digital video receiver with alarm contact	2xSM
UTF 4040 TX-MSA	Miniature digital video transmitter with alarm contact	1xSM
UTF 40xx /SA	Stand-alone version of rack-mount models	

# Up-the-Fiber™ 4000

## Technical Specification

# Miniature digital video transmitter, CC



### Video

Video format	NTSC, PAL, SECAM
Input/output level	1 Vpp (±3 dB)
Bandwidth (-3 dB)	6 MHz
Sampling resolution	9-bit effective
Group delay	<20 ns
Differential gain	<2%
Differential phase	<1°
SNR	>63 dB (weighted)
Connector type	BNC 75Ω (gold-plated center pin)

### Contact Closure

Number of channels	1
Input (TX)	+3.3V pull-up, 2.2 kΩ
Threshold	1.4V
Output (RX)	Fail-safe, isolated; 100 mA/50V

### Powering

Power consumption	<3W
Rack-mount units	MC 10 and MC 11 power supply cabinets
Stand-alone option (/SA)	12 VDC (PSA-12 DC, PSA-12 DC/25 or PSR-12-DC)
Miniature stand-alone transmitters	12 VDC or 24 VAC (PSA-12 DC, PSA-12 DC/25 or PSR-12-DC)

### Management

LED status indicators (RX only)	Power-on (green); local synchronization error (red); remote synchronization error (yellow)
TX models:	NV: No video on input or output (red)
RX models:	SYNC: Operational link (green), local synchronization error (red); remote synchronization error (yellow)
Network Management	SNM™ compatible
SNM™ variables	PS voltages, module temperature, module status, configuration, etc.

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation
MTBF	>250,000h
Safety and EMC	IEC/EN 60950-1, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, EN 55022, FCC part 15

### Mechanical

Dimensions (h x w x d)	
Stand-alone	45 x 45 x 25 mm (1.77 x 1.77 x 0.98 in.)
Rack-Mount	128 x 71 x 190 mm (5 x 2.8 x 7.48 in.)
Weight (approx.)	
Stand-alone	250g (8.81 oz.)
Rack-Mount	450g (15.87 oz.)

Optical	UTF 4000 TX/RX	UTF 4040 TX/RX
Fiber type	MM (62.5)	MM (62.5)
System link budget	23 dB <sup>1</sup>	23 dB <sup>1</sup>
Link length	6 km <sup>2</sup>	46 km <sup>2</sup>
Min. Link Loss	0 dB	0 dB
Output power	>-12 dBm <sup>1</sup>	>-12 dBm <sup>1</sup>
Input sensitivity	-36 dBm	-36 dBm
Transm. wavelength	1310 nm	1310 nm
Connector type	SC	SC

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Limited distance due to fiber bandwidth



## Features

- AM video
- Adjustment-free operation (Automatic Gain Control)
- Easy to install
- Compact standalone and rack-mount cards
- Video SNR >60 dBw for short link



## Description

The VBS 2000 series offers a complete range of low-cost fiber optic video transmitters and receivers. Built-in Automatic Gain Control (AGC) allows plug-and-play installation and maintenance-free operation. VBS transmitters and receivers are available in stand-alone or rack-mount housings for both single-mode and multimode applications.

The very compact VBS 2020 TX and VBS 2050 TX transmitters are designed to operate over a broad temperature range and are, therefore, suitable for use close to cameras or even inside outdoor camera housings.

The rack-mount versions are designed to be slotted into an MC 10 or MC 11 power supply cabinets. Rack-mount models are also available as stand-alone units (/SA versions). The space-saving VBS 2020 TX-3 transmitters and RX-3 receivers can provide up to 33 video transmission links, using only a single MC 10 or MC 11 power supply cabinet at each location.

The compact VBS 2020 and 2050 stand-alone transmitters are powered by a PSA-12 DC power adapter or, for extreme environmental conditions, a PSR-12 DC power supply unit.

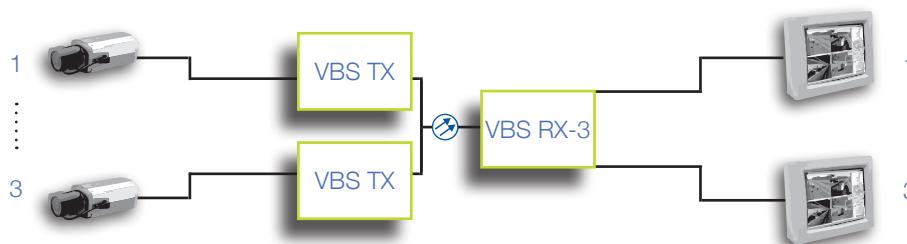
## Ordering Information

Model	Description	Fiber Type
VBS 2010 TX	Video transmitter	1xMM
VBS 2010 RX	Video receiver	1xMM
VBS 2020 TX	Matchbox video transmitter	1xMM
VBS 2020 TX-3	Triple video transmitter	3xMM
VBS 2020 RX-3	Triple video receiver	3xMM
VBS 2050 TX	Matchbox video transmitter	1xSM
VBS 2050 TX-3	Triple video transmitter	3xSM
VBS 2050 RX-3	Triple video receiver	3xSM
VBS 20xx /SA	Stand-alone versions of rack-mount models	

# VBS 2000

## Technical Specification

## Video Modems



### Video

Video format	NTSC, PAL, SECAM
Input/output level	1 V <sub>pp</sub> (±3 dB)
Bandwidth (-3 dB)	10 MHz
Differential gain	<5%
Differential phase	<5°
SNR	
Short link	>60 dB
Over opt. budget	>45 dB
Connector type	BNC 75Ω (gold-plated center pin)

### Powering

Power consumption	
VBS 2010 TX	0.5W
VBS 2010 RX	1.7W
VBS 2020 TX	0.5W
VBS 2020 TX-3	1.3W
VBS 2020 RX-3	5.2W
VBS 2050 TX	0.75W
VBS 2050 TX-3	1.7W
VBS 2050 RX-3	6W
Rack-mount units	MC 10 and MC 11 power supply cabinets
Stand-alone units	
VBS 20xx /SA	11 to 16 VDC (PSA-12 DC, PSA-12 DC/25 or PSR-12 DC)
VBS 2020/2050 TX	8 to 25 VDC

### Management

LED status indicators	
DC	Power-on indicator (green)
NV	No video signal on input or output (red)
Network management	SNM™ compatible
SNM™ variables	Voltages, module temperature, alarm status (VBS 2050 only)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation
MTBF	>100,000h
Safety and EMC	IEC/EN 60950, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, IEC/EN 55022, FCC part 15

### Mechanical

Dimensions (h x w x d)	
VBS 2020/2050 TX	33 x 60 x 90 mm (1.3 x 2.36 x 3.54 in.)
Others	35 x 128 x 190 mm (1.38 x 5.04 x 7.48 in.)
Weight (approx.)	
VBS 2020/2050 TX	4.93 oz. (140g)
Others	15.87 oz. (450g)

Optical	VBS 2010 TX/RX	VBS 2020 TX/RX	VBS 2050 TX-RX
Fiber type	MM (62.5)	MM (62.5)	SM (09)
System link budget	16 dB*	16 dB*	12 dB
Link length	5 km	5 km	24 km
Min. Link Loss	0 dB	0 dB	0 dB
Output power	>-18 dBm*	>-18 dBm*	>-28 dBm
Output wavelength	850 nm	850 nm	1300 nm
Input sensitivity	<-34 dBm	<-34 dBm	<-40 dBm
Connector type	ST	ST	ST

\* For 50/125 μm fiber, subtract 4 dB.



## Features

- Single channel video transmitters and receivers
- 9-bit uncompressed digital video
- High quality video  $\geq 63$  dBw SNR
- Compatible with NTSC and PAL standards
- Compact stand-alone and rack-mount versions
- Network Management System (NMS) compatible



## Description

The 9111D series models transport one high quality video over one optical fiber. They provide digital quality video transmission in simple, easy-to-use packages. The rackmount versions can support up to 54 channels in a 4 RU high, 19 inch rack space.

Uncompressed 9-bit digitizing, oversampling, and digital filtering ensure a very high transmission performance, exceeding the requirements of the EIA RS 250C short haul specification.

The wide operating temperature range of these units makes the 9111 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9111 series comes as a rack mount version only, suitable for a 9002, 9003-2 or 9008 power supply cabinet, or as a stand-alone unit (9113 & 9114). The 9111 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9111 rack-mount card, use the 9003-2 mini chassis.

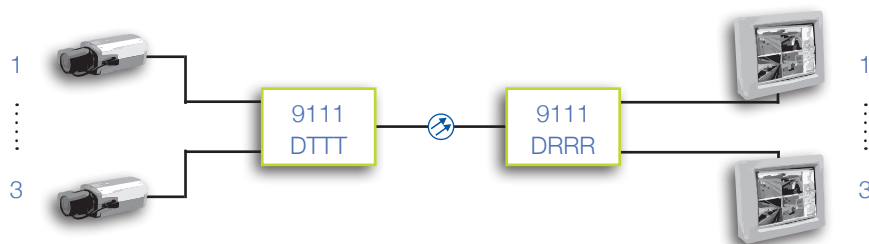
## Ordering Information

Model	Description	Fiber Type
9111DT-L-ST	9-bit digital video transmitter	1x MM
9111DTTT-L-ST	Triple 9-bit digital video transmitter	3x MM
9114DR-LM-ST	Compact digital video receiver	1x MM
9111DRRR-L-ST	Triple 9-bit digital video receiver	3x MM/3x SM
9111DT-LD-ST	9-bit digital video transmitter	1x SM
9111DTTT-LD-ST	Triple 9-bit digital video transmitter	3x SM
9113DT-LD-ST	Mini digital video transmitter	1x SM
9114DR-L-ST	Compact digital video receiver	1x SM

# 9111D Series

## Technical specifications

1-channel video



### Video

Video format	NTSC, PAL
Video input	1 Vpp into 75Ω
Connector	BNC
Bandwidth	5 Hz to 6.5 MHz (-3 dB)
Differential gain	1.0% typical
Differential phase	0.7° typical
SNR	≥63 dBw
Video encoding	Uncompressed 9-bit linear PCM
Video sampling rate	16 MHz

### Power Requirements

Model	9111DT	9111DTTT
Voltage	6 VDC	6 VDC
Current	200 mA	500 mA
	9111DR	9111DRRR
	6 VDC	6 VDC
	300 mA	800 mA
	9113DT	9114DR
	8-15 VDC	8-15 VDC
	110 mA @ 12 VDC	150 mA @ 12 VDC

### Physical Specifications

9111DT, 9111DTTT, 9111DR, 9111DRRR

Dimensions (h x w x d)	154.9 x 20.3 x 218.4 mm (6.1 x 0.8 x 8.6 in.)
Weight (approx.)	136g (4.79 oz.)
9113DT	Miniature stand-alone
Dimensions (h x w x d)	19.0 x 19.0 x 121.9 mm (0.75 x 0.75 x 4.8 in.)
Weight (approx.)	90.7g (3.18 oz.)
9114DR	Stand-alone
Dimensions (h x w x d)	25.4 x 68.6 x 109.2 mm (1.0 x 2.7 x 4.3 in.)
Weight (approx.)	136g (4.79 oz.)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

### Recommended supplies

9111D	9002, 9003-2, 9008
9113D/9114D	9014PS, 9011PS, PSA-12 DC, PSR-12 DC

### Indicators

9111DTxx	Power, Video Present (x1, x3)
9113DT	Power
9111DRxx	Power TX Video In (x1, x3), Sync/Not Sync (x1, x3)
9114DR	Power, video Present, Sync/Not Sync

### Management System

9900 Network Management System (NMS)

Optical	9111DT-L / 9111DR-L	9111DT-LD 9111DR-L	9111DTTT-LD 9111DRRR-L	9113DT-LD 9111DR-L	9113DT-LD 9114DR-L
Fiber type	MM (62.5)	SM (09)	SM (09)	SM (09)	SM (09)
Output wavelength	1310 nm	1310 nm	1310 nm	1310 nm	1310 nm
Output power	-17 dBm	-7 dBm	-7 dBm	-7 dBm	-7 dBm
Input sensitivity	-29 dBm	-30 dBm	-30 dBm	-30 dBm	-30 dBm
System link budget	12 dB <sup>1</sup>	23 dB	23 dB	23 dB	23 dB
Link length	5 km <sup>2</sup>	57 km	57 km	57 km	57 km
Connector type	ST (others optional)	ST (others optional)	ST (others optional)	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by modal and chromatic dispersion, fiber quality, and fiber bandwidth.



# Up-the-Fiber™ 4200 Bilinx™ Digital video transmitter with Bosch Bilinx™ protocol

## Features

- High-quality 9-bit video  $\geq 63$  dBw SNR
- Bosch Bilinx™ up-the-coax protocol
- Miniature transmitters <2x2x1 inch
- High-density receivers
- 12 VDC and 24 VAC direct powering
- Alarm contact
- Unique time-saving connection and configuration



## Description

On an extremely small footprint, Optelecom-NKF's fiber optic Up-the-Fiber™ series provides high-quality, 9-bit digitized video transmission supporting Bosch's Bilinx™ protocol over extended distances. UTF 4200 exceeds the normally limited Bilinx™ protocol using digital processing and intelligent features.

The UTF 4200 uses either one single-mode or one or two multimode optical fibers and also features an isolated contact closure output to transport alarms from the camera (anti-tamper or door contact).

The miniature stand-alone transmitters are suitable to be used within outdoor camera housings or camera connection boxes. UTF 4200 receivers are also available as stand-alone units (/SA).

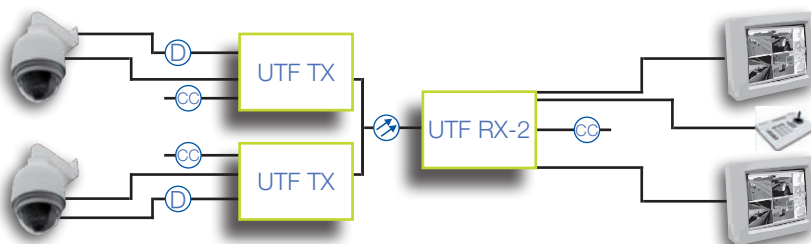
## Ordering Information

Models	Description	Fiber Type
UTF 4200 TX-MSA/Bilinx	Miniature digital video transmitter with CC for Bosch Bilinx™	2x MM
UTF 4200 RX/Bilinx	Digital video receiver with CC for Bosch Bilinx™	2x MM
UTF 4200 RX-2/Bilinx	Dual digital video receiver with CC for Bosch Bilinx™	2x MM
UTF 4210 TX-MSA/Bilinx	Miniature digital video transmitter with CC for Bosch Bilinx™	1x MM
UTF 4210 RX/Bilinx	Digital video receiver with CC for Bosch Bilinx™	1x MM
UTF 4210 RX-2/Bilinx	Dual digital video receiver with CC for Bosch Bilinx™	1x MM
UTF 4250 TX-MSA/Bilinx	Miniature digital video transmitter with CC for Bosch Bilinx™	1x SM
UTF 4250 RX/Bilinx	Digital video receiver with CC for Bosch Bilinx™	1x SM
UTF 4250 RX-2/Bilinx	Dual digital video receiver with CC for Bosch Bilinx™	1x SM
UTF 42xx/Bilinx /SA	Stand-alone version of rack-mount models	
In-dome mounting bracket	Bracket to mount a UTF TX-MSA inside a Bosch AutoDome® or EnviroDome®	

# Up-the-Fiber™ 4200 Bilinx™

## Technical Specification

## Digital video transmitter with Bosch Bilinx™ protocol



Bosch Dome Camera  
Application with an In-Dome  
Mounting Bracket

### Video

Number of channels	1
Video format	NTSC, PAL, SECAM
Input/output level	1 Vpp (±3 dB)
Bandwidth (-3 dB)	6 MHz
Sampling resolution	9-bit effective
Group delay	<20 ns
Differential gain	<2%
Differential phase	<1°
SNR	>63 dB (weighted)
Connector type	BNC 75Ω (gold-plated center pin)

### Data

Number of channels	1 (full-duplex)
Data interfaces	Up-the-coax
Interface support	Bosch Bilinx™

### Management

LED status indicators	
TX models	Power-on (green); local synchronization error (red); remote synchronization error (yellow)
RX models	NV: No video on input or output (red) SYNC: Operational link (green), local synchronization error (red); remote synchronization error (yellow)
Network Management	SNM™ compatible
SNM™ variables	PS voltages, module temperature, module status, configuration, etc.

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation.
MTBF	>250,000h
Safety and EMC	IEC/EN 60950-1, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, EN 55022, FCC part 15

### Physical

Stand-alone	
Dimensions (h x w x d)	45 x 45 x 25 mm (1.77 x 1.77 x 0.98 in.)
Weight (approx.)	250g (8.81 oz.)
Rack-mount	
Dimensions (h x w x d)	128 x 71 x 190 mm (5 x 2.8 x 7.48 in.)
Weight (approx.)	450g (15.87 oz.)

### Contact Closure

Number of channels	1
Input (TX)	+3.3V pull-up, 2.2 kΩ
Threshold	1.4V
Output (RX)	Fail-safe, potential-free; 100 mA/50V

### Power Requirements

Power consumption	<3W
Rack-mount units	MC 10 and MC 11 power supply cabinets
Stand-alone option (/SA)	12 VDC (PSA 12-DC, PSA 12-DC/25 or PSR 12-DC)
Miniature stand-alone transmitters	12 VDC (PSA 12-DC, PSA 12-DC/25 or PSR 12-DC) or 24 VAC

Optical	UTF 4240 TX/RX	UTF 4210 TX/RX	UTF 4250 TX/RX
Fiber type	2x SM (09)	1x MM (62.5)	1x SM (09)
System link budget	23 dB <sup>2</sup>	23 dB	23 dB
Link length	6 km <sup>1</sup>	6 km <sup>1</sup>	46 km
Min. Link Loss	0 dBm	0 dBm	9 dBm
Output power	>-12 dBm <sup>2</sup>	>-12 dBm / >-12 dBm	>-12 dBm / >-12 dBm
Input sensitivity	-35 dBm	-35 dBm / -35 dBm	-35 dBm / -35 dBm
Transm. wavelength	1300 nm	1310 nm / 1550 nm	1310/1550 nm
Connector type	SC	SC	SC

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Distance limited due to fiber bandwidth.



## Features

- High quality 9-bit video  $\geq 63$  dBw SNR over any type of fiber
- Miniature transmitters  $< 2 \times 2 \times 1$  inch
- High density receivers
- DC and AC camera powering
- Alarm contact



## Description

On an extremely small footprint, Optelecom-NKF's Up-the-Fiber (UTF) digital line of equipment provides high-quality, 9-bit digitized video transmission with bidirectional data at an exceptionally low price. UTF systems work with one or two multimode optical fibers.

Up-the-Fiber receivers can handle one or two video, data, or CC channels. The UTF module supports EasyC-s. With EasyC-s, a group of receivers uses only one external data connection, simplifying system implementation and maintenance. The data port only needs to be configured on the receiver; the transmitter automatically follows.

The bidirectional RS485/422 data interface supports PTZ data from all types of camera interfaces including RS485, TTY, Manchester, Bi-phase, SensorNet, etc. In addition, the module offers an isolated alarm contact closure output such as door contacts, anti-tamper contacts, etc.

Their wide operating temperature range makes the compact, stand-alone transmitters suitable for use in outdoor camera housings and camera connection boxes, for example. UTF receivers are also available as stand-alone units.

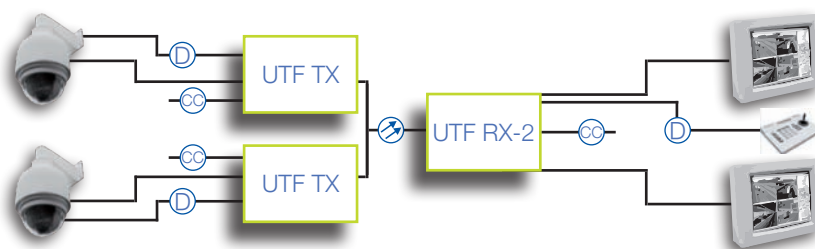
## Ordering Information

Model	Description	Fiber Type
UTF 4200 TX-MSA	Miniature digital video transmitter with CC and 2-way data	2xMM
UTF 4200 RX	Digital video receiver with CC and 2-way data	2xMM
UTF 4200 RX-2	Dual digital video receiver with CC and 2-way data	4xMM
UTF 4210 TX-MSA	Miniature digital video transmitter with CC and 2-way data	1xMM
UTF 4210 RX	Digital video receiver with CC and 2-way data	1xMM
UTF 4210 RX-2	Dual digital video receiver with CC and 2-way data	2xMM
UTF 4210 TX /Bosch	Video transmitter for in-dome solutions: Bosch AutoDome™ or EnviroDome™	1xMM
UTF 42xx /SA	Stand-alone version of rack-mount models	

# Up-the-Fiber™ 4200 MM

## Technical Specification

# Miniature digital video transmitter, data, CC



### Video

Video format	NTSC, PAL, SECAM
Input/output level	1 Vpp (±3 dB)
Bandwidth (-3 dB)	6 MHz
Sampling resolution	9-bit effective
Group delay	<20 ns
Differential gain	<2%
Differential phase	<1°
SNR	>63 dB (weighted)
Connector type	BNC 75Ω (gold-plated center pin)

### Contact Closure

Number of channels	1
Input (TX)	+3.3V pull-up, 2.2 kΩ
Threshold	1.4V
Output (RX)	Fail-safe, isolated; 100 mA/50V

### Management

#### LED status indicators (RX only)

TX models:	Power-on (green); local synchronization error (red); remote synchronization error (yellow) NV: No video on input or output (red)
RX models:	SYNC: Operational link (green), local synchronization error (red); remote synchronization error (yellow) SNM™ compatible

#### Network Management

SNM™ variables PS voltages, module temperature, module status, configuration, etc.

### Powering

Power consumption	<3W
Rack-mount units	MC 10 and MC 11 power supply cabinets
Stand-alone option (/SA)	12 VDC (PSA-12 DC. PSA-12 DC/25 or PSR-12-DC)
Miniature stand-alone trans-mitters	12 VDC (PSA-12 DC. PSA-12 DC/25 or PSR-12-DC) or 24 VAC

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation
MTBF	>250,000h
Safety and EMC	IEC/EN 60950-1, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, EN 55022, FCC part 15

### Mechanical

Dimensions (h x w x d)	
Stand-alone	45 x 45 x 25 mm (1.77 x 1.77 x 0.98 in.)
Rack-Mount	128 x 71 x 190 mm (5 x 2.8 x 7.48 in.)
Weight (approx.)	
Stand-alone	250g (8.81 oz.)
Rack-Mount	450g (15.87 oz.)

Optical	UTF 4200 TX/RX	UTF 4210 TX/RX
Fiber type	2x MM (62.5)	1x MM (62.5)
System link budget	15 dB <sup>1</sup>	23 dB <sup>1</sup>
Link length	6 km <sup>2</sup>	6 km <sup>2</sup>
Min. Link Loss	0 dB	0 dB
Output power	>-17 dBm <sup>1</sup>	>-12 dBm <sup>1</sup>
Input sensitivity	-32 dBm	-35 dBm
Transm. wavelength	1300 nm	1310/1550 nm
Connector type	SC	SC

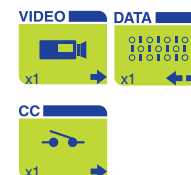
<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Limited distance due to fiber bandwidth



## Features

- High-quality 9-bit video  $\geq 63$  dBw SNR over one or two single-mode fibers
- EasyC-s™: time-saving PTZ connection and configuration
- Miniature transmitters <2x2x1 inch
- High density receivers
- 12 VDC and 24 VAC direct powering
- High-speed data channel supporting all major PTZ/dome cameras
- Alarm contact



## Description

On an extremely small footprint, Optelecom-NKF's Up-the-Fiber (UTF) digital line of equipment provides high-quality, 9-bit digitized video transmission with bidirectional data at an exceptionally low price. UTF systems work with one or two single-mode optical fibers.

Up-the-Fiber receivers can handle one or two video, data, or CC channels. The UTF module supports EasyC-s. With EasyC-s, a group of receivers uses only one external data connection, simplifying system implementation and maintenance. Also, to configure the data port, only the receiver has to be set; the transmitter automatically follows.

The bidirectional RS485/422 data interface supports PTZ data from all types of camera interfaces including RS485, TTY, Manchester, Bi-phase, and SensorNet. In addition, the module offers an isolated alarm contact closure output such as door contacts, anti-tamper contacts, etc.

Their wide operating temperature range makes these compact, stand-alone transmitters suitable for use in outdoor camera housings and camera connection boxes, for example. UTF receivers are also available as stand-alone units.

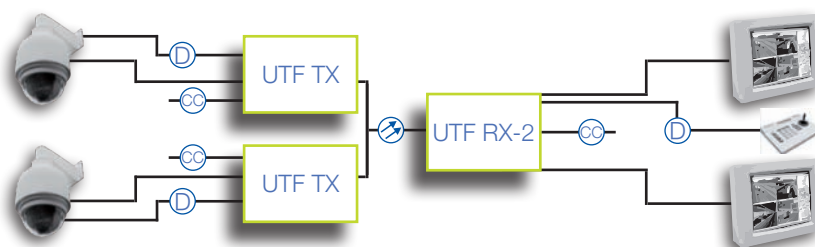
## Ordering Information

Model	Description	Fiber Type
UTF 4240 TX-MSA	Miniature digital video transmitter with CC and 2-way data	2x SM
UTF 4240 RX	Digital video receiver with CC and 2-way data	2x SM
UTF 4240 RX-2	Dual digital video receiver with CC and 2-way data	2x SM
UTF 4250 TX-MSA	Miniature digital video transmitter with CC and 2-way data	1x SM
UTF 4250 RX	Digital video receiver with CC and 2-way data	1x SM
UTF 4250 RX-2	Dual digital video receiver with CC and 2-way data	1x SM
UTF 4250 TX /Bosch	Video transmitter for in-dome solutions: Bosch Autodome® or EnviroDome®	
UTF 42xx /SA	Stand-alone version of rack-mount models	

# Up-the-Fiber™ 4200 SM

## Technical Specification

# Miniature digital video transmitter, data, CC



### Video

Number of channels	1
Video format	NTSC, PAL, SECAM
Input/output level	1 Vpp (±3 dB)
Bandwidth (-3 dB)	6 MHz
Sampling resolution	9-bit effective
Group delay	<20 ns
Differential gain	<2%
Differential phase	<1°
SNR	>63 dB (weighted)
Connector type	BNC 75Ω (gold-plated center pin)

### Data

Number of channels	1 (full-duplex)
Data interfaces	RS422/485 (2- or 4-wire)
Interface support	Current loop/TTL/TTY/Manchester/Bi-Phase
Data format	Asynchronous, serial
Data rate	DC to 230 kb/s
Connector type	6-pin screw terminal
EasyC-s™	Backplane data bus wiring and single-point configuring (RX)

### Power Requirements

Power consumption	<3W
Rack-mount units	MC 10 and MC 11 power supply cabinets
Stand-alone option (/SA)	12 VDC (PSA 12-DC, PSA 12-DC/25 or PSR 12-DC)
Miniature stand-alone transmitters	12 VDC (PSA 12-DC, PSA 12-DC/25 or PSR 12-DC) or 24 VAC

### Management

LED status indicators	Power-on (green); local synchronization error (red); remote synchronization error (yellow)
TX models	NV: No video on input or output (red)
RX models	SYNC: Operational link (green), local synchronization error (red); remote synchronization error (yellow)
Network Management	SNM™ compatible
SNM™ variables	PS voltages, module temperature, module status, configuration, etc.

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation.
MTBF	>250,000h
Safety and EMC	IEC/EN 60950-1, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, EN 55022, FCC part 15

### Environmental

Stand-alone	
Dimensions (h x w x d)	45 x 45 x 25 mm (1.77 x 1.77 x 0.98 in.)
Weight (approx.)	250g (8.81 oz.)
Rack-mount	
Dimensions (h x w x d)	128 x 71 x 190 mm (5 x 2.8 x 7.48 in.)
Weight (approx.)	450g (15.87 oz.)

### Contact Closure

Number of channels	1
Input (TX)	+3.3V pull-up, 2.2 kΩ
Threshold	1.4V
Output (RX)	Fail-safe, potential-free; 100 mA/50V

Optical	UTF 4240 TX/RX	UTF 4250 TX/RX
Fiber type	2x SM (09)	1x SM (09)
System link budget	23 dB	23 dB
Link length	46 km	46 km
Min. Link Loss	0 dBm	9 dBm
Output power	>-12 dBm	>-12 dBm / >-12 dBm
Input sensitivity	-32 dBm	-35 dBm / -35 dBm
Transm. wavelength	1300 nm	1310/1550 nm
Connector type	SC	SC



## Features

- AM video with duplex data (RS422/485)
- Adjustment-free operation (Automatic Gain Control)
- Easy to install
- Compact stand-alone and rack-mount cards
- Video SNR >60 dBw for short links



## Description

The VDS 2200 series offers a range of low-cost fiber optic video/data transceivers. Built-in Automatic Gain Control (AGC) allows for plug-and-play installation and maintenance-free operation.

VDS transmitters come in stand-alone housings; the receivers are rack-mountable or stand-alone models (/SA). The VDS system is available in dual multimode versions.

Its bidirectional data interface makes the VDS compatible with all types of cameras (RS422/485, TTY, Manchester, Bi-phase, etc.).

The very compact VDS 2200 series transmitters are designed to be used over a broad temperature range and are, therefore, suitable for use close to cameras or even inside outdoor camera housings.

VDS receivers are designed to be slotted into MC 10 or MC 11 power supply cabinets. Standalone VDS models are powered by PSA-12 DC adapters. For extreme environmental conditions, a PSR-12 DC is recommended.

## Ordering Information

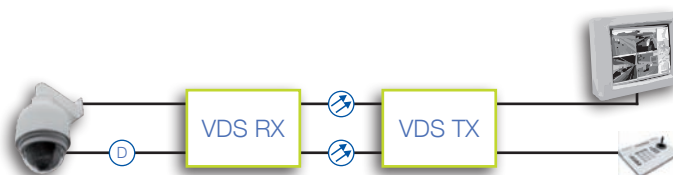
Model	Description	Fiber Type
VDS 2200 TX	Matchbox video transmitter & data transceiver	2x MM
VDS 2200 RX	Video receiver, data transceiver	2x MM
VDS 22xx /SA	Stand-alone versions of rack-mount models	



# VDS 2200

## Technical specifications

## Video and data modems



### Video

Video format	1
Input/output level	NTSC, PAL, SECAM
Bandwidth (-3 dB)	1 Vpp ( $\pm 3$ dB)
Differential phase	8 MHz
Differential gain	$< 5^\circ$
SNR	$< 5\%$
Short link	$> 60$ dBw
Over opt. budget	$> 45$ dBw
Connector type	BNC 75 $\Omega$ (gold-plated center pin)

### Data

Number of channels	1 (full-duplex)
Data interfaces	RS422/485 (2- or 4-wire)
Interface support	Current loop/TTL/TTY/Manchester/Bi-Phase
Data format	Asynchronous, serial
Data rate per channel	DC to 64 kbit/s
Connector type	2x 3-pin screw terminal

### Power Requirements

Power consumption	$< 1.1$ W
VDS 22xx TX	11 to 22 VDC (PSA-12 DC, PSA-12 DC/25 or PSR-12 DC)
VDS 22xx RX	MC 10 and MC 11 power supply cabinets
VDS 22xx /SA)	11 to 16 VDC (PSA-12 DC, PSA-12 DC/25 or PSR-2 DC)

### Physical Specifications

VDS 22xx TX	
Dimensions (h x w x d)	33 x 60 x 90 mm (1.3 x 2.36 x 3.54 in.)
Weight (approx.)	140g (4.93 oz.)
VDS 22xx RX	
Dimensions (h x w x d)	35 x 128 x 190 mm (1.38 x 5.04 x 7.48 in.)
Weight (approx.)	450g (15.87 oz.)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	$< 95\%$ as long as there is no condensation.
MTBF	$> 100,000$ h
Safety and EMC	IEC/EN 60950-1, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, EN 55022, FCC part 15

### Management

LED status indicators	
DC	Power-on indicator (green)
CR	Data carrier received (green)
NV	No video signal on input or output (red)

Optical	VDS 2200 TX/RX
Fiber type	2x MM (62.5)
System link budget	16 dB*
Link length	5 km
Min. Link Loss	0 dB
Output power	$> -18$ dBm
Input sensitivity	$< -34$ dBm
Output wavelength	850 nm
Connector type	2x St

\* For 50/125  $\mu$ m fiber, subtract 4 dB.

## Features

- Single-channel digital video and duplex data transmitters and receivers
- 9-bit uncompressed digital video
- High quality video  $\geq 63$  dBw SNR
- Compatible with NTSC and PAL standards
- Duplex, user-configurable data channel
- Stand-alone, rack-mount card, and Pelco in-dome versions
- Network Management System (NMS) software



## Description

The 9221D series models transport one video signal and one duplex data signal over one optical fiber. They combine high-quality digital video transmission with duplex PTZ or other serial data in one easy-to-use unit.

Uncompressed 9-bit digitizing, oversampling, and digital filtering ensure a very high transmission performance, exceeding the requirements of the EIA RS 250C short haul specification.

The wide operating temperature range of these units makes the 9221 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9221 series comes as a rack mount version suitable for a 9002 or 9008 power supply cabinet, or as a stand-alone unit (9225). The 9221 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9221 rack-mount card, use the 9003-2 mini chassis.

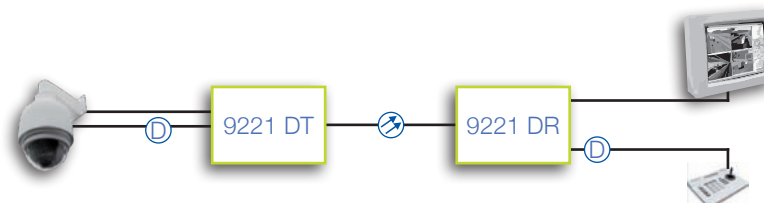
## Ordering Information

Model	Description	Fiber Type
9221DT/MMH-ST	1-channel digital video transmitter, duplex data	1x MM
9225DT/SM-ST	1-channel digital video transmitter, duplex data	1x SM
9221DR/MMH-ST	1-channel digital video receiver, duplex data	1x MM
9225DR/SM-ST	1-channel digital video receiver, duplex data	1x SM
9229DT-P/MMH-ST	In-dome transmitter for Pelco Spectra III	1x MM
9221DT/SM-ST	1-channel digital video transmitter, duplex data	1x SM
9221DR/SM-ST	1-channel digital video receiver, duplex data	1x SM
9229DT-P/SM-ST	In-dome transmitter for Pelco Spectra III	1x SM
9225DT/MMH-ST	Stand-alone version of the 9221 models	
9225DR/MMH-ST	Stand-alone version of the 9221 models	

# 9221D Series

## Technical specifications

## 1-channel video, duplex data



<b>Video</b>		<b>Environmental</b>		
Video format	NTSC, PAL	Operating temperature	-40° C to +74° C (-40° F to +165.2° F)	
Video input	1 Vpp into 75Ω	Storage temperature	-55° C to +85° C (-67° F to +185° F)	
Connector	BNC	Relative humidity	<95% as long as there is no condensation	
Bandwidth	5 Hz to 6.5 MHz (-3 dB)	<b>Recommended supplies</b>	9014PS, 9011PS, PSR-12 DC	
Differential gain	1.0%			
Differential phase	0.7°			
SNR	≥63 dBw	<b>Management System</b>	9900 Network Management System (NMS)	
Video encoding	Uncompressed 9-bit linear PCM			
Video sampling rate	16 MHz			
<b>Data</b>		<b>Indicators</b>	Video In, Sync, Not Sync, Loop, RD Tx Video In, Loop, Sync, Not Sync, RD Sync, Not Loop, RD	
Port	Data			
Interface	Selectable Duplex RS232, RS422 2-/4-wire, RS485 2-/4-wire, Manchester/Bi-Phase			
Rate	RS232, RS422, and RS458 up to 128 kb/s (Auto Baud), Manchester Bi-phase 32 kb/s	<b>Physical Specifications</b>	1-slot card, 9000 series chassis	
Connector	5-pin removable screw terminal except the 9229DT-P that mounts directly to the camera PC board			
<b>Power Requirements</b>		<b>Physical Specifications</b>	9221D 154.9 x 20.3 x 218.4 mm (6.1 x 0.8 x 8.6 in.) 272g (9.55 oz.) Stand-alone 40.6 x 81.3 x 127.0 mm (1.6 x 3.2 x 5.0 in.) 362.9g (12.81 oz.) Pelco Spectra III internal mount 78.74 x 19.05 x 121.9 mm (3.1 x 0.75 x 4.8 in.) 90.7g (3.19 oz.)	
Model	9221DT			9221DR
Voltage	6 VDC (chassis)			6 VDC (chassis)
Current	500 mA			450 mA
	9225DT			9225DR
	9 to 15 VDC			9 to 15 VDC
	280 mA			500 mA
	9229DT-P			
	Supplied by camera			
	160 mA			

Optical	9221DT / DR-MMH TX / RX	9221DT/DR-SM TX / RX	9229DT/9221DR-SM TX / RX	9229DT/9221DR-MMH TX / RX
Fiber type	MM (62.5)	SM (09)	SM (09/125)	MM (62.5/125)
Output wavelength	1310 nm / 1550 nm	1310 nm / 1550 nm	1310 nm / 1550 nm	1310 nm / 1550 nm
Output power	-7 dBm / -7 dBm	-7 dBm / -7 dBm	-7 dBm / -7 dBm	-30 dBm / 30 dBm
Input sensitivity	-29 dBm / 30 dBm	-30 dBm / 30 dBm	-30 dBm / 30 dBm	-30 dBm / 29 dBm
System link budget	22 dB <sup>1</sup> / 23 dB <sup>1</sup>	23 dB <sup>1</sup> / 23 dB <sup>1</sup>	22 dB / 23 dB <sup>1</sup>	23 dB <sup>1</sup> / 23 dB <sup>1</sup>
Fiber length (range) <sup>2</sup>	19 km	57 km	57 km	19 km
Connection type	ST (others optional)	ST (others optional)	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by fiber bandwidth.

## 9281D Series

## 1-channel video with “up the coax”

### Features

- Single-channel digital video transmitters and receivers
- 9-bit compressed digital video
- High-quality video  $\geq 63$  dBw SNR
- Transports duplex “up the coax” PTZ and camera control/data channel information
- Extended Distance transmitter (-EX) overcomes distance limitations of standard “up the coax” systems (-EX version)
- Stand-alone and rack-mount versions
- Network Management System (NMS) compatible



### Description

The 9281D series modules digitize and transport one video plus duplex data in “up the coax”-type camera control systems such as the Panasonic Proteus Pelo, TOA and other similar systems over one optical fiber.

The Extended Distance transmitter (-EX), used with a standard receiver, overcomes the typical 1.5 km distance limitation of standard copper and unbuffered fiber “up the coax” systems by buffering the data and properly injecting it onto the video signal in the subsequent frame.

Uncompressed 9-bit digitizing, oversampling, and digital filtering ensure a very high transmission performance, exceeding the requirements of the EIA RS 250C short haul specification.

The wide operating temperature range of these units makes the 9281 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9281 series comes as a rack mount version, suitable for a 9002, 9003-2 or 9008 power supply cabinet, or as a stand-alone unit (9225). The 9281 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9281 rack-mount card, use the 9003-2 mini chassis.

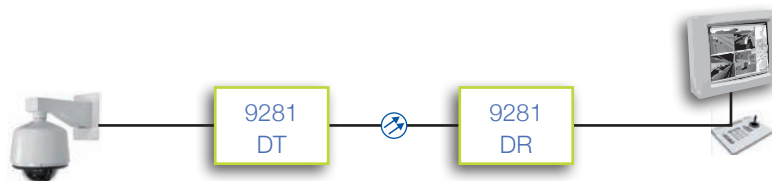
### Ordering Information

Model	Description	Fiber Type
9281DT/MMH-ST	1-channel “up the coax”	1x MM
9281DR/MMH-ST	1-channel “up the coax”	1x MM
9281DR/SM-ST	1-channel “up the coax”	1x SM
9281DT-EX/SM-ST	Extended distance transmitter	1x SM
9285DT/XX-ST	Stand-alone version of the 9281 transmitter models	
9285DR/XX-ST	Stand-alone version of the 9281 receiver models	

# 9281D Series

## Technical specifications

## 1-channel video with “up the coax”



<b>Video</b>		<b>Environmental</b>	
Video format	NTSC, PAL	Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Video input	1 Vpp into 75Ω	Storage temperature	-55° C to +85° C (-67° F to +185° F)
Connector	BNC	Relative humidity	<95% as long as there is no condensation
Bandwidth	5 Hz to 6.5 MHz (-3 dB)		
Differential gain	1.0%		
Differential phase	0.7°		
SNR	≥63 dBw		
Video encoding	Uncompressed 9-bit linear PCM		
Video sampling rate	16 MHz		
<b>Power Requirements</b>		<b>Physical Specifications</b>	
Model	9281DT	9281DR	9281DT, 9281DR
Voltage	6 VDC (chassis)	6 VDC (chassis)	Dimensions (h x w x d)
Current	360 mA	340 mA	1-slot card, 9000 series chassis
			154.9 x 20.3 x 218.4 mm
			(6.1 x 0.8 x 8.6 in.)
			Weight (approx.)
			272.0g (9.59 oz.)
			9285DT, 9285DR
			Stand-alone chassis (Size 5)
			40.6 x 81.3 x 127.0 mm
			(1.6 x 3.3 x 5.0 in.)
			Weight (approx.)
			453.6g (16.0 oz.)
<b>Recommended supplies</b>			
for 9285DT(-EX)/DR		9014PS, 9011PS, PSR-12 DC	
<b>Indicators</b>			
9281DT, 9281DT-EX		Sync, Video Present, Data Active, VD2 Active	
9285DT, 9285DT-EX		Sync/Not Sync, Loop, Video Present, Data Active, VD2 Active	
9281DR		Sync, Tx Video Present, Data Active, VD2 Active	
9285DR		Sync/Not Sync, Loop, Tx Video Present, Data Active, VD2 Active	
<b>Management System</b>		9900 Network Management System (NMS)	

Optical	9281DT / DR-MMH TX / RX	9281DT/DR-SM TX / RX	9281DT-EX/DR-SM TX / RX
Fiber type	MM (62.5)	SM (09)	SM (09)
Output wavelength	1310 nm / 1550 nm	1310 nm / 1550 nm	1310 nm / 1550 nm
Output power	-7 dBm / -7 dBm	-7 dBm / -7 dBm	-7 dBm / -7 dBm
Input sensitivity	-29 dBm / 30 dBm	-32 dBm / 32 dBm	-32 dBm / 32 dBm
System link budget	22 dB <sup>1</sup> / 23 dB <sup>1</sup>	23 dB / 25 dB	25 dB / 25 dB
Fiber length (range) <sup>2</sup>	approx. 1.5 km <sup>2</sup>	approx. 1.5 km <sup>2</sup>	62 km
Connection type	ST (others optional)	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Varies slightly depending on the “up-the-coax” camera system used.



## Features

- Video with audio and data over one fiber
- Uncompressed 10-bit video
- High-speed, full-duplex data
- CD-quality full-duplex audio
- Adjustment-free installation and operation
- Rack-mount and stand-alone



## Description

The remarkably versatile VAD 5300 series transceivers digitize and transmit one video signal while simultaneously handling two streams of full-duplex data, contact closures and audio signals, all over one single-mode or multimode optical fiber.

Due to the advanced 10-bit A/D conversion techniques used, a high-quality and superbly stable video signal can be sent over very long distances without degradation. Audio is full duplex and of CD quality.

The high speed interfaces are suitable for RS232/422/ 485, TTY, Manchester and Bi-phase, and are compatible with all CCTV equipment.

While VAD transceivers are designed to be slotted into MC 10 or MC 11 power supply cabinets, they can also be supplied as standalone units (/SA versions).

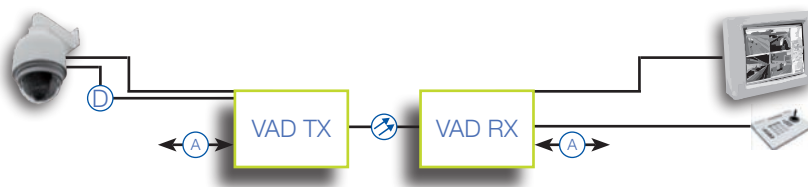
## Ordering Information

Model	Description	Fiber Type
VAD 5310 TX	Digital video transmitter, 2-way audio & data	1xMM
VAD 5310 RX	Digital video receiver, 2-way audio and data	1xMM
VAD 5350 TX	Digital video transmitter, 2-way audio & data	1xSM
VAD 5350 RX	Digital video receiver, 2-way audio and data	1xSM
VAD 53xx /SA	Stand-alone versions of rack-mount models	

# VAD 5300

## Technical specifications

## Digital video, 2-way audio and data



### Video

Number of channels	1
Video format	NTSC, PAL, SECAM
Input/output level	1 Vpp ( $\pm 3$ dB)
DC restore (clamping)	On or off (selectable)
Bandwidth (-3 dB)	7.5 MHz
Sampling resolution	10-bit
Sampling rate	18 Msamples/s
Differential gain	<1%
Differential phase	<1°
Group delay	<50 ns
SNR	>67 dB (weighted)
Connector type	BNC 75 $\Omega$ (gold-plated center pin)

### Audio

Number of channels	2 (full-duplex)
Bandwidth	20 Hz to 20 kHz
Sampling resolution	16-bit
In-/output level	0 dBV (+6 dBV max)
Total harmonic distortion	<0.25% at nominal
SNR	>75 dBA
Input impedance	>50 k $\Omega$ or 600 $\Omega$ bal.
Output impedance	<50 $\Omega$ bal.
Connector type	RJ45

### Physical Specifications

Dimensions (h x w x d)	128 x 35 x 190 mm (5 x 1.38 x 7.48 in.)
Weight (approx.)	450g (15.87 oz.)
Housing	Rack-mount or stand-alone

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation.
MTBF	>100,000h
Safety and EMC	IEC/EN 60950-1, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, EN 55022, FCC part 15

### Management

LED status indicators	
DC	Power-on indicator (green)
NV	No video on input or output (red)
SYNC	Full-duplex link (green), local (red) or remote synchronization error (yellow)
D1	RS4xx data activity on input (red/green = 1/0)
D2	RS232 data activity on input (green/off = 1/0)
Network Management	SNM™ compatible
SNM™ variables	PS Voltages, module temperature, module status, optical levels, configuration, etc.

Optical	VAD 5310 TX/RX	VAD 5350 TX/RX
Fiber type	1x MM (62.5)	1x SM (0.9)
System link budget	9 dB <sup>1</sup> @ 1300 nm	21 dB @ 1310 nm
Link length	4 km <sup>1</sup>	42 km
Min. Link Loss	0 dBm	0 dBm
Output power	>-16 dBm <sup>2</sup> / >-15 dBm <sup>2</sup>	>-4 dBm / >-11 dBm
Input sensitivity	<-35 dBm <-25 dBm	<-35 dBm <-25 dBm
Output wavelength	1310 nm / 850 nm	1310 nm / 1550 nm
Connector type	ST	FC (others optional)

<sup>1</sup> Due to fiber bandwidth, the maximum transmission distance may be limited to 4 km.

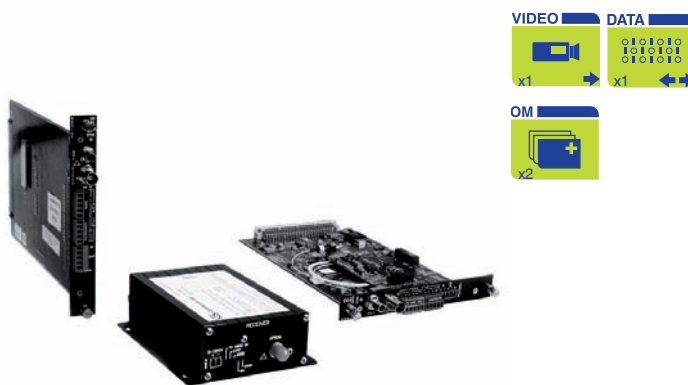
<sup>2</sup> For 50/125  $\mu$ m fiber, subtract 4 dB.





## Features

- Single-channel digital video transmitters and receivers
- 9-bit uncompressed digital video
- High quality video  $\geq 63$  dBw SNR
- 1 duplex user-configurable data channel
- 2 duplex Option Modules
- Stand-alone and rack-mount versions
- Network Management System (NMS) compatible



## Description

The 9241D series modules digitize and transport one video, one duplex data, and two Option Module channels operating in both directions over one optical fiber. The dedicated data channel and two user selected option data types make this model pair a flexible and powerful solution.

Uncompressed 9-bit digitizing, oversampling, and digital filtering ensure a very high transmission performance, exceeding the requirements of the EIA RS 250C short haul specification.

The wide operating temperature range of these units makes the 9241 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9241 series comes as a rack mount version only, suitable for a 9002, 9003-2 or 9008 power supply cabinet, or as a stand-alone unit (9245). The 9241 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9241 rack-mount card, use the 9003-2 mini chassis.

## Ordering Information

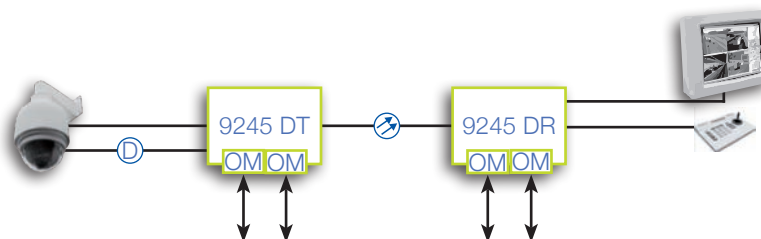
Models*	Description	Fiber Type
9241DT(XX)/MMH-ST	1-ch. video w/3 duplex data/option channels	1x MM
9241DR(XX)/MMH-ST	1-ch. video w/3 duplex data/option channels	1x MM
9241DT(XX)/SM-ST	1-ch. video w/3 duplex data/option channels	1x SM
9241DR(XX)/SM-ST	1-ch. video w/3 duplex data/option channels	1x SM
9245DT	Stand-alone version of the 9241D transmitter models	
9245DR	Stand-alone version of the 9241D receiver models	

\* Replace (XX) in Model Number with code letters for desired Option Modules.  
Refer to chart on reverse side or the Option Modules datasheet.

# 9241D Series

## Technical specifications

# 1-channel video with 3 duplex data/option channels



### Video

Video format	NTSC, PAL
Video input	1 Vpp into 75Ω
Connector	BNC
Bandwidth	5 Hz to 6.5 MHz (-3 dB)
Differential gain	1.0%
Differential phase	0.7°
SNR	≥63 dBw
Video encoding	Uncompressed 9-bit linear PCM
Video sampling rate	16 MHz

### Option Module

Number of free channels	2x, duplex
A module	1x audio
B module	1x user-configurable data (RS232, RS422, RS485)
C module	1x contact closure
D or E module	2x audio (simplex only)
GM or GR module	2x intercom audio

For more information on Option Modules, refer to the Option Modules datasheet or contact Optelecom-NKF.

### Power Requirements

Model	9241DT	9241DR
Voltage	6.0 VDC (chassis)	6.0 VDC (chassis)
Current	700 mA	700 mA
	9245DT	9245DR
	8-15 VDC	8-15 VDC
	360 mA@12 VDC	360 mA@12 VDC

### Indicators

9241DT	Sync, Video Present
9241DR	Sync, Tx Video Present
9245DT	Sync, Not Sync, Loop, RC, Video Present
9245DR	Sync, Not Sync, Loop RC, Tx Video Present

### Physical Specifications

9241DT, 9241DR	1-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 40.6 x 218.4 mm (6.1 x 1.6 x 8.6 in.)
Weight (approx.)	272g (0.59 oz.)
9245DT, 9245DR	Stand-alone chassis (Size 5)
Dimensions (h x w x d)	40.6 x 81.3 x 127.0 mm (1.6 x 3.3 x 5.0 in.)
Weight (approx.)	362.9g (12.8 oz.)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

### Recommended supplies

for 9245DT/DR	9014PS, 9011PS, PSR-12 DC
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### Management System

9900 Network Management System (NMS)

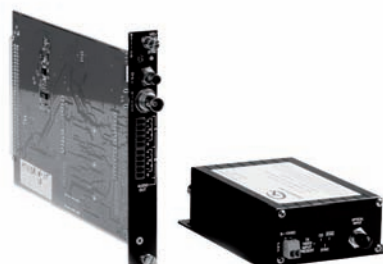
Optical	9241DT/DR-MMH TX / RX	9241DT/DR-SM TX / RX
Fiber type	MM (62.5)	SM (09)
Output wavelength	1310 nm / 1550 nm	1310 nm / 1550 nm
Output power	-7 dBm / -7 dBm	-7 dBm / -7 dBm
Input sensitivity	-29 dBm / 30 dBm	-30 dBm / 30 dBm
System link budget	22 dB <sup>1</sup> / 23 dB <sup>1</sup>	23 dB / 23 dB
Fiber length (range) <sup>2</sup>	19 km	57 km
Connection type	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by fiber bandwidth.

## Features

- Single-channel video and stereo audio transmitter and receiver
- 9-bit uncompressed digital video
- High quality video  $\geq 63$  dBw SNR
- 4 simplex (2 stereo) audio channels
- Available in a SpectraStream CWDM version
- Standalone and rack-mount versions
- Network Management System (NMS) compatible



## Description

The 9711 series modules form a simple video/audio solution designed to transport one video and two stereo audio channels over one optical fiber. The high quality video and audio transmission make this pair suitable for use in video/audio distribution in public areas.

These modules use 16-bit digital transmission for each of the four audio channels. Models are available in multimode, single-mode, and SpectraStream CWDM versions.

Uncompressed 9-bit digitizing, oversampling, and digital filtering ensure a very high transmission performance, exceeding the requirements of the EIA RS 250C short haul specifications.

The wide operating temperature range of these units makes the 9711D well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9711 series comes as a rack mount version, suitable for a 9002 or 9008 power supply cabinet, or as a standalone unit (9715). The 9711 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9711 rack-mount card, use the 9003-2 mini chassis.

## Ordering Information

Models*	Description	Fiber Type
9711DT-L-ST	Digital video with stereo audio	1x MM
9711DR-LM-ST	Digital video with stereo audio	1x MM
9711DT-LD-ST	Digital video with stereo audio	1x SM
9711DR-L-ST	Digital video with stereo audio	1x SM
9715DT-LD-ST	Stand-alone version of the 9711D transmitter models	
9715DR-L-ST	Stand-alone version of the 9711D receiver models	

# 9711D Series

## Technical specifications

# 1-channel video with 2 stereo audio channels



### Video

Video format	NTSC, PAL
Video input	1 Vpp into 75Ω
Connector	BNC
Bandwidth	5 Hz to 6.5 MHz (-3 dB)
Differential gain	1.0%
Differential phase	0.7°
SNR	≥63 dBw
Video encoding	Uncompressed 9-bit linear PCM
Video sampling rate	16 MHz

### Audio

2x stereo audio channels	
Frequency response	20 Hz to 20 KHz, SNR ≥78 dB
Input	Impedance 600Ω or 47 kΩ, user-selectable, balanced or unbalanced, input level 1.0 to 5.7 Vpp
Output	Output impedance will match input impedance into 600Ω or greater, balanced or unbalanced
I/O Connector	2x 5-pin removable screw terminal connector

### Power Requirements

Model	9711DT	9711DR
Voltage	6.0 VDC (chassis)	6.0 VDC (chassis)
Current	220 mA	250 mA
	9715DT	9715DR
	8-15 VDC	8-15 VDC
	280 mA@12 VDC	320 mA @ 12 VDC

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

### Physical Specifications

9711DT, 9711DR	1-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 40.6 x 218.4 mm (6.1 x 1.6 x 8.6 in.)
Weight (approx.)	272g (0.59 oz.)
9715DT, 9715DR	Stand-alone chassis (Size 5)
Dimensions (h x w x d)	40.6 x 81.3 x 127.0 mm (1.6 x 3.3 x 5.0 in.)
Weight (approx.)	362.9g (12.8 oz.)

### Recommended supplies for 9715DT/DR

9014PS, 9011PS, PSR-12 DC

### Management System

9900 Network Management System (NMS)

### Indicators

9711DT	Power, Video Present
9711DR	Sync, TX Video Present
9715DT	Power, Video Present (x2)
9715DR	Sync, Not Sync, CD, TX Video Present

Optical	9711DT-L / 9711DR-L	9711DT-LD / 9711DR-L
Fiber type	MM (62.5)	SM (09)
Output wavelength	1310 nm	1310 nm
Output power	-17 dBm	-7 dBm <sup>1</sup>
Input sensitivity	-29 dBm	-30 dBm
System link budget	12 dB	23 dB
Fiber length (range) <sup>2</sup>	6 km	57 km
Connection type	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by modal and chromatic dispersion, fiber quality, and fiber bandwidth.

## Features

- Two-channel video and data transmitters and receivers
- 9-bit uncompressed digital video
- High quality video  $\geq 63$  dBw SNR
- Simplex High-Speed (HS) data port
- Available in a SpectraStream CWDM version
- Rack-mount version
- Network Management System (NMS) compatible



## Description

The 9191D series modules digitize and transport two videos and one simplex High-Speed port over one optical fiber in one direction. 9-bit video sampling provides extremely high video quality. The High-Speed port supports transmission of 1.6 Mb/s RS422 or connection to an optional Option Module Host card for transport of either four or eight audio, data, or contact closure signals in the same direction as the video signal.

Uncompressed 9-bit digitizing, oversampling, and digital filtering ensure a very high transmission performance, exceeding requirements of the EIA RS 250C short haul specification.

The wide operating temperature range of these units makes the 9191 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9191 series comes as a rack mount version only, suitable for a 9002 or 9008 power supply cabinet. The 9191 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9191 rack-mount card, use the 9003-2 mini chassis.

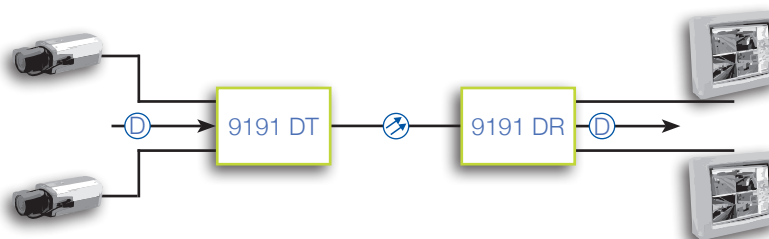
## Ordering Information

Models	Description	Fiber Type
9191DT-LDS-ST	Two-channel video and data transmitter	1xMM
9191DR-S-ST	Two-channel video and data receiver	1x MM
9191DT-LD-ST	Two-channel video and data transmitter	1x SM
9191DR-L-ST	Two-channel video and data receiver	1x SM

# 9191D Series

## Technical specifications

## 2-channel video with simplex data



### Video

Video format	NTSC, PAL
Video input	1 Vpp into 75Ω
Connector	BNC
Bandwidth	5 Hz to 6.5 MHz (-3 dB)
Differential gain	1.0%
Differential phase	0.7°
SNR	≥63 dBw
Video encoding	Uncompressed 9-bit linear PCM
Video sampling rate	16 MHz

### High-speed port

Number of ports	1x simplex
Data format	RS422 or Extension Port
Data rate	
Synchronous RS422	15 Mb/s
Asynchronous RS422	≤1.5 Mb/s
Extension port for:	
Option Module hosts	9961A-C, 9962A-C
10 Mb Ethernet	9971-C, 9972-C

For more information on CWDM options, contact Optelecom-NKF.

### Power Requirements

9191DT	
Voltage	6.0 VDC (chassis)
Current	420 mA
9191DR	
Voltage	6.0 VDC (chassis)
Current	380 mA

### Indicators

9191DT	Power, Video Present (x2)
9191DR	Status, TX Video Present (x2)

### Management System

9900 Network Management System (NMS)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

### Physical Specifications

9191DT, 9191DR	1-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 40.6 x 218.4 mm (6.1 x 1.6 x 8.6 in.)
Weight (approx.)	453.6g (16.0 oz.)

Optical	9191DT-LDS/9191D-S TX / RX	9191DT-LD/9191DR-L TX / RX
Fiber type	MM (62.5)	SM (09)
Output wavelength	850 nm / 850 nm	1310 nm / 1310 nm
Output power	-7 dBm / -7 dBm	-7 dBm / -7 dBm
Input sensitivity	-30 dBm / -30 dBm	-30 dBm / -30 dBm
System link budget	17 dB <sup>1</sup> / 17 dB <sup>1</sup>	23 dB / 23 dB
Fiber length (range) <sup>2</sup>	25 km	57 km
Connector type	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by fiber bandwidth.

## 9292D Series 2-channel video with 1 HS port, 2 Option Modules, & 1 Ethernet port

### Features

- Two-channel video, data, audio, CC or intercom transmitters and receivers
- 9-bit compressed digital video
- Very high quality video  $\geq 67$  dBw SNR
- 100 Mb/s Fast Ethernet switch
- 1 duplex High-Speed (HS) port channel
- 2 user-configurable duplex Option Modules
- Network Management System (NMS) compatible



### Description

The 9292D series modules digitize and transport two video channels, a 100 Mb/s Fast Ethernet channel, a duplex High-Speed port data channel, and two duplex Option Module channels over one optical fiber.

The two Option Module channels provide additional transport for any combination of two data, audio, contact closure, or intercom channels on the same fiber as the video and high-speed port channels. The High-Speed port supports duplex 1.5 Mb/s RS422 or connection to an optional Option Module Host card for transport of four or eight duplex audio, data, contact closure, or intercom signals.

Uncompressed 9-bit digitizing, oversampling, and digital filtering ensure a very high transmission performance, exceeding the requirements of the EIA RS 250C short haul specification.

The wide operating temperature range of these units makes the 9292 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9292 series comes as a rack mount version only, suitable for a 9002 or 9008 power supply cabinet. The 9292 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9292 rack-mount card, use the 9003-2 mini chassis.

### Ordering Information

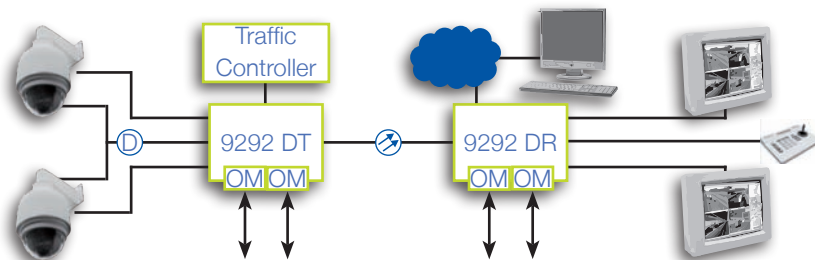
Models	Description	Fiber Type
9292DT(XX)/MMH-ST	2-channel digital video transmitter	1x MM
9292DR(XX)/MMH-ST	2-channel digital video receiver	1x MM
9292DT(XX)/SMH-ST	2-channel digital video transmitter	1x SM
9292DR(XX)/SMH-ST	2-channel digital video receiver	1x SM
9292DT(XX)/SM-ST	2-channel digital video transmitter	1x SM
9292DR(XX)/SM-ST	2-channel digital video receiver	1x SM



## 9292D Series

### Technical specifications

## 2-channel video with 1 HS port, 2 Option Modules, and 1 Ethernet port



#### Video (x4)

Video format	NTSC, PAL
Video input	1 Vpp into 75Ω
Connector	BNC
Bandwidth	5 Hz to 6.5 MHz (-3 dB)
Differential gain	0.7%
Differential phase	0.7°
SNR	≥67 dBw
Video encoding	Uncompressed 10-bit linear PCM
Video sampling rate	15 MHz

#### Power Requirements

<b>9292DT</b>	
Voltage	6.0 VDC (chassis)
Current	650 mA
<b>9292DR</b>	
Voltage	6.0 VDC (chassis)
Current	700 mA

#### Indicators

9191DT	Sync, Not Sync, Loop, Video Present (x2)
9191DR	Sync, not Sync, Loop, Tx Video Present (x2)

#### Management System

9900 Network Management System (NMS)

#### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

#### Physical Specifications

9292DT, 9292DR	2-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 40.6 x 218.4 mm (6.1 x 1.6 x 8.6 in.)
Weight (approx.)	453.6g (16.0 oz.)

#### High-speed ports

Number of ports	1x duplex
Data format	RS422 or Extension Port
Data rate	
Synchronous RS422	15 Mb/s
Asynchronous RS422	≤1.5 Mb/s
Extension port for:	
Option Module hosts	9961A-C, 9962A-C
10 Mb Ethernet	9971-C, 9972-C

#### Option Module

Number of free channels	2x, duplex
A module	1x audio
B module	1x user-configurable data (RS232, RS422, RS485)
C module	1x contact closure
D or E module	2x audio (simplex only)
GM or GR module	2x intercom audio

For more information on Option Modules, refer to the Option Modules datasheet or contact Optelecom-NKF.

#### Ethernet Ports

10/100 Fast Ethernet, Auto-sensing, Auto MIDX, Full/Half Duplex, Auto Negotiate, built-in 4-port unmanaged switch, RJ45 connectors

Optical	9292DT/DR-MM TX / RX	9292DT/DR-SM TX / RX	9292DT/DR-SMH TX / RX
Fiber type	MM (62.5)	SM (09)	SM (09)
Output wavelength	1310 nm / 1550 nm	1310 nm / 1550 nm	1550 nm / 1310 nm
Output power	-7 dBm / -7 dBm	-7 dBm / -7 dBm	-3 dBm / -3 dBm
Input sensitivity	-23 dBm / -30 dBm	-27 dBm / -30 dBm	-27 dBm / -30 dBm
System link budget	16 dB <sup>1</sup> / 16 dB <sup>1</sup>	20 dB / 23 dB	24 dB / 27 dB
Fiber length (range) <sup>2</sup>	7 km	25 km	68 km
Connection type	ST (others optional)	ST (others optional)	ST (others optional)

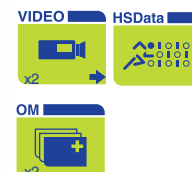
<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by modal and chromatic dispersion, fiber quality, and fiber bandwidth.

# 9421D Series 2-channel video with 1 HS port and 2 Option Modules

## Features

- Two-channel video transmitters and receivers
- 9-bit uncompressed digital video
- High quality video  $\geq 63$  dBw SNR
- 1 duplex High-Speed (HS) port
- 2 duplex user-configurable Option Modules
- Stand-alone and rack-mount versions
- Network Management System (NMS) compatible



## Description

The 9421D series modules digitize and transport two video channels, one duplex High-Speed port data channel, and 2 Option Module channels over one optical fiber, with the Option Module channels operating in both directions.

The two Option Module channels provide additional transport for any combination of two data, audio, contact closure, or intercom channels on the same fiber as the video and High-Speed port channels. The high-speed port supports duplex 1.5 Mb/s RS422 or connection to an optional Option Module Host card for transport of four or eight duplex audio, data or contact closure, or 10 Mb/s Ethernet signals.

Uncompressed 9-bit digitizing, oversampling, and digital filtering ensure a very high transmission performance, exceeding requirements of the EIA RS 250C short haul specification.

The wide operating temperature range of these units makes the 9421 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9421 series comes as a rack mount version only, suitable for a 9002 or 9008 power supply cabinet, or as a stand-alone unit (9425). The 9421 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9421 rack-mount card, use the 9003-2 mini chassis.

## Ordering Information

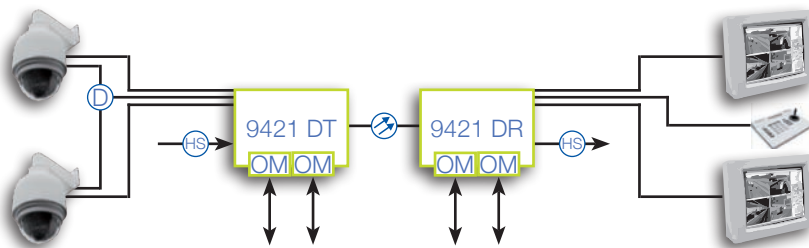
Models*	Description	Fiber Type
9421DT(XX)/MMH-ST	2-channel digital video transmitter	1x MM
9421DR(XX)/MMH-ST	2-channel digital video receiver	1x MM
9421DT(XX)/SM-ST	2-channel digital video transmitter	1x SM
9421DR(XX)/SM-ST	2-channel digital video receiver	1x SM
9425DT(XX)/SM-ST	Stand-alone version of the 9421D transmitter model	1x SM
9425DR(XX)/SM-ST	Stand-alone version of the 9421D receiver model	1x SM

\* For user-definable Option Modules, replace (XX) in Model Number with code letters for desired Option Modules.

# 9421D Series

## Technical specifications

# 2-channel video with 1 HS port and 2 Option Modules



### Video (x2)

Video format	NTSC, PAL
Video input	1 Vpp into 75Ω
Connector	BNC
Bandwidth	5 Hz to 6.5 MHz (-3 dB)
Differential gain	2.0%
Differential phase	1.0°
SNR	≥63 dBw
Video encoding	Uncompressed 9-bit linear PCM
Video sampling rate	15 MHz

### Indicators

9421DT	Sync, Video Present (x2)
9425DT	Loop, Sync, Not Sync, Video Present (x2)
9421DR	Sync, Tx Video Present (x2)
9425DR	Loop, Sync, Not Sync, Tx Video Present (x2)

### Management

Management System	9900 Network Management System (NMS)
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### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

### Power Requirements

Model	9421DT	9421DR
Voltage	6 VDC (chassis)	6 VDC (chassis)
Current	650 mA	700 mA
	9425DT	9425DR
	8 to 15 VDC	8 to 15 VDC
	370 mA@12 VDC	370 mA@12 VDC

### High-speed ports

Number of ports	1x duplex
Data format	RS422 or Extension Port
Data rate	
Synchronous RS422	15 Mb/s
Asynchronous RS422	≤1.5 Mb/s
Extension port for:	
Option Module hosts	9961A-C, 9962A-C
10 Mb Ethernet	9971-C, 9972-C

For more information, contact Optelecom-NKF.

### Option Module

Number of free channels	2x, duplex
A module	1x audio
B module	1x user-configurable data (RS232, RS422, RS485)
C module	1x contact closure
D or E module	2x audio (simplex only)
GM or GR module	2x intercom audio

For more information on Option Modules, refer to the Option Modules datasheet or contact Optelecom-NKF.

### Ethernet Ports

10/100 Fast Ethernet, Auto-sensing, Auto MDX, Full/Half Duplex, Auto Negotiate, built-in 4-port unmanaged switch, RJ45 connectors

### Physical Specifications

9421DT, 9421DR	1-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 20.3 x 218.4 mm (6.1 x 0.8 x 8.6 in.)
Weight (approx.)	272g (9.59 oz.)
9425DT, 9425DR	Stand-alone Chassis (Size 5)
Dimensions (h x w x d)	40.6 x 81.3 x 127.0 mm (1.6 x 3.3 x 5.0 in.)
Weight (approx.)	453.6g (9.59 oz.)

Optical	9421DT/DR-MMH TX / RX	9421DT/DR-SM TX / RX
Fiber type	MM (62.5)	SM (09)
Output wavelength	1310 nm / 1550 nm	1310 nm / 1550 nm
Output power	-7 dBm / -7 dBm	-7 dBm / -7 dBm
Input sensitivity	-26 dBm / -30 dBm	-25 dBm / -31 dBm
System link budget	19 dB <sup>1</sup> / 21 dB <sup>1</sup>	18 dB / 24 dB
Fiber length (range) <sup>2</sup>	13 km	47 km
Connection type	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by fiber bandwidth.

## Features

- Four-channel digital video multiplexer
- Uncompressed 10-bit digital video
- No signal degradation over long distances
- Adjustment free operation
- Compact rack-mount or stand-alone



## Description

The TETRA 4000 combines video signal quality with ease of use over extremely long distances.

The multiplexer simultaneously transmits four camera signals over one fiber. Uncompressed 10-bit digitizing, oversampling, and digital filtering ensure a very high video channel transmission performance, exceeding the requirements of the EIA RS250-C medium-haul specifications.

The wide operating temperature range of the TETRA 4000 system makes this multiplexer well suited for environmentally harsh applications such as traffic monitoring, incident management, video surveillance in city centers, and airport security.

The TETRA 4000 comes in a single Euro card cassette, suitable for an MC 10 or MC 11 power supply cabinet, or as a stand-alone unit (/SA version). LED indicators provide an instant overview of the system status, including power and system faults.

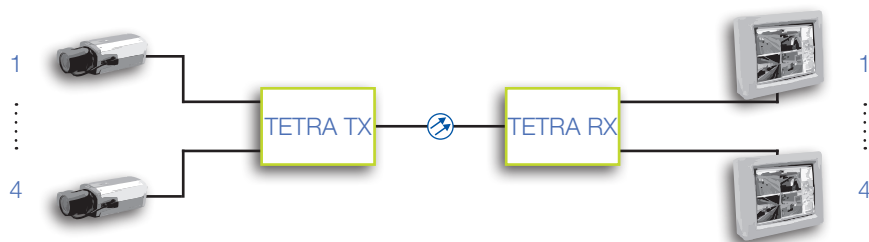
## Ordering Information

Models	Description	Fiber Type
TETRA 4010 TX	4-channel digital video multiplexer	1xMM
TETRA 4010 RX	4-channel digital video demultiplexer	1xMM
TETRA 4050 TX	4-channel digital video multiplexer	1xSM
TETRA 4050 RX	4-channel digital video demultiplexer	1xSM
TETRA40XX/SA	Standalone versions of rack-mount models.	

# TETRA 4000

## Technical specifications

## 4-channel digital video



### Video

Number of channels	4
Video format	NTSC, PAL
Input/output level	1 Vpp ( $\pm 3$ dB)
Bandwidth (-3 dB)	6 MHz
Sampling resolution	10-bit
Sampling rate	56 MHz
Differential gain	<2%
Differential phase	<1°
Group delay	<20 ns
SNR	>63 dB (weighted)
Connector type	

### Power Requirements

Power consumption	<2.6W
Rack-mount units	MC 10 and MC 11 power supply cabinets
Standalone units (/SA)	12 to 15 VDC (PSA-12 DC/25 or PSR-12 DC)

### Management

LED status indicators	
DC	Power-on indicator (green)
NV	No video on input or output (red)
SYNC	Operational link (green), local synchronization error (red)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation.
MTBF	>200,000h
Safety and EMC	IEC/EN 60950-1, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, EN 55022, FCC part 15

### Physical Specifications

Dimensions (h x w x d)	128 x 35 x 190 mm (5.04 x 1.38 x 7.48 in.)
Weight (approx.)	490g (16.56 oz.)
Housing	Rack-mount or stand-alone

Optical	TETRA 4010 TX/RX	TETRA 4050 TX/RX
Fiber type	1x MM (62.5)	1x SM (0.9)
System link budget	20 dB @ 1310 nm	26 dB @ 1310 nm
Link length	4 km <sup>1</sup>	65 km
Min. Link Loss	0 dBm	0 dBm
Output power	-4 dBm <sup>2</sup>	-4 dBm
Input sensitivity	-24 dBm	-30 dBm
Output wavelength	1310 nm	1310 nm
Connector type	ST (others optional)	SC (others optional)

<sup>1</sup> Due to fiber bandwidth, the maximum transmission distance may be limited.

<sup>2</sup> For 50/125  $\mu$ m fiber, subtract 4 dB.

## 9341D Series

## 4-channel video with simplex data

### Features

- Four-channel video transmitters and receivers
- 9-bit uncompressed digital video
- High quality video  $\geq 63$  dBw SNR
- 1 Simplex HS port
- Rack-mount version
- Network Management System (NMS) compatible



### Description

The 9341D series modules digitize and transport four videos and one simplex High-Speed port over one optical fiber in one direction. The High-Speed port supports transmission of 1.5 Mb/s RS422 in the same direction as the video signals or connection to an optional Option Module host card for transport of four or eight additional audio, data, or contact closure signals in the same direction as the video.

Uncompressed 9-bit digitizing, oversampling, and digital filtering ensure a very high transmission performance, exceeding the requirements of the EIA RS 250C short haul specification.

The wide operating temperature range of these units makes the 9341 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9341 series comes as a rack mount version only, suitable for a 9002 or 9008 power supply cabinet. The 9341 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9341 rack-mount card, use the 9003-2 mini chassis.

### Ordering Information

Models	Description	Fiber Type
9341DT-LDL-ST	4-channel digital video transmitter	1x MM
9341DR-LM-ST	4-channel digital video receiver	1x MM
9341DT-LD-ST	4-channel digital video transmitter	1x SM
9341DR-L-ST	4-channel digital video receiver	1x SM

# 9341D Series

## Technical specifications

## 4-channel video with simplex data



### Video (x4)

Video format	NTSC, PAL
Video input	1 Vpp into 75Ω
Connector	BNC
Bandwidth	5 Hz to 6.5 MHz (-3 dB)
Differential gain	1.0%
Differential phase	0.7°
SNR	≥63 dBw
Video encoding	Uncompressed 9-bit linear PCM
Video sampling rate	15 MHz

### High-speed ports

Number of ports	1x duplex
Data format	RS422 or Extension Port
Data rate	
Synchronous RS422	15 Mb/s
Asynchronous RS422	≤1.5 Mb/s
Extension port for:	
Option Module hosts	9961A-C, 9962A-C
10 Mb Ethernet	9971-C, 9972-C

For more information on HS port capabilities, contact Optelecom-NKF.

### Indicators

9341DT	Status, Video Present (x4)
9341DR	Status, TX, Video Present (x4)

### Management

Management System	9900 Network Management System (NMS)
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### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

### Power Requirements

9341DT	
Voltage	6 VDC (chassis)
Current	750 mA

### Physical Specifications

9341DT, 9341DR	1-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 20.3 x 218.4 mm (6.1 x 0.8 x 8.6 in.)
Weight (approx.)	272g (9.59 oz.)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

Optical	9341DT-LDL/ 9341DR-LM TX / RX	9341DT-LD/9341DR-L TX / RX
Fiber type	MM (62.5)	SM (09)
Output wavelength	1310 nm	1310 nm
Output power	-7 dBm	-7 dBm <sup>1</sup>
Input sensitivity	-28 dBm	<-29 dBm
System link budget	21 dB <sup>1</sup>	22 dB
Fiber length (range) <sup>2</sup>	5 km	54 km
Connection type	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by modal and chromatic dispersion, fiber quality, and fiber bandwidth.

# TETRA 4200

## 4-channel digital video, data

### Features

- Four-channel digital video multiplexer with 2-way data
- Uncompressed 10-bit digital video
- 1x full duplex data channel
- No signal degradation over long distances
- Adjustment free operation
- Compact rack-mount or stand-alone



### Description

The TETRA 4200, provides a compact and versatile combination of video and data and can be deployed effectively in almost any CCTV application.

The multiplexer simultaneously transmits four camera signals and one bidirectional data signal over one fiber. Uncompressed 10-bit digitizing, oversampling, and digital filtering ensure a very high video channel transmission performance, exceeding the requirements of the EIA RS250-C medium-haul specifications.

The configurable data interfaces are suitable for RS232/422/485, providing compatibility with all CCTV equipment.

The wide operating temperature range of the TETRA 4200 system makes this multiplexer well suited for environmentally harsh applications such as traffic monitoring, incident management, video surveillance in city centers, and airport security.

The TETRA 4200 comes in a single Eurocard cassette, suitable for an MC 10 or MC 11 power supply cabinet, or as a stand-alone unit (/SA version). LED indicators provide an instant overview of the system status, including power and system faults.

### Ordering Information

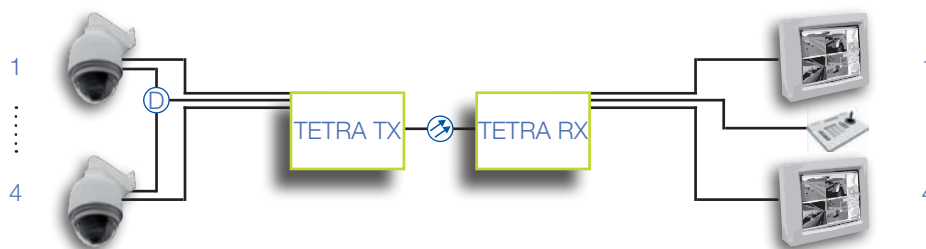
Model	Description	Fiber Type
TETRA 4210 TX	4-channel digital video multiplexer with 2-way data	1xMM
TETRA 4210 RX	4-channel digital video demultiplexer with 2-way data	1xMM
TETRA 4250 TX	4-channel digital video multiplexer with 2-way data	1xSM
TETRA 4250 RX	4-channel digital video demultiplexer with 2-way data	1xSM
TETRA 42XX/SA	Standalone versions of rack-mount models.	



# TETRA 4200

## Technical specifications

## 4-channel digital video, data



### Video

Number of channels	4
Video format	NTSC, PAL
Input/output level	1 Vpp ( $\pm 3$ dB)
Bandwidth (-3 dB)	6 MHz
Sampling resolution	10-bit
Sampling rate	56 MHz
Differential gain	<2%
Differential phase	<1°
Group delay	<10 ns
SNR	>63 dB (weighted)
Connector type	

### Physical Specifications

Dimensions (h x w x d)	128 x 35 x 190 mm (5.04 x 1.38 x 7.48 in.)
Weight (approx.)	490g (16.56 oz.)
Housing	Rack-mount or stand-alone

### Management

LED status indicators	
DC	Power-on indicator (green)
NV	No video on input or output (red)
SYNC	Operational link (green), local synchronization error (red)

### Data

Numbers of channels	1 (full-duplex)
Data interface	1xRS232, RS422 or RS485 (4- or 2-wire)
Data format	Asynchronous, serial
Data rate	DC to 256 kbit/s
Sampling rate	3 Msamples/s
Connector type	5-pin screw terminal

### Power Requirements

Power consumption	<2.6W
Rack-mount units	MC 10 and MC 11 power supply cabinets
Standalone units (/SA)	12 to 15 VDC (PSA-12 DC/25 or PSR-12 DC)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation
MTBF	>100,000h
Safety and EMC	IEC/EN 60950, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, IEC/EN 55022, FCC part 15

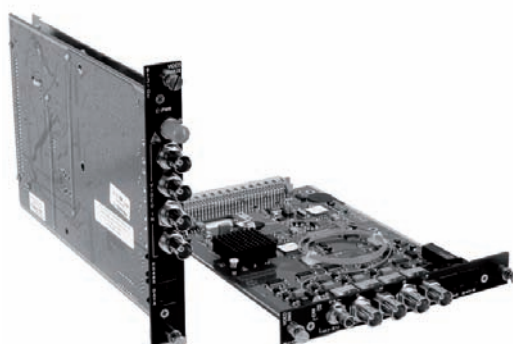
Optical	TETRA 4210 TX/RX	TETRA 4250 TX/RX
Fiber type	1x MM (62.5)	1x SM (0.9)
System link budget	18 dB @ 1310 nm	23 dB @ 1310 nm
Link length	4 km <sup>1,2</sup>	57 km
Min. Link Loss	0 dB	0 dB
Output power	-4 dBm / -7 dBm	-4 dBm / -7 dBm
Input sensitivity	-33 dBm / -22 dBm	-34 dBm -27 dBm
Output wavelength	1310 nm / 1550 nm	1310 nm / 1550 nm
Connector type	SC (others optional)	SC (others optional)

<sup>1</sup> Due to fiber bandwidth, the maximum transmission distance may be limited to 4km.

<sup>2</sup> For 50/125  $\mu$ m fiber, subtract 4 dB.

## Features

- Four-channel video transmitters and receivers
- 10-bit uncompressed digital video
- Very high quality video  $\geq 67$  dBw SNR
- 3 simplex user-configurable data channels
- Rack-mount version
- Network Management System (NMS) compatible



## Description

The 9131D models digitize and transport four video signals and three data channels over one optical fiber in one direction. The use of 10-bit video sampling provides extremely high video quality. The RS232, user-configurable RS422/RS485 Manchester 2-wire, and RS485 2-wire ports add additional capability to this basic four-channel transport card.

The wide operating temperature range of these units makes the 9131 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9131 series comes as a rack mount version only, suitable for a 9002, or 9008 power supply cabinet. The 9131 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9131 rack-mount card, use the 9003-2 mini chassis.

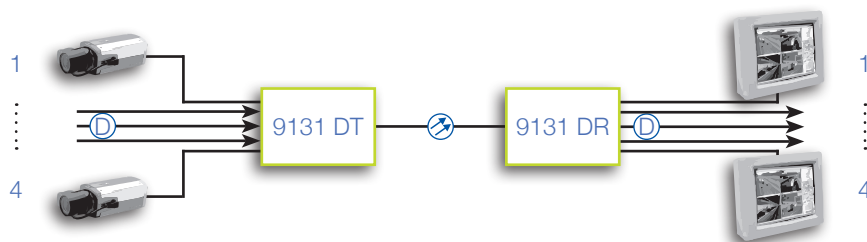
## Ordering Information

Models	Description	Fiber Type
9131DT-LDL-ST	4-channel digital video transmitter	1x MM
9131DR-LM-ST	4-channel digital video receiver	1x MM
9131DT-LD-ST	4-channel digital video transmitter	1x SM
9131DR-L-ST	4-channel digital video receiver	1x SM

# 9131D Series

## Technical specifications

# 4-channel video with 3 simplex data channels



### Video (x4)

Video format	NTSC, PAL
Video input	1Vpp into 75Ω
Connector	BNC
Bandwidth	5 Hz to 6.5 MHz (-3 dB)
Differential gain	≤0.7%
Differential phase	≤0.7°
SNR	≥67 dBw
Video encoding	Uncompressed 10-bit linear PCM
Video sampling rate	15 MHz

### Power Requirements

9131DT	
Voltage	6.0 VDC (chassis)
Current	1.2A
9131DR	
Voltage	6.0 VDC (chassis)
Current	1.2A

### Indicators

9131DT	Power
9131DR	Sync, Error, Not CD

### Management System

	9900 Network Management System (NMS)
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### Physical Specifications

9131DT, 9131DR	1-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 20.3 x 218.4 mm (6.1 x 0.8 x 8.6 in.)
Weight (approx.)	272 g (0.6 lbs.)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

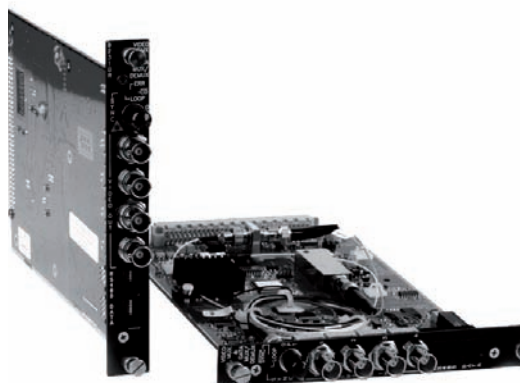
Optical	9131DT-LDL/ 9131DR-LM	9131DT-LD/ 9131DR-L
Fiber type	MM (62.5)	SM (09)
Output wavelength	1310 nm	1310 nm
Output power	-4 dBm <sup>2</sup>	-4 dBm
Input sensitivity	-29 dBm	-29 dBm
System link budget	25 dB	25 dB
Fiber length (range) <sup>2</sup>	8 km	62 km
Connector type	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by fiber bandwidth

## Features

- Four-channel video and data transmitters and receivers
- 10-bit uncompressed digital video
- Very high quality video  $\geq 67$  dBw SNR
- 3 duplex user-configurable data channels
- Rack-mount version
- Network Management System (NMS) compatible



## Description

The 9231D models digitize and transport four video signals and three duplex data channels over one optical fiber. The use of 10-bit video sampling provides extremely high video quality. The RS232, user-configurable RS422/RS485 Manchester 2-wire, and RS485 2-wire ports add capability to this basic four-channel transport card.

The wide operating temperature range of these units makes the 9231 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9231 series comes as a rack mount version only, suitable for a 9002 or 9008 power supply cabinet. The 9231 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9231 rack-mount card, use the 9003-2 mini chassis.

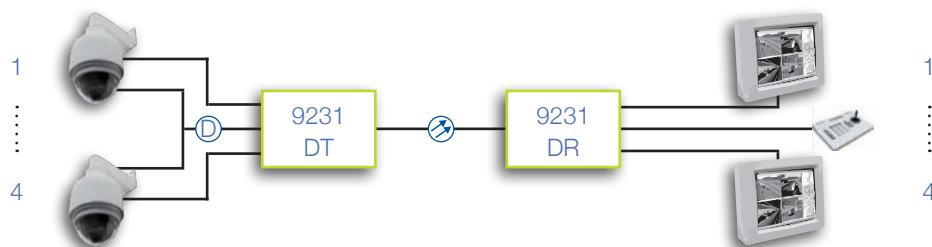
## Ordering Information

Models	Description	Fiber Type
9231DT/MMH-ST-1315	4-channel digital video transmitter	1x MM
9231DR/MMH-ST-1513	4-channel digital video receiver	1x MM
9231DT/SM-ST-1315	4-channel digital video and data transmitter	1x SM
9231DR/SM-ST-1513	4-channel digital video and data receiver	1x SM

# 9231D Series

## Technical specifications

## 4-channel video with 3 duplex data channels



### Video (x4)

Video format	NTSC, PAL
Video input	1Vpp into 75Ω
Connector	BNC
Bandwidth	5 Hz to 6.5 MHz (-3 dB)
Differential gain	1.0%
Differential phase	0.7°
SNR	≥63 dBw
Video encoding	Uncompressed 9-bit linear PCM
Video sampling rate	16 MHz

### Indicators

9231DT	Sync, Loop Not Sync
9231DR	Sync, Loop, Error, Not CD

### Management

Management System	9900 Network Management System (NMS)
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### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

### Power Requirements

9231DT, 9231DR	
Voltage	6 VDC (chassis)
Current	1.2A

### Physical Specifications

9231DT, 9231DR	1-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 20.3 x 218.4 mm (6.1 x 0.8 x 8.6 in.)
Weight (approx.)	272 g (0.6 lbs.)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

### Optical

Data Channels	
Channel 1	Duplex RS485 2-wire 128 kb/s Auto Baud, RJ12 connector
Channel 2	User-configurable duplex RS422 or RS485 2- /4-wire or Manchester (Bi-Phase), 128 kb/s Auto Baud (Manchester 32 kb/s), RJ45 connector shared with data Ch. 3
Channel 3	Duplex RS232 3-wire, 115.2 Kbps Auto Baud, RJ45 connector shared with data Ch. 2

Optical	9231DT/DR-MMH TX/RX	9231DT/DR-SM TX/RX
Fiber type	MM (62.5)	SM (09)
Output wavelength	1310 nm / 1550 nm	1310 nm/ 1550 nm
Output power	-7 dBm <sup>1</sup> / -7 dBm <sup>1</sup>	-5 dBm/-7 dBm
Input sensitivity	-23 dBm/ -30 dBm	-28 dBm/ -30 dBm
System link budget	16 dB/ 23 dB	23 dB/ 23 dB
Fiber length (range) <sup>2</sup>	7 km	57 km
Connection type	ST (others optional)	ST (others optional)

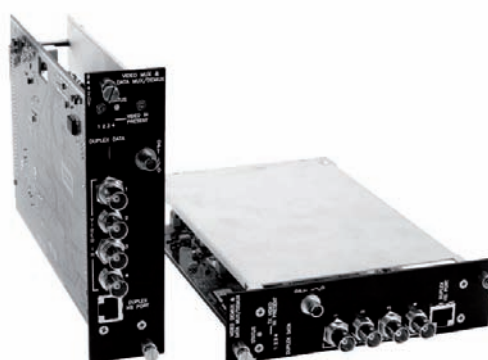
<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by fiber bandwidth.

# 9442D Series 4-channel video with 3 duplex data/HS port channels

## Features

- Four-channel video transmitters and receivers
- 9-bit uncompressed digital video
- High quality video  $\geq 63$  dBw SNR
- 2 duplex user -configurable data channels
- 1 Duplex High-Speed (HS) port
- User-configurable
- Rack-mount version
- Network Management System (NMS) compatible



## Description

The 9442D models digitize and transport four video signals, two duplex data channels, and a duplex High-Speed port over one optical fiber. One of two built-in duplex data ports is set for RS232 operation and the other is user-configurable as RS232, RS485 or RS485 2-/4-wire, or Manchester encoding. The duplex High-Speed port makes it possible to add a custom configuration of audio, data, contact closures, intercom, or even a Fast Ethernet-compatible 10 Mb Ethernet channel to the same fiber as the video and built-in data.

Uncompressed 9-bit digitizing, oversampling, and digital filtering ensure a very high transmission performance, exceeding the requirements of the EIA RS 250C short haul specification.

The wide operating temperature range of these units makes the 9442 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9442 series comes as a rack mount version only, suitable for a 9002 or 9008 power supply cabinet. The 9442 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9442 rack-mount card, use the 9003-2 mini chassis.

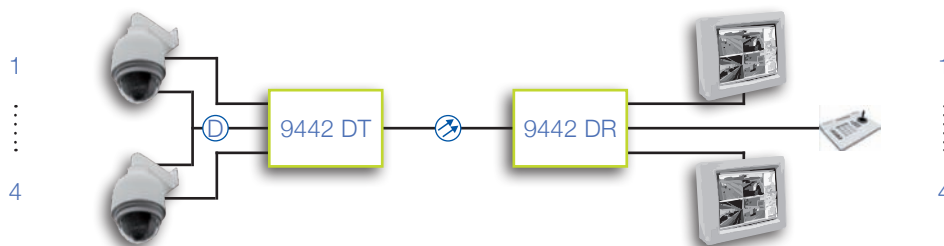
## Ordering Information

Models	Description	Fiber Type
9442DT/MMH-ST	4-channel video with 3 duplex data	1x MM
9442DR/MMH-ST	4-channel video with 3 duplex data	1x MM
9442DT/SM-ST	4-channel video with 3 duplex data	1x SM
9442DR/SM-ST	4-channel video with 3 duplex data	1x SM
9442DT/SMH-ST	4-channel video with 3 duplex data	1x SM
9442DR/SMH-ST	4-channel video with 3 duplex data	1x SM

# 9442D Series

## Technical specifications

# 4-channel video with 3 duplex data/HS port channels



### Video (x4)

Video format	NTSC, PAL
Video input	1 Vpp into 75Ω
Connector	BNC
Bandwidth	5 Hz to 6.5 MHz (-3 dB)
Differential gain	1.0%
Differential phase	0.7°
SNR	≥63 dBw
Video encoding	Uncompressed 9-bit linear PCM
Video sampling rate	15 MHz

### High-Speed Port

Number of ports	1x duplex
Data format	RS422 or Extension Port
Data Rate	
Synchronous	15 Mb/s
Asynchronous RS	≤1.5 Mb/s
Extension port for:	
Option Module hosts	9961A-C, 9962A-C
10 Mb Ethernet	9971-C, 9972-C

For more information on HS port capabilities, contact Optelecom-NKF.

### Indicators

9442DT	Status, Video Present (x4)
9442DR	Status, TX, Video Present (x4)

### Management

Management System	9900 Network Management System (NMS)
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### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

### Power Requirements

9442DT	
Voltage	6 VDC (chassis)
Current	800 mA
9442DR	
Voltage	6 VDC (chassis)
Current	700 mA

### Physical Specifications

9442DT, 9442DR	2-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 40.6 x 218.4 mm (6.1 x 1.6 x 8.6 in.)
Weight (approx.)	362.9g (12.80 oz.)

Optical	9442DT/DR-MM TX / RX	9442DT/DR-SM TX / RX	9442DT/DR-SMH TX / RX
Fiber type	MM (62.5)	SM (09)	SM (09)
Output wavelength	1310 nm / 1550 nm	1310 nm/ 1550 nm	1550 nm / 1310 nm
Output power	-7 dBm/ -7 dBm	-7 dBm/ -7 dBm	-3 dBm/-3 dBm
Input sensitivity	-23 dBm / -30 dBm	<-28 dBm / <-32 dBm	<-27 dBm / <-32 dBm
System link budget	16 dB <sup>1</sup> / 23 dB <sup>1</sup>	21dB / 25 dB	24 dB / 25 dB
Fiber length (range) <sup>2</sup>	7 km	51 km	62 km
Connection type	ST (others optional)	ST (others optional)	ST (others optional)

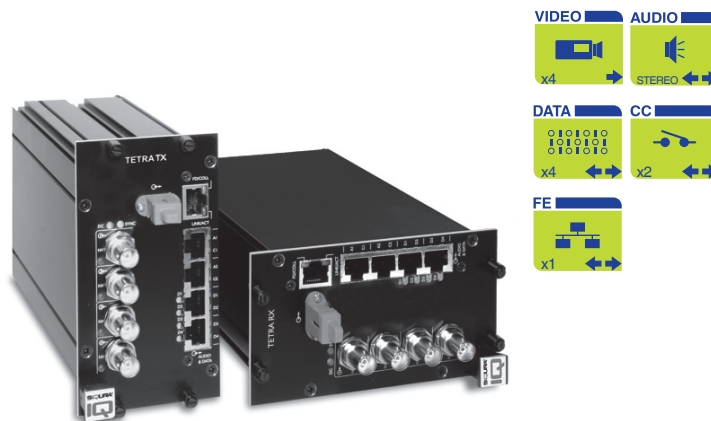
<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by modal and chromatic dispersion, fiber quality, and fiber bandwidth.

# TETRA 4300 4-channel digital video, audio, data, CC, & Fast Ethernet

## Features

- Four-channel digital video multiplexer with 2-way audio, data, contacts and Fast Ethernet
- Uncompressed 10-bit digital video
- 1x 10/100Base-TX Fast Ethernet (IEEE 802.3)
- 4 full-duplex data channels
- 2 CD-quality, full-duplex audio channels
- 2 full-duplex contact closures
- No signal degradation over long distances
- Adjustment-free operation
- Compact rack-mount or standalone



## Description

The TETRA 4300, providing a compact and versatile combination of video, audio, data, contacts, and Ethernet, can be deployed effectively in almost any CCTV application.

The multiplexer simultaneously transmits four camera signals with two audio, four data, and two telemetry signals, and one 10/100Base-TX Fast Ethernet interface over one single-mode or multimode optical fiber. Uncompressed 10-bit digitizing, oversampling, and digital filtering ensure a very high video channel transmission performance, exceeding the requirements of the EIA RS250-C medium-haul specifications.

The configurable data interfaces are suitable for RS232/422/485, TTY, Manchester, and Bi-phase providing compatibility with all CCTV equipment.

In addition to data and audio, the TETRA offers a 10/100 Mb/s Fast Ethernet interface with auto-negotiation, auto-sensing, and auto-MDI/MDI-X for a fast, reliable connection.

The wide operating temperature range of these units make the TETRA 4300 system extremely well suited for environmentally harsh applications such as traffic monitoring, incident management, video surveillance in city centers, and airport security.

The TETRA 4300 comes as a twin Eurocard cassette, suitable for an MC 10 or MC 11 power supply cabinet, or as a stand-alone unit (/SA version). LED indicators provide an instant overview of the system's status, including power, communication activity and system faults.

## Ordering Information

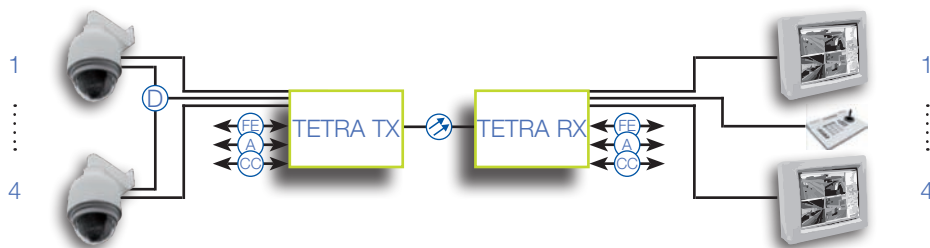
Model	Description	Fiber Type
TETRA 4310 TX	4-ch digital video mux, 2-way audio, data, CC, & FE	1xMM
TETRA 4310 RX	4-ch digital video demux 2-way audio, data, CC, & FE	1xMM
TETRA 4350 TX	4-ch digital video mux, 2-way audio, data, CC, & FE	1xSM
TETRA 4350 RX	4-ch digital video demux, 2-way audio, data, CC, & FE	1xSM
TETRA 4350 RX/ED	4-ch digital video demux, 2-way audio, data, CC, & FE, extended distance	1xSM
TETRA 43XX /SA	Stand-alone versions of rack-mount models	



# TETRA 4300

## Technical specifications

# 4-channel digital video, audio, data, CC, and Fast Ethernet



### Video

Number of channels	4
Video format	NTSC, PAL
Input/output level	1 Vpp ( $\pm 3$ dB)
DC restore (clamping)	On or off (selectable)
Bandwidth ( $-3$ dB)	6 MHz
Sampling resolution	10-bit
Sampling rate	27 Msamples/s, 2x over-sampled
Differential gain	$<2\%$
Differential phase	$<1^\circ$
Group delay	$<33$ ns
SNR	$>63$ dB (weighted)
Connector type	BNC $75\Omega$ (gold-plated center pin)

### Data

Number of channels	4 (full-duplex)
Data interface	2x RS232, 2x RS422/485 (2- or 4-wire)
Interface support	Current loop/TTY/TTL/ Manchester/ Bi-Phase
Data format	Asynchronous, serial
Data rate	DC to 1.5 Mb/s
Sampling rate	15 Msamples/s
Connector type	RJ45

### Management

LED status indicators	Power-on indicator (green)
DC	No video on input or output (red)
NV	Full-duplex link (green), local (red)
SYNC	or remote synchronization error (yellow)
D1, D3	RS-4xx data activity on input (red/green = 1/0)
D2, D4	RS-232 data activity on input (green/off = 1/0)

### Audio

Number of channels	2 (full-duplex)
Bandwidth	20 Hz to 20 kHz
Sampling rate	16-bit
In-/output level	0 dBV (+6 dBV max.)
Total harmonic distortion	$<0.25\%$ at nominal level
SNR	$>75$ dBA
Input impedance	47 k $\Omega$ or 600W bal.
Output impedance	47W bal.
Connector type	RJ45

### Contact Closure

Number of channels	2 (full-duplex)
Input activation	0.5 mA
Output	Fail-safe, potential-free
Switch rating	2A at 30 VDC
Connector type	RJ45

### Environmental

Operating temperature	$-40^\circ\text{C}$ to $+74^\circ\text{C}$ ( $-40^\circ\text{F}$ to $+165.2^\circ\text{F}$ )
Storage temperature	$-55^\circ\text{C}$ to $+85^\circ\text{C}$ ( $-67^\circ\text{F}$ to $+185^\circ\text{F}$ )
Relative humidity	$<95\%$ as long as there is no condensation
MTBF	$>100,000$ h
Safety and EMC	IEC/EN 60950, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, IEC/EN 55022, FCC part 15

### Power Requirements

Power consumption	$<12$ W (2A inrush)
Rack-mount units	MC 10 and MC 11 cabinets
Standalone units (/SA)	11 to 16 VDC (PSA-12 DC/25 or PSR-12 DC)

### Physical Specifications

Dimensions (h x w x d)	128 x 35 x 190 mm (5.04 x 1.38 x 7.48 in.)
Weight (approx.)	490g (16.56 oz.)
Housing	Rack-mount or stand-alone

Optical	TETRA 4310 TX/RX	TETRA 4350 TX/RX	TETRA 4350 TX/RX ED
Fiber type	1x MM (62.5)	1x SM (0.9)	1x SM (0.9)
System link budget	$>18$ dB @ 1310 nm	$>18$ dB @ 1310 nm	20 dB @ 1310 nm
Link length	2 km <sup>1</sup>	25 km <sup>1</sup>	45 km <sup>1</sup>
Min. Link Loss	0 dB	0 dB	0 dB
Output power	-4 dBm <sup>2</sup> / -8 dBm	-4 dBm / -8 dBm	-4 dBm / -8 dBm
Input sensitivity	-28 dBm / -20 dBm	-32 dBm / -24 dBm	-32 dBm / -24 dBm
Output wavelength	1310 nm / 1550 nm	1310 nm / 1550 nm	1310 nm / 1550 nm
Connector type	SC	SC (others optional)	SC (others optional)

<sup>1</sup> Due to fiber bandwidth, the maximum transmission distance may be limited.

<sup>2</sup> For 50/125  $\mu\text{m}$  fiber, subtract 4 dB.

## Features

- Four-channel video transmitters and receivers
- 10-bit uncompressed digital video
- Very high quality video  $\geq 67$  dBw SNR
- 3 duplex user-configurable data channels
- 4 Option Modules
- Rack-mount version
- Network Management System (NMS) compatible



## Description

The 9432D models digitize and transport four video signals, three duplex data channels, and four duplex Option Module channels over one optical fiber. The use of 10-bit video sampling provides extremely high video quality. The three duplex data ports and four duplex Option Module channels make this versatile card capable of meeting four channel video applications requiring additional duplex audio/data, contact closures, and intercom links.

The wide operating temperature range of these units makes the 9432 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9432 series comes as a rack mount version only, suitable for a 9002 or 9008 power supply cabinet. The 9432 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9432 rack-mount card, use the 9003-2 mini chassis.

## Ordering Information

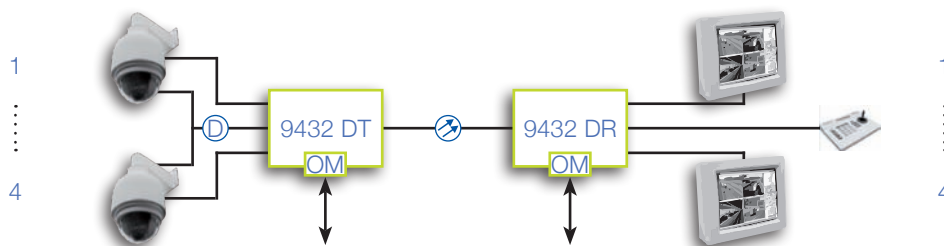
Models*	Description	Fiber Type
9432DT(XXXX)/MMH-ST	4-ch digital video with data/option channels	1x MM
9432DR(XXXX)/MMH-ST	4-ch digital video with data/option channels	1x MM
9432DT(XXXX)/SM-ST	4-ch digital video with data/option channels	1x SM
9432DR(XXXX)/SM-ST	4-ch digital video with data/option channels	1x SM
9432DT(XXXX)/SMH-ST	4-ch digital video with data/option channels	1x SM
9432DR(XXXX)/SMH-ST	4-ch digital video with data/option channels	1x SM

\* Replace the XXXX with the identification letters for the four option modules when ordering.

# 9432D Series

## Technical specifications

## 4-channel video with 3 duplex data channels



### Video (x4)

Video format	NTSC, PAL
Video input	1Vpp into 75Ω
Connector	BNC
Bandwidth	5 Hz to 6.5 MHz (-3 dB)
Differential gain	≤0.7%
Differential phase	≤0.7°
SNR	≥67 dBw
Video encoding	Uncompressed 10-bit linear PCM
Video sampling rate	15 MHz

### Indicators

9432DT	Sync, Loop, Not Sync
9432DR	Sync, Loop, Error, Not CD

### Management

Management System	9900 Network Management System (NMS)
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### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

### Power Requirements

9432DT	
Voltage	6 VDC (chassis)
Current	1.2A
9432DR	
Voltage	6 VDC (chassis)
Current	1.2A

### Physical Specifications

9442DT, 9442DR	2-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 40.6 x 218.4 mm (6.1 x 1.6 x 8.6 in.)
Weight (approx.)	362.9 g (0.8 lbs.)

### Optical

Data Channels	
Channel 1	Duplex RS485 2-wire 128 kb/s Auto Baud, RJ12 connector
Channel 2	User-configurable duplex RS422 or RS485 2-/4-wire or Manchester (Bi-Phase), 128 kb/s Auto Baud (Manchester 32 kb/s), RJ45 connector shared with data Ch. 3
Channel 3	Duplex RS232 115.2 kb/s Auto Baud, RJ45 connector shared with data Ch. 2

### Option Module

Number of free channels	1x, duplex
A module	1x audio
B module	1x user-configurable data (RS232, RS422, RS485)
C module	1x contact closure
D or E module	2x audio (simplex only)
GM or GR module	2x intercom audio

Optical	9432DT/ DR-MMH TX/RX	9432DT/ DR-SM TX/RX	9432DT/ DR-SMH TX/RX
Fiber type	MM (62.5)	SM (09)	SM (09)
Output wavelength	1310 nm / 1550 nm	1310 nm/ 1550 nm	1550 nm / 1310 nm
Output power	-7 dBm/ -7 dBm	-5 dBm/ -7 dBm	-1 dBm/-2 dBm
Input sensitivity	-23 dBm/ -30 dBm	-28 dBm/ -30 dBm	-28 dBm/ -29 dBm
System link budget	16 dB <sup>1</sup> / 23 dB <sup>1</sup>	23dB / 23 dB	28 dB / 27 dB
Fiber length (range) <sup>2</sup>	7 km	57 km	68 km
Connection type	ST (others optional)	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by fiber bandwidth.

## Features

- Eight-channel digital video multiplexer
- Uncompressed 10-bit digital video
- No signal degradation over long distances
- Adjustment free operation
- Compact rack-mount or stand-alone



## Description

The OCTA 4000, provides a compact solution for the transmission of eight unidirectional independent composite video signals via one multi-mode or one single-mode optical fiber. Uncompressed 10-bit digitizing, oversampling, and digital filtering ensure a very high video channel transmission performance, exceeding the requirements of the EIA RS250-C medium-haul specifications.

The wide operating temperature range of the OCTA 4000 system makes this multiplexer well suited for environmentally harsh applications such as traffic monitoring, incident management, video surveillance in city centers, and airport security.

The OCTA 4000 comes in a twin Euro card cassette, suitable for an MC 10 or MC 11 power supply cabinet, or as a stand-alone unit (/SA version). LED indicators provide an instant overview of the system status, including power and system faults.

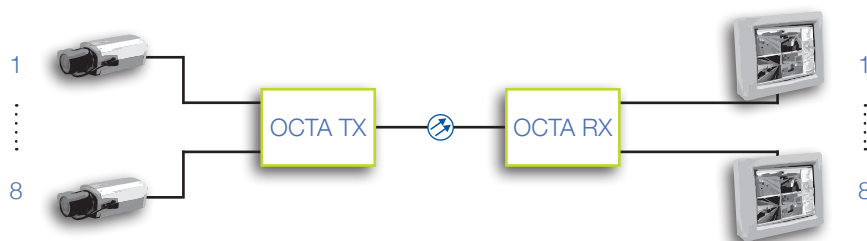
## Ordering Information

Model	Description	Fiber Type
OCTA 4010 TX	8-channel digital video multiplexer	1xMM
OCTA 4010 RX	8-channel digital video demultiplexer	1xMM
OCTA 4050 TX	8-channel digital video multiplexer	1xSM
OCTA 4050 RX	8-channel digital video demultiplexer	1xSM
OCTA 40XX/SA	Standalone version of the rack-mount models	

# OCTA 4000

## Technical specifications

## 8-channel digital video



### Video

Number of channels	8
Video format	NTSC, PAL
Input/output level	1 Vpp (±3 dB)
Bandwidth (-3 dB)	6 MHz
Sampling resolution	10-bit
Sampling rate	56 MHz
Differential gain	<2%
Differential phase	<1°
Group delay	<20 ns
SNR	>63 dB (weighted)
Connector type	BNC 75Ω (gold-plated center pin)

### Power Requirements

Power consumption	<12W (2A inrush)
Rack-mount units	MC 10 and MC 11 cabinets
Standalone units (/SA)	11 to 16 VDC (PSA-12 DC/25 or PSR-12 DC)

### Management

LED status indicators	
DC	Power-on indicator (green)
NV	No video on input or output (red)
SYNC	Full-duplex link (green), local (red) or remote synchronization error (yellow)

### Physical Specifications

Dimensions (h x w x d)	128 x 35 x 190 mm (5.04 x 1.38 x 7.48 in.)
Weight (approx.)	490g (16.56 oz.)
Housing	Rack-mount or stand-alone

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation
MTBF	>100,000h
Safety and EMC	IEC/EN 60950, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, IEC/EN 55022, FCC part 15

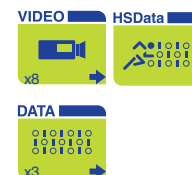
Optical	OCTA 4010 TX/RX	OCTA 4050 TX/RX
Fiber type	1x MM (62.5)	1x SM (0.9)
System link budget	>18 dB @ 1310 nm	>22 dB @ 1310 nm
Link length	2 km <sup>1</sup>	54 km
Min. Link Loss	0 dBm	0 dBm
Output power	>-4 dBm <sup>2</sup>	>-4 dBm
Input sensitivity	<-22 dBm	<-26 dBm
Output wavelength	1310 nm	1310 nm
Connector type	ST (others optional)	SC (others optional)

<sup>1</sup> Due to fiber bandwidth, the maximum transmission distance may be limited.

<sup>2</sup> For 50/125 μm fiber, subtract 4 dB.

## Features

- Eight-channel video transmitters and receivers
- 10-bit uncompressed digital video
- Very high quality video  $\geq 67$  dBw SNR
- 3 simplex user-configurable data channels
- 2 simplex High-Speed (HS) ports
- Rack-mount versions
- Network Management System (NMS) compatible



## Description

The 9152D models digitize and transport eight video signals, three simplex data channels, and two simplex High-Speed ports over one optical fiber in one direction. The use of 10-bit video sampling provides extremely high video quality. The RS232, user-configurable RS422/RS485 Manchester 2-wire, and RS485 2-wire ports along with two High-Speed ports make this card very adaptable to many applications requiring large numbers of additional data, audio, or other signals along with the video.

The wide operating temperature range of these units makes the 9152 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9152 series comes as a rack mount version only, suitable for a 9002 or 9008 power supply cabinet. The 9152 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9152 rack-mount card, use the 9003-2 mini chassis.

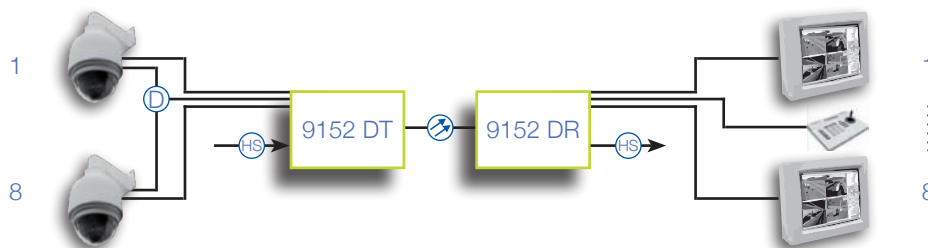
## Ordering Information

Models	Description	Fiber Type
9152DT-LDL-ST	8-channel digital video and data transmitter	1x MM
9152DR-LM-ST	8-channel digital video and data receiver	1x MM
9152DT-LD-ST	8-channel digital video and data transmitter	1x SM
9152DR-L-ST	8-channel digital video and data receiver	1x SM

# 9152D Series

## Technical specifications

## 8-channel video w/5 simplex data channels



### Video (x4)

Video format	NTSC, PAL
Video input	1Vpp into 75Ω
Connector	BNC
Bandwidth	5 Hz to 6.5 MHz (-3 dB)
Differential gain	≤0.7%
Differential phase	≤0.7°
SNR	≥67 dBw
Video encoding	Uncompressed 10-bit linear PCM
Video sampling rate	15 MHz

### Indicators

9152DT	Power
9152DR	Sync, Error, Not CD

### Management

Management System	9900 Network Management System (NMS)
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### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

### Power Requirements

9152DT	
Voltage	6 VDC (chassis)
Current	1.5A
9152DR	
Voltage	6 VDC (chassis)
Current	1.5A

### Physical Specifications

9152DT, 9152DR	2-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 40.6 x 218.4 mm (6.1 x 1.6 x 8.6 in.)
Weight (approx.)	362.9 g (0.8 lbs.)

### Optical

Data Channels	
Channel 1	Duplex RS485 2-wire 128 kb/s Auto Baud, RJ12 connector
Channel 2	User-configurable duplex RS422 or RS485 2-/4-wire or Manchester (Bi-Phase), 128 kb/s Auto Baud (Manchester 32 kb/s), RJ45 connector shared with data Ch. 3
Channel 3	Simplex RS232 115.2 kb/s Auto Baud, RJ45 connector shared with data Ch. 2

### High-Speed Ports

Number of ports	2x, simplex
Data format	RS422 or Extension Port
Data rate	
Synchronous RS422	≤15 Mb/s
Asynchronous RS422	≤1.5 Mb/s
Extension port for:	
Option Module hosts	9961A-C, 9962A-C
10 Mb Ethernet	9971-C, 9972-C

Optical	9152DT-LDL/ 9152DR-LM	9152DT-LD/ 9152DR-L
Fiber type	MM (62.5)	SM (09)
Output wavelength	1310 nm	1310 nm
Output power	-4 dBm <sup>1</sup>	-4 dBm
Input sensitivity	-23 dBm/ -30 dBm	-28 dBm/ -30 dBm
System link budget	20 dB	20dB
Fiber length (range) <sup>2</sup>	4 km	48 km
Connection type	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by fiber bandwidth.

## OCTA 4300

## 8-channel digital video, audio, data, CC, & Fast Ethernet

### Features

- Eight-channel digital video multiplexer with 2-way audio, data, contacts and Fast Ethernet
- Uncompressed 10-bit digital video
- One 10/100Base-TX Fast Ethernet (IEEE 802.3)
- 4 full-duplex data channels
- 2 CD-quality full-duplex audio channels
- 2 full-duplex contact closures
- No signal degradation over long distances
- Adjustment-free operation
- Compact rack-mount or stand-alone



### Description

The OCTA 4300 provides a compact and versatile combination of video, audio, data, and Ethernet that can be deployed effectively in almost any CCTV application. The multiplexer simultaneously transmits eight camera signals with two audio, four data, and two telemetry signals, and one 10/100Base-TX Fast Ethernet interface over one single-mode or multimode optical fiber.

Uncompressed 10-bit digitizing, oversampling, and digital filtering ensure a very high transmission performance of the video channels, exceeding the requirements of the EIA RS250-C short-haul specifications.

The highly configurable data interfaces are suitable for RS232/422/485, TTY, Manchester, and Bi-phase, and provide compatibility with all CCTV equipment.

In addition to data and audio, the OCTA offers a 10/100 Mbps Fast Ethernet interface with auto-negotiation, auto-sensing, and auto-MDI/MDI-X for a fast, easy, and reliable connection.

The wide operating temperature range of these units make the OCTA 4300 system well-suited for environmentally harsh applications such as traffic monitoring, incident management, video surveillance in city centers, and airport security.

The OCTA 4300 comes as a twin Eurocard cassette, suitable for an MC 10 or MC 11 power supply cabinet, or as a stand-alone unit (/SA version). LED indicators give an instant overview of the system's status.

### Ordering Information

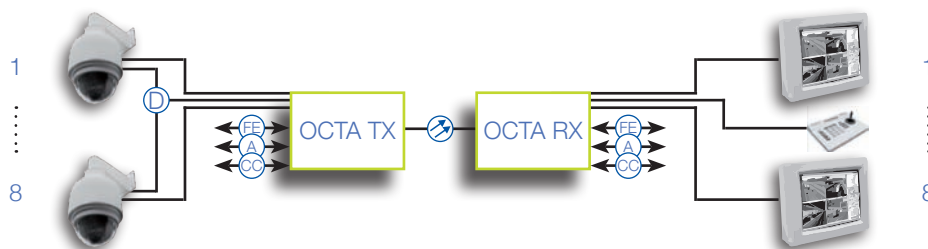
Model	Description	Fiber Type
OCTA 4310 TX	8-ch digital video mux, 2-way audio, data, CC, FE	1xMM
OCTA 4310 RX	8-ch digital video demux, 2-way audio, data, CC, FE	1xMM
OCTA 4350 TX	8-ch digital video mux, 2-way audio, data, CC, FE	1xSM
OCTA 4350 RX	8-ch digital video demux, 2-way audio, data, CC, FE	1xSM
OCTA 4350 RX/ED	8-ch digital video demux, 2-way audio, data, CC, FE, extended distance	1xSM
OCTA 43XX /SA	Stand-alone version of the rack-mount models	



# OCTA 4300

## Technical specifications

# 8-channel digital video, audio, data, CC, and Fast Ethernet



### Video

Number of channels	8
Video format	NTSC, PAL
Input/output level	1 Vpp ( $\pm 3$ dB)
DC restore (clamping)	On or off (selectable)
Bandwidth ( $-3$ dB)	6 MHz
Sampling resolution	10-bit
Sampling rate	27 Msamples/s, 2x over-sampled
Differential gain	$< 2\%$
Differential phase	$< 1^\circ$
Group delay	$< 33$ ns
SNR	$> 63$ dB (weighted)
Connector type	BNC $75\Omega$ (gold-plated center pin)

### Data

Number of channels	4 (full-duplex)
Data interface	2x RS232, 2x RS422/485 (2- or 4-wire)
Interface support	Current loop/TTY/TTL/ Manchester/ Bi-Phase
Data format	Asynchronous, serial
Data rate	DC to 1.5 Mb/s
Sampling rate	15 Msamples/s
Connector type	RJ45

### Management

LED status indicators	
DC	Power-on indicator (green)
NV	No video on input or output (red)
SYNC	Full-duplex link (green), local (red) or remote synchronization error (yellow)
D1, D3	RS-4xx data activity on input
D2, D4	(red/green = 1/0)

### Physical Specifications

Dimensions (h x w x d)	128 x 35 x 190 mm (5 x 1.38 x 7.48 in.)
Weight (approx.)	450g (15.87 oz.)
Housing	Rack-mount or stand-alone

### Audio

Number of channels	2 (full-duplex)
Bandwidth	20 Hz to 20 kHz
Sampling rate	16-bit
In-/output level	0 dBV (+6 dBV max.)
Total harmonic distortion	$< 0.25\%$ at nominal level
SNR	$> 75$ dBA
Input impedance	47 k $\Omega$ or 600W bal.
Output impedance	47 $\Omega$ bal.
Connector type	RJ45

### Contact Closure

Number of channels	2 (full-duplex)
Input activation	0.5 mA
Output	Fail-safe, potential-free
Switch rating	2A at 30 VDC
Connector type	RJ45

### Environmental

Operating temperature	$-40^\circ\text{C}$ to $+74^\circ\text{C}$ ( $-40^\circ\text{F}$ to $+165.2^\circ\text{F}$ )
Storage temperature	$-55^\circ\text{C}$ to $+85^\circ\text{C}$ ( $-67^\circ\text{F}$ to $+185^\circ\text{F}$ )
Relative humidity	$< 95\%$ as long as there is no condensation
MTBF	$> 100,000$ h
Safety and EMC	IEC/EN 60950, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, IEC/EN 55022, FCC part 15

### Power Requirements

Power consumption	$< 12$ W (2A inrush)
Rack-mount units	MC 10 and MC 11 cabinets
Standalone units (/SA)	11 to 16 VDC (PSA-12 DC/25 or PSR-12 DC)

### Fast Ethernet

Switching method	Store and Forward
Interfaces	1x 10/100Base-TX (IEEE 802.3u)
Max distance (CAT5/5e/6)	Auto MDI/MDI-X, auto polarity
Connector	Auto-Negotiation 100m RJ45

Optical	OCTA 4310 TX/RX	OCTA 4350 TX/RX	OCTA 4350 TX/RX ED
Fiber type	1x MM (62.5)	1x SM (09)	1x SM (0.9)
System link budget	$> 16$ dB @ 1310 nm	$> 20$ dB @ 1310 nm	20 dB @ 1310 nm
Link length	2 km <sup>1</sup>	20 km <sup>2</sup>	45 km
Min. link loss	0 dB	0 dB	0 dB
Output power	-4 dBm <sup>2</sup> / -8 dBm <sup>3</sup>	-4 dBm / -8 dBm	-4 dBm / -8 dBm
Output wavelength	1310 nm / 1550 nm	1310 nm / 1550 nm	1310 nm / 1550 nm
Connection type	SC (others optional)	SC (others optional)	SC (others optional)

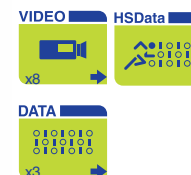
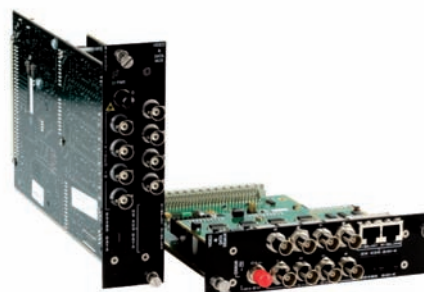
<sup>1</sup> Due to fiber bandwidth, the maximum transmission distance may be limited.

<sup>2</sup> Due to dispersion at 1550 nm.

<sup>3</sup> For 50/125  $\mu\text{m}$  fiber, subtract 4 dB.

## Features

- Eight-channel digital video and data transmitters and receivers
- 10-bit uncompressed digital video
- Very high quality video  $\geq 67$  dBw SNR
- 2 high-speed port channels
- 3 duplex data channels
- Supported by SpectraStream
- Rack-mount versions
- Network Management System (NMS) compatible



## Description

The 9252D series modules digitize and transport eight video channels, a simplex and a duplex high-speed port data channel, and three duplex data channels over one optical fiber. The high-speed port support 1.5 Mbps RS422 or connection to optional Option Module host cards for transport of four or eight duplex audio, data, contact closure, intercom, or 10 Mb Ethernet signals. With its three built-in duplex data ports, this is a complete solution for video, audio, and data transport over fiber.

The wide operating temperature range of these units makes the 9252 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9252 series comes as a rack mount version only, suitable for a 9002 or 9008 power supply cabinet. The 9252 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9252 rack-mount card, use the 9003-2 mini chassis.

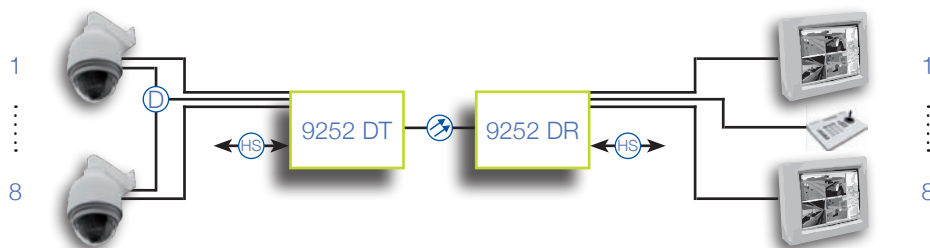
## Ordering Information

Models	Description	Fiber Type
9252DT/MMH-ST-1315	8-channel digital video and data transmitter	1x MM
9252DR/MMH-ST-1513	8-channel digital video and data receiver	1x MM
9252DT/SMH-ST-1513	8-channel digital video and data transmitter	1x SM
9252DR/SMH-ST-1315	8-channel digital video and data receiver	1x SM
9252DT/SM-ST-1315	8-channel digital video and data transmitter	1x SM
9252DR/SM-ST-1513	8-channel digital video and data receiver	1x SM

# 9252D Series

## Technical specifications

## 8-channel video with 4 duplex data channels



### Video (x8)

Video format	NTSC, PAL
Video input	1Vpp into 75Ω
Connector	BNC
Bandwidth	5 Hz to 6.5 MHz (-3 dB)
Differential gain	≤0.7%
Differential phase	≤0.7°
SNR	≥67 dBw
Video encoding	Uncompressed 10-bit linear PCM
Video sampling rate	15 MHz

### Indicators

9252DT	Sync, Not Sync, Loop
9252DR	Sync, Loop, Not CD, Error

### Management

Management System	9900 Network Management System (NMS)
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### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

### Power Requirements

9252DT	
Voltage	6 VDC (chassis)
Current	1.4A
9252DR	
Voltage	6 VDC (chassis)
Current	1.4A

### Physical Specifications

9152DT, 9152DR	2-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 40.6 x 218.4 mm (6.1 x 1.6 x 8.6 in.)
Weight (approx.)	453.6 g (1.0 lbs.)

### Optical

Data Channels	
Channel 1	Duplex RS485 2-wire 128 kb/s Auto Baud, RJ12 connector
Channel 2	User-configurable duplex RS422 or RS485 2-/4-wire or Manchester (Bi-Phase), 128 kb/s Auto Baud (Manchester 32 kb/s), RJ45 connector shared with data Ch. 3
Channel 3	Simplex RS232 115.2 kb/s Auto Baud, RJ45 connector shared with data Ch. 2

### High-Speed Ports

Number of ports	1x duplex, 1x simplex
Data format	RS422 or Extension Port
Data rate	
Synchronous RS422	≤15 Mb/s
Asynchronous RS422	≤1.5 Mb/s
Extension port for:	
Option Module hosts	9961A-C, 9962A-C
10 Mb Ethernet	9971-C, 9972-C

Optical	9252DT/ DR-MMH TX/RX	9252DT/ DR-SM TX/RX	9252DT/DR-SMH TX/RX
Fiber type	MM (62.5)	SM (09)	SM (09)
Output wavelength	1310 nm/ 1550 nm	1310 nm/ 1550 nm	1550 nm / 1310 nm
Output power	-4 dBm / -7 dBm	-5 dBm/ -7 dBm	-1 dBm/ -1 dBm
Input sensitivity	-20 dBm/ -23 dBm	-24 dBm/ -30 dBm	-24 dBm/ -30 dBm
System link budget	16 dB <sup>1</sup> / 16 dB <sup>1</sup>	9 dB/ 23 dB	23 dB/ 29 dB
Fiber length (range) <sup>2</sup>	3.5 km	45 km	74 km
Connection type	ST (others optional)	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by fiber bandwidth.

# ADS 1200

## Audio and data transceiver

### Features

- Full-duplex RS422/485, RS232, and audio over one or two fibers
- Adjustment-free operation and installation
- Compact, modular design



### Description

The ADS 1200 series offers a range of fiber optic transceivers with four data channels, two audio channels, and two contact closures, all full-duplex, providing a solution for almost every application.

The two audio channels offer broadcast quality, while the two contact closure channels have potential-free outputs. Each data channel is fully independent and offers transmission speeds from DC to 64 kb/s. Available data interfaces are RS232, RS422, 4- or 2-wire RS485, TTY, Manchester, and Biphase, providing for connection to a wide range of cameras and control interfaces.

The rack-mounted ADS transceivers are available in one or two-fiber versions for both single-mode and multimode applications. The flexibility this provides allows configurations ranging from simple point-to-point links to dedicated drop-and-insert rings.

Rack-mountable ADS transceivers are designed to be slotted into MC 10 or MC 11 power supply cabinets.

Stand-alone units (/SA version) are to be powered with a PSA-12 DC.

The bidirectional RS485/422 data interface supports PTZ data from all types of camera interfaces including RS485, TTY, Manchester, Biphase, and SensorNet. In addition, the module offers an isolated alarm contact closure output such as door contacts, anti-tamper contacts, etc.

Their wide operating temperature range makes these compact, stand-alone transmitters suitable for use in outdoor camera housings and camera connection boxes, for example. UTF receivers are also available as stand-alone units.

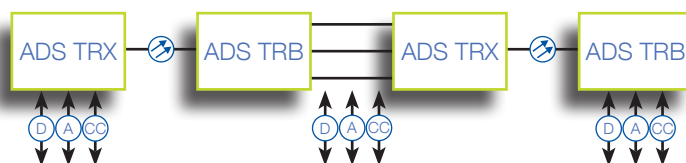
### Ordering Information

Model	Description	Fiber Type
ADS 1200 TRX	Dual fiber audio/data multiplexer	2xMM
ADS 1210 TRA	One fiber audio/data multiplexer, A-side	1xMM
ADS 1210 TRB	One fiber audio/data multiplexer, B-side	1xMM
ADS 1240 TRX	Dual fiber audio/data multiplexer	2xSM
ADS 1250 TRA	One fiber audio/data multiplexer, A-side	1xSM
ADS 1250 TRB	One fiber audio/data multiplexer, B-side	1xSM
ADS 12xx /SA	Stand-alone version of the rack-mount models	

# ADS 1200

## Technical specifications

## Audio and data transceiver



<b>Data</b>		<b>Contact Closure</b>	
Number of channels	4 (full-duplex)	Number of channels	2 (full-duplex)
Data interfaces	2x RS232, 2x RS422/485 (2- or 4-wire)	Input activation	0.5 mA
Interface support	Current loop, TTY, TTL, Manchester, and Bi-phase	Output	Fail-safe, potential-free
Data format	Asynchronous, serial	Switch rating	2A at 30 VDC
Data rate per channel	DC to 64 kbit/s	Connector type	RJ45
Sample rate per channel	512 ksamples/s		
Connector type	RJ45		
<b>Audio</b>		<b>Environmental</b>	
Number of channels	2 (full-duplex)	Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Bandwidth	40 Hz to 15 kHz	Storage temperature	-55° C to +85° C (-67° F to +185° F)
Sampling rate	16 bit	Relative humidity	<95% as long as there is no condensation
In-/output level	0 dBV (+6 dBV max.)		>100,000h
Total harmonic distortion	<1% at nominal level	MTBF	IEC/EN 60950, IEC/EN 60825,
SNR	>62 dBA	Safety and EMC	IEC/EN 61000, EN 50130-4, EN 50081-1,
Input impedance	>50 kΩ or 600Ω balanced		IEC/EN 55022, FCC part 15
Output impedance	<50Ω balanced		
Connector type	RJ45		
<b>Management</b>		<b>Physical Specifications</b>	
LED status indicators		Dimensions (h x w x d)	128 x 35 x 190 mm (5 x 1.38 x 7.48 in.)
DC	Power-on indicator (green)	Weight (approx.)	450g (15.87 oz.)
NV	No video on input or output (red)	Housing	Rack-mount or stand-alone
SYNC	Full-duplex link (green), local (red) or remote synchronization error (yellow)		
D1, D3	RS-4xx data activity on input (red/green = 1/0)		
D2, D4	RS-232 data activity on input (green/off = 1/0)		
Network Management	SNM™ compatible		
SNM™ variables	PS Voltages, module temperature, module status, optical levels, configuration, etc.		
<b>Power Requirements</b>			
Power consumption	<12W (2A inrush)		
Rack-mount units	MC 10 and MC 11 cabinets		
Standalone units (VA)	11 to 16 VDC (PSA-12 DC/25 or PSR-12 DC)		

Optical	ADS 1200 TRX	ADS 1210 TRA / TRB	ADS 1240 TRX	ADS 1250 TRA / TRB <sup>1</sup>
Fiber type	2x MM (62.5)	1x MM (62.5)	SM (09/125)	MM (62.5/125)
Output wavelength	850 nm	1850 nm / 1300 nm	1310 nm / 1550 nm	1310 nm / 1550 nm
System link budget	19 dB <sup>1</sup>	19 dB <sup>1</sup> @ 850 nm	-7 dBm / -7 dBm	-30 dBm / 30 dBm
Link length	6 km	6 km	50 km	50 km
Min. link loss	0 dB	0 dB	0 dB	0 dB
Output power	>-16 dBm <sup>1</sup>	>-16 dBm <sup>1</sup> / >-24 dBm <sup>1</sup>	>-7 dBm	>-7 dBm / >-7 dBm
Input sensitivity	-35 dBm	-35 dBm / < -35 dBm	<-32 dBm	<-32 dBm / <-32 dBm
Connector type	ST	ST	FC	FC

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB

## Features

- Eight-channel Contact Closure Module
- Fail-safe
- Adjustment-free operation and installation
- Potential-free (output)
- Rack-mount and stand-alone



## Description

### CCM1010

The CCM 1010 series transports eight telemetry contacts unidirectionally over one multimode optical fiber.

The CCM is monitored by status LEDs indicating the link condition and its internal synchronization. The contact closures are designed to be fail-safe; they will fall back to "open" in case of data failure, connection loss, or power loss.

### CCM1010 /RS232

The CCM 1010/RS232 contact closure multiplexer system can transmit eight independent contact closure signals unidirectionally over an RS232 data link.

The CCM is monitored by status LEDs indicating the link condition and its internal synchronization. The contact closures are designed to be fail-safe; they will fall back to "open" in case of data failure, connection loss or power loss.

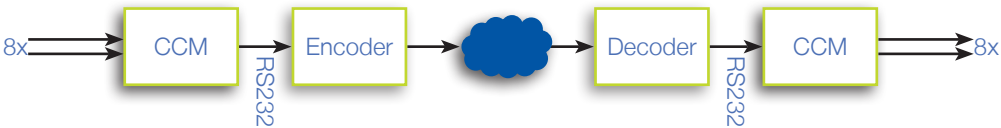
## Ordering Information

Model	Description	Fiber Type
CCM 1010 TX	8-channel contact closure transmitter	1xMM
CCM 1010 RX	8-channel contact closure transmitter	1xMM
CCM 1010 TX/RS232	8-channel contact closure transmitter	N/A
CCM 1010 RX/RS232	8-channel contact closure transmitter	N/A
CCM 1010 ...../SA	Stand-alone versions of rack-mount models	

CCM 1010(/RS232)

8-channel Contact Closure Extension Module

Technical specifications



Contact Closure

Number of channels	8 (Simplex)
Input	+5V pull-up, 10 kΩ
Threshold	4.3V (<1.5 kΩ)
Output	Fail-safe, potential free
Switch rating	2A at 30 VDC
Connector type	D37

RS232 Interface

Format	RS232
Data frequency	1 start, 1 stop, no parity
Data rate	2.4 kb/s
Connector	D37

Management

LED status indicators	
DC	Power-on indicator (green)
SYNC	RX only: link synchronized (green),link down (red)
FR	TX only: Correct transmission framing (green), internal failure (red)

Power Requirements

Power consumption	1.2W
Rack-mount units	MC 10 and MC 11 power supply cabinets
Standalone units (/SA)	11 to 6 VDC (PSA-12 DC, PSA-12 DC/25, PSR-12 DC)

Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% no condensation
MTBF	>100.000h
Safety & EMC	IEC/EN 60950, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, IEC/EN 55022, FCC part 15

Physical Specifications

Dimensions (h x w x d)	128 x 35 x 190 mm (5 x 1.38 x 7.48 in.)
Weight (approx.)	450g (15.87 oz.)
Housing	Rack-mount or stand-alone

Optical	CCM 1010 TX/RX
Fiber type	1x MM
System link budget	28 dB
Link length	9 km
Min. Link Loss	0 dBm
Output power	>-17 dBm <sup>2</sup>
Input sensitivity	<-45 dBm
Output wavelength	850 nm
Connector type	ST

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

## Features

- Miniature data fiber modems
- RS232, RS422, and RS485 versions available
- Optically interchangeable for converting one data type to another
- Optically compatible with most Optelecom-NKF Drop and Insert Data Modems



## Description

These miniature data modems transport an RS232, RS422, or RS485 data signal on a pair of fibers. Available in multimode and single-mode versions, they are packaged in a D-Sub connector-size package. These units can be mixed and matched to provide both optical data transmission and data type conversion with one link. All units operate on two fibers.

## Ordering Information

Models	Description	Fiber Type
4132B-S-ST	RS232 miniature data fiber modem	2x MM
4132B-LD-ST	RS232 miniature data fiber modem	2x SM
4185A-S-ST	RS422/485 miniature data fiber modem	2x MM
4185A-LD-ST	RS422/485 miniature data fiber modem	2x SM



# 4132B, 4185A

## Technical specifications

## Miniature data modems



### Data

Data Type RS232	TD and RD (3-wire), DC to 115.2 kb/s, Auto Baud, Pulse distortion $\pm 1.3$ us max. (16% @ 128 kb/s)
Data Type RS422	2-/4-wire, DC to 128 kb/s Auto Baud, Pulse distortion $\pm 1.3$ us max. (16% @ 128 kb/s) Input Impedance 120 $\Omega$ or 1.3 k $\Omega$ switchable
Data Type RS485	2-/4-wire, DC to 128 kb/s Auto Baud, Pulse distortion $\pm 1.3$ us max. (16% @ 128 kb/s) Input Impedance 120 $\Omega$ or 1.3 k $\Omega$ switchable

### Power Requirements

4132B	
Voltage	+5.5 to +15 VDC
Current	65 mA @ 12 VDC
4185A	
Voltage	+8.0 to +15 VDC
Current	35 mA @ 12 VDC

Recommended supplies 9014PS, 9011PS, PSR-12 DC

### Physical Specifications

4132B	
Dimensions (h x w x d)	15.2 x 53.3 x 66.0 mm (0.6 x 2.1 x 2.6 in.)
Weight (approx.)	90.7g (3.19 oz.)
4185A	
Dimensions (h x w x d)	17.8 x 53.3 x 80.0 mm (0.7 x 2.1 x 3.15 in.)
Weight (approx.)	90.7g (3.19 oz.)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

Optical	4132B-S	4132B-LD	4185A-S	4185A-LD
Fiber type	MM (62.5)	SM (09)	MM (62.5)	SM (09)
Output wavelength	850 nm	1310 nm	850 nm	1310 nm
Output power	-19 dBm	-18 dBm	-19 dBm	-18 dBm
Input sensitivity	-41 dBm	-41 dBm	-41 dBm	-41 dBm
System link budget	22 dB <sup>1</sup>	23 dB	22 dB <sup>1</sup>	23 dB
Fiber length (range) <sup>2</sup>	6 km	57 km	6 km	57 km
Connection type	ST	ST	ST	ST

<sup>1</sup> For 50/125  $\mu$ m fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by fiber bandwidth.

## Features

- Drop/insert data communications systems
- Fault-tolerant ring operation
- 2 user-configurable data ports
- One- and two-fiber versions
- Data retiming for unlimited repeating
- Unique data tagging feature
- Stand-alone and rack-mount versions
- Network Management System (NMS) compatible



## Description

These drop and insert data modems support special features that make them extremely adaptable for many types of systems. Two fully independent, user-configurable data ports on each modem support the operation of two devices on the same logical data link. In addition, the data tagging feature prevents masters from receiving data from other masters, local units from receiving data from other local units, and makes dual master systems possible. It also solves compatibility problems with software. These units are optically compatible with the 4132B and 4185A mini and the 9521AY and 9525AY drop and insert modems. They are available in multimode and single-mode optical versions.

Two fully independent, user-programmable data ports supporting RS232, RS422, or RS485 operation at up to 115.2 kb/s.

The wide operating temperature range of these units makes the 9522 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9522 series comes as a rack mount version only, suitable for a 9002 or 9008 power supply cabinet, or as a stand-alone unit (9526). The 9522 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9522 rack-mount card, use the 9003-2 mini chassis.

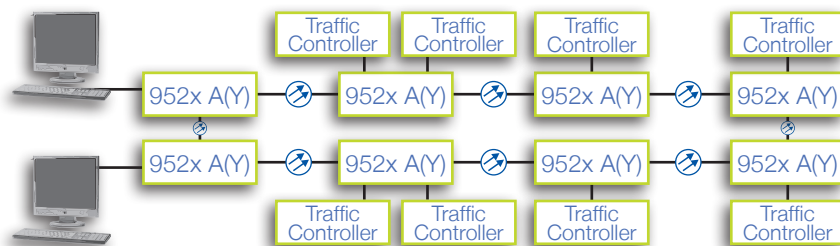
## Ordering Information

Models	Description	Fiber Type
9522A-S-ST	Drop and insert data modem	2x MM
9522A-LD-ST	Drop and insert data modem	2x SM
9522AY-SM-ST	Drop and insert data modem	1x SM
9526A	Stand-alone version of the 9522A models	

# 9522A Series

## Technical specifications

## Dual port drop and insert data modems



### Data Interfaces

#### Primary Data Port

Type User-configurable RS232, RS422 or RS485 2-/4-wire  
Data Rates 150, 300, 600, 1.2k, 2.4k, 3.6k, 4.8k, 7.2k, 9.6k, 14.4k, 19.2k, 28.8 k, 38.4k, 57.6k, 115.2k baud Auto

#### Baud

Retiming Accuracy 0.01% of pulse width  
Connector DE25S DE25S (D type female, 9-pin)  
Secondary Data Port Identical to the primary port. (buffered)

### Power Requirements

#### 9522A, 9522AY

Voltage 6 VDC (chassis)  
Current 300 mA

#### 9526A, 9526AY

Voltage 8-15 VDC  
Current 360 mA @ 12 VDC

### Recommended supplies

Recommended supplies for 9526A/AY 9014PS, 9011PS, PSR-12 DC

### Physical Specifications

#### 9526A, 9526AY

Stand-alone chassis  
Dimensions (h x w x d) 48.3 x 152.4 x 218.4 mm (1.9 x 6.0 x 8.6 in.)  
Weight (approx.) 907.2g (32.0 oz.)

#### 9522A, 9522AY

2-slot card, Series 9000 chassis  
Dimensions (h x w x d) 154.9 x 40.6 x 218.4 mm (6.1 x 1.6 x 8.6 in.)  
Weight (approx.) 680.4g (24.0 oz.)

### Environmental

Operating temperature -40° C to +74° C (-40° F to +165.2° F)  
Storage temperature -55° C to +85° C (-67° F to +185° F)  
Relative humidity <95% as long as there is no condensation

Optical	9522A-S	9522A-LD	9522AY-SM - TX / RX
Fiber type	MM (62.5)	SM (09)	SM (09)
Output wavelength	850 nm	1310 nm	850 nm / 1310 nm
Output power	-19 dBm	-18 dBm	-23 dBm / -21 dBm
Input sensitivity	-41 dBm	-41 dBm	-37 dBm / -35 dBm
System link budget	22 dB <sup>1</sup>	23 dB	20 dB / 20 dB
Fiber length (range) <sup>2</sup>	6 km	57 km	48 km
Connector type	ST (others optional)	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 µm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by modal and chromatic dispersion, fiber quality, and fiber bandwidth.



## Features

- Drop/insert data communications systems
- User-configurable data port (RS232/422/485)
- Fault-tolerant ring operation
- Separate RS232 Expansion Port
- One- and two-fiber versions
- Data retiming for unlimited repeating
- Stand-alone versions



## Description

These drop and insert data modems support special features that make them extremely adaptable for many types of systems. In addition to the user-configurable data port, there is a buffered RS232 port available for expanding to additional rings or daisy chains.

One user-programmable data port supports RS232, RS422, or RS485 operation at up to 115.2 kb/s.

These units are also optically compatible with the 9522A series drop and insert modems. They are available in multimode and single-mode optical versions.

The wide operating temperature range of these units makes the 9525 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

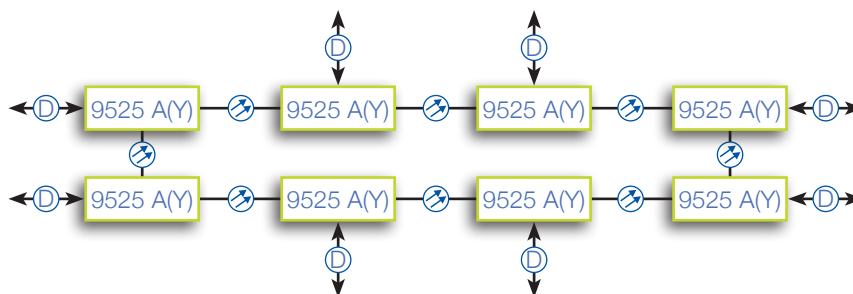
## Ordering Information

Models	Description	Fiber Type
9525A-S-ST	Drop and insert modem	2x MM
9525A-LD-ST	Drop and insert modem	2x SM
9525AY/SM-ST	Drop and insert modem	1x SM

# 9525A Series

## Technical specifications

## Drop and insert data modems



### Data Interfaces

#### Primary Data Port

Type	User-configurable RS232, RS422 or RS485 2-/4-wire
Data Rates	150, 300, 600, 1.2k, 2.4k, 3.6k, 4.8k, 7.2k, 9.6k, 14.4k, 19.2k, 28.8 k, 38.4k, 57.6k, 115.2k baud Auto

#### Baud

Retiming Accuracy	0.01% of pulse width
Connector DE25S	DE25S (D type female, 9-pin)

#### Expansion Data Port

Type	RS232
Data Rates	150, 300, 600, 1.2k, 2.4k, 3.6k, 4.8k, 7.2k, 9.6k, 14.4k, 19.2k, 28.8 k, 38.4k, 57.6k, 115.2k baud Auto

#### Baud

Retiming Accuracy	0.01% of pulse width
Connector	RJ11

### Power Requirements

#### 9525A, 9525AY

Voltage	9-15 VDC
Current	200 mA @ 12 VDC

### Recommended supplies

Recommended supplies for 9525A/AY	9014PS, 9011PS, PSR-12 DC
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### Indicators

9525A, 9525AY	Power, BERT, Fault-Pri, Fault-Sec, TX1/TD, RX1/RD, TX2/CTS, RX2/TDE, PR1/RDE, PR2/ CTSE
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### Physical Specifications

9525A, 9525AY	Stand-alone chassis
Dimensions (h x w x d)	40.6 x 81.3 x 127.0 mm (1.6 x 3.2 x 5.0 in.)
Weight (approx.)	453.6g (16.00 oz.)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

Optical	9525A-S	9525A-LD	9525AY-SM - TX / RX
Fiber type	MM (62.5)	SM (09)	SM (09)
Output wavelength	850 nm	1310 nm	1310 nm / 1550 nm
Output power	-9 dBm	-18 dBm	-18 dBm / -18 dBm
Input sensitivity	-41 dBm	-41 dBm	-38 dBm / -38 dBm
System link budget	22 dB <sup>1</sup>	23 dB	20 dB / 20 dB
Fiber length (range) <sup>2</sup>	6 km	57 km	43 km
Connector type	ST (others optional)	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 µm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by modal and chromatic dispersion, fiber quality, and fiber bandwidth.

## Features

- 8-channel RS232 optical modems
- Uses time multiplexing data transmission techniques
- Synchronous or asynchronous operation
- Sources standard DCE clock frequencies
- Stand-alone and rack-mount versions
- Network Management System (NMS) compatible



## Description

These data modems transport eight channels of RS232 data signal on one or two fibers. They are available in multimode and single-mode optical versions and rack-mount or stand-alone packages. They operate at baud rates of up to 115.2 kb/s and can be configured as eight independent channels or TX/TX and handshaking signals.

The wide operating temperature range of these units makes the 9551 series well-suited for environmentally harsh applications such as traffic monitoring, video surveillance in city centers, and federal and critical infrastructures.

The 9551 series comes as a rack mount version, suitable for a 9002 or 9008 power supply cabinet, or as a stand-alone unit (9555). The 9551 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9551 rack-mount card, use the 9003-2 mini chassis.

## Ordering Information

Models	Description	Fiber Type
9551-LD-ST	8-channel fiber data modem	2x SM
9551-S-ST	8-channel fiber data modem	2x MM
9555-ST	Stand-alone version of the 9551 models	

# 9551 Series

## Technical specifications

## 8-channel RS232 data modems



### Data Interfaces

Data Type	RS232 (x8)
Asynchronous Rate	DC to 115.2 Kbps, Auto Baud
Synchronous Data Rates	1.2k, 2.4k, 3.6k, 4.8k, 7.2k, 9.6k, 14.4k, 19.2k, 28.8k, 38.4k, 57.6k, 76.8k, 115.2 k Baud, dipswitch selected
Sampling Rate	920 kHz
Pulse Width Distortion	<2.0 % @ 19.2k, 13% @ 115.2k
Connector	DB25S (Female 25-pin)

### Power Requirements

9551	
Voltage	6 VDC (chassis)
Current	500 mA
9555	
Voltage	8 to 14 VDC
Current	360 mA @ 12 VDC

### Recommended supplies

Recommended supplies for 9555	9014PS, 9011PS, PSR-12 DC
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### Indicators

9551	Sync, Not Sync, Loop, Loopback
9555	Power, Sync, Loop, Received Data (x8)

### Managment

Manament System	9900 Network Management System (NMS)
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### Physical Specifications

9551	Stand-alone chassis
Dimensions (h x w x d)	40.6 x 81.3 x 127.0 mm (1.6 x 3.2 x 5.0 in.)
Weight (approx.)	453.6g (16.00 oz.)
9555	Stand-alone chassis (Size 5)
Dimensions (h x w x d)	40.6 x 81.3 x 127.0 mm (1.6 x 3.3 x 5.0 in.)
Weight (approx.)	317.5g (11.19 oz.)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

Optical	9551-S	9551-LD
Fiber type	MM (62.5)	SM (09)
Output wavelength	850 nm	1310 nm
Output power	-16 dBm	-10 dBm
Input sensitivity	-35 dBm	-35 dBm
System link budget	19 dB <sup>1</sup>	25 dB
Fiber length (range) <sup>2</sup>	5 km	62 km
Connector Type	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 µm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by modal and chromatic dispersion, fiber quality, and fiber bandwidth.

## Features

- Optical POTS telephone line extension
- Compatible with many telephone-type intercom systems
- Phone-to-phone intercom system or line-to-phone extension
- Available in stand-alone and rack-mount versions
- Network Management System (NMS) compatible



## Description

The 9571Y series modems transport a standard Plain Old Telephone Signal ("POTS") over one fiber. A pair consists of a "P" end connected to the phone and an "L" end connected to the line. A pair of "P" ends may be connected together and used with standard telephones for a phone-to-phone intercom system.

Units are available in multimode and single-mode optical versions and rack-mount or stand-alone packages.

## Ordering Information

Models	Description	Fiber Type
9571LY/MM-08T-ST	Telephone line extender, line end	1xMM
9571PY/MM-13T-ST	Telephone line extender, phone end	1xMM
9571L/SM-13T-ST	Telephone line extender, line end	1xSM
9571PY/SM-15T-ST	Telephone line extender, phone end	1xSM
9575	Stand-alone version of the 9571 models	



# 9571Y Series

## Technical specifications

## Fiber optic telephone line extenders



### Data Interfaces

Telephone line interface	Standard U.S.
I/O Impedance	600 $\Omega$
Connector	RJ11C

### Power Requirements

9571Y	
Voltage	6 VDC (chassis)
Current	4000 mA
9575Y	
Voltage	9 to 15 VDC
Current	400 mA @ 12 VDC

### Recommended supplies

Recommended supplies for 9575Y	9014PS, 9011PS, PSR-12 DC
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### Indicators

9571Y, 9575Y	Sync, Not Sync, Loop, Loopback
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### Managment

Managment System	9900 Network Management System (NMS)
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### Physical Specifications

9571Y	1-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 20.3 x 218.4 mm (6.1 x 0.8 x 8.6 in.)
Weight (approx.)	363g (12.80 oz.)
9575Y	Stand-alone chassis (Size 5)
Dimensions (h x w x d)	40.6 x 81.3 x 127.0 mm (1.6 x 3.3 x 5.0 in.)
Weight (approx.)	363g (12.80 oz.)

### Environmental

All "P" phone end versions	
Operating temperature	-20° C to +74° C (-4° F to +165.2° F)
All "L" phone end versions	
Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
All units	
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

Optical	9571Y/9575Y-MM TX / RX	9575Y-SM TX / RX
Fiber type	MM (62.5)	SM (09)
Output wavelength	850 nm / 1310nm	850 nm / 1310nm
Output power	-17 dBm / -18 dBm	-11 dBm / -11 dBm
Input sensitivity	-35 dBm / -35 dBm	-35 dBm / -35 dBm
System link budget	18 dB <sup>1</sup> / 17 dB <sup>1</sup>	24 dB / 24 dB
Fiber length (range) <sup>2</sup>	5 km	60 km
Connector Type	ST	ST

<sup>1</sup> For 50/125  $\mu$ m fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by modal and chromatic dispersion, fiber quality, and fiber bandwidth.

## Features

- Single channel two-fiber data modem
- User-configurable for RS232, RS422, RS485 2-/4-wire, and Manchester PTZ
- Compatible with Optelecom-NKF data modems
- Rack-mount card
- Network Management System (NMS) compatible



## Description

The 9591 data modem transports an RS232, RS422, RS485, or Manchester PTZ data signal on a pair of fibers. This model supports both optical data transmission and data type conversion in one unit. Front panel signal status indicators, local, and optical loopback functions for troubleshooting communications links are built in. The unit operates on two fibers. It is optically compatible with the 4132B or 4185A mini modems and the 9522A series drop and insert modems.

The 9591 series comes as a rack mount version only, suitable for a 9002 or 9008 power supply cabinet. The 9591 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9591 rack-mount card, use the 9003-2 mini chassis.

Units are available in multimode and single-mode versions.

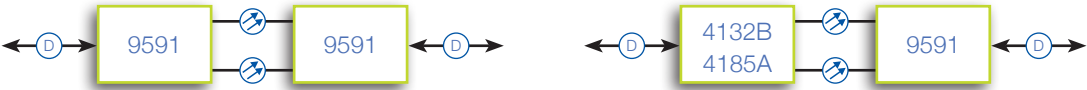
## Ordering Information

Models	Description	Fiber Type
9591-S-ST	Single-channel two-fiber data fiber modem	2x MM
9591-LD-ST	Single-channel two-fiber data fiber modem	2x SM

9591 Series

Technical specifications

1-channel data modem



Data Interfaces

Type RS232, RS422, RS485, or Manchester  
Data rates DC to 128 kb/s Auto Baud; Manchester: 32 kb/s  
Connector 5-pin removable screw terminal

Power Requirements

Voltage 6 VDC (chassis)  
Current 140 mA

Managment

Manament System 9900 Network Management System (NMS)

Physical Specifications

9591 1-slot card, 9000 series chassis  
Dimensions (h x w x d) 154.9 x 20.3 x 218.4 mm (6.1 x 0.8 x 8.6 in.)  
Weight (approx.) 226.8g (8.0 oz.)

Environmental

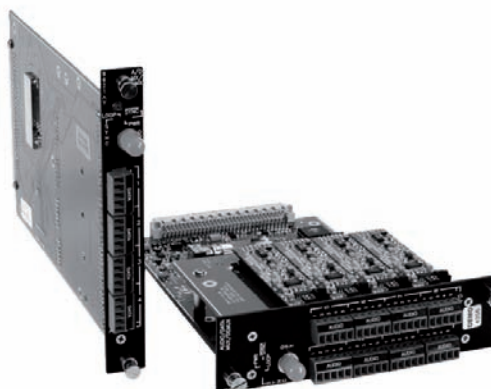
Operating temperature -40° C to +74° C (-40° F to +165.2° F)  
Storage temperature -55° C to +85° C (-67° F to +185° F)  
Relative humidity <95% as long as there is no condensation

Optical	9591-S	9591-LD
Fiber type	MM (62.5)	SM (09)
Output wavelength	850 nm	1310nm
Output power	-19 dBm	-18 dBm
Input sensitivity	-41 dBm	-41 dBm
System link budget	22 dB <sup>1</sup>	23 dB
Fiber length (range) <sup>2</sup>	5 km	57 km
Connector Type	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.  
<sup>2</sup> Range may be limited by modal and chromatic dispersion, fiber quality, and fiber bandwidth.

## Features

- 9621A and 9622A cards transport four or eight duplex Option Module channels on one fiber
- Option Modules are available for audio, data, contact closure, and intercom applications
- Rack-mount version
- Network Management System (NMS) compatible



## Description

These Option Module host cards provide optical transport for four or eight duplex Option Module channels and make complex system configuration easy by supporting nearly any combination of four or eight data, audio, contact closures, or intercom channels on a fiber.

The 9621 and 9622 series come as rack mount versions only, suitable for a 9002 or 9008 power supply cabinet. The 9621 and 9622 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9621/9622 rack-mount card, use the 9003-2 mini chassis.

## Ordering Information

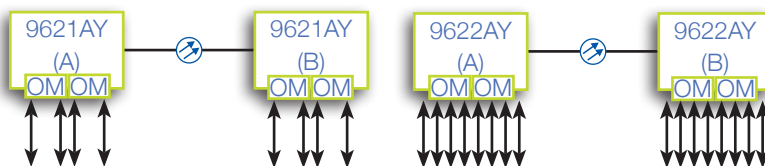
Models	Description	Fiber Type
9621AY(XXXX)/MM-08T-ST	4-channel Option Module host card, A-side	1x MM
9621AY(XXXX)/MM-13T-ST	4-channel Option Module host card, B-side	1x MM
9621AY(XXXX)/SM-13T-ST	4-channel Option Module host card, A-side	1x SM
9621AY(XXXX)/SM-15T-ST	4-channel Option Module host card, B-side	1x SM
9622AY(XXXXXXXX)/MM-08T-ST	8-channel Option Module host card, A-side	1x MM
9622AY(XXXXXXXX)/MM-13T-ST	8-channel Option Module host card, B-side	1x MM
9622AY(XXXXXXXX)/SM-13T-ST	8-channel Option Module host card, A-side	1x SM
9622AY(XXXXXXXX)/SM-15T-ST	8-channel Option Module host card, B-side	1x SM

# 9621AY, 9622AY

## Technical specifications

# 4-/8-channel optical duplex

## Option Module host cards



### Option Module

Number of free channels

9621AY	4x, duplex
9622AY	8x, duplex
A module	1x audio
B module	1x user-configurable data (RS232, RS422, RS485)
C module	1x contact closure
D or E module	2x audio (simplex only)
GM or GR module	2x intercom audio

For more information on Option Modules, refer to the Option Modules datasheet or contact Optelecom-NKF.

### Power Requirements

9621AY	
Voltage	6.0 VDC (chassis)
Current	400-800 mA*
9622AY	
Voltage	6.0 VDC (chassis)
Current	800-1000 mA*

\* Depends on the number and type of Option Modules Installed

### Indicators

9621AY, 9622AY	Power, Sync, Not Sync, Loop
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### Managment

Managment System	9900 Network Management System (NMS)
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### Physical Specifications

9961A-C	1-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 20.3 x 218.4 mm (6.1 x 0.8 x 8.6 in.)
Weight (approx.)	227 g (8.0 oz.)
9962A-C	2-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 40.6 x 218.4 mm (6.1 x 1.6 x 8.6 in.)
Weight (approx.)	12.8 oz. (363 g)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

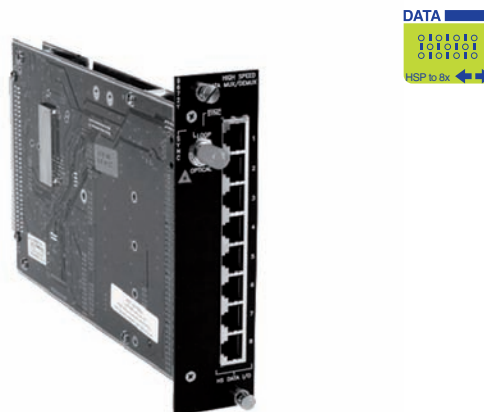
Optical	9621AY-MM/9622AY-MM TX / RX	9621AY-SM/9622AY-SM TX / RX
Fiber type	MM (62.5)	SM (09)
Output wavelength	850NM / 1310 nm	1310 nm / 1550 nm
Output power	-16 dBm <sup>1</sup> / -17 dBm <sup>1</sup>	-7 dBm / -7 dBm
Input sensitivity	-31 dBm / -31 dBm	<-27 dBm / <-24 dBm
System link budget	15 dB / 14 dB	25 dB
Fiber length (range) <sup>2</sup>	4 km	62 km
Connector Type	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 µm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by modal and chromatic dispersion, fiber quality, and fiber bandwidth.

## Features

- 8 duplex High-Speed ports on one fiber
- 1.5 Mb/s RS422 port
- Unrivalled flexibility
- Rack-mount version
- Network Management System (NMS) compatible



## Description

The 9672Y provides optical transport of eight duplex High-Speed (HS) ports. Each HS port may be used not only as a high speed RS422 port (1.5 Mb/s), but also as a duplex expansion port for Option Module host cards or 10 Mb/s Ethernet, thus offering unlimited flexibility.

The 9672 series comes as a rack mount version only, suitable for a 9002 or 9008 power supply cabinet. The 9672 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9672 rack-mount card, use the 9003-2 mini chassis.

## Ordering Information

Models	Description	Fiber Type
9672Y/MMH-13T-ST	8-ch optical High-Speed data port card, A-side	1x MM
9672Y/MMH-15T-ST	8-ch optical High-Speed data port card, B-side	1x MM
9672Y/SM-13T-ST	8-ch optical High-Speed data port card, A-side	1x SM
9672Y/SM-15T-ST	8-ch optical High-Speed data port card, B-side	1x SM
9672Y/SMH-13T-ST	8-ch optical High-Speed data port card, A-side	1x SM
9672Y/SMH-15T-ST	8-ch optical High-Speed data port card, B-side	1x SM

# 9672Y Series

## Technical specifications

## 8-channel High-Speed port cards



### Data

Number of ports	8x
Data format	RS422 or Extension Port
Data rate	
Synchronous RS422	≤15 Mb/s
Asynchronous RS422	≤1.5 Mb/s
Extension port for:	
Option Module hosts	9961A-C, 9962A-C
10 Mb Ethernet	9971-C, 9972-C

For more information, contact Optelecom-NKF.

### Power Requirements

Voltage	6 VDC (chassis)
Current	1.2A

### Indicators

Sync, Not Sync, Loop

### Managment

Managment System	9900 Network Management System (NMS)
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### Physical Specifications

9672Y	2-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 20.3 x 218.4 mm (6.1 x 0.8 x 8.6 in.)
Weight (approx.)	680g (23.98 oz.)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

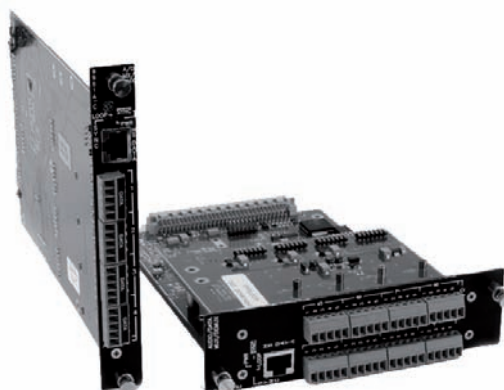
Optical	9672Y/MMH-13T / 9672Y/MMH-15T TX / RX	9672Y/SM-13T / 9672Y/SM-15T TX / RX	9672Y/SMH-13T / 9672Y/SMH-15T TX / RX
Fiber type	MM (62.5)	SM (09)	SM (09)
Output wavelength	1310 nm / 1510 nm	1550 nm / 1310 nm	1310 nm / 1510 nm
Output power	-7 dBm / -7 dBm	-7 dBm / -7 dBm	-6 dBm / -6 dBm
Input sensitivity	-27 dBm / -27 dBm	-28 dBm / -28 dBm	-36 dBm / -36 dBm
System link budget	16 dB <sup>1</sup> / 16 dB <sup>1</sup>	21 dB / 21 dB	30 dB / 30 dB
Fiber length (range) <sup>2</sup>	12 km	20 km	77 km
Connector Type	ST (others optional)	ST (others optional)	ST (others optional)

<sup>1</sup> For 50/125 μm fiber, subtract 4 dB.

<sup>2</sup> Range may be limited by modal and chromatic dispersion, fiber quality, and fiber bandwidth.

## Features

- Transport 4 or 8 Option Module channels on one High Speed port
- Option Modules available for audio, data, contact closure, and intercom applications
- Option Modules may be installed in nearly any combination and can be changed in the field
- Rack-mount version
- Network Management System (NMS) compatible



## Description

These Option Module host cards provide transport for four or eight Option Module channels on an available High-Speed port, usually on a video transport card. Using these host cards, additional Option Module channels can be added to any system that has cards equipped with the High-Speed ports. Option Modules

are available for audio, data, contact closure, and intercom links. Option Modules may be installed in nearly any combination to suit the application. The cards will operate in simplex mode on simplex High-Speed ports and in duplex mode on duplex High-Speed ports.

Refer to the Option Modules datasheet for details.

## Ordering Information

### Models

9961A-C(XXXX)\*  
9962A-C(XXXXXXXX)\*

### Description

High-Speed port expansion card for 4 Option Modules  
High-Speed port expansion card for 8 Option Modules

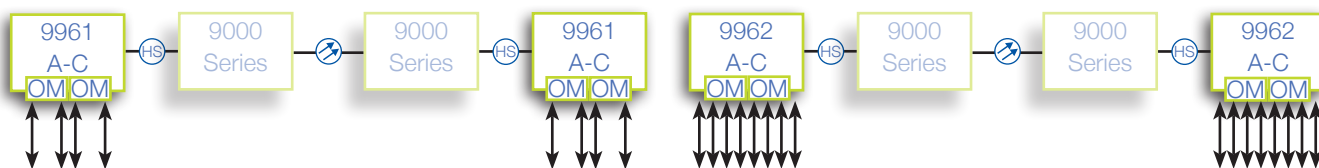
\* Replace the Xs in Model Number with code letters for desired Option Modules. Refer to the Option Modules datasheet.



# 9961A-C, 9962A-C

## Technical specifications

# 4 and 8 channel option module host card



### Option Module

Number of free channels

9961A-C	4x, duplex
9962A-C	8x, duplex
A module	1x audio
B module	1x user-configurable data (RS232, RS422, RS485)
C module	1x contact closure
D or E module	2x audio (simplex only)
GM or GR module	2x intercom audio

For more information on Option Modules, refer to the Option Modules datasheet or contact Optelecom-NKF.

### Power Requirements

9961A-C	6.0 VDC (chassis)
Voltage	300-800 mA*
Current	
9962A-C	6.0 VDC (chassis)
Voltage	800-1100 mA*
Current	

\* Depends on the number and type of Option Modules Installed

### Indicators

9961A-C	Power, Sync, Not Sync, Loop
9962A-C	Power, Sync, Not Sync, Loop

### Managment

Managment System	9900 Network Management System (NMS)
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### Physical Specifications

9961A-C	1-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 20.3 x 218.4 mm (6.1 x 0.8 x 8.6 in.)
Weight (approx.)	227 g (8.0 oz.)
9962A-C	1-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 40.6 x 218.4 mm (6.1 x 1.6 x 8.6 in.)
Weight (approx.)	363 g (12.8 oz.)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

## Features

- 10/100Base-TX to FX media converter
- 2-fiber single-mode or 2-fiber multimode
- In accordance with IEEE 802.3 and IEEE 802.3u
- Store-and-forward at full speed
- 1 Mb buffer
- MDI/MDI-X auto select
- Adjustment-free installation and operation



## Description

The versatile XSNet™ 1600 MC media converter series offers cost-effective solutions for optical LAN, WAN, and FttH networks. XSNet™ 1600 MC modules are plug-and-play for easy installation, featuring auto-negotiation and auto-MDI/ MDI-X detection.

The XSNet™ 1600 MC offers fully operational 10 or 100 Mb/s connections over fiber in accordance with IEEE 802 requirements.

The combination of the XSNet™ 1650 MCA and the XSNet™ 2700 MSW managed switch, using only one optical fiber is a cost-effective Fiber to the Home (FttH) solution.

The XSNet™ 1600 MC series offers the possibility to select half- or full-duplex mode over the optical FX port. In full duplex mode the system can span up to 12.4 miles (20 km) over single-mode.

An external AC/DC adapter is included with each XSNet™ 1600 MC model.

## Ordering Information

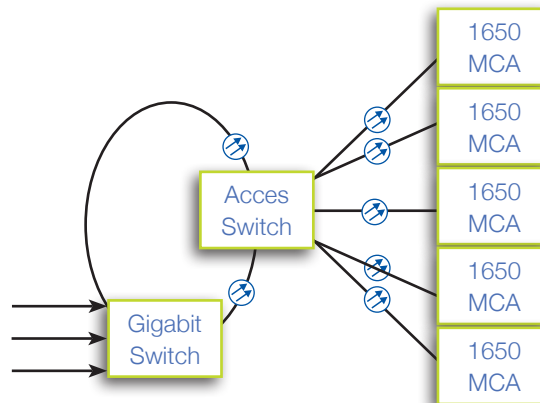
Model	Description
XSNet 1600 MC /x*	10/100 to 100Base-FX media converter
XSNet 1640 MC /x*	10/100 to 100Base-FX media converter
XSNet 1650 MCA /x*	1-fiber 10/100 to 100Base-FX media converter
XSNet 1650 MCB /x*	1-fiber 10/100 to 100Base-FX media converter

\* Indicate type of adapter plugs: US = North America, EU = Europe, UK = United Kingdom.

# XSNet™ 1600 MC

## Technical specifications

## 10/100Base-TX to FX media converter



### Electrical

Interfaces	10/100Base-TX, Auto-negotiation, Auto-sensing, Auto-MDI/MDI-X
Connector	RJ45
Cable type	TP (Cat5 or better)
Max distance	100m

### Standards

IEEE 802.3	100Base-T specification
IEEE 802.3u	100Base-TX and 100Base-FX specification
IEEE 802.3x	802.3x Full duplex operation

### Status LEDs

PWR	Green: Power-on indication
FDX/COL	(TX or FX-port) Yellow: Full-duplex operation; Blinking: collision in half-duplex operation
LNK/ACT	(TX or FX-port) Green: Link operational; Blinking: port activity
100	Green: 100Base-TX connection (TX-port); Off: 10Base-TX connection

### Power

External AC/DC adapter	+12 VDC, 0.8A
------------------------	---------------

### Environmental

Operating temperature	0° C to +50° C (+32° F to +122° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation.

### Mechanical

Dimensions (h x w x d)	23.4 x 73.8 x 109.2 mm (0.92 x 2.91 x 4.3 in.)
Weight (approx.)	158g (5.57 oz.)
Housing	Stand-alone



## Features

- Unmanaged 4+1-port Fast Ethernet switch
- Field-hardened
- 4x 10/100Base-TX ports (IEEE802.3u)
- 1x 100Base-FX one- or two-fiber port
- N-way auto-negotiation
- Auto-sensing and auto-MDI/MDI-X crossover
- Non-blocking store-and-forward switching



## Description

The compact XSNet™ 1600 QMC is a versatile 5-port Fast Ethernet switch for indoor and outdoor applications. The switch offers 4 independent 10/100Base-TX ports, featuring autonegotiation, auto sensing and auto-MDI/X-MDI crossover, as well as one 100Base-FX port featuring an unrivaled flexibility in choice of optics. Easily extend existing LANs with the QMC using either one or two multimode or single-mode fibers. The plug-and-play XSNet™ 1600 QMC is hot-swappable. It provides exceptional performance under industrial conditions, characterized by mechanical stress (vibration and shock) and a wide range of operating temperatures.

For applications such as IP-communication along motorways, or in subways, airports, tunnels, or Fiber to the Home (FtH), the XSNet 1600 QMC series offers a range of solutions. The extended operating temperature range guarantees reliable transport even in outdoor applications.

Within Optelecom-NKF's Advanced IP-Video Network solutions, the XSNet™ switch series plays a crucial role in the reliable transport of IP-streams; it relies on both proven interoperability between the various Advanced IPVideo Network elements and on proven compatibility with third-party network equipment (e.g., Cisco and HP). The switch comes as a Eurocard module to be slotted into an Optelecom-NKF MC 10 or MC 11 power supply cabinet, or in a stand-alone (/SA) version.

## Ordering Information

### Model

XSNet 1600 QMC  
XSNet 1640 QMC  
XSNet 1650 QMC-A  
XSNet 1650 QMC-B  
XSNet 16xx QMC/SA

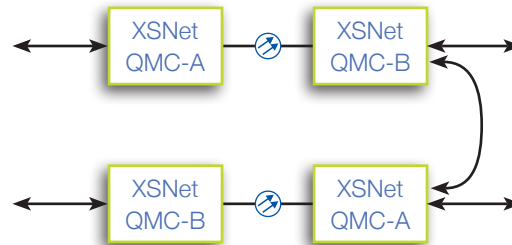
### Description

4+1-port field-hardened Fast Ethernet switch  
4+1-port field-hardened Fast Ethernet switch  
4+1-port field-hardened Fast Ethernet switch  
4+1-port field-hardened Fast Ethernet switch  
Stand-alone version of rack-mount models

# XSNet™ 1600 QMC

## Technical specifications

## 5-port Fast Ethernet switch



### Performance

Address table size	4K entries
Switching method	Store and forward

### Electrical

Interfaces	4x 10/100Base-TX MDI/MDI-X auto-crossover, auto-polarity Auto-sensing and auto-detect
Connector	4x RJ45
Maximum distance	100m

### Standards

IEEE 802.3	100Base-T specification
IEEE 802.3u	100Base-TX
IEEE 802.3x	Full duplex operation

### Management

Network Management	SNM™-compatible
SNM™ variables	Voltages, module temperature, module status, port configurations

### Led status indicator

DC	Power-on indication (Green)
Sync	Fiber Link status (Green, blinks with activity, Red: link down)
Per electrical port	Green: 100 Mb, blinks with activity Yellow: 10 Mb, blinks with activity

### Powering

Power consumption	3W
Rack-mount units	MC 10 and MC 11 power supply cabinets
Standalone units (/SA)	11 to 16 VDC (PSA-12 DC/25 or PSR-12 DC)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation.
MTBF	>100,000h
Safety and EMC	IEC/EN 60950, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, IEC/EN 55022, FCC-15

### Mechanical

Dimensions (h x w x d)	128 x 35 x 190 mm (5.04 x 1.38 x 7.48 in.)
Weight (approximately)	490g (17.28 oz.)
Housing	Rack-mount or stand-alone



## Features

- Managed 4+2-port Fast Ethernet switch
- Field-hardened
- 4x 10/100Base-TX and two pluggable optical ports
- Non-blocking store-and-forward switching
- Password-protected web interface
- VLAN tagging (802.1Q)
- IGMPv2 multicast and Rapid Spanning Tree



## Description

Optelecom-NKF's XSNet™ 1800 SW is a 6-port managed Fast Ethernet switch for indoor and outdoor applications. The switch offers four independent 10/100Base-TX ports featuring auto negotiation and auto-MDI/X-MDI crossover, as well as two pluggable 100Base-FX ports featuring an unrivaled flexibility in choice of optics. A range of XSNet™ SFP devices fit the 100Base-FX ports.

The XSNet™ 1800 SW provides exceptional performance under industrial conditions, characterized by mechanical stress (vibration and shock) and a wide range of operating temperatures. The compact switch offers Rapid Spanning Tree and Advanced IGMP to ensure rapid switchover times and to secure reliable transport of video, audio, and data streams. Quality of Service (QoS) is addressed by the XSNet™ 1800 SW using priority queuing (802.1p) and tagged VLANs (802.1Q), which are crucial functions for reliable and real-time services.

Within Optelecom-NKF's Advanced IP-Video Network solutions, the XSNet™ switch series plays a crucial role in the reliable transport of IP streams; it relies on both proven interoperability between the various Advanced IP-Video Network elements and on proven compatibility with third-party network equipment (e.g., Cisco and HP). Configuration and management are simplified by the built-in web interface and SNMPv2 agent. Full in-band control is available through Siquira MX™ Configuration Toolkit. The switch comes as a Eurocard module, to be slotted into an Optelecom-NKF MC 10 or MC 11 power supply cabinet, or as a stand-alone (/SA) version, and is firmware upgradeable.

## Ordering Information

### Model

XSNet 1800 SW  
XSNet 1800 SW/SA  
XSNet SFP

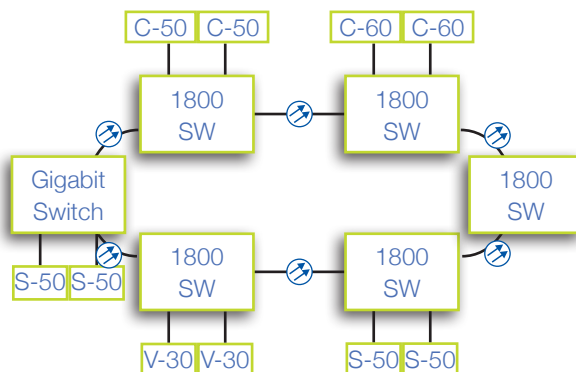
### Description

4+2-port field-hardened Fast Ethernet switch  
Stand-alone version of rack-mount model  
See SFP data sheet

# XSNet™ 1800 SW

## Technical specifications

# 6-port managed Fast Ethernet switch



### Performance

Address table size	4K entries
Switching fabric	Non-blocking
Switching method	Store and forward

### Electrical

Interfaces	4x 10/100Base-TX
Connector	4x RJ45
Maximum distance	100m

### Optical

Interfaces	2x empty 100 MB optical interface
Type of interface	XSNet SFP (See XSNet SFP data sheet)

### Standards

IEEE 802.3	10Base-T specification
IEEE 802.3u	100Base-TX
IEEE 802.3x	Full duplex operation
IEEE 802.1d	Spanning Tree Protocol
IEEE 802.1p	QoS
IEEE 802.1Q	Tagged VLAN*
IEEE 802.1w	Rapid Spanning Tree Protocol

### Management

Management agent	SNMP v2 compatible (RFC1902-1907)
RFC1213	MIB-2
RFC1493	Bridge MIB
RFC 1643	Ethernet MIB
RFC 1757	RMON MIB
Led status indicator	
DC	Power-on indication (green)
Sync	Fiber Link status (green, blinks with activity)
	Green: 100 Mb, blinks with activity
	Amber: 10 Mb, blinks with activity
Per electrical port	

### Management protocols

Out-of-band:	SNM™
In-band:	MX™, SNMPv2, HTTP (password protected)

### Powering

Power consumption	<6W
Rack-mount units	MC 10 and MC 11 power supply cabinets
Standalone models (/SA)	11 to 16 VDC (PSA-12 DC/25 or PSR-12 DC)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C -67° (F to +185° F)
Relative humidity	<95% as long as there is no condensation.
MTBF	>250,000h
Safety and EMC	IEC/EN 60950-1, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, EN 55022, FCC part 15

### Mechanical

Dimensions (h x w x d)	128 x 35 x 190 mm (5.04 x 1.38 x 7.48 in.)
Weight (approximately)	490g (17.28 oz.)
Housing	Rack-mount or stand-alone

\* Not to be combined with RSTP



## Features

- Managed 8+2-port Gigabit Ethernet switch
- Field-hardened
- 8x 10/100Base-TX and two pluggable Gigabit ports
- Non-blocking store-and-forward switching
- Password-protected web interface
- VLAN tagging (802.1Q)
- IGMPv2 multicast and Rapid Spanning Tree



## Description

Optelecom-NKF's XSNet™ 2800 SW is an 8+2-port managed Gigabit Ethernet switch for indoor and outdoor applications. The switch offers eight independent 10/100Base-TX ports, featuring auto-negotiation and auto-MDI/X-MDI crossover, and two pluggable 1000Base-FX (Gigabit) ports featuring an unrivaled flexibility in choice of optics. A range of XSNet™ SFP devices fit the 1000Base-FX ports.

The XSNet™ 2800 SW provides exceptional performance under industrial conditions, characterized by mechanical stress (vibration and shock) and a wide range of operating temperatures. The compact switch offers Rapid Spanning Tree and Advanced IGMP to ensure rapid switchover times and to secure reliable transport of video, audio, and data streams. Quality of Service (QoS) is addressed by the XSNet™ 2800 SW using priority queuing (802.1p) and tagged VLANs (802.1Q), which are crucial functions for reliable and real-time services.

Within Optelecom-NKF's Advanced IP-Video Network solutions, the XSNet™ switch series plays a crucial role in the reliable transport of IP-streams; it relies on both proven interoperability between the various Advanced IP-Video Network elements and on proven compatibility with third-party network equipment (e.g., Cisco and HP). Configuration and management are simplified by the built-in web interface and SNMPv2 agent. Full in-band control is available through Siquira MX™ Configuration Toolkit. The switch comes as a Eurocard module, to be slotted into an Optelecom-NKF MC 10 or MC 11 power supply cabinet,

## Ordering Information

### Model

XSNet 2800 SW  
XSNet 2800 SW/SA

### Description

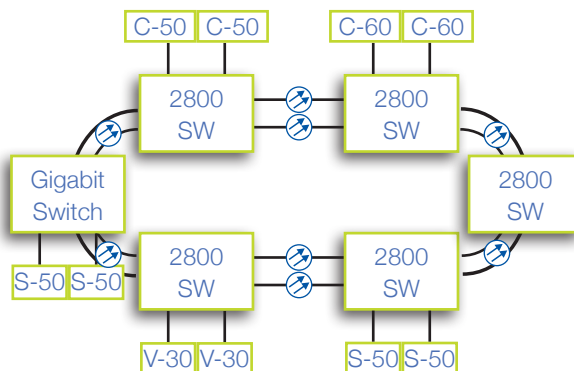
8+2-port field-hardened managed switch with 2 Gigabit up-link ports  
Stand-alone version of rack-mount model



# XSNet™ 2800 SW

## Technical specifications

# 8 + 2-port managed Gigabit Ethernet switch



### Performance

Address table size	4K entries
Switching fabric	Non-blocking
Switching method	Store and forward

### Electrical

Interfaces	8x 10/100Base-TX
Connector	8x RJ45
Maximum distance	100m

### Optical

Interfaces	2x empty 100 MB optical interface
Type of interface	XSNet SFP (See XSNet SFP data sheet)

### Standards

IEEE 802.3	10Base-T specification
IEEE 802.3u	100Base-TX
IEEE 802.3x	Full duplex operation
IEEE 802.3z	1000Base-FX
IEEE 802.1d	Spanning Tree Protocol
IEEE 802.1p	QoS
IEEE 802.1Q	Tagged VLAN*
IEEE 802.1w	Rapid Spanning Tree Protocol

### Management

Multicast	IGMPv2 snooping
Management agent	SNMP v2 compatible (RFC1902-1907)
RFC1213	MIB-2
RFC1493	Bridge MIB
RFC 1643	Ethernet MIB
RFC 1757	RMON MIB
Led status indicator	
DC	Power-on indication (green)
Sync	Fiber Link status (green, blinks with activity)
	Green: 100 Mb, blinks with activity
	Amber: 10 Mb, blinks with activity
Per electrical port	
Management protocols	SNM™
Out-of-band:	MX™, SNMPv2, HTTP (password protected)
In-band:	

### Powering

Power consumption	10W
Rack-mount units	MC 10 and MC 11 power supply cabinets
Standalone models (/SA)	11 to 16 VDC (PSA-12 DC/25 or PSR-12 DC)

### Environmental

Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation.
MTBF	>250,000h
Safety and EMC	IEC/EN 60950-1, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, EN 55022, FCC part 15

### Mechanical

Dimensions (h x w x d)	128 x 71 x 190 mm (5 x 2.8 x 7.48 in.)
Weight (approximately)	900g (31.61 oz.)
Housing	Rack-mount or stand-alone

\* Not to be combined with RSTP



## Features

- Small Form-Factor Pluggable (SFP) Multi-Source Agreement (MSA)-compliant
- Compliant with the IEEE 802.3 Ethernet standard
- Hot-swappable
- Dual LC connector (SC connector for one fiber solution)
- Compatible with Gigabit and 100 Mb networks (100/1000Base-FX)
- Single power supply 3.3V



## Description

Small Form-Factor Pluggables (SFPs) are standardized modular optical transceivers for Gigabit Ethernet (1000 Base-FX) or Fast Ethernet (100 Base-FX).

The XSNet™ SFPs are available in a wide range of models for multimode or single-mode, various distances, one or two fibers, and for CWDM applications. With this variety of models, any network solution can be realized, while maintaining flexibility and scalability at a competitive price level.

The XSNet™ SFPs are available for multimode and single-mode optical fiber. They are optimized for use with Optelecom-NKF's XSNet™ 1800 SW, 2800 SW, and 3200 SW Ethernet switches and with the CS-20 integrated video encoder/switch module.,

## Ordering Information

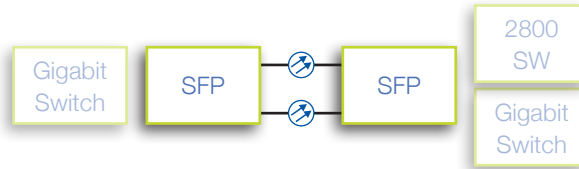
Model	Description
XSNet SFP MM/850	2-fiber multimode SFP (100/1000Base-FX)
XSNet SFP MM/1310	2-fiber multimode SFP (100 Mb only)
XSNet SFP SM/10	Single-mode SFP, dual-LC connector
XSNet SFP SM/BidiA	One fiber, single-mode SFP, SC connector
XSNet SFP SM/BidiB	One fiber, single-mode SFP, SC connector
XSNet SFP SM/60	Long distance single-mode SFP, dual-LC
XSNet SFP SM/CWDM*	Coarse WDM SFP, dual LC connector

\* a = 1470 nm, b = 1490 nm, ..., h = 1610 nm

# XSNet™ SFP

## Technical specifications

## Small Form-Factor Pluggable



### Electrical

#### Interfaces

Small Form-Factor Pluggable (SFP)  
Multi-Source Agreement (MSA) compliant

-40° C to +74° C (-40° F to +165.2° F)  
-55° C to +85° C (-67° F to +185° F)  
<95% as long as there is no condensation.  
>250,000h  
IEC/EN 60950-1, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, EN 55022, FCC part 15

### Standards

IEEE 802.3u  
IEEE 802.3z

100Base-SX/FX specification  
1000Base-SX/LX specification

### Environmental

Operating temperature  
Storage temperature  
Relative humidity

-40° C to +74° C (-40° F to +165.2° F)  
-55° C to +85° C (-67° F to +185° F)  
<95% as long as there is no condensation.

128 x 71 x 190 mm (5 x 2.8 x 7.48 in.)  
900g (31.61 oz.)

### Mechanical

#### Housing

SFP

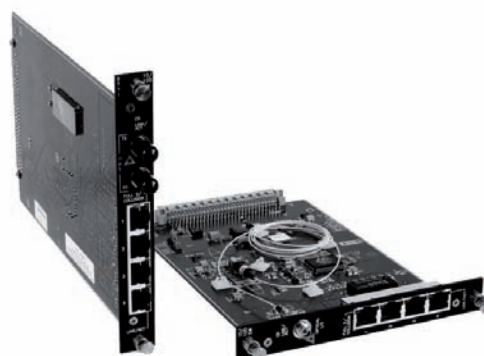
Rack-mount or stand-alone

Optical	XSNet SFP SM BidiA/ BidiB	XSNet SFP MM /850	XSNet SFP MM /1310	XSNet SFP SM /10	XSNet SFP SM /60	XSNet SFP SM /CWDM-I
Fiber type	1x SM	2x MM	2x MM	2x SM	2x SM	2x SM
Optical return loss	>45 dB	>14 dB	>14 dB	>25 dB	>45 dB	>45 dB
System budget	13 dB	7.5 dB	12 dB	10.5 dB	18 dB	25 dB
Min. link loss	0 dB	0 dB	0 dB	0 dB	0 dB	5 dB
Output power	-9 to -3 dBm/ -9 to -3 dBm	-9.5 to -4 dBm	-14 to -20 dBm	-9 to -3 dBm	-5 to -3 dBm	-3 to +2 dBm
Output wavelength	1310 nm/ 1490 nm	850 nm	1310 nm	1310 nm	1550 nm	$\lambda = a, b, \dots, h^1$
Input sensitivity	-22 dBm/ -22 dBm	-17 dBm	-32 dBm	-22 dBm	-23 dBm	-28 dBm
Connector type	SC	Dual LC	Dual LC	Dual LC	Dual LC	Dual LC
Ethernet	100/1000 Mb/s	100/1000 Mb/s	100 Mb/s	100/1000 Mb/s	100/1000 Mb/s	100/1000 Mb/s



## Features

- Transports a 10/100 Mb Ethernet signal over one or two fibers
- Built-in 10/100 Mb unmanaged 4 port Ethernet switch
- Rack-mount version
- Network Management System (NMS) compatible



## Description

The 9771 series adds Ethernet transport capabilities to fiber systems. With the addition of Ethernet devices at remote locations, providing Ethernet transport on your existing system without installing new fiber can reduce costs substantially. The Y versions operate on one fiber using WDM techniques.

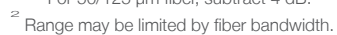
The 9771 series comes as a rack mount version only, suitable for a 9002 or 9008 power supply cabinet. The 9771 series modules are managed with the Optelecom-NKF Network Management System (NMS).

To create a stand-alone version of the 9771 rack-mount card, use the 9003-2 mini chassis.

## Ordering Information

Models	Description	Fiber Type
9771-LD-ST	2-fiber Ethernet transport	2x SM
9771Y/SM-13T-ST	1-fiber Ethernet transport, A-side	1x SM
9771Y/SM-15T-ST	1-fiber Ethernet transport, B-side	1x SM

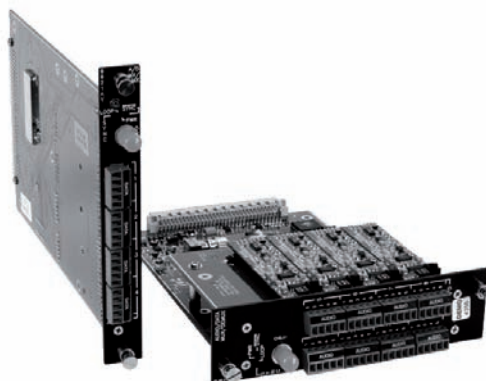
## Fast Ethernet media converter/switch



## 9971-C, 9973-C

### Features

- Convert a 10 Mb Ethernet signal to the high-speed port format
- Add 10 Mb Ethernet connectivity between a pair of fiber video or data transmission cards with a duplex highspeed port available
- Includes two additional user-configurable data ports
- 9000 series rack-mount cards
- 9900 series Network Management System (NMS) compatible



### Description

A pair of 9971-C interface cards supports transport of a 10 Mb Ethernet link on a duplex high-speed port. Many 9000 series data and video transport cards offer duplex high-speed ports supporting the 9971-C. The 9971-C can be added to SpectraStream CWDM systems when CWDM-compatible duplex host cards are used in the system.

### Ordering Information

#### Models

9971-C  
9973-C

#### Description

10 Base T to High-Speed port interface card with two additional user-configurable data ports  
10 Base T to High-Speed port interface card with built-in 10/100 Mb 4-port Ethernet switch

# 9971-C, 9973-C

## Technical specifications

## Ethernet to High Speed port card



### Data Interface

High-speed port type

Duplex 9000 series High-Speed RS422 port  
Ethernet port: Type 10 Base T Ethernet, Full/  
Half Duplex, Connector RJ45  
Ethernet ports (x4): Type 10/100 Base T  
Ethernet, Full/Half Duplex, Auto Negotiate,  
Connector RJ45 (x4)

9971-C

9973-C

### Data (9971-C only)

Number of ports  
Type

2x  
User-programmable RS232, RS422 2-/  
4-wire, or RS485 2-/4-wire, Data Rate DC to  
128 kb/s, Auto Baud  
RS232  $\geq 3$  kW  
120W or 12 kW  
2x 5-pin removable screw terminal

Input Impedance

RS422/RS485

Connectors

### Power Requirements

9971A-C

Voltage

Current

6.0 VDC (chassis)

375 mA

9973A-C

Voltage

Current

6.0 VDC (chassis)

400 mA

### Indicators

9971-C

High-Speed port

Ethernet port

Loop

TX, RX, Error, Full Duplex, Half Duplex

9973-C

Com link (High-Speed port)

Ethernet ports

Status

Port Activity, Link

### Management

Management System

9900 Network Management System (NMS)

### Physical Specifications

9971A-C

Dimensions (h x w x d)

Weight (approx.)

1-slot card, 9000 series chassis

154.9 x 20.3 x 218.4 mm (6.1 x 0.8 x 8.6 in.)

453 g (16.0 oz.)

9973A-C

Dimensions (h x w x d)

Weight (approx.)

1-slot card, 9000 series chassis

154.9 x 20.3 x 218.4 mm (6.1 x 0.8 x 8.6 in.)

453 g (16.0 oz.)

### Environmental

Operating temperature

Storage temperature

Relative humidity

-40° C to +74° C (-40° F to +165.2° F)

-55° C to +85° C (-67° F to +185° F)

<95% as long as there is no condensation

## Features

- Up to 11 slots
- Efficient, state-of-the-art switched-mode power supply
- Built-in dual fan
- Reversible mounting brackets
- Programmable contact closures
- Dual redundant power supply (MC 10 version)
- Management (SNM™) interface
- Field hardened



## Description

MC 11 power supply cabinets can house and power 11 Optelecom-NKF single-width rack-mount modules. The heart of the MC 11 is a powerful, efficient power supply unit, based on the latest switched-mode techniques, which can supply up to 165 watts.

The MC 11's built-in fans provide sufficient cooling for full-load operation over a wide temperature range. Additionally, they make it possible to stack cabinets on top of each other and use every inch of available rack space efficiently. All connections are concentrated on one side. Reversible mounting brackets give you the choice to have all connections at the front or at the back.

The MC 11 DC version is fitted with two DC inputs and two identical DC/DC conversion circuits to provide the highest availability possible. A power failure on or off the inputs is indicated with an LED and a galvanic isolated contact.

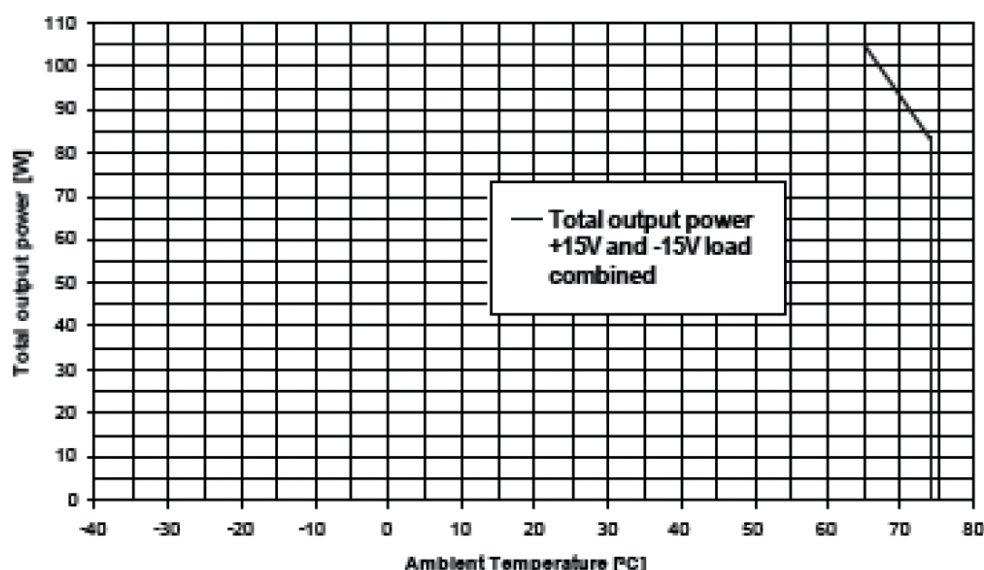
The EB-2 option offers network management and is compatible with Optelecom-NKF's Smart Network Manager (SNM™). It provides status information and control over system modules, including the power supply cabinet itself. The EB-2 option also offers two programmable alarm contacts. There are MC 11 models for 230 VAC, 115 VAC, as well as options available for DC power systems.

## Ordering Information

Model	Description
MC 11 AC-230	Power supply cabinet, 19-inch/3 RU
MC 11 AC-115	Power supply cabinet, 19-inch/3 RU
MC 11 AC-230 /EB-2	Power supply cabinet with SNM™ management interface, 19-inch/3 RU
MC 11 AC-115 /EB-2	Power supply cabinet with SNM™ management interface, 19-inch/3 RU
MC 10 AC-230 /EB-2	Dual power supply cabinet with SNM™ management, 19-inch/3 RU
MC 10 AC-115 /EB-2	Dual power supply cabinet with SNM™ management, 19-inch/3 RU
MC 11 DC	Redundant DC power supply cabinet, 19-inch/3 RU



MC10-11 Power supply - Output Power Derating



## Electrical

### Number of slots

MC 11 (DC)	11 slots
MC 10	10 slots
Type of slot	7 TE Eurocassette

### Powering

Mains voltage	MC 10/11 AC-230 230 VAC
Operation voltage	
Frequency	40-100 Hz
Max. drop-out time	10 ms
Primary fuse	1.6A/250V slow
Power efficiency (full load)	>90%
DC output power	83W
DC input power	
input current	

### Management

LED status indicators	
DC	Power-on indicator (green)
EB	Data activity (SNM™) on external bus (green)
Network Management	SNM™ compatible
SNM™ variables	Voltages, modules, module temperature, module status, optical levels, etc.
Number of SNM interfaces	2x 9-pin sub-D per cabinet
Interface format	RS485
Data rate	19.2 kb/s
Programmable contacts	2 per cabinet
Switch rating	2A at 30 VDC

### MC 10/11 AC-115

115 VAC
40-100 Hz
10 ms
3.16A/250V slow
>90%
83W

### Environmental

Operating temperature	-40° C to +65° C (-40° F to +149° F)
Storage temperature	-55° C to +85° C (-67° F to +155° F)
Relative humidity	<95% as long as there is no condensation.
MTBF	>100,000h
Safety and EMC	IEC/EN 60950-1, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, EN 55022, FCC part 15

### Mechanical

Dimensions (h x w x d)	132 x 483 x 240 mm (5.2 x 19.02 x 9.45 in.), without cabling 132 x 483 x 350 mm (5.2 x 19.02 x 13.78 in.), with cabling
Weight (approx.)	4.5 kg (9.92 lbs.)



## Features

- 19-inch, 1 RU mounting tray for standalone modules
- Prepared for direct mounting of:
  - 3x stand-alone Euro-cassette models
  - 6x UTF MSA models
  - 6x matchbox models
  - 1x PSR-12 DC power supply
  - Reversible mounting brackets
- Low cost



## Description

The MT 03 Mounting Tray offers a cost-effective solution to fit Optelecom-NKF's stand-alone equipment, such as the compact UTF 4000 TX-MSA series and the S-50 Video Server in 19-inch installations. In addition, it can hold a PSR-12 DC power supply unit for powering stand-alone models.

The tray is fitted with threaded holes that fit perfectly with the stand-alone modules.

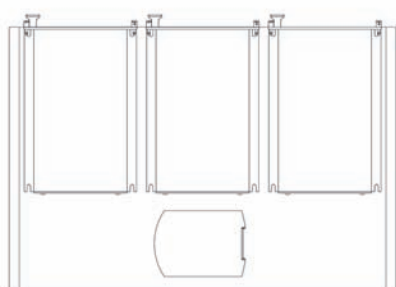
## Ordering Information

Model	Description
MT 03	Mounting tray for stand-alone modules

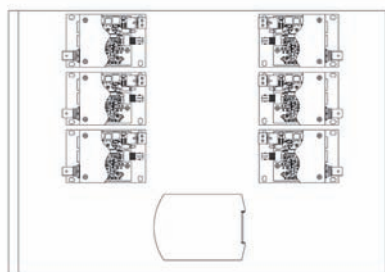
# MT 03

## Technical specifications

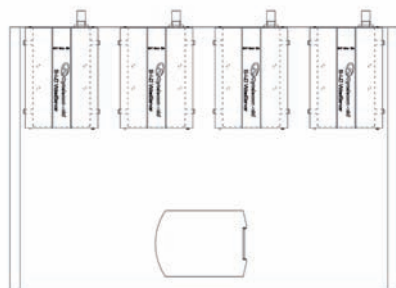
# 19-inch mounting tray



MT03 Eurocard SA



MT03 Matchbox



MT03 S-40



MT03 UTF

### Environmental

Operating temperature	-40° C to +65° C (-40° F to +149° F)
Storage temperature	-55° C to +85° C (-67° F to +155° F)
Relative humidity	<95% as long as there is no condensation.
MTBF	>100,000h
Safety and EMC	IEC/EN 60950-1, EN 50130-4, FCC part 15

### Mechanical

Prepared with threaded holes for direct mounting of:	3x Stand-alone Eurocassette models 6x UTF MSA models 6x Matchbox models 1x PSR-12 DC power supply
Dimensions (h x w x d)	44 x 483 x 260 mm (1.73 x 19.02 x 10.24 in.)
Weight (approx.)	1 kg (2.2 lbs.)



## 9002 Features

- Rack-mountable chassis supports Optelecom-NKF Series 9000 rack-mount cards
- Supports up to 21 slots

## 9050BF Features

- Three-slot, heavy duty, fan-cooled pluggable power supply module
- Front panel jacks for monitoring output voltage, current, and temperature
- 9900 Network Management System (NMS)



## Description

### 9002 21-slot 19" rack-mount chassis

The Model 9002 19-inch 4 RU chassis is designed for rackmounting Optelecom-NKF Series 9000 cards. All electrical and optical connections are made to the front panels of the plug-in cards. Individual cards can be hot swapped without affecting the operation of other cards in the chassis. The rack mounting ears may be installed on the front or rear of the chassis as required for the specific application.

The 9002 may be equipped with one or two power supplies. You can set these supplies to operate as load-sharing or as primary and backup supplies. 18 slots are available for use with one supply installed; 15 are available with two supplies installed. The chassis supports the Network Management System.

### 9050BF rack-mount power supply

These 6 VDC power supplies are intended to meet the requirements of Optelecom-NKF Series 9000 chassis rackmount units. The supplies may be operated as a single supply or, when two supplies are installed, primary/backup mode or load sharing mode. Adjustments are made simple by a set of front panel meter test points for output voltage, current, and temperature and a voltage adjustment control.

For noise immunity and proper ventilation, install blank panels over unused slots. See the optional accessories chart in Ordering Information below. Power supplies are ordered separately; the version of supply required depends on the number of cards installed and their total power consumption. Refer to the User's Manual and system applications notes available from the factory for details on installing the 9002 chassis.

## Ordering Information

### Models

9002  
9050-BF  
9996 1  
9998 1

### Description

21-slot 19" rack-mount chassis (without power supply unit, 9050BF)  
3-slot power supply unit for use with the 9002 chassis  
Single Blank Panel (1-slot cover plate)  
Triple Blank Panel (3-slot cover plate)

9002, 9050BF

Technical specifications

19-inch rack-mount chassis

9002	
Number of free slots	21
9050BF	
Number of slots	3
Input voltage range	100-240 VAC, 50/60 Hz
Output voltage	6.1 VDC
Max. current	24A @ -40° C to +50° C (-40° F to +122° F)
Derated	13.5A @ -40° C to +65° C (-40° F to +149° F)
Number of fans	1
Physical Specifications	
9002	19-inch, 4 RU
Dimensions (h x w x d)	177.8 x 442.6 x 203.2 mm (7 in. x 19 in. x 8 in.)
Weight (approx.)	2.72 kg (6 lbs.)
9050BF	3-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 60.9 x 218.4 mm (6.1 x 2.4 x 8.6 in.)
Weight (approx.)	1.45 kg (3.2 lbs.)
Environmental	
Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

## Features

- 2-slot mini chassis for 9000 series rack-mount
- Uses 9010 external power supplies
- Converts rack-mount cards to stand-alone



## Description

The Model 9003-2 chassis is a compact rugged enclosure for stand-alone applications of 9000 series rack-mount models. Four mounting holes are provided for attaching to vertical flat surfaces.

The chassis are powered by the Model 9010 external power supply

## Ordering Information

### Model

9003-2  
9996

### Description

2-slot mini chassis for stand-alone housing of Series 9000 rack-mount cards  
Single plank panel (1-slot cover plate)

9003

## Technical specifications

9000 Series mini chassis

### Physical Specifications

Dimensions (h x w x d)	180.34 x 44.42 x 217.37 mm (7.1 in. x 1.749 x 8.558 in.)
Weight (approx.)	535.2g (18.87 oz.)
Power input connectors	2.5 x 5.5 mm male barrel-type, center position, 6 VDC

## Features

- Rack-mountable cabinet supports Optelecom-NKF 9000 series rack-mount cards
- Built-in power supply
- 19-inch, 2 RU
- Supports a total of eight slots
- Fans for cooling



## Description

The Model 9008 19-inch 2 RU chassis is designed for rack mounting Optelecom-NKF 9000 series cards. All electrical and optical connections are made to the front panels of the plug-in cards. Individual cards can be hot swapped without affecting the operation of other cards in the chassis. The rack mounting ears may be installed on the front or rear of the chassis as required for the specific application. The 9008 is equipped with a built-in power supply, so no slots are taken by supplies.

The 9008 has a built-in fan system so that the horizontally installed cards have sufficient airflow for cooling. The chassis supports the Network Management System.

Three LEDs provide basic system status: a power LED, a management Network LED to indicate chassis communication activity, and a System LED that illuminates when any card in the system has a serious fault. Install blank panels to cover unused slots for noise immunity and proper ventilation.

## Ordering Information

### Models

9008  
9996\*  
9998\*

### Description

8-slot 2 RU 19" rack-mount power supply cabinet  
Single Blank Panel (1-slot cover plate)  
Triple Blank Panel (3-slot cover plate)

\* All empty slots should have 9996 or 9998 blank panels installed to protect the installed cards and to maintain proper airflow.



Electrical	
AC input voltage range	100-240 VAC 50/60 Hz
DC output voltage range	6.1 VDC (nominal)
Max. current	14A @ -40° F to +122° F (-40° C to +50° C)
Physical Specifications	
Dimensions (h x w x d)	88.9 x 442.6 x 304.8 mm (3.5 x 19.0 x 12.0 in.)
Weight (approx.)	2.59 kg (5.7 lbs.)
Environmental	
Operating temperature	-40° C to +74° C (-40° F to +165.2° F)
Storage temperature	-55° C to +85° C (-67° F to +185° F)
Relative humidity	<95% as long as there is no condensation

### 9900-NMS Features

- Provides graphical user interface for monitoring and managing Optelecom-NKF's Series 9000 systems
- Supports SNMP, Serial Mode, Ethernet Mode, and Web-based management

### 9942A Features

- Provides system monitoring and management of Optelecom-NKF Series 9000 transmission systems
- Operates in four different configurations: Web server, SNMP, Ethernet NMS, and Serial Management
- RS232 Serial Console port for manual set up and field firmware upgrades



### Description

The 9900 Network Management Software Package includes 9911-NMS Serial management, 9941-NMS Ethernet management, and 9900-SNMP SNMP support package.

9941-NMS and 9911-NMS support an Operator mode for monitoring only and a password-protected Supervisor mode for configuration and setup. It supports System-, Chassis-, and Card-level status screens. Functions can be configured with up to three alarm levels.

An alarm log is created and saved for up to 30 days, recording all changes in system status. An inventory log can be created listing the model number, serial number, and location of every card connected to the system.

The 9900-SNMP software includes:

- Optelecom-NKF's enterprise MIB files — These files can be used with off-the-shelf SNMP management software. The MIB files contain information associated with the Optelecom-NKF plug-in cards for the Optelecom-NKF 9000 series chassis that is required for an SNMP management package to communicate with the 9942A Management Card via Ethernet.
- Management Upgrade Utility (MUU) — An application that communicates with the 9942A using a serial connection and allows for easy upgrade of the Optelecom-NKF cards managed via SNMP. All Optelecom-NKF Series 9000 cards manufactured prior to the release of the 9942A software require this upgrade to operate in an SNMP environment.

### Ordering Information

#### Models

9900-NMS  
9942A

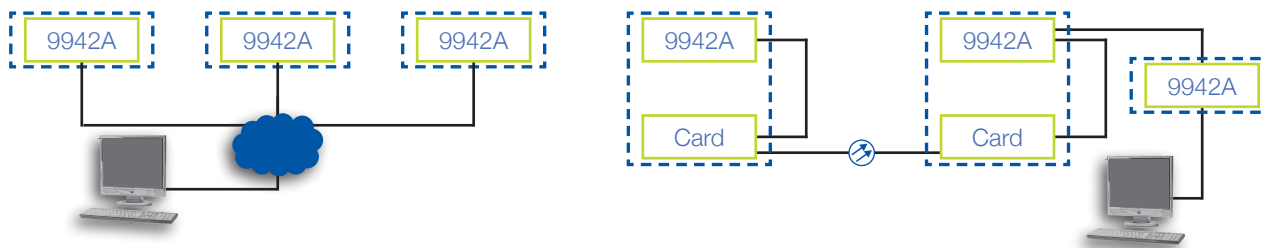
#### Description

Software package for Network Management  
Network Management card

# 9900-NMS, 9942A

## Technical specifications

# Network Management



### 9900-NMS

CPU minimum	Intel Pentium 4, 2 GHz
CPU recommended	Intel Dual-Core Pentium 3 GHz or better
Memory	1024 MB RAM or more
Video card	DirectX 9c compatible*
Operating system	Windows 2000/XP
LAN port	10/100/1000Base-TX
HD free space	>50 MB
SNMP	V1 or V2c
MIB	MIB II (RFC 1213)

Recommended dual monitor support

\* Contact Optelecom-NKF for the latest specs.

### 9942A

#### Ethernet Interface

Network Port	10/100 BaseT, Full/Half Duplex, Auto Negotiate, Connector RJ45, Supports Static or Dynamic Addressing
Remote Console Functions	(DHCP, BootP) Via Telnet

#### Management Bus Serial Interface

Port 1	RS485 2-wire Duplex, 9600 Baud (fixed), two RJ11 connectors wired in parallel
Ports 2 and 3	RS232 3-wire duplex, 9600 Baud (fixed), two RJ11 Connectors
Console Port	RS232 3-wire duplex, 38400 Baud (fixed), RJ11 connector

### Physical Specifications

9942A	1-slot card, 9000 series chassis
Dimensions (h x w x d)	154.9 x 20.3 x 218.4 mm (6.1 x 0.8 x 8.6 in.)
Weight (approx.)	227 g (8.0 oz.)

### Indicators

SP (Serial Poll), SR (Serial Response) NMS (NMS/Ethernet/SNMP Activity), ST (Error), 100 BaseT (Ethernet Port) Link/Activity, Full Duplex/Half Duplex, Error

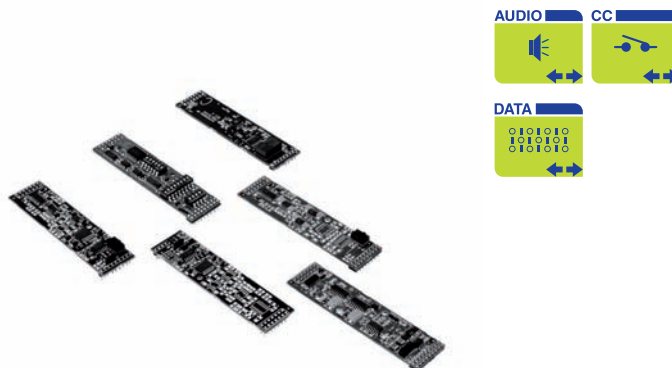
### Managment

Managment System	9900 Network Management System (NMS)
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# Option Modules

## Features

- Unrivalled flexibility
- User definable service per Option Module channel:
  - Contact closure
  - Audio
  - Stereo Audio
  - RS422/485 and RS232 data
  - Intercom (AiPhone )



## Description

The option module is a small, plug-in circuit card module that offers the capacity to transport various signal types over a fiber transmission link. The Option module is only available for selected fiber optic transmitter and receiver models of the 9000 series.

If the basic operation of the host link is unidirectional (simplex), the video and any additional signal transmission capabilities operate only in the same direction as the video.

When the operation of the host link is bidirectional (duplex), the additional signals operate in both directions on the fiber. The option modules come factory pre-installed and are specially designed to provide maximum flexibility in virtually any combination of audio, data, contact closures, or intercom channels. Refer to the datasheet of 9000 series models that carry option models for ordering information.

## Ordering Information

### Models

Option Module A  
Option Module B  
Option Module C  
Option Module D  
Option Module E  
Option Module GM  
Option Module GR

### Description

Audio Module  
Data Module  
Contact Closure Module  
Simplex Stereo Audio input Module  
Simplex Stereo Audio output Module  
Aiphone Intercom Module, Master End  
Aiphone Intercom Module, Remote End

# Option Modules

## Technical specifications

### Option Module Type A

Duplex Audio	
Frequency response	20 Hz to 20 kHz
Input connections	Balanced or unbalanced
Input impedance	600 $\Omega$ or 47 $\Omega$ , selectable
Input level	1 Vpp, nominal; 5.5 Vpp, maximum
Output level	Equivalent to input level
Output connections	Balanced or unbalanced, selectable
SNR	>78 dB (weighted)

### Option Module Type B

Duplex Data	
Data input types	RS232, RS422/485
Data rate	DC to 115 kbps (RS422/485 and RS232); 32 kbps (Manchester)

### Option Module Type C

Duplex Contact Closure	
Input current	6 mA (maximum); 0.6 mA (minimum)
Maximum isolation voltage	50 VDC
Output contact rating	300 mA @ 30 VDC

### Option Module Types D & E

Simplex Stereo Audio	
Frequency response	20 Hz to 20 kHz
Input connections	Balanced or unbalanced
Input impedance	600 $\Omega$ or 47 $\Omega$ , selectable
Input level	1 Vpp, nominal; 5.5 Vpp, maximum
Output level	Equivalent to input level
Output connections	Balanced or unbalanced, selectable
SNR	>78 dB (weighted)

### Option Module Types GM & GR

Intercom	
Frequency response	200 Hz to 3.7 kHz
Input connections	Twisted pair from AiPhone LEM Master, and LE
Power remote end	Series Remotes 2.0A (signaling); 350 mA (normal)
Power master end	350 mA (normal)
Contact Closure	
Input current	6 mA (maximum); 0.6 mA (minimum)
Maximum isolation voltage	50 VDC
Output contact rating	300 mA @ 30 VDC

## Features

- External wall-pluggable AC to DC power supplies for standalone units
- 9010PS in-line power supply for the 9003-2 mini chassis
- 9011PS in-line power supply
- 9014PS
- PSA 12 DC, PSA 12 DC-25
- PSR 12 DC



## Description

These power supplies meet the requirements of Optelecom-NKF standalone units and the 9003-x series of mini chassis. All units have a power efficiency of greater than 50%. When using these supplies in extremely hot or cold locations, ensure that you select a supply rated for operation in the temperature ranges required. Most power supplies have reduced capabilities in temperature extremes.

Make sure you select a supply with the proper AC input voltage range specifications for the locality in which it will be used. Call the Systems Engineers at Optelecom-NKF if you have any questions at all about which supply to use or for information on power supplies for legacy Optelecom or NKF equipment.

## Ordering Information

### Models

9010 PS  
9011 PS  
9014 PS  
PSR-12 DC  
PSA-12 DC  
PSA-12 DC-25

### Description

Inline, Switching  
Inline, Switching  
Wall-Wart, Linear  
DIN Rail Mount, Switching  
Wall-Wart, Linear  
Wall-Wart, Switching

# 9010, 9011, 9014, PSA, PSR

## Technical specifications

## Stand-alone and mini chassis power supplies

<b>Electrical</b>				
<b>Model</b>	9010	9011	9014	
Input Voltage Range	100-240 VAC 50/60 Hz	100-240 VAC 50/60 Hz	100-130 VAC 60 Hz	
Output Voltage Range	6 VDC @ 4A	12 VDC @ 1A	9 VDC @ 600 mA (unregulated)	
Connector	2.3 x 5.5 mm Female, Barrel-type, Center Positive	Tinned Leads	Tinned Leads	
Temperature Range	0°C to +45°C (+32°F to +113°F)	0°C to +45°C (+32°F to +113°F)	0°C to +45°C (+32°F to +113°F)	
<b>Model</b>	PSR	PSA-12 DC-25	PSA-12 DC /EU	
Input Voltage Range	85-264 VAC 50/60 Hz	98-132 VAC 60 Hz	230 VAC ± 15%	
Output Voltage Range	12 VDC @ 1.5A	12 VDC @ 1.25A	12 VDC @ 800 mA	
Connector	25W (18W at 74°C) Max Spring Clamp Terminal	15W Max Tinned Leads	9.6W Max 2p Screw Connector	
Temperature Range	-10°C to +60°C (+14°F to +140°F) (-74°C at 18W)	0°C to +45°C (+32°F to +113°F)	+5°C to +40°C (+41°F to +104°F)	
<b>Physical*</b>				
Dimensions (h x w x d)				
9010	44.45 x 63.5 x 114.3 mm (1.75 x 2.5 x 4.5 in.)			
9011	31.8 x 47.63 x 98.43 mm (1.5 x 1.875 x 3.75 in.)			
9014	44.45 x 47.63 x 63.5 mm (1.75 x 1.875 x 2.5 in.)			
PSR	76.2 x 44.45 x 99.5 mm (3.0 x 1.75 x 3.92 in.)			
PSA-12 DC-25	88.9 x 50.8 x 31.75 mm (3.5 x 2.0 x 1.25 in.)			
Weight (approx.)	272g (9.59 oz.)			
<b>Environmental</b>				
Storage temperature	-67°F to +185°F (-55°C to +85°C)			
Relative humidity	<95% as long as there is no condensation.			