



Going future today.



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About ASTRO



The change from analogue to digital transmission technology is in full activity, and with it a wide array of multimedia possibilities. Communication links of the future will no longer be restricted by the means involved. ASTRO is active in shaping this transformation. As a specialist in innovative products for full-service networks and digital reception systems, we are the ideal partner for the diverse challenges brought by the new age of multimedia communication.

For the complex requirements in this future market ASTRO offers individual solutions on highest level. As a modern High-Tech-company with more than 60 years of experience we benefit from a successful alliance of tradition and innovation. With 190 highly qualified employees and a region-wide service network we are your professional partner.

Herbert Strobel
(Managing director)



Quality and reliability

- Our high-class products are subject to a demanding quality and security check. Your satisfaction is our benchmark
- ASTRO-products are EMC-certified.
- Functionality determines the design of ASTRO-products.



Flexibility and service

- Our region-wide service network we are able to react quickly and flexible to all your needs.
- ASTRO-experts speak your language.
- Our specialists support you locally and help to develop market-driven solutions.



Tradition and innovation

- Benefit from our long standing experience and the unusually long staff membership of our highly qualified employees.
- As a full-line distributor ASTRO offers one-stop solutions even for complex requirements.
- Your success is our success. We support you creatively and competent in partnership.



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ASTRO Product Finder

Where to find what? - A guidepost to the ASTRO product line-up

Satellite-technology

Which **parabolic-antenna** is suitable for which **application**?



„Which parabolic-antenna does have which feature?“
see page 9

Which **LNB** is suitable for which **parabolic-antenna**?



see „Applications for universal LNBs“
on page 10

Which **multiswitch** is suitable for which **application**?



see „Which multiswitch for which application?“ on page 18

Which products are suitable for a **single cable solution**?



see „Single cable solution“
on page 39

Head-end technology

Which **Head-end-series** offers which **signal processing options**?



see „Which head-end-series offers which signal processing options?“ on page 52



see „Plug-in cards of the X-series“
on page 60



see „Plug-in cards of the V-series“
on page 86



see „Modules of the U-series“
on page 109

Passives

Which **wall outlet** offers which **connectors**?



see „GUT... wall outlet types“
on page 184

Which **wall outlet** is suitable for which **application**?



see „Which wall outlet for which application?“ on page 185

By which **quality features do ASTRO wall outlets** stand out?



see „Quality features of GUT 1.. wall outlets“ on page 186

Terrestrial technology

Where do I find **antennas** for **DVB-T-reception**?



see „ADI 3, ADO 3“ on page 210

Where do I find **antennas** for **reception of analogue signals**?



see „RUF 22, UK 3 N, UK 5“
on page 211

Where do I find **antenna diplexers** and **amplifiers**?



see „AZX 13, ADX 32, HMW 13“
on page 212

Broadband-amplifiers

Which **amplifiers** are suitable for which **application**?



see „Which amplifier for which application?“ on page 130

Which **amplifier** delivers the desired **output level**?



see „Which amplifier for which application?“ on page 130

Which **amplifiers** do have a **modular design**?



see „Modular broadband amplifiers“ on page 155

Optical transmission

Which **components** are required for transmission of **CATV-signals**?



see „Which optical components for which application?“ on page 162

Which components are suitable for **transmission of SAT-IF via large distances**?



see „Which optical components for which application?“ on page 162

Which components are suitable for **reverting of optical signals to RF SAT-signals**?



see „Which optical components for which application?“ on page 162

Accessories

Where do I find **accessories for SAT-IF-distribution installations**?



see page 214

Which **tools** are needed **for mounting**?



see page 226

Where do I find **suitable mounting material for antenna installations**?



see page 231

Common information

Where do I find a **contact person at ASTRO**?



see „Contacts“ on page 240

Where do I find the **terms of delivery and payment**?



see „Terms of delivery and payment“ on page 239

Where do I find **advices to product labeling**?



see „Product labeling“ on page 239

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Satellite-technology

External SAT-units

Overview of parabolic-antennas and LNBS

High class and price-competitive aluminium offset parabolic-antennas
Universal LNBS for reception of all common SAT-signals (analogue / digital) in the KU-band

Page 8



Multiswitches

Overview of multiswitches

Complete range of stand-alone and cascadable devices for all applications of SAT-IF-distribution

Page 17



Single cable solution

Components for mounting of single cable solutions (TV- and Radio-multi-subscriber-installations without large wiring complexity)

Page 39



Receivers

DVB-receivers for reception of unencrypted (Fee to Air) and encrypted digital TV- and Radio-programmes with CA modules compliant to DVB standard

Page 44





External SAT-units

ASTRO offers several satellite reception units for all applications at different quality levels.











see „Which parabolic-antennas offer which quality features?“ on page 9

The parabolic-antennas are supplemented by the well matched feed systems of the SBX- and ACX-series:

- SAT-series: premium-class offset parabolic-antennas for semi-professional application and very quality-conscious consumers
- ASP-series: high class offset parabolic-antennas with excellent price-performance ratio and very good test results
- AST-series: budget-priced offset parabolic-antennas for price-conscious consumers

Which parabolic-antennas offer which quality features?

Series			Quality of materials
SAT	ASP	AST	
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Reflector in high-tensile Aluminium-building, powder-coated in: white light grey anthracite red 
	<input checked="" type="checkbox"/>		Reflector bracket made of zinc coated steel, plastic coated 
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Special-LNB-bracket LNB-bracket 40 mm, pour LNB-bracket 40 mm, plastic 
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Mast clamp made of hot zinc dipped steel, screw thread bracket made of stainless steel 
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		10 years warranty compliant to warranty conditions 
Assembling aids			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Approved hang up appliance for connecting reflector and reflector bracket 
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Well readable elevation scale on both sides 
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		4-times elevation fixing with stainless steel screws; only one screw size (only 1 tool for positioning afforded) 



Applications for universal LNBs

analogue / digital

Reception of all popular SAT-signals in the KU-band, e.g. ASTRA ..., Eutelsat ...

SBX... for offset-parabolic antennas SAT 90 and 1200

ACX... for offset-parabolic antennas AST 60, 850 and ASP 78, 85, 100

Type:	ACX 915	SBX / ACX 925	SBX 745 / ACX 945
Application:	1 subscriber	2 subscribers	Multiswitch-installation
	H / V High + Low	2 x H / V High + Low	V H V H * Low Low High High
			* only for illustration technical variation is possible
Type:	SBX 785 / ACX 985		ACX 988
Application:	4 subscribers, with integrated multiswitch		8 subscribers, with integrated multiswitch
	4 x H / V High + Low		8 x H / V High + Low

Which LNB is suitable for which parabolic-antenna?

Type	Diameter	Single	Twin	Quatro	Quatro-Switch	Octo-Switch
AST 60	58 (64) cm	<input checked="" type="checkbox"/>				
AST 850	85 (55) cm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> *
ASP 78	74 (84) cm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> *
ASP 85	85 (85) cm		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ASP 100	110 (99) cm		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SAT 90	90 (99) cm		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SAT 1200	123 (157) cm		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* conditionally suited

SAT 90, SAT 1200

High class offset parabolic-antennas



- easy to install
- reflectors made of powder coated aluminium
- bracket for LNB made of zinc coated steel, plastic coated
- matched LNBs of the SBX-series

Type		SAT 90	SAT 1200
Order no.:	white (RAL 9002)	300 070 / 4026187740047	300 130 / 4026187740092
EAN-code	anthracite (RAL 7012) red (RAL 8012)	300 110 / 4026187740054 300 111 / 4026187740115	300 170 / 4026187740153 -
Reflector-diameter	[cm]	90 (99)	123 (157)
Gain:	10,95 - 11,75 GHz 11,70 - 12,50 GHz 12,50 - 12,75 GHz	38,6 39,2 39,6	41,5 42,2 42,5
Angle of beam	[[°]]	< 1,9	< 1,43
Wind load at q = 800 N / m	[N]	730	1296
clamping range of mast bracket	[mm]	48 - 90	50 - 90
A / E bracket		included	SSH 1200 afforded (see below)

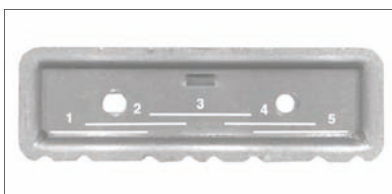
SSH1200



AE bracket for SAT 1200;
fixed bracket made of stainless steel, hot zinc dipped,
for azimuth and elevation adjustment of the antenna to a
SAT position, exact adjustment by elevating screw, for
masts with maximum diameter of 76 mm

Type	SSH 1200
Order number	370 130
EAN-code	4026187790097

ADP 90, ADP 1200



Multifeed adapter plate for SAT series;
for reception of two or more satellites (e. g. Astra
19,2°E and Hotbird 13°E); one LNB afforded per
satellite; these are mounted on the multifeed adapter

Type	ADP 90	ADP 1200
Order number	370 900	370 120
EAN-Code	4026187790134	4026187790103



SBX 725, SBX 745, SBX 785

Quatro universal LNBS



- UV resistant weather proof housing
- matched to the antennas of the SAT-serie
- suitable for multifeed mounting by compact design
- afforded F-plugs included

Type		SBX 725	SBX 745	SBX 785
Connector plan:				
Order number		310 721	310 741	310 761
EAN-Code		4026187730291	4026187730307	4026187730314
Application		Multiple users 2 Receiver-outputs	Multiple users for multiswitches	Multiple users 4 Receiver-outputs
Input frequency range				
Low Band	[GHz]	10,7 - 11,7		
High Band	[GHz]	11,7 - 12,75		
Output frequency range				
Low Band	[MHz]	950 - 1950		
High Band	[MHz]	1100 - 2150		
Common data				
Oscillator-frequency (L.O.)	[GHz]	950 - 1950 1100 - 2150		
Cross polarisation discrimination	[dB]	> 30		
Gain	[dB]	50 - 60		
Signal switching	[kHz]	22 (±2) switchable per output	-	L = 0; H = 22 (±4)
Amplitude	[V]	0,6 (±0,2Vpp)		
Outputs F-Connector	[Ω]	2 x 75	4 x 75	4 x 75
LNB Voltage	[V]	vertical 11,5 -14 horizontal 15,5 - 19 switchable per output	8 - 19	vertical 11,5 -14 horizontal 15,5 - 19
Current demand	[mA]	170 typ. 1 mal 200 typ. 2 mal	185 typ.	215 typ.
suitable for parabolic antennas		SAT 90 / 1200	SAT 90 / 1200	SAT 90 / 1200

ASP 78, ASP 85, ASP 100

Premium offset parabolic-antennas



- quick and easy mounting
- reflector made of powder coated aluminium
- back made of zinc coated steel
- 40 mm LNB bracket
- stainless screws
- 10 years warranty
- matched LNBs of the ACX-series

Type		ASP 78	ASP 85	ASP 100
Order-Nr:	light grey (RAL 7004) anthracite (RAL 7012) red (RAL 8012) white (RAL 7035)	- 300 781 300 782 300 783	300 852 300 851 300 850 300 849	- 300 500 300 501 300 502
EAN-Code:	light grey (RAL 7004) anthracite (RAL 7012) red (RAL 8012) white (RAL 7035)	- 4026187002411 4026187002435 4026187002428	4026187740238 4026187740221 4026187740245 4026187740283	- 4026187170547 4026187170554 4026187170561
Reflector-Diameter	[cm]	74 (84)	85 (85)	1099 x 991
Gain:	10,95 - 11,75 GHz 11,70 - 12,50 GHz 12,50 - 12,75 GHz	36,8 37,75 38,5	38,12 38,65 39,53	39,8 40,5 40,9
Wind load at q = 800 N / m	[N]	590		119 kg at 144 km/h
Clamping range of mast bracket	[mm]	32 - 80		32 - 60
A / E bracket		included		

ADS 78 / 85 Guss, ADS 100 Guss, ADH 100



ADS 78 / 85: Multifeed adapter plate for ASP 78 and ASP 85 for reception of two or more satellites; one LNB per satellite afforded; LNBs are mounted on the multifeed adapter plate;

ADS 100: adapter plate for ASP 100

ADH 100: LNB-adaptor for ADS 100

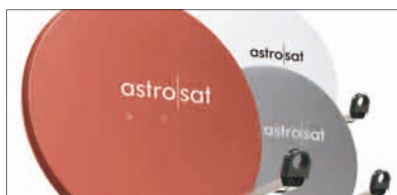
Type	ADS 78 / 85 Guss
Order number	370 851
EAN-Code	4026187790219

Type	ADH 100	ADS 100 Guss
Order number	370101	370100
EAN-Code	4026187131128	4026187131111



AST 60, AST 850

Cost-effective offset parabolic-antennas



- reflector made of aluminium
- easy mounting
- mast bracket made of zinc coated steel, plastic coated
- adapter for LNB slip-on
- 40 mm LNB bracket
- matched LNBs of the ACX-series

Type		AST 60	AST 850
Order no.:	anthracite (RAL 7012) red (RAL 8012) white (RAL 7035)	300 071 - -	300 030 300 050 300 040
EAN-Code:	anthracite (RAL 7012) red (RAL 8012) white (RAL 7035)	4026187740139 - -	4026187740184 4026187740207 4026187740191
Reflector-Diameter	[cm]	58 (64)	85 (85)
Gain:	10,95 - 11,75 GHz 11,70 - 12,50 GHz 12,50 - 12,75 GHz	35,1 35,6 36,1	38,12 38,65 39,53
	[dBi]		
Wind load at q = 800 N / m	[N]	308	580
Clamping range of mast bracket	[mm]	32 - 80	32 - 76
A / E-bracket		included	

ADP85



for reception of two or more satellites (e. g. Astra 19,2°E and Hotbird 13°E); one LNB per satellite afforded; these are mounted on the multifeed adapter plate.

Type	ADP 85
Order number	310 051
EAN-Code	4026187790141



ASTRO offers different AST-complete packages, including a parabolic-antenna, LNB and AE-bracket. Ask for it!

ACX 915, ACX 925, ACX 945

Quatro universal LNBs



- UV resistant weather proof housing; well matched to the antennas of the AST and ASP series
- 40 mm LNB bracket
- suitable for multifeed applications by compact design
- extendable cover for F-plugs

Type		ACX 915	ACX 925	ACX 945
Connector plan:				
Order number		310 915	310 925	310 945
EAN-Code		4026187735098	4026187735104	4026187735111
Application		Single user 1 Receiver-output	Multiple users 2 Receiver-outputs	Multiple users for multiswitches
Input frequency range				
Low Band	[GHz]	10,7 - 11,7		
High Band	[GHz]	11,7 - 12,75		
Output frequency range				
Low Band	[MHz]	950 - 1950		
High Band	[MHz]	1100 - 2150		
Common data				
Oscillator-frequency (L.O.)	[GHz]	9,75 - (± 1 MHz) 10,6 - (± 1 MHz)		
Cross polarsiation discrimination	[dB]	> 30		
Gain	[dB]	55 Typ:		
Signal switching	[kHz]	22 (± 22 kHz) switchable per output	-	L=0, H=22 (± 4)
Amplitude	[V]	0,6 ($\pm 0,2$ Vpp)		
Outputs; F-connector	[Ω]	2 x 75	2 x 75	4 x 75
LNB-voltage Current demand suitable for parabolic antennas	[V] [mA]	vertical 11,5 - 14 horizontal 16 - 20 switchable per output 80 typ. AST 60 / 850 ASP 78 / 85	8 - 19 190 typ. AST 850 ASP 78 / 85	vertical 11,5 - 14 horizontal 15,5 - 19 190 typ. AST 850 ASP 78 / 85 / 100



ACX 985, ACX 988

Quatro universal LNBS with integrated multiswitch



- UV resistant weather proof housing; well matched to the antennas of the AST and ASP series
- 40 mm LNB bracket
- extendable cover for F-plugs

Type		ACX 985	ACX 988
Connector plan:			
Order number		310 985	310 988
EAN-Code		4026187735128	4026187735135
Application		Multiple users 4 Receiver-outputs	Multiple users 8 Receiver-outputs
Input frequency range			
Low Band	[GHz]	10,7 - 11,7	
High Band	[GHz]	11,7 - 12,75	
Output frequency range			
Low Band	[MHz]	950 - 1950	
High Band	[MHz]	1100 - 2150	
Common data			
Oscillator-frequency (L.O.)	[GHz]	9,75 (± 1 MHz) 10,6 (± 1 MHz)	
Cross polarisation discrimination	[dB]	> 30	
Gain	[dB]	55 typ.	
Signal switching	[kHz]	22 (±4) switchable per output	
Amplitude	[V]	0,6 (±0,2Vpp)	
Outputs; F-connector	[Ω]	4 x 75	8 x 75
LNB-voltage	[V]	vertical 11,5 - 14 horizontal 15,5 - 19 switchable per output	8 - 19
Current demand	[mA]	200 typ.	
suitable for parabolic antennas		AST 850 ASP 78 / 85 / 100	



Multiswitches

ASTRO offers a range of multiswitches for all demands from stand-alone devices to cascadable systems.

- SAM ECOswitch: Multiswitches with outstanding price/performance ratio, 4 or 8 SAT inputs plus terrestrial input and optionally 6, 8, 12 or 16 receiver-outputs; power supply with stand-by function
- AMS Stand-alone: high-class compact-multiswitch with 4 SAT-inputs and terrestrial input, suitable for return path, integrated switching power supply with stand-by function
- AMS cascade: high-class cascadable multiswitches with 4, 8, or 16 SAT-inputs plus terrestrial input and 8 to 16 receiver-outputs, level, adjustment, selectable LNB-supply, integrated energy-saving switching power supply.



Which multiswitch for which application?

Type	Reception	Type of Device	SAT-inputs	Terrestr. Inputs	Receiver-outputs	Cascade-outputs	DiSEqC-support	Page
SAM 5... ECOswitch Stand-alone	1 Satellite	Stand-alone	4	1	6	-	-	20
		Stand-alone	4	1	8	-	-	20
		Stand-alone	4	1	12	-	-	20
		Stand-alone	4	1	16	-	-	20
AMS 5... ECOswitch Stand-alone	1 Satellite	Stand-alone	4	1	6	-	-	22
		Stand-alone	4	1	8	-	-	22
		Stand-alone	4	1	12	-	-	22
		Stand-alone	4	1	16	-	-	22
AMS 5... ECOswitch cascadable	1 Satellite	Base unit	4	1	8	4 + 1 terr.	-	24
		Extension	4	1	8	4 + 1 terr.	-	24
		Extension	4	1	12	4 + 1 terr.	-	24
		Extension	4	1	16	4 + 1 terr.	-	24
Reverse feedable extensions; suitable for SAM-series	1 Satellite	Extension	4	1	8	4 + 1 terr.	-	24
		Extension	4	1	16	4 + 1 terr.	-	24
AMS 5... ECOswitch Amplifier, Splitter, Tap	1 Satellite	Amplifier	4	1	-	4 + 1 terr.	-	27
		Remote fed Amplifier	4	-	-	4 x SAT	-	27
		Splitter	4	1	-	4 + 1 terr.	-	29
		Single Tap	4	1	-	4 + 1 terr.	-	30
		Twin-Tap	4	1	-	4 + 1 terr.	-	30
SAM 9... ECOswitch Stand-alone	2 Satellites	Stand-alone	8	1	4	-	<input checked="" type="checkbox"/>	31
		Stand-alone	8	1	6	-	<input checked="" type="checkbox"/>	31
		Stand-alone	8	1	8	-	<input checked="" type="checkbox"/>	31
		Stand-alone	8	1	12	-	<input checked="" type="checkbox"/>	31
		Stand-alone	8	1	16	-	<input checked="" type="checkbox"/>	31
AMS 9... cascadable	2 Satellites	Base unit	8	1	8	8 + 1 terr.	<input checked="" type="checkbox"/>	33
		Extension	8	1	8	8 + 1 terr.	<input checked="" type="checkbox"/>	33
		Extension	8	1	12	8 + 1 terr.	<input checked="" type="checkbox"/>	33
		Extension	8	1	16	8 + 1 terr.	<input checked="" type="checkbox"/>	33
AMS 17... cascadable	4 Satellites	Base unit	16	1	8	16 + 1 terr.	<input checked="" type="checkbox"/>	36
		Extension	16	1	8	16 + 1 terr.	<input checked="" type="checkbox"/>	36
		Extension	16	1	12	16 + 1 terr.	<input checked="" type="checkbox"/>	36
		Extension	16	1	16	16 + 1 terr.	<input checked="" type="checkbox"/>	36

ECOswitch - the energy saving multiswitches

Development and production in compliance with ecology

ECOswitch Multiswitches were developed with ecological requirements in mind. Production is compliant to RoHS consistently without the use of any harmful substances.

The plastic plugs are flame retardant and recyclable.

High economic efficiency by low power consumption

All modules of the ECOswitch-series excel at high economy and low power consumption under operating conditions (e. g. SAM 58 ECOswitch: 8,5 W).

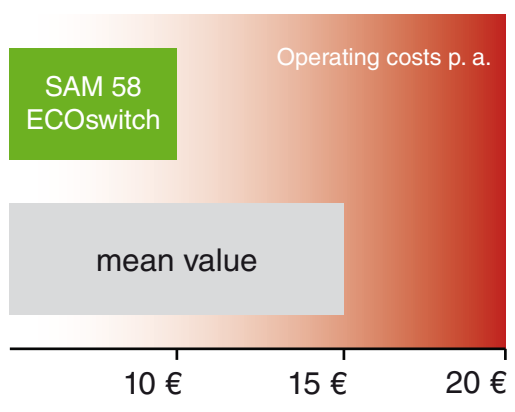
The energy saving concept with Standby-Function enables low power consumption when receivers are switched off. All active Multi-switches of the AMS-series are equipped with an integrated, energy saving switch-mode power supply.

Quality „Made in Germany“

ECOswitch-Multiswitches are unexceptionally manufactured in Germany.



up to 40 % less power consumption compared to conventional Multiswitches



ASTRO ECOswitch multiswitches excel at low cost of operation and up to date ecological details:

Power LED and Stand-By Function

- Power LED indicates operation mode of the device (active or stand-by)
- Indication of malfunction
- Multiswitch only consumes power when SAT-TV signals are received

AMS ECOswitch: Energy saving switch-mode power supply

- Low power consumption in active mode
- Only 0,5 W power consumption in stand-by mode

AMS ECOswitch: Indication LED per receiver output

- Output current control
- LED per receiver output indicates, when a TV-signal is received



SAM ECOswitch series: Stand-alone, 5 inputs

Price-competitive compact multiswitches 4 SAT-inputs + terrestrial



- Energy-saving concept with stand-by function; power LED
- flame-retardant plastics
- for analogue and digital signals
- low tap loss
- optionally available: SVP 20 overvoltage protection



see page 216

SAM 56 ECOswitch



4 SAT inputs / 1 terrestrial input and 6 receiver outputs with integrated energy-saving power supply

SAM 58 ECOswitch



4 SAT inputs / 1 terrestrial input and 8 receiver outputs with integrated energy-saving power supply

SAM 512 ECOswitch



4 SAT inputs / 1 terrestrial input and 12 receiver outputs with integrated energy-saving power supply

SAM 516 ECOswitch



4 SAT inputs / 1 terrestrial input and 16 receiver outputs with integrated energy-saving power supply

Type		SAM 56 Ecoswitch	SAM 58 Ecoswitch	SAM 512 Ecoswitch	SAM 516 Ecoswitch
Input connector plan					
Order number		360 506	360 508	360 512	360 516
EAN-Code		402687110901	402687110918	402687110925	402687110932
Receiver outputs		6	8	12	16
SAT range					
Frequency range	[MHz]	950 - 2150			
Gain	[dB]	-4		0 - 3	
Output level	[dBμV]	typ. 100, acc. EN 500083-3			
Input isolation	[dB]	typ. 25			
Output isolation					
SAT / SAT	[dB]	typ. 40			
SAT / Terrestrial	[dB]	typ. 40			
Receiver / Receiver	[dB]	typ. 35			
Return loss					
Input LNB	[dB]	typ. 8			
Output	[dB]	typ. 10			
Terrestrial range					
Frequency range	[MHz]	47 - 862			
Tap loss	[dB]	typ. 20	typ. 21	typ. 25	typ. 26
Maximum input level	[dBμV]	typ. 120, acc. EN 500083-2, limited by EMC			
Isolation					
Receiver / Receiver	[dB]	typ. 24			
Terrestrial / SAT	[dB]	typ. 35			
Return loss					
Input Terrestrial	[dB]	typ. 10			
Output	[dB]	typ. 10			
Power consumption					
All receivers off	[W / VA]	2 / 5,5		3 / 7	
Minimum 1 receiver on	[W / VA]	8,5 / 11		11,5 / 14	
LNB current	[mA]	300			
Common data					
Impedance	[Ω]	75			
Connectors		F-female			
LNB-supply voltage	[V]	15			
Maximum LNB-current	[mA]	300			
EMC		compliant with EN 500083-2			
Supply voltage	[V~/Hz]	230 / 50			
Ambient temperature	[°C]	-15...+55			
Dimensions (W x H x D)	[mm]	217 x 124 x 57		312 x 124 x 57	



Extension modules AMS 5580 and AMS 5160 are also applicable with SAM-ECOswitch multiswitches, see page 24

AMS ECOswitch series: Stand-alone, 5 inputs

High-class compact-multiswitches 4 SAT-inputs + 1 terrestrial



- terrestrial input, passive or shiftable FM active, for direct connection of an antenna
- separate level controllers for every SAT-input
- LNB-supply selectable 12 V / 18 V / 22 kHz
- energy saving switching-power supply, 0,5 W power consumption in stand-by mode
- LED control per subscriber and for output current monitoring (short-circuit proof)
- optional SVP 20 crowbar



see page 216

AMS 506 ECOswitch



4 SAT inputs / 1 terrestrial input and 6 receiver-outputs with integrated energy saving power supply

AMS 508 ECOswitch



4 SAT inputs / 1 terrestrial input and 8 receiver-outputs with integrated energy saving power supply

AMS 512 ECOswitch



4 SAT inputs / 1 terrestrial input and 12 receiver-outputs with integrated energy saving power supply

AMS 516 ECOswitch



4 SAT inputs / 1 terrestrial input and 16 receiver-outputs with integrated energy saving power supply

Type		AMS 506 ECOswitch	AMS 508 ECOswitch	AMS 512 ECOswitch	AMS 516 ECOswitch
Input connector plan:					
Order number		360 061	360 081	360 121	360 161
EAN-Code 4026187...		...131135	...131142	...7131159	...131166
Receiver-outputs		6	8	12	16
SAT range					
Frequency range	[MHz]	950 - 2150			
Gain	[dB]	2 ± 2,5			
Maximum output level	[dBμV]	Typ. 105 for 35dB IMA2 and IMA3 accord.. EN 50083-3			
SAT- input attenuator	[dB]	0 - 10			
Isolation					
SAT input / SAT input; SAT / Terrestrial	[dB]	Typ. 40, min. 36			
Receiver / Receiver	[dB]	Typ. 30, min. 25			
Return loss					
SAT- LNB Inputs	[dB]	Typ. 14, min. 10			
Receiver-Outputs	[dB]	Typ. 10, min. 6			
Terrestrial range passive					
Frequency range	[MHz]	5 - 862			
Tap loss *	[dB]	21 ± 1,5	21 ± 1,5	24 ± 1,5	24 ± 1,5
Maximum input level	[dBμV]	Typ. 120, accord. EN 50083-2			
FM range amplifier, bandpass filtered for direct connection of an FM aerial					
Frequency range	[MHz]	87,5 - 108			
coupling out gain of receiver	[dB]	12 ± 1,5	12 ± 1,5	9 ± 1,5	9 ± 1,5
FM attenuator	[dB]	0 - 20			
Maxim. output level of receiver **	[dBμV]	94	94	91	91
Noise figure	[dB]	7,5			
Isolation					
Receiver / Receiver; Terrestrial / SAT	[dB]	Typ. 40, min. 30			
Return loss					
Terrestrial input passive; Receiv. output	[dB]	18, at 40MHz -1,5 / Octave			
FM input	[dB]	Typ. 14, min. 10			
Input power					
Standby, 1 Receiver + LNB + AMS 5550	[W / VA]	0,5 / 2,1 minimum input power; 13 / 26 maximum input power			
Current demand per receiver	[mA]	40			
Common data					
Impedance	[Ω]	75			
Connectors		F-jacks			
LNB-supply voltage	[V]	12V / 12V_18V_0kHz_22KHz			
Max. LNB current plus AMS 5550	[mA]	350 plus max. 220 (12V mode)			
Power LED		green: SAT mode; yellow: SAT standby; red: overload / short circuit			
Receiver LED		green: when receiver voltage is applied			
EMC		accord. EN 50053-2			
Power supply	[V-/Hz]	230 / 50 ± 10%			
Ambient temperature	[°C]	-15...+55			
Dimensions (W x H x D)	[mm]	241 x 177 x 47		314 x 177 x 47	

* at filter shoulder @862MHz additionally max. 1dB

** for 60dB KMA accord. EN 50083-3



AMS ECOswitch series: Cascadable, 5 inputs

High quality cascadable multiswitches 4 SAT-inputs + 1 terrestrial



- passive terrestrial input, or switchable FM active for direct connection of an antenna
- separate level controllers for every SAT-input
- LNB-supply selectable 12 V / 18 V / 22 kHz
- energy saving switching-power supply, 0,5 W power consumption in stand-by mode
- LED control per subscriber and for output current monitoring (short-circuit proof)
- optional SVP 20 crowbar



see page 216

AMS 558 ECOswitch



System base unit with integrated energy saving switching-power supply

AMS 5508, AMS 5512, AMS 5516



Extension modules, available with 8, 12 or 16 receiver-outputs;
5 termination resistors included;

AMS 5580, AMS 5160



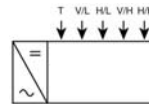
Backwards feedable extension modules with 8 or 16 receiver-outputs for already existing multiswitches of the AMS- and SAM-series in connection with quatro universal LNBs (e. g. ACX- or SBX-series)



AMS 5580 and AMS 5160 are also applicable with multiswitches of the SAM ECOswitch-series, see page 20

Type **AMS 558 ECOswitch**

Input connector plan:



Order number		360 581
EAN-Code		4026187131173
Receiver-outputs		8
SAT range		
Frequency range	[MHz]	950 - 2150
Gain	[dB]	2 ± 2,5
Output level	[dBμV]	Typ. 105 for 35dB IMA2 and IMA3 accord. EN 50083-3
SAT-input attenuator	[dB]	0 - 10
Passband attenuation	[dB]	4 ± 1
Isolation		
SAT-input / SAT-input; SAT / Terrest.	[dB]	Typ. 40, min. 36
Receiver / Receiver	[dB]	Typ. 30, min. 25
Return loss		
SAT- LNB inputs; SAT trunk-output	[dB]	Typ. 14, min. 10
Receiver- outputs	[dB]	Typ. 10, min. 6
Terrestrial range passive		
Frequency range	[MHz]	5 - 862
Tap loss	[dB]	29,5 ± 1,5 (at filter shoulder @ 862MHz additionally max. 1dB)
Trunk-passband attenuation	[dB]	4,1 ± 0,3
FM range amplifier, bandpass filtered for direct connection to an FM aerial		
Frequency range	[MHz]	87,5 - 108
Uncoupling amplification receiver	[dB]	4,5 ± 1,5
Uncoupling amplification trunk	[dB]	29,5 ± 1,5
FM attenuator	[dB]	0 - 20
Maxim. output level receiver	[dBμV]	87 (for 60dB KMA accord. EN 50083-3)
Maxim. Output level trunk	[dBμV]	112 (for 60dB KMA accord. EN 50083-3)
Noise figure	[dB]	7,5
Isolation		
Receiver / Receiver; Terrestrial / SAT	[dB]	Typ. 40, min. 30
Return loss		
Input terrestr. passive; output trunk	[dB]	18, at 40MHz -1,5 / octave
Input FM / trunk output	[dB]	Typ. 14, min. 10
Receiver outputs	[dB]	18, at 40MHz -1,5 / octave
Power consumption		
Standby, 1 Receiver + LNB + AMS 5550	[W / VA]	0,5 / 2,1 minimum power consumption; 13 / 26 maximum power consumption
Current demand per receiver	[mA]	40
Common data		
Impedance	[Ω]	75
Connectors		F-jacks
LNB-voltage supply	[V]	12V / 12V_18V_0kHz_22KHz
Max. LNB current plus AMS 5550	[mA]	350 plus max. 220 (12V mode)
Power LED		green: SAT mode; yellow: SAT standby; red: overload / short circuit
Receiver LED		green: when receiver voltage is applied
EMC		accord. EN 50053-2
Voltage supply	[V~/Hz]	230 / 50 ± 10%
Ambient temperature	[°C]	-15...+55
Dimensions (W x H x D)	[mm]	241 x 249 x 47



Type		AMS 5508 ECOswitch	AMS 5512 ECOswitch	AMS 5516 ECOswitch	AMS 5580 ECOswitch	AMS 5160 ECOswitch
Input connector plan:						
Order number		360 582	360 583	360 584	360 585	360 ???
EAN-Code 4026187...		...131180	...131197	...131203	...131210	...131???
Module type		Extension			backwards feedable	
Receiver-outputs		8	12	16	8	16
SAT range						
Frequency range	[MHz]	950 - 2150				
Gain	[dB]	2 ± 2,5				
Maximum output level	[dBμV]	Typ. 105 for 35dB IMA2 and IMA3 accord. EN 50083-3				
Trunk passband attenuation	[dB]	2,4 ± 1,5	2,7 ± 1,5	2,7 ± 1,5	2,4 ± 1,5	2,7 ± 1,5
Isolation						
SAT input / SAT input	[dB]	Typ. 40, min. 36				
SAT / Terrestrial	[dB]	Typ. 40, min. 36				
Receiver / Receiver	[dB]	Typ. 30, min. 25				
Return loss						
SAT-LNB-inputs	[dB]	Typ. 14, min. 10				
SAT trunk-outputs	[dB]	Typ. 14, min. 10				
Receiver- outputs	[dB]	Typ. 10, min. 6				
Terrestrial range passive						
Frequency range	[MHz]	5 - 862				
Decoupling attenuation *	[dB]	22,5 ± 1,5	25,5 ± 1,5	25,5 ± 1,5	22,5 ± 1,5	25,5 ± 1,5
Trunk-passband attenuation	[dB]	4,8 ± 0,8				
Maximum input level	[dBμV]	Typ. 120, accord. EN 50083-2				
Isolation						
Receiver / Receiver	[dB]	Typ. 40, min. 30				
Terrestrial / SAT	[dB]	Typ. 40, min. 30				
Return loss						
Input terrestrial passive	[dB]	18, at 40MHz -1,5 / octave				
Output trunk	[dB]	18, at 40MHz -1,5 / octave				
Receiver-outputs	[dB]	18, at 40MHz -1,5 / octave				
Power consumption						
Current demand per receiver	[mA]	40			40 plus Quatro LNB via V/L	
Common data						
Impedance	[Ω]	75				
Connectors		F-jacks				
LNB-voltage supply	[V]				Depends on multiswitch, only suitable for quadro LNB's, no SAT preamplifier	
Max. LNB current plus AMS 5550 (remote feedable SAT amplifier)	[mA]	-				
DC- admission per SAT trunk	[V / mA]	25 / 700			25 / 700 diode decoupled	
Receiver LED		green: when receiver voltage is applied				
EMC		accord. EN 50053-2				
Ambient temperature	[°C]	-15...+55				
Dimensions (W x H x D)	[mm]	170 x 177 x 47	177 x 231 x 47	170 x 177 x 47	177 x 231 x 47	177 x 231 x 47

* at filter shoulder @862MHz additionally max. 1dB

AMS 550 ECOswitch, AMS 5500 ECOswitch

Amplifiers for AMS.. cascadable multiswitches



KLASSE
A
CLASS

ECOswitch

- separate level control and equalizer for every SAT-input
- DC-bypass function for LNB supply selectable
- only AMS 550: terrestrial input passive, or switchable FM active for direct connection to an antenna
- only AMS 550: LNB supply selectable 12 V / 18 V / 22 kHz
- only AMS 550: energy saving switching power supply, only 0,5 W power consumption in stand-by mode
- only AMS 550: LED control for output current monitoring
- only AMS 5500: supply by AMS multiswitches (quatro switch capable)
- only AMS 5500: stand-by function



Type		AMS 550 ECOswitch	AMS 5550 ECOswitch
Input connector plan:			
Order number		360 550	360 551
EAN-Code 4026187...		...131227	...131234
		local powering	remote powering
Frequency range			
FM, bandpass filtered, for direct connection to FM aerial	[MHz]	87,5 - 108	
Terrestrial passive	[MHz]	5 - 862	
SAT-IF	[MHz]	950 - 2150	
Gain			
FM	[dB]	30 ± 1,5	-
Terrestrial passive	[dB]	-2,5 ± 0,5	-
SAT-IF	[dB]	20 ± 1,5	
Attenuator			
FM	[dB]	0 - 20	-
SAT-IF	[dB]	0 - 20	
SAT-IF Slope	[dB]	0 - 8	
Maximum output level			
FM 60 dB KMA accord. EN 50083-3	[MHz]	112	-
SAT-IF 35 dB IMA 2 / IMA 3 accord. EN 50083-3		110	
Noise figure			
FM	[dB]	7,5	-
SAT-IF	[dB]	8	
Return loss			
FM Input / Output	[dB]	Typ. 14, min 10	-
Terrestrial passive Input / Output	[dB]	18, at 40 MHz -1,5 / octave	
SAT-IF Input / Output	[dB]	Typ. 14, min 10	
Isolation			
Isolation SAT trunk / SAT trunk	[dB]	Typ. 40, min. 36	
Selection SAT ... Terrestrial	[dB]	Typ. 40, min. 25	
Selection Terrestrial ... SAT	[dB]	Typ. 30, min. 20	-
Power consumption			
Min. 1 receiver on, terr. passive, DC-Bypass mode	[W / VA]	3,7 / 6,9	-
Remote powering current demand at 10 V / 14 V / 18 V	[mA]	-	220 / 170 / 140
Common data			
Impedance	[Ω]	75	
Connectors		F-jacks	
LNB-voltage supply	[V]	12V / 12V_18V_0 kHz_22 KHz	-
Max. LNB current	[mA]	350	
DC-admission per SAT trunk	[V / mA]	25 / 700 (DC- Bypass)	25 / 700
Power LED		green: SAT mode; yellow: SAT standby; red: overload / short circuit	green: SAT mode
EMC		accord. EN 50053-2	
Voltage supply	[V~/Hz]	230 / 50 ± 10%	-
Ambient temperature	[°C]	-15...+55	
Dimensions (W x H x D)	[mm]	235 x 177 x 47	159 x 177 x 47

AMS 5020 ECOswitch

Splitter for AMS 5.. cascadable multiswitches



- return path capable terrestrial trunk line (5 - 862 MHz)
- distribution of the input signal on two trunk lines each
- separate diode decoupled remote powering paths
- stand-by function

Type		AMS 5020 ECOswitch
Input connector plan:		
Order number		360 552
EAN-Code 4026187...		...131241
Frequency range		
Terrestrial passive	[MHz]	5 - 862
SAT-IF	[MHz]	950 - 2150
Tap loss		
Terrestrial passive	[dB]	4 ± 0,8
SAT-IF	[dB]	4,5 ± 1
Return loss		
Terrestrial	[dB]	18, at 40 MHz -1,5 / Octave
SAT-IF	[dB]	Typ. 14, min. 10
Isolation		
Terrestrial: output 1 - output 2	[dB]	Typ. 25, min. 20
SAT-IF: output 1 - output 2	[dB]	Typ. 26, min. 24
Terrestrial - SAT	[dB]	Typ. 40, min. 36
SAT trunk - SAT trunk	[dB]	Typ. 40, min. 36
Common data		
Impedance	[Ω]	75
Connectors		15 F-jacks
DC- admission per SAT trunk max.; diode decoupled	[V / mA]	25 / 700
EMC		accord. EN 50053-2
Ambient temperature	[°C]	-15...+55
Dimensions (W x H x D)	[mm]	170 x 177 x 47



AMS 5116 ECOswitch, AMS 5216 ECOswitch

Taps for AMS 5.. cascadable multiswitches



- return path capable terrestrial trunk line (5 - 862 MHz)
- tap from one resp. two trunk lines from main trunk
- separate diode decoupled remote powering paths
- stand-by function
- highly reduced mounting effort when mounting larger distribution networks with several supply lines

Type		AMS 5116 ECOswitch	AMS 5216 ECOswitch
Input connector plan:			
		Single-tap	Twin-tap
Order number		360553	360554
EAN-Code		4026187131258	4026187131265
Frequency range			
Terrestrial passive	[MHz]	5 - 862	
SAT-IF	[dB]	950 - 2150	
Trunk bandpass attenuation			
Terrestrial passive	[dB]	1,1 ± 0,5	1,8 ± 0,6
SAT-IF	[dB]	2 ± 1	
Tap loss			
Terrestrial passive	[dB]	12,5 ± 0,5	13 ± 0,5
SAT-IF	[dB]	(14,5...11,5) ± 1	
Isolation			
Terrestrial output 1 - output 2	[dB]	-	Typ. 40, min. 36
SAT-IF output 1 - output 2	[dB]	-	Typ. 40, min. 30
Terrestrial - SAT	[dB]	Typ. 40, min. 36	
SAT trunk - SAT trunk	[dB]	Typ. 40, min. 36	
Return loss			
Terrestrial	[dB]	18, at 40 MHz -1,5 / octave	
SAT-IF	[dB]	Typ. 14, min. 10	
Common data			
Impedance	[Ω]	75	
Connectors		15 F-jacks	20 F-jacks
DC- admission per SAT trunk max.; diode decoupled	[V/mA]	25 / 700	
EMC		accord. EN 50053-2	
Ambient temperature	[°C]	-15...+55	
Dimensions (W x H x D)	mm	165 x 177 x 47	170 x 177 x 47

SAM ECOswitch series: Stand-alone, 9 inputs

Price-competitive compact multiswitches 8 SAT-inputs + 1 terrestrial



- Energy-saving concept with stand-by function; power LED
- LNBS only powered when in use
- flame-retardant plastics
- DiSEqC 2.0 (bi-directional communication between receiver and multiswitch)

SAM 94 ECOswitch



8 SAT inputs / 1 terrestrial input and 4 receiver outputs with integrated energy-saving power supply

SAM 96 ECOswitch



8 SAT inputs / 1 terrestrial input and 6 receiver outputs with integrated energy-saving power supply

SAM 98 ECOswitch



8 SAT inputs / 1 terrestrial input and 8 receiver outputs with integrated energy-saving power supply

SAM 912 ECOswitch



8 SAT inputs / 1 terrestrial input and 12 receiver outputs with integrated energy-saving power supply

SAM 916 ECOswitch



8 SAT inputs / 1 terrestrial input and 16 receiver outputs with integrated energy-saving power supply



Type		SAM 94 Ecoswitch	SAM 96 Ecoswitch	SAM 98 Ecoswitch	SAM 912 Ecoswitch	SAM 916 Ecoswitch
Input connector plan						
Order number		360 904	360 906	360 908	360 912	360 916
EAN-Code		4026187110949	4026187110956	4026187110963	4026187110970	4026187110987
Receiver outputs		4	6	8	12	16
SAT range						
Frequency range	[MHz]	950 - 2150				
Gain	[dB]	0 - 4				
Output level	[dBμV]	typ. 100, acc. EN 500083-3				
Input isolation SAT / SAT	[dB]	typ. 30				
Output isolation						
SAT / SAT	[dB]	typ. 40				
SAT / Terrestrial	[dB]	typ. 40				
Receiver / Receiver	[dB]	typ. 35				
Return loss						
Input LNB	[dB]	typ. 8				
Output	[dB]	typ. 10				
Terrestrial range						
Frequency range	[MHz]	5 - 862				
Tap loss	[dB]	19...22	20...23	21...24	25...27	26...28
Maximum input level	[dBμV]	typ. 120, acc. EN 500083-2, limited by EMC				
Isolation						
Receiver / Receiver	[dB]	typ. 24				
Terrestrial / SAT	[dB]	typ. 35				
Return loss						
Input Terrestrial	[dB]	typ. 10				
Output	[dB]	typ. 10				
Power consumption						
All receivers off	[W / VA]	3,5 / 7,5				
1 LNB on	[W / VA]	10 / 12,5				
2 LNBs on	[W / VA]	16 / 19				
LNB current	[mA]	300				
Common data						
Impedance		75				
Connectors		F-Female				
LNB-supply voltage	[V]	15 (maximum LNB-current 600 mA)				
Maximum LNB-current	[mA]	600				
EMC		compliant with EN 500083-2				
Supply voltage	[V~/Hz]	230 / 50				
Ambient temperature	[°C]	-15...+55				
Dimensions (W x H x D)	[mm]	217 x 214 x 57			289 x 214 x 57	

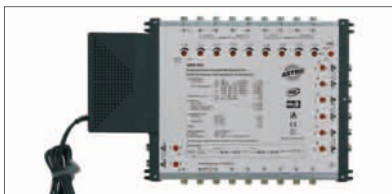
AMS Serie: Cascadable, 9 inputs

High quality casadable DiSEqC multiswitches, 8 SAT-inputs + 1 terrestrial



- Basic multiswitch usable as single switch for 8 subscribers, as amplifier or as cascade termination
- for cascading with AMS 998 / 9912 / 9916
- DVB-T-suitable, active terrestrial input with 15 dB attenuator
- attenuator (0...10 dB) for SAT-IF-inputs
- LNB supply voltage selectable 12V DC / 18 V DC / 22 kHz
- integrated energy-saving switching power supply
- optionally available: SVP 20 overvoltage protection

AMS908



System base unit with integrated energy-saving switching power supply, basic multiswitch usable as single switch for 8 subscribers, as amplifier or as cascade termination

AMS 998, AMS 9912, AMS 9916



Extension modules, available with 8, 12 or 16 receiver outputs



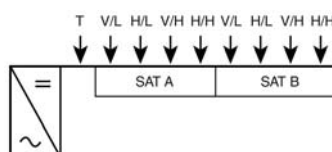
for connecting cascadable multiswitches we recommend: F-Quick-plug FSS 07 Q, see page 219



System base unit

AMS 908

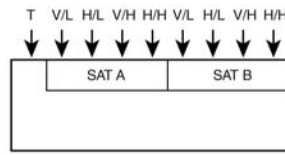
Input connector plan



Order number		360 901
EAN-Code		4026187770709
Receiver outputs		8
Frequency range		
Terrestrial passive / active	[MHz]	5...862 / 47...862
SAT-IF	[MHz]	950...2200
Gain		
Terrestrial active	[dB]	15
SAT	[dB]	12...16
Selection		
Terrestrial active / SAT	[dB]	> 26
Terr. pass. / SAT / Terr. pass. / SAT	[dB]	> 30
SAT / Terrestrial	[dB]	> 32
Isolation		
Trunk / Trunk	[dB]	≥ 30
Receiver / Receiver	[dB]	≥ 28
Maximum output level 60 dB / EN 50083-3		
Range	[MHz]	47 - 862
IMA3	[dB]	105
IMA2	[dB]	101
CTB / CSO	[dB]	94 / 90
Range	[MHz]	950 - 2200
35 dB IMA3 / EN 50083-3	[dBμV]	109
35 dB IMA2 / EN 50083-3	[dBμV]	111
Noise figure		
Terrestrial / SAT	[dB]	< 7 / < 7
LNB remote current		
Total current	[mA]	800
Single port current	[mA]	400
Current consumption per reciver	[mA]	25
Power consumption		
Terrestrial active	[W]	40
Terrestrial passive	[W]	36
Stand-by / Terrestrial active	[W]	6
Stand-by / Terrestrial passive	[W]	3
Common data		
Dimensions (W x H x D)	[mm]	326 x 130 x 39

Extension modules	AMS 998	AMS 9912	AMS 9916
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Input connector plan:



Order number		360 911	360 931	360 921
EAN-Code		4026187770716	4026187770723	4026187770730
Receiver outputs		8	12	16
Through loss				
Terrestrial	[dB]	3,5...4,5	3,5...5	3,5...5
SAT-IF	[dB]	2...4,5	4...8	4...8
Tap loss				
Terrestrial	[dB]	17...23	20...24	21...25
SAT-IF	[dB]	21...15	22...16	22...16
Frequency range				
Terrestrial	[MHz]	5 - 862		
SAT-IF	[MHz]	950 - 2200		
Crosstalk attenuation	[dB]	> 26		
Isolation				
Trunk / Trunk	[dB]	> 30	> 26	> 26
Receiver / Receiver	[dB]	> 30	> 26	> 26
Weitere Daten				
Current consumption per receiver	[mA]	max. 25	max. 25	max. 25
DC-pass (Trunk 0, 2...8)	[A]	max. 2	8,1	9,0
Dimensions (B x H x T)	[mm]	264 x 130 x 39	264 x 211 x 39	264 x 211 x 39



AMS series: cascadable, 17 inputs

High-class cascadable multiswitch, 16 SAT-inputs + 1 terrestrial

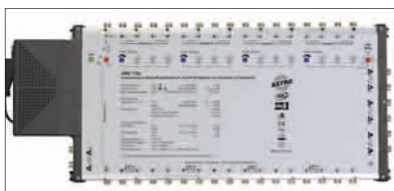


- Basic multiswitch AMS 1788 usable as single switch for 8 subscribers, as amplifier or as cascade termination
- for cascading with AMS 1708 / 1712 / 1716
- DVB-T-suitable, active terrestrial input with 15 dB attenuator
- attenuator (0...10 dB) for SAT-IF-inputs
- LNB-supply selectable (12 V / 18 V / 22 kHz)
- integrated energy saving switching power supply
- optionally: SVP 20 overvoltage protection



see page 216

AMS1788



System base unit with integrated energy-saving switching power supply, basic multiswitch usable as single switch for 8 subscribers, as amplifier or as cascade termination

AMS 1708, AMS 1712, AMS 1716



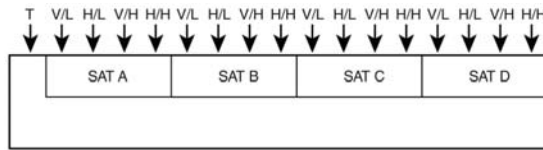
Extension modules, available with 8, 12 or 16 receiver outputs



for connecting cascadable multiswitches we recommend: F-Quick-plug FSS 07 Q, see page 219

System base unit **AMS 1788**

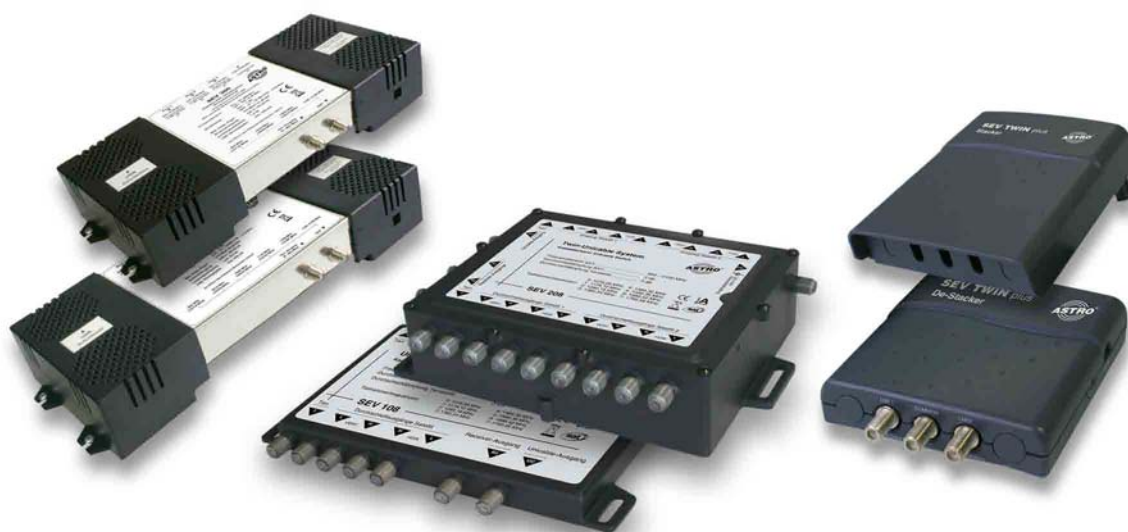
Input connector plan:



Order number		360 420
EAN-Code		4026187770785
Receiver outputs		8
Frequency range		
Terrestrial passive / active	[MHz]	5...862 / 47...862
SAT-IF	[MHz]	950...2200
Gain		
Terrestrial active	[dB]	-5
SAT	[dB]	16...20
Selection		
Terrestrial active / SAT	[dB]	> 26
terr. pass. / SAT / terr. pass. / SAT	[dB]	> 30
Terrestrial	[dB]	> 32
Isolation		
Trunk / Trunk	[dB]	≥ 30
Receiver / Receiver	[dB]	≥ 28
Maximum output level 60 dB / EN 50083-3		
Range	[MHz]	47 - 862
IMA3	[dB]	105
IMA2	[dB]	101
CTB / CSO	[dB]	94 / 90
Range	[MHz]	950 - 2200
35 dB IMA3 / EN 50083-3	[dBμV]	110
35 dB IMA2 / EN 50083-3	[dBμV]	110
Noise figure		
SAT	[dB]	< 7
LNB remote current		
Total current	[mA]	1200
Single port current	[mA]	300
Current consumption per receiver	[mA]	25
Power consumption		
Terrestrial active	[W]	54 (Terrestrial 18 V / 250 mA)
Terrestrial passive	[W]	50
Stand-by / Terrestrial active	[W]	8 (Terrestrial 18 V / 250 mA)
Stand-by / Terrestrial passive	[W]	3
Common Daten		
Dimensions (B x H x T)	[mm]	326 x 130 x 39



Extension modules		AMS 1708	AMS 1712	AMS 1716
Input connector plan:				
Order number		360 440	360 460	360 480
EAN-Code		4026187770792	4026187770808	4026187770815
Receiver outputs		8	12	16
Through loss				
Terrestrial	[dB]	5...6	3,5...5	3,5...5
SAT-IF	[dB]	2...4	4...8	4...8
Tap loss				
Terrestrial	[dB]	22...27	20...24	21...25
SAT-IF	[dB]	17...20	22...16	22...16
Frequency range				
Terrestrial	[MHz]	5 - 862		
SAT-IF	[MHz]	950 - 2200		
Crosstalk attenuation	[dB]	> 26		
Isolation				
Trunk / Trunk	[dB]	> 30		
Receiver / Receiver	[dB]	> 30		
Common data				
Current consumption per receiver	[mA]	max. 25		
Dimensions (W x H x D)	[mm]	426 x 132 x 39	426 x 211 x 39	426 x 211 x 39



Single cable solution

ASTRO offers a programmable single cable solution for mounting of multiple subscriber installations.

The following components are available:

Digital single cable distribution system:

- Effortless connection of multiple subscribers possible; the signal is distributed via the already installed trunk lines in the house
- Price-competitive reception with any digital receiver in best video and audio quality
- Complete „Sky“ can be received optionally
- Additional supply of terrestrial signals in the range of 47 to 862 MHz possible.
- 3 (SEV 300) or 5 (SEV 500) free programmable inputs 950 to 2150 MHz for supply of free selectable SAT-inputs
- Additional high power amplifiers of the SEV ZFV series available

Unicable-multiswitches:

- For distribution of SAT- and terrestrial TV- and radio signals
- HDTV-support, cascable
- Connection of up to 8 receivers possible

Stacker and De-Stacker:

- For merging two SAT-IF signals in one line
- Allows the use of twin-receivers (PVR) or two single-receivers with only one cable
- Automatical search of satellite-set-top-boxes obtained



SEV 300, SEV 500

Digital single cable distribution system



- programmable
- cost effective reception of many TV- and radio programs in best quality
- 3 (SEV 300) or 5 (SEV 500) free programmable inputs for input of selectable SAT-inputs
- usable with every digital receiver, no additional control commands
- USB Interface

Type		SEV 300	SEV 500
Connector plan:			
Order number		360 022	360 023
EAN-Code		4026187690205	4026187690212
Frequency range			
Optional inputs	[MHz]	3 x 950 - 2150	5 x 950 - 2150
Optional outputs	[MHz]	964 / 1016 / 1068	964 / 1016 / 1068 / 1716 / 1768
SAT horizontal	[MHz]	1100 - 2150	
Terrestrial	[MHz]	47 - 862	
Gain	[dB]	15...18 (1100...2150 MHz)	
Maximum output level			
(35 dB IMA)	(dB μ V)	110	
Terrestrial attenuation	[dB]	1 (47...862 MHz)	
Power supply			
Supply voltage	[V~]	230, 50/60 Hz	
Power consumption	[VA]	7,0 (ohne LNB)	max. 9,0 (ohne LNB)
LNB-current flow	[mA]	max. 440	
Common data			
Dimensions (WxHxD)	[mm]	300 x 130 x 55	350 x 130 x 55

SEV ZFV 1, SEV ZFV 2, SEV ZFV 4

System amplifier for increasing the number of subscribers



- high-power amplifier for SAT-signals
- well matched for SEV 300 and SEV 500 single cable solution
- integrated equalizer



suitable wall outlet GUT 311,
see page 187

Type		SEV ZFV 1	SEV ZFV 2	SEV ZFV 4
Connector plan:				
Order number		360 001	360 002	360 004
EAN-Code		4026187002541	4026187002558	4026187002565
Outputs		1	2	4
Frequency range				
Terrestrial	[MHz]	47 - 862		
SAT	[MHz]	950 - 2150		
Gain				
SAT	[dB]	8...15	je 6...18	je 6...18
Terrestrial	[dB]	-1	-4	-8
Maximum output level				
(35 dB IMA)	(dBμV)	118	2x 118	4x 118
Power supply				
Supply voltage	[V~]	230, 50/60 Hz		
Power consumption	[VA]	max. 2	max. 8	max. 10
Common data				
Dimensions (W x H x D)	[mm]	165 x 140 x 55	190 x 140 x 55	240 x 160 x 59



SEV Twin plus D

Stacker and De-Stacker



KLASSE
A
CLASS

- for use of twin receivers (PVR) or two single receivers with only one cable
- automatic detection with satellite set-top-boxes (original frequencies remain)
- power supply via included power supply unit
- stacker appropriate for outdoor installation

Type		SEV Twin plus Stacker	SEV Twin plus De-Stacker
Connector plan:			
Order number		360 005	
EAN-Code		4026187003517	
Frequency range			
Input LNB 1	[MHz]	950 - 2150	
Input LNB 2	[MHz]	47 - 2150	
Common	[MHz]	47 - 3850 (output)	47 - 3850 (input)
Tap loss			
LNB 1 > Common	[dB]	0	-
LNB 2 > Common	[dB]	-2	-
Transmission loss			
Common > LNB 1	[dB]	-	+9
Common > LNB 2	[dB]	-	+6
Common data			
Connectors	[Ω]	F-jack, 75	
Minimum input level	[dBμV]	-	70
Maximum input level	[dBμV]	-	95
Power supply		via De-Stacker	via external power supply (included)
Ambient temperature	[°C]	-15...+40	
Dimensions (W x H x D)	[mm]	122 x 155 x 35	116 x 90 x 32

SEV 108, SEV 208

Unicable-multiswitches



- SAT-supply via one coax-cable
- connection of up to 8 receivers; terrestrial loop through output
- cascadable
- HDTV-support; compliant to unicable standard EN 50494

Type		SEV 108	SEV 208
Connector plan:			
Order number		360 018	360 028
EAN-Code		40261871203444	4026187120337
Inputs		4 x Sat-IF inputs for Quatro LNB 1 x UHF / VHF input for terrestrial antenna	8 x Sat-IF inputs for Quatro LNB 1 x UHF / VHF input for terrestrial antenna
Outputs		4 x Sat-IF string outputs 1 x terrestrial string output 1 x legacy output (standard output for connecting the a receiver without unicable-support) 1 x unicable output for connecting up to 8 receivers	8 x Sat-IF string outputs 1 x terrestrial string output 2 x legacy output (standard output for connecting the a receiver without unicable-support) 1 x unicable output for connecting up to 8 receivers
Frequency range			
Satellite	[MHz]	950 - 2150	950 - 2150
Terrestrial	[MHz]	47 - 862	47 - 862
String attenuation			
Satellite	[dB]	maximal 3	maximal 5, typisch 3
Terrestrial	[dB]	maximal 3	maximal 5, typisch 3
Gain			
Satellite	[dB]	mindestens -10	maximal 10
Terrestrial	[dB]	0	-15
Isolation			
Satellite-Satellite-Outputs	[dB]	minimum 30	
Satellit-Terrestrisch	[dB]	minimum 35	
Common data			
Output level, AGC controlled	[dBμV]	93	
Controlprotocol		DiSEqC extended accord. CENELEC prEN50494	
Current demand	[VDC], [mA]	20, 380	19, 350
Dimensions (W x H x D)	[mm]	ca. 139 x 19 x 203	ca. 196 x 47 x 163
Ambient temperature	[C°]	-20...+60	
Power supply unit			
Input voltage	[V AC], [Hz]	90 - 265, 50/60	
Output voltage	[VDC]	20	19
Maximum current	[mA]	600	940
Short-circuit proof		no	yes





Receivers

ASTRO offers different receiver models of the ASR-series.

- ASR 625 HDMI: compact, price-competitive Free-To-Air receiver with HDMI-connector.
- ASR 1100 HD: DVB-S receiver for reception of unencrypted and encrypted TV- and radio programmes; HDTV
- ASR 1200 Twin HD: well equipped DVB-S twin receiver for reception of unencrypted and encrypted TV- and radio programmes; HDTV

ASR 625 HDMI

DVB-S Free-To-AIR receiver for reception of unencrypted digital TV- and radio programmes



- high digital video and audio quality
- storage of up to 4500 channels (TV and radio)
- electronic programme guide (EPG)
- freeze frame / subtitle and complex videotext functions
- AC3 Dolby-Digital-Surround output (SPDIF), electronically
- HDMI-output
- 256 colours on screen display(OSD)
- automatical storage of previous channel

<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p> <p>8</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p> <p>8</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p>	<p>Switching on / off the receiver</p> <p>Change the channel or flip through menu upwards</p> <p>Change the channel or flip through menu downwards</p> <p>Connecting to a PC for software upgrade</p> <p>Connecting a LNB</p> <p>Connecting another receiver</p> <p>Connecting a video- oder DVD-recorder</p> <p>Connecting a TV</p> <p>Mains switch</p> <p>Connecting a digital amplifier</p> <p>Analogue stereo-output</p> <p>Connecting a digital TV</p>
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Type		ASR 625 HDMI
Order number		320 626
EAN-Code		4026187003494
Tuner		
IF-input frequency	[MHz]	950 -2150
Input level	(dB μ V)	45...75
Input jack	[Ω]	75, F-jack
Demodulator		
Demodulation type		QPSK
Input data rate	[MSPS]	1...35
FEC / Viterbi decoding rate		1/2, 2/3, 3/4, 5/6, 7/8, AUTO
Video		
Video decoder		MPEG-2 (Main Profile @ Main Layer)
Ratio / resolution		4:3 Letterbox, 4:3 Panscan, 16:9, / 720 x 576 (PAL), 720x480 (NTSC)
Audio		
Audio-decoder		MPEG-1/2 Layers 1 oder 2
Audio-mode		Left, Right, Stereo, AC-3-Digital
Video- / Audio-output		
Video-output level	[Vss]	1 (75 Ω)
Audio-output level	[Vss]	3,0 (600 Ω) with sound volume control
Digital audio level	[Vss]	0,5 (75 Ω)
Modulator		
Output frequency		Channel 21 - 69, adjustable
PC-interface		
Connector		Sub-D plug 9-poles
Protocol		RS-232 (maximum 115 200 bps)
Front		
Channel display		4-signs
Buttons		On/Off, Channel +/-
Back		
IF-input		F-jack
IF-loop through output		F-jack
Scart-connectors		1 TV, 1 VCR, EN 50 049-1
Audio (HiFi) / Video		Cinch
AC-3 Dolby Surround output		SPDIF coaxial
RS232 serial interface		Sub-D plug 9-poles
Mains connection		European standard
Common data		
Supply voltage	[V~]	100...240, 50 / 60 Hz
Power consumption	[W]	19 / Standby 7
Switching voltage	[VDC]	13/18, max. 300 mA
LNB-control AC		22 kHz -tone / DiSEqC 1.0 and 1.2, Tone-Burst A/B
Ambient temperature	[$^{\circ}$ C]	0...+40
Dimensions (W x H x D)	[mm]	ca. 285 x 44 x 160
Weight	[kg]	ca. 1

ASR 1100 HD

DigitalH D-receiver



- HDTV PVR receiver (H.264 / MPEG4 HD)
- 2 x USB for external hard disc
- 2 x common interface and 1 x smart card reader
- unicable / DiSEqC 1.0, 1.1, 1.2 and 1.3 (USALS)
- record and play with connected hard disc
- 8-signs alphanumeric display
- software-update via USB or network
- HDMI 576i, 576p, 720p, 1080i

<p>1 Smartcard</p> <p>2 CI</p> <p>3 ▲ + ▼</p> <p>4 ⏻</p>	<p>Smart Card Reader</p> <p>Common Interface connector</p> <p>Change programme or navigate in menu</p> <p>Switch on / off the receiver</p>
<p>5 LNB IN</p> <p>6 VIDEO</p> <p>7 YUV</p> <p>8 USB</p> <p>9 ON / OFF</p> <p>10 RS 232</p> <p>11 LAN</p> <p>12 HDMI</p> <p>13 AUDIO R / L</p> <p>14 DIGITAL AUDIO</p> <p>15 LNB OUT</p>	<p>Connecting a LNB</p> <p>Connecting a videorecorder</p> <p>YPbPr connector</p> <p>USB connector</p> <p>Mains switch</p> <p>Connecting to PC for software-update</p> <p>Network connectors</p> <p>Connecting a digital TV</p> <p>Analogue Stereo-output</p> <p>Connecting a digital amplifier</p> <p>Connecting another digital receiver</p>



Type		ASR 1100 HD
Order number		320110
EAN-Code		40026187120719
Tuner and Channel-decoder		
Input connector		F-Type, IEC 169-24, jack
Loop through output		F-Type, IEC 169-24, jack
Frequency range	[MHz]	950 - 2150
Input impedance	[Ω]	75
Signal level	[dBm]	-65 bis -25
Demodulation		QPSK / 8PSK
Input symbol rate		2 ~ 45 Ms/s(QPSK of DVB-S) 2 ~ 45 Ms/s(QPSK of DVB-S2) 2 ~ 37 Ms/s(8PSK of DVB-S2) 1/2, 2/3, 3/4, 5/6 and 7/8 with Constraint Length K=7(DVB-S)
FEC Decoder		1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9 and 9/10 (DVB-S2)
MPEG Transport stream A/V Decoding		
Transport stream		H.264(MPEG-4 part 10, MPEG-4/AVC and H26L), MPEG-II ISO/IEC 13818-2/11172-2
Profile Level		MPEG-4/AVC MP@L4, MPEG-II MP@HL
Input rate	[Mbit/s]	maximum 80
Videoformat		4:3 Letter Box, 4:3 PanScan, 16 : 9
Video resolution		720 x 576i, 720 x 576p, 720 x 480i, 720 x 480p, 1280 x 720p, 1920 x 1080i
Audio decoding		Dolby AAC, AC-3, MPEG-1 Layer 1,2 and 3
Audio modus		Stereo/joint stereo/mono, Dolby AC-3
Sampling rate	[kHz]	32, 44.1 and 48
Audio / Video connectors		
RCA		CVBS Video, Audio L, R output, Component YPbPr Video-output
HDMI		Video & Audio output
Optical		AC-3 Dolby Digital (SPDIF)
RS-232C	[kbps]	9 pin D-SUB (Male) type, transfer-rate 115
USB		2 x USB 2.0 Host connector (back)
Ethernet	[Mbps]	100, RJ45 connector
LNB-control		
LNB-voltage	[VDC]	13/18, maximum 400 mA
22 kHz Tone	[kHz]	22 ± 2, 0,6 ± 0,2 V
DISEqC		V1.0 / 1.2 / USALS
Front		
Connectors		1 CI-module-slot & 1 Smart Card Reader
Display		VFD Display 8-stellig
Buttons		3 Buttons (Standby, channel up-down)
Main system		
Master processor		STi chipset
Storage		Flash 32 Mb, Sdram 192 Mb, EEprom 256 bytes
Common data		
Supply voltage	[V~]	100...250, 50/60 Hz
Power consumption	[W]	maximum 35 / Standby ≤ 1
Ambient temperature	[°C]	0...+45
Dimensions (W x H x D)	[mm]	ca. 340 x 60 x 230
Weight	[kg]	ca. 1,6

ASR 1200 Twin HD

Digital twin HD-receiver



- 2 HDTV-tuners for recording two programmes simultaneously
- 2 x USB and e-SATA for external hard disc
- 12-signs alphanumeric VFD display
- Linux operating system
- HDMI 576i, 576p, 720p, 1080i
- video-format in 4:3 and 16:9
- PIP and splitscreen (picture in picture)
- user friendly OSD-menu (multiple languages)



1	USB 2.0	USB connector
2	Smartcard	Smart Card Reader
3	CI	Common Interface connector
4	◀ + ▶	Change program or navigate in menu
5	▲ + ▼	Adjust volume
6	LNB 1	Connecting a LNB
7	LNB 2	Connecting a LNB
8	VIDEO	Connecting a TV via cinch
9	YUV	YPbPr connector
10	VCR SCART	Connecting a videorecorder via Scart-cable
11	RS 232	Connecting a PC for software-update
12	e-SATA	Hard disc connectors
13	ON / OFF	Mains switch
14	LAN	Network connector
15	HDMI	Connecting a digital TV
16	USB 2.0	USB connector
17	TV SCART	Connecting a TV or videorecorder via Scart
18	AUDIO R / L	Analogue Stereo-output
19	DIGITAL AUDIO	Connecting a digital amplifier
20	LNB 1 OUT	Connecting a digital receiver
21	LNB 2 OUT	Connecting another digital receiver

Type		ASR 1200 twin HD
Order number		320120
EAN-Code		4026187111205
Tuner and Channel-decoder		
Input connector		F-Type, IEC 169-24, jack
Loop through output		F-Type, IEC 169-24, jack
Frequency range	[MHz]	950 - 2150
Input impedance	[Ω]	75
Signal level	[dBm]	-65 to -25
Demodulation		QPSK / 8PSK
Input symbol rate		2 ~ 45 Ms/s(QPSK of DVB-S) 2 ~ 45 Ms/s(QPSK of DVB-S2) 2 ~ 37 Ms/s(8PSK of DVB-S2) 1/2, 2/3, 3/4, 5/6 and 7/8 with Constraint Length K=7(DVB-S)
FEC Decoder		1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9 and 9/10 (DVB-S2)
MPEG Transport stream A/V Decoding		
Transport stream		H.264(MPEG-4 part 10, MPEG-4/AVC and H26L), MPEG-II ISO/IEC 13818-2/11172-2
Profile level		MPEG-4/AVC MP@L4, MPEG-II MP@HL
Input rate	[Mbit/s]	maximum 15
Videoformat		4:3 Letter Box, 4:3 PanScan, 16 : 9
Video resolution		720 x 576i, 720 x 576p, 720 x 480i, 720 x 480p, 1280 x 720p, 1920 x 1080i
Audio decoding		Dolby AAC, AC-3, MPEG-1 Layer 1,2 and 3
Audio mode		Stereo/joint stereo/mono, Dolby AC-3
Sampling Rate	[kHz]	32, 44.1 and 48
Audio / Video Anschlüsse		
TV SCART		RGB, Y/C, CVBS Video, Audio L, R output
VCR SCART		CVBS Video, Audio L, R output, RGB Video-input, CVBS Video, Audio L, R input
RCA		CVBS Video, Audio L, R output, Component YPbPr Video-output
HDMI		Video & Audio output
Optical		AC-3 Dolby Digital (SPDIF)
RS-232C	[kbps]	9 pin D-SUB (Male) type, transfer-rate 115
USB		USB 2.0 Host connector (front- and back)
e-SATA		External SATA HDD
LNB-control		
LNB-voltage	[VDC]	13/18, maximum 400 mA
22 kHz Tone	[kHz]	22 ± 2, 0,6 ± 0,2 V
DISEqC		V1.0 / 1.2 / USALS
Front		
Connectors		1 USB 2.0 Host Port, 2 Common Interface & 1 Smart Card Reader
Display		VFD Display 12 signs
Buttons		5 buttons (standby, channel up-down, volume low-high)
Main system		
Master processor		STi chipset St7109
Storage		Flash 32 Mb, Sdram 192 Mb, EEprom 128 kb
Common data		
Supply voltage	[V~]	100...250, 50/60 Hz
Power consumption	[W]	maximum 60 / standby ≤ 1
Ambient temperature	[°C]	0...+45
Dimensions (W x H x D)	[mm]	ca. 340 x 60 x 230
Weight	[kg]	ca. 2,0



Head-end technology

Overview of signal-processing options

Universal compact SAT-processing

Z-8 complete unit

Overview X-series

Base units with 2 (X-2), 5 (X-5) or 8 (X-8) plug-in slots
Plug-in cards of the X-series

Professional SAT-processing

Overview V-series

V16 base units with 8 plug-in slots
Plug-in cards of the V-series

Carrier Class signal-processing

Overview U-series

Professional SAT-distribution technology
IP transmission- and reception-gateways
Head-end management system
Active and passive combining
Carrier Class Edge technology

Head-end accessories

Mounting cabinets and -accessories
Bus controllers
Jumper- and adapter-cables
Channel selective input- and output filters
Power supplies for X-5, X-8 and V16 base units
KC 3 programming unit
HE-programming software

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Page 53

Page 83

Page 107

Page 121



Which head-end offers which signal-processing?

You will find an overview of the different series on page 60 (X-series), page 86 (V-series) resp. page 109 (U-series)

Important: All plug-in cards of the X-series can be mounted in V 16 base units!

Signal processing	Series	Plug-in cards (X-, V-series) and modules (U-series)				Page
Terrestrial converters	X-series	X-DTU	X-DTU duo			62
	V-series	V 311				96
DVB-S2 to COFDM	X-series	X-COFDM duo S2	X-COFDM duo S2 CI			63
	V-series	V 912	V 912 CI			105
QPSK to PAL	X-series	X-DVB-S/PAL duo	X-DVB-S/PAL duo CI	X-DVB-S/PAL twin DD	X-DVB-S/PAL twin DD CI	66
	V-series	V 612	V 612 CI			102
QPSK to Multinorm	X-series	X-DVB-S Multinorm twin	X-DVB-S Multinorm twin CI			65
COFDM (DVB-T) to PAL	X-series	X-DVB-T/PAL twin	X-DVB-T/PAL twin CI			67
	V-series	V 712	V 712 CI			103
COFDM to Multinorm	X-series	X-DVB-T Multinorm twin	X-DVB-T Multinorm twin CI			68
QAM to PAL	X-series	X-DVB-C/PAL twin	X-DVB-C/PAL twin CI			69
	V-series	V 812	V 812 CI			104
QAM to Multinorm	X-series	X-DVB-C Multinorm twin	X-DVB-C Multinorm twin CI			70
A/V to PAL	X-series	X-A/V twin 860 S	X-A/V Multinorm twin	X-A/V quad		71
	V-series	V 112				88
PAL to A/V	X-series	X-Demod twin				72
QPSK to QAM	X-series	X-QAM twin 3	X-QAM twin 5	X-QAM twin 6		73
DVB-S2 to QAM	X-series	X-QAM twin 5 S2	X-QAM twin 6 S2	X-QAM duo 7 S2	X-QAM duo 7 S2 CI	74
	V-series	V 512	V 512 CI	V 514	V 534	97
QAM to QAM	X-series	X-CQAM twin 6	X-TQAM twin 6			78
	V-series	V 504				98
QAM to UKW	X-series	X-DVB-C/FM twin				79
QPSK to UKW	X-series	X-DVB-S/FM twin	X-DVB-S/FM octopus			79
UKW to UKW	X-series	X-UKW twin	X-UKW Verstärker			80
Audio to UKW	X-series	X-FM twin S				82
ASI to QAM	V-series	V 202				89
ASI to PAL	V-series	V 212	V 212 CI			90
ASI to UKW	V-series	V 222	V 228			91
QAM to ASI	V-series	V 231	V 231 CI			92
COFDM to ASI	V-series	V 241	V 241 CI			93
QPSK to ASI	V-series	V 251	V 251 CI			94
DVB-S2 to ASI	V-series	V 252	V 253 CI			94
COFDM to QAM	V-series	V 503	X-TQAM twin 6			98
DVB-S2 and ASI to QAM and ASI	V-series	V 532				99
ASI to QAM and ASI	V-series	V 532-ASI				100
ASI to COFDM	V-series	V 912-ASI				106
IP to PAL	U-series	U 114				111
IP to FM	U-series	U 124				112
IP to QAM	U-series	U 154				113



Universal compact SAT-processing

Z-8 complete unit:

The Z-8 complete unit is the most price-competitive solution for SAT-processing: 8 slots for mounting of plug-ins populated with Z 62 D plug-in cards for processing of digital satellite signals into PAL output channels; programming only via KC 3 programming unit; plug-in modules are locked by a locking device built into the base unit; only plug-in cards of the Z-series pluggable.

X-series:

The X-series is guaranteed future-proof thanks to a flexible modular concept. Its outstanding features are easy servicing and easy expandability. A motherboard holds easily interchangeable plug-in modules allowing a mixed digital/analogue complement. The entire system is enclosed in a compact metal housing with 2, 5 or 8 plug-in slots.

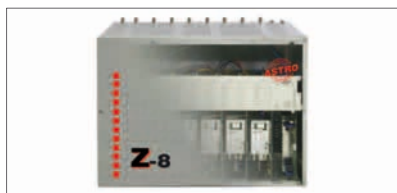
The main field of application for the X-series are conversion or expansion of small to medium-sized community installations and design of new distribution networks.

- analogue, digital, twin and single plug-in cards pluggable
- suitable for adjacent channels to 862 MHz
- integrated input switching matrix and output combiner to simplify cabling
- low service and maintenance expenses
- fully compatible with cards of the X-series
- adjustment via the HE-programming software (only X-5 / X-8 twin) or via programming unit KC 3 (exceptions see overview of X-plug-in cards)



Z-8

Complete unit



- 8 plug-in slots (each populated with a Z 62 D plug-in card)
- 16 PAL output channels from 8 input transponders
- extensive programme choice by combining
- configuration exclusively via KC 3 programming unit



see page 126

- plug-in modules locked by integrated locking device

Common data		Z-8 base unit
Power supply	[V~/Hz]	230 / 50
EMC		accord. EN 50083-2
Ambient temperature	[°C]	0...+50
Dimensions (H x W x D) with mounting brackets backside		340 x 491 x 290
Weight without plug-in cards	[kg]	4,9
Power cons. (without plug-in cards)	[VA] / [W]	maximum 95 / 80

Type		Z-8 DVB-S/PAL
Order number		380 500
EAN-Code		4026187652081
scope of supply:		
Base unit Z-8		<input checked="" type="checkbox"/>
ZSV SAT-distribution field		2 x
Z...Twin-plug-in cards		8 x Z 62 D

Plug-in card Z 62 D:

QPSK demodulator		
Input frequency range	[MHz]	950 - 2150
Input level	[dBμV]	40 - 80
SAT-IF-input	[Ω]	F-jack, 75
Return loss	[dB]	≥ 10
AFC-catch range		automatical adjustment
SAT-IF-bandwidth	[MHz]	36
Spectrum shape	[%]	35 cos-roll-off
Input data rate	[MBaud]	2 - 35, adjustable
Viterbi-Decoding (accord. DVB standard)		1/2; 2/3; 3/4; 5/6; 7/8; automatically / manually
Interfaces		-
RF modulators		
Connectors	[Ω]	IEC-jack, 75
Output frequency	[MHz]	47 - 862
Output channels		K2 - K69 (C2 - C69)
Output level	[dBμV]	90 - 100
Intermodulation distance	[dB]	typ. 60
Return loss	[dB]	> 10
Spurious frequency distance	[dB]	typ. 60
TV standard		B, G (D/K on request)
Video-signal to noise ratio	[dB]	typ. 56
Common data		
Power consumption	[W]	13,5
Ambient temperature	[°C]	0...+50



Universal and compact - the X-series

By continuous advancement the approved head-end modules of the X-series have matured to a complete, rounded off concept for nearly every demand. Within the series ASTRO offers three base units for different requests:

Base units of the X-series

- X-2 twin: 2 SAT-inputs, 2 external inputs, preparation for 4 A/V-inputs, analogue and digital Twin- and Single-plug-in cards pluggable
- X-5 twin: 2 switchable SAT-inputs, 10 external inputs, analogue and digital Twin- and Single-plug-in cards pluggable
- X-8 twin: 4 external inputs, preparation for 32 A/V-inputs, 1 Bus adapter, analogue and digital Twin- and Single-plug-in cards pluggable

The arrangement of the signal processing with the base units X-2 twin, X-5 twin and X-8 twin and the price-competitive digital twin-modules result in the systems high efficiency. Of course all modules of the X-series can be used in the V 16 base unit as well.

The plug-in cards of the X-series offer you approved technology and flexible mounting of the base units with plug-in modules. Digital (DVB-C / -S / -T) as well as analogue input signals can be processed and converted into cable-suitable DVB-C, PAL or FM signals.

Which signals can be converted with the X-series?

- Terrestrial converters (DVB-T and analogue TV)
- DVB-S to PAL, DVB-T to PAL and DVB-C to PAL Transcoders
- DVB-S to FM Transcoders
- DVB-S(2) to QAM, DVB-T to QAM, DVB-C to QAM and DVB-S(2) to COFDM Transmodulators
- A/V Modulators and De-Modulators
- Terrestrial FM-Converters



you can find a detailed overview on pages 60 - 61

The high-performance transmodulators are HDTV applicable and support all features required for processing cable signals according DVB-C standard. But also the transcoders for PAL and FM offer convincing features, of which operators as well as endcustomers will benefit. Terrestrial converters, modulator-cards and analogue SAT-modules complement the X-series.

The very good price/performance ratio of the X-series makes it possible to use it even in small networks, but because of the good system parameters it can promptly be used in larger CATV-networks.

X-2t win

Base unit with 2 slots



- 2 SAT-inputs, 2 external inputs, ready for 4 AV-inputs
- audio / video modulator plug-in cards pluggable (with X-A/V quad up to 8 channels)
- for analogue, digital, twin and single plug-in modules
- audio / video modulator plug-in cards pluggable (with X-A/V quad up to 8 channels)
- suitable for adjacent channels up to 862 MHz
- plug-in power supply included
- integrated output combiner to simplify cabling
- adjustment via KC 3 programming unit



see page 126

Type		X-2 twin base unit
Order number		380 020
EAN-Code		4026187651732
Supply voltage	[V~/Hz]	230 / 50
EMC		compliant EN 50083-2
Ambient temperature	[°C]	0...+50
Dimensions (W x H x D)	[mm]	240 x 115 x 235
Weight	[kg]	2,3
Power supply	[V]	12, 5 A, 60 W



X-5tw in

Base unit with 5 slots



- base unit with input splitter, power supply and motherboard
- ideal for supplement of existing CATV- or IF-distribution networks
- individual assembly and configuration
- adjustment via HE programming software or KC 3 programming unit

Type		X-5 base unit
Version		twin
Order number		330 461
EAN-Code		4026187650810
SAT inputs		
Switchable inputs		2
External inputs		10
Polarisations		up to 12
AV-inputs		-
Busadapter BA 2		-
Common data		
Supply voltage	[V~/Hz]	230 / 50
EMC		compliant EN 50083-2
Ambient temperature	[°C]	0...+50
Dimensions (W x H x D)	[mm]	218 x 360 x 277
Weight	[kg]	3,6
Power consumption	[VA] / [W]	maximum 95 / 80

X-8t win

Base unit with 8 slots



- Base unit with input splitter, power supply and motherboard
- ideal for supplement of existing CATV- or IF-distribution networks
- individual assembly and configuration
- adjustment via HE programming software or KC 3 programming unit

Type		X-8 twin
Order number		380 010
EAN-Code		4026187651732
SAT inputs		
Switchable inputs		-
External inputs		4
Polarisations		up to 8
AV-inputs (prepared)		up to 32
Busadapter		1
Common data		
Supply voltage	[V- / Hz]	230 / 50
EMC		according EN 50083-2
Ambient temperature	[°C]	0...+50
Dimensions (W x H x D) with mounting brackets backside	[mm]	340 x 426 x 277 (19" / 7 HE Basis) 340 x 491 x 290
Weight	[kg]	6,8
Power consumption	[VA] / [W]	maximum 200 / 160

X-8tw in

Complete units



Type	X-8 twin DVB-S/PAL	X-8 twin DVB-S/PAL CI
Order number	380 013	380 011
EAN-Code	4026187652012	4026187651848
Consisting of:		
X-8 Basis twin	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
X-plug-in cards	8 x X-DVB-S/PAL twin (16 Channels)	8x X-DVB-S/PAL twin CI (16 Channels)



Plug-in cards of the X-series

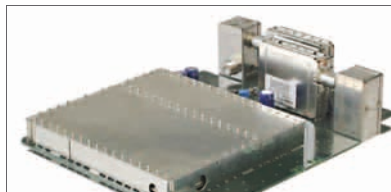
Type	Description	Pluggable in		Programmable with KC 3	Page
		X-5	X-8		
Terrestrial Converters					
X-DTU	terrestrial converter (analogue or DVB-T)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	62
X-DTU duo	terrestrial twin-converter (analogue oder DVB-T) independent output channels	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	62
DVB-S2 to COFDM					
X-COFDM duo S2	DVB-S2 to COFDM (DVB-T) twin-converter, Direct Digital, independent output channels		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	63
X-COFDM duo S2 CI	DVB-S2 to COFDM (DVB-T) twin-converter with CI, Direct Digital, independ. output channels		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	63
QPSK to PAL					
X-DVB-S/PAL duo	QPSK to PAL twin-converter, independent output channels	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	66
X-DVB-S/PAL duo CI	QPSK to PAL twin-converter with CI, independent output channels		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	66
X-DVB-S-PAL twin DD	QPSK to PAL twin-converter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	64
X-DVB-S-PAL twin DD CI	QPSK in PAL twin-converter with CI		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	64
QPSK to Multinorm					
X-DVB-S/Multinorm twin	QPSK to PAL, PAL B/G, PAL D/K NiCAM twin-converter, Direct Digital		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	65
X-DVB-S/Multinorm twin CI	QPSK to PAL, PAL B/G, PAL D/K NiCAM twin-converter with CI, Direct Digital		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	65
COFDM to PAL					
X-DVB-T/PAL twin	COFDM (DVB-T) to PAL twin-converter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	67
X-DVB-T/PAL twin CI	COFDM (DVB-T) to PAL twin-converter with CI		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	67
COFDM to Multinorm					
X-DVB-T/Multinorm twin	COFDM (DVB-T) to PAL, PAL B/G, PAL D/K NiCAM twin-converter, Direct Digital		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	68
X-DVB-T/Multinorm twin CI	COFDM (DVB-T) to PAL, PAL B/G, PAL D/K NiCAM twin-converter with CI		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	68
QAM to PAL					
X-DVB-C/PAL twin	QAM to PAL twin-converter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		69
X-DVB-C/PAL twin CI	QAM to PAL twin-converter with CI		<input checked="" type="checkbox"/>		69
QAM to Multinorm					
X-DVB-C/Multinorm twin	QAM to PAL, PAL B/G, PAL D/K NiCAM twin-converter, Direct Digital		<input checked="" type="checkbox"/>		70
X-DVB-C/Multinorm twin CI	QAM to PAL converter, PAL B/G, PAL D/K NiCAM twin-converter with CI, Direct Digital		<input checked="" type="checkbox"/>		70
A/V to PAL					
X-A/V twin 860 S	A/V to PAL twin-modulator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		71
X-A/V Multinorm twin	A/V to PAL twin-modulator, Direct Digital		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	71
X-A/V quad	A/V to PAL quad-modulator		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	71

Type	Description	Pluggable in		Programmable with KC 3	Page
		X-5	X-8		
PAL to A/V					
X-Demod twin	PAL to A/V twin-demodulator, Mono	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	72
QPSK to QAM					
X-QAM twin 3	QPSK to QAM twin-converter, Direct Digital, MER typ. 40 dB	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		73
DVB-S2 to QAM					
X-QAM twin 5 S2	DVB-S2 to QAM twin-converter with data rate adjustment, NIT/PID-processing, PID-remapping, PCR-correction, Direct Digital, MER typ. 40 dB		<input checked="" type="checkbox"/>		74
X-QAM twin 6 S2	DVB-S2 to QAM twin-converter with data rate adjustment, NIT/PID-processing, PID-remapping, PCR-correction, OP-ID, Direct Digital, MER typ. 45 dB		<input checked="" type="checkbox"/>		74
X-QAM duo 7 S2	DVB-S2 to QAM twin-converter with data rate adjustment, NIT/PID-processing, servicefilter, OP-ID, PID-remapping, PCR-correction, Direct Digital, MER typ. 45 dB, independent output channels		<input checked="" type="checkbox"/>		75
X-QAM duo 7 S2 CI	DVB-S2 to QAM twin-converter with data rate adjustment, NIT/PID-processing, servicefilter, OP-ID, PID-remapping, PCR-correction, Direct Digital, MER typ. 45 dB, independent output channels, CI-Interface		<input checked="" type="checkbox"/>		75
X-QAM quad	DVB-S2 to QAM quad-transmodulator; data rate adjustment, NIT/PID-processing, PID-remapping, PCR-correction, Direct Digital, MER typ. 45 dB		<input checked="" type="checkbox"/>		76
X-QAM Router	DVB-S2 to QAM quad-multiplexer; data rate adjustment, NIT/PID-processing, servicefilter, service-routing, PID-remapping, PCR-correction, Direct Digital, MER typ. 45 dB		<input checked="" type="checkbox"/>		77
QAM to QAM					
X-CQAM twin 6	QAM (DVB-C) to QAM twin-converter with data rate adjustment, NIT/PID-processing, PID-remapping, PCR-correction, Direct Digital, MER typ. 45 dB	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		78
X-TQAM twin 6	QAM (DVB-T) to QAM twin-converter with data rate adjustment, NIT/PID-processing, PID-remapping, PCR-correction, Direct Digital, MER typ. 45 dB	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		78
QAM to FM					
X-DVB-C/FM twin	QAM to FM twin-transcoder with RDS, Direct Digital	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		79
QPSK to FM					
X-DVB-S/FM twin	QPSK to FM twin-transcoder with RDS, Direct Digital	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	79
X-DVB-S/FM octopus	QPSK to FM 8-times-transcoder with RDS, Direct Digital		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	79
FM to FM					
X-UKW twin	FM to FM terrestrischer twin-converter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	80
X-UKW Verstärker	terrestrial FM-amplifier with 6 wave traps	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	81
Audio to UKW					
X-FM twin S	Audio to FM twin-modulator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	82



X-DTU, X-DTU duo

digital / analogue terrestrial converters



- for conversion and input of terrestrial TV-programmes in existing CATV- or SAT-IF distribution networks
- DVB-T to DVB-T or PAL to PAL possible
- automatic input level adjustment
- electronic level adjustment
- X-DTU duo offers 2 independent programmable output channels

Type		X-DTU	X-DTU duo
Order number		330 598	330 597
EAN-Code		4026187651947	4026187651985
Input			
Impedance	[Ω]	75	
Connectors		IEC jack	
Input frequency range	[MHz]	47 - 862	
Input level			
analogue / digital	[dBμV]	50 - 80 / 40 - 70	
Return loss	[dB]	typ. ≥ 10	typ. ≥ 8
TV standard		DVB-T	B/G, (D/K o. req.) / DVB-T 7/8 MHz
Control range for level control	[dB]	> 45	
Output (RF modulator)			
Output frequency	[MHz]	47 - 862 / C 2 - C 69	
Output level			
analogue / digital	[dBμV]	90 - 100 / 80 - 90	90 - 100 / 85 - 95
Intermodulation distance	[dB]	typ. 60	
Return loss	[dB]	> 10	
Common data			
Power consumption	[W]	7,5	11
Ambient temperature	[°C]	0...+ 50	

X-COFDM duo S2, X-COFDM duo S2 CI

DVB-S2 to COFDM (DVB-T) twin-converter



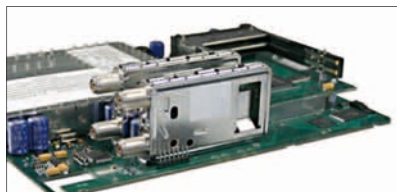
- for processing of DVB-S(2)-modulated SAT-IF-signals in two independent COFDM output channels
- selection of programmes for transmutation via pass- or drop-service filter
- CI Interface (only X-COFDM duo S2 CI)

Typ		X-COFDM duo S2	X-COFDM duo S2 CI
Order number		330 483	330 482
EAN-Code		4026187002954	4026187131296
DVB-S(2) demodulator			
Connectors	[Ω]	F-jack, 75	
Input frequency range	[MHz]	950 - 2150	
Input level	[dBμV]	44 - 80	
Input symbol rate	[MS/s]	max. 30,0 (DVB-S2); max. 45 (DVB-S)	
DVB-S Viterbi		1/2; 2/3; 3/4; 5/6; 6/7; 7/8	
DVB-S2 LDPC		1/4; 1/3; 2/5; 1/2; 3/5; 2/3; 3/4; 4/5; 5/6; 8/9; 9/10	
DVB-S2 Roll-off-factors		0,20;0,25;0,35	
DVB-S2 Modulation		QPSK, 8PSK	
COFDM modulator			
Signal processing		accord. DIN EN 300744	
Transmission modes		2k (8k on request)	
Modulation		QPSK; 16 QAM; 64 QAM	
Coding		1/2; 2/3; 3/4; 5/6; 6/7; 7/8	
Bandwidth	[MHz]	6; 7; 8	
TS editing			
Data rate adjustment		<input checked="" type="checkbox"/>	
PCR-correction		<input checked="" type="checkbox"/>	
PID-filtering / -remapping		PID-remapping	
Service-Filtering		Pass- / Drop-Filter	
CI-Interface		-	<input checked="" type="checkbox"/>
RF output			
Connectors	[Ω]	IEC-jack, 75	
Frequency range	[MHz]	47 - 862 (K2 - K69) adjustable in 0,1 MHz-steps	
Output level	[dBμV]	80...96 adjustable	
MER (equalizer, 64 QAM)	[dB]	typ. 36	
Spurious frequency dist. 47 - 862 MHz	[dB]	> 60 discrete interferences / > 57, noise interferences	
Channel filter		optional	
Common data			
Power consumption	[W]	13,5	17
Ambient temperature	[°C]	0...+50	



X-DVB-S/PAL twin DD, X-DVB-S/PAL twin DD CI

QPSK to PAL converters

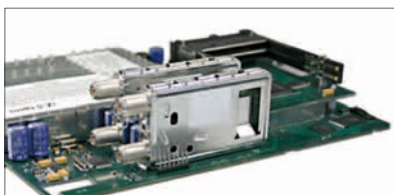


- for processing of two digital SAT-TV-programmes in one or two PAL-signals in the frequency range 47 - 862 MHz
- output channel A selectable, output channel B is automatically selected as the adjacent channel
- Data services like VPS or teletext can be switched on / off via software as well as the generation of test lines
- electronic level adjustment

Type		X-DVB-S/PAL twin DD	X-DVB-S/PAL twin DD CI
Order number		330 676	330 677
Ean-Code		4026187651756	4026187680138
QPSK demodulator			
Input frequency range	[MHz]	950 - 2150	
Input level	[dB μ V]	40 - 80	
SAT-IF input	[Ω]	F jack, 75	
Return loss	[dB]	≥ 10	
AFC-catch range		automatically adjusted	
SAT-IF bandwidth	[MHz]	36	
Spectrum shape cos-roll-off	[%]	35	
Input data rate	[mBaud]	2 - 35, adjustable	
Viterbi-decoding (according DVB standard)		1/2; 2/3; 3/4; 5/6; 7/8 automatically / manually	
CI interfaces		-	<input checked="" type="checkbox"/>
RF modulator			
Connectors	[Ω]	IEC jack, 75	
Output frequency	[MHz]	47 - 862 (2 adjacent channels)	
Output channels		C2 - C69 (2 adjacent channels)	
Output level	[dB μ V]	90 - 100 (incl. base unit)	
Intermodulation distance	[dB]	typ. 60	
Return loss	[dB]	> 10	
Spurious frequency distance	[dB]	typ. 60	
TV standard		PAL	
Video-signal to noise ratio	[dB]	typ. 55	
Common data			
Power consumption	[W]	14	17,5
Ambient temperature	[$^{\circ}$ C]	0...+50	

X-DVB-S Multinorm twin, X-DVB-S Multinorm twin CI

QPSK to PAL twin-converters



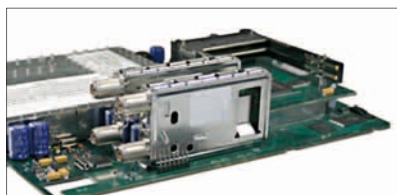
- for processing of two digital SAT-TV-programmes in two adjacent PAL-signals in the frequency range 47 - 862 MHz
- free configuration via software, support of all common TV standards
- electronic level adjustment

Type		X-DVB-S Multinorm twin	X-DVB-S Multinorm twin CI
Order number		330 667	330 666
QPSK demodulator			
Input frequency range	[MHz]	950 - 2150	
Input level	[dBμV]	40 - 80	
SAT-IF input	[Ω]	F jack, 75	
Return loss	[dB]	≥ 10	
AFC-catch range		automatically adjusted	
SAT-IF bandwidth	[MHz]	36	
Spectrum shape cos-roll-off	[%]	35	
Input data rate	[mBaud]	2 - 35, adjustable	
Viterbi-Decoding (according DVB standard)		1/2; 2/3; 3/4; 5/6; 7/8 automatically / manually	
CI interfaces		-	<input checked="" type="checkbox"/>
RF modulator			
Connectors	[Ω]	IEC jack, 75	
Output frequency	[MHz]	47 - 862 (C2 - C69)	
Output level	[dBμV]	90 - 100	
Intermodulation distance	[dB]	typ. 60	
Return loss	[dB]	> 10	
Spurious frequency distance	[dB]	typ. 60	
TV standard		PAL/SECAM, B/G/D, SECAM L, A2/NICAM	
Inter-carrier signal to noise ratio	[dB]	typ. 60	
Stereo cross talk	[dB]	> 55	
Residual carrier accuracy	[%]	1	
Video-signal to noise ratio	[dB]	typ. 60	
Common data			
Power consumption	[W]	12,5	14,5
Ambient temperature	[°C]	0...+50	



X-DVB-S/PAL duo, X-DVB-S/PAL duo CI

QPSK to PAL twin-converters



- for processing of two digital SAT-TV-programmes in two adjacent PAL-signals in the frequency range 47 - 862 MHz
- free configuration via software, support of all common TV standards
- electronic level adjustment

Type		X-DVB-S/PAL duo	X-DVB-S/PAL duo CI
Order number		330 686	330 687
EAN-Code		4026187111014	4026187111021
QPSK demodulator			
Input frequency range	[MHz]	950 - 2150	
Input level	[dBμV]	40 - 80	
SAT-IF Input	[Ω]	F jack, 75	
Return loss	[dB]	≥ 10	
AFC-catch range		automatically adjusted	
SAT-IF-Bandwidth	[MHz]	36	
Spectrum shape cos-roll-off	[%]	35	
Input data rate	[mBaud]	2 - 35, adjustable	
Viterbi-Decoding (according DVB standard)		1/2; 2/3; 3/4; 5/6; 7/8 automatically / manually	
CI interfaces		-	<input checked="" type="checkbox"/>
RF modulator			
Connectors	[Ω]	IEC jack, 75	
Output frequency	[MHz]	47 - 862 (C2 - C69) independant adjustable	
Output level	[dBμV]	90 - 100	
Intermodulation distance	[dB]	typ. 60	
Return loss	[dB]	> 10	
Spurious frequency distance	[dB]	typ. 60	
TV standard		PAL/SECAM, B/G/D, SECAM L, A2/NICAM	
Intercarrier signal to noise ratio	[dB]	typ. 58	
Stereo cross talk	[dB]	> 55	
Residual carrier accuracy	[%]	1	
Video-signal to noise ratio	[dB]	typ. 60	
Common data			
Power consumption	[W]	10,5	13,5
Ambient temperature	[°C]	0...+50	

X-DVB-T/PAL twin, X-DV-T/PAL twin CI

COFDM to PAL converters



- for processing of one or two digital DVB-T TV-programmes in one or two adjacent PAL-signals in the frequency range 47 - 862 MHz
- output channel A selectable, output channel B automatically selected as the adjacent channel
- Data services like VPS or teletext can be switched on / off via software as well as the generation of test lines
- electronic level adjustment

Type		X-DVB-T/PAL twin	X-DVB-T/PAL twin CI
Order number		330 590	330 499
EAN-Code		4026187651794	4026187651985
COFDM demodulator			
Input frequency range	[MHz]	47 - 862	
Input level	[dBμV]	35 - 84	
Input	[Ω]	IEC jack, 75	
Return loss	[dB]	typ. 8	
Range of level control	[dB]	65	
CI interfaces		-	<input checked="" type="checkbox"/>
RF modulator			
Connectors	[Ω]	IEC jack, 75	
Output frequency	[MHz]	47 - 862	
Output channels		C2 - C69	
Output level	[dBμV]	90 - 100	
Intermodulation distance	[dB]	typ. 60	
Return loss	[dB]	> 10	
Spurious frequency distance	[dB]	typ. 60	
TV standard		B, G (D/K on demand)	
Video-signal to noise ratio	[dB]	typ. 60	
Common data			
Power consumption	[W]	13,5	17
Ambient temperature	[°C]	0...+50	



X-DVB-T Multinorm twin, X-DVB-T Multinorm twin CI

COFDM to PAL twin-converter



- for processing of two digital SAT-TV-programmes in two adjacent PAL-signals in the frequency range 47 - 862 MHz
- free configuration via software, support of all common TV standards
- electronic level adjustment

Type		X-DVB-T Multinorm twin	X-DVB-T Multinorm twin CI
Order number		330 599	330 600
EAN-Code		4026187110499	4026187650636
COFDM demodulator			
Input frequency range	[MHz]	47 - 862	
Input level	[dBμV]	35 - 84	
Input	[Ω]	IEC-jack, 75	
Return loss	[dB]	typ. 8	
Level control	[dB]	65	
CI Interface		-	<input checked="" type="checkbox"/>
RF modulators			
Connectors	[Ω]	IEC-jack, 75	
Output frequency	[MHz]	47 - 862 (K2 - K69)	
Output level	[dBμV]	90 - 100	
Intermodulation distance	[dB]	typ. 60	
Return loss	[dB]	> 10	
Spurious frequency distance	[dB]	typ. 60	
TV standard		PAL/SECAM, B/G/D, SECAM L, A2/NICAM	
Intercarrier signal to noise ratio	[dB]	typ. 60	
Stereo cross talk	[dB]	> 55	
Residual carrier accuracy	[%]	1	
Video signal to noise ratio	[dB]	typ. 60	
Common data			
Power consumption	[W]	15	18
Ambient temperature	[°C]	0...+50	

X-DVB-C/PAL twin, X-DVB-C/PAL twin CI

QAM to PAL converters



- for processing of one / two digital DVB-C TV-programmes in one / two PAL-signals in the frequency range 47 - 862 MHz
- X-DVB-C/PAL twin (CI): output channel A selectable, output channel B automatically selected as the adjacent channel
- data services like VPS or teletext can be switched on / off via software as well as the generation of test lines
- electronic level adjustment

Type		X-DVB-C/PAL twin	X-DVB-C/PAL twin CI
Order number		330 579	330 577
EAN-code		4026187651855	4026187651954
QAM demodulator			
Input frequency range	[MHz]	47 - 862	
Input level	[dBμV]	58-75	47 - 92
Connectors	[Ω]	IEC jack, 75	
Return loss	[dB]	typ. 10	
Range of level control	[dB]	17	
CI interfaces		-	<input checked="" type="checkbox"/>
RF modulator			
Connectors	[Ω]	IEC jack, 75	
Output frequency	[MHz]	47 - 862	
Output channels		C2 - C69	
Output level	[dBμV]	90 - 100	
Intermodulation distance	[dB]	typ. 60	
Return loss	[dB]	> 10	
Spurious frquency distance	[dB]	typ. 60	
TV standard		B, G (D/K on demand)	
Video-signal to noise ratio	[dB]	typ. 60	
Common data			
Power consumption	[W]	9	15,5
Ambient temperature	[°C]	0...+50	



X-DVB-C Multinorm twin, X-DVB-C Multinorm twin CI

QAM to PAL twin-converter



- for processing of two digital DVB-C TV-programmes in two adjacent PAL-signals in the frequency range 47 - 862 MHz
- free configuration via software, support of all common TV standards
- electronic level adjustment

Type		X-DVB-C Multinorm twin	X-DVB-C Multinorm twin CI
Order number		330 646	330 647
EAN-Code		4026187110871	4026187110888
QAM demodulator			
Input frequency	[MHz]	47 - 862	
Input level	[dBμV]	58 - 75	
Connectors	[Ω]	IEC jack, 75	
Return loss	[dB]	> 8	
AFC catch range		adjusted automatically	
Range of level control	[dB]	typ. 45	
Input data rate	[mBaud]	0,5 - 7, adjustable	
CI interfaces		-	<input checked="" type="checkbox"/>
RF modulator			
Connectors	[Ω]	IEC jack, 75	
Output frequency	[MHz]	47 - 862 (C2 - C69)	
Output level	[dBμV]	90 - 100	
Intermodulation distance	[dB]	typ. 60	
Return loss	[dB]	> 10	
Spurious frequency distance	[dB]	typ. 60	
TV standard		PAL/SECAM, B/G/D, SECAM L, A2/NICAM	
Intercarrier signal to noise ratio	[dB]	typ. 60	
Stereo cross talk	[dB]	> 55	
Residual carrier accuracy	[%]	1	
Video-signal to noise ratio	[dB]	typ. 60	
Common data			
Power consumption	[W]	13,5	17
Ambient temperature	[°C]	0...+50	

X-A/V twin 860 S, X-A/V Multinorm twin, X-A/V quad

Audio/ Video to PAL modulators



- for modulation of audio / video signals in CATV- or SAT-IF distribution networks
- separated activation and deactivation of both output channels
- electronic level adjustment (X-A/V twin 860 S: manual adjustment)
- X-A/V Multinorm twin: outstanding output parameters by Direct Digital technology
- X-A/Vmultinorm twin: free configuration via software, support of all common TV standards

Type		X-A/V twin 860 S	X-A/V Multinorm twin	X-A/V quad
Order number		330 322	330 326	380 322
EAN-Code		4026187651305	4026187110864	4026187651589
RF modulator				
Output frequency range	[MHz]	47 - 862		
Output channels		C2 - C69		
Output level	[dBμV]	90 - 100		
Intermodulation distance	[dB]	typ. 60		
Return loss	[dB]	> 10		
Spurious frequency range	[dB]	typ. 60		
TV standard		B, G (D/K on demand)	PAL / SECAM B/G/D, Secam L, A2 / Nicam	B, G (D/K on demand)
Video-signal to noise ratio	[dB]	typ. 58	typ. 60	typ. 60
Audio / Video				
Input		15-pin SUB-D jack (2 A/V input signals per jack)		
Audio				
Input level	[V RMS]	0,5	0,5	0,5
Frequency range		40 Hz - 15 kHz		
Signal to noise ratio	[dB]	typ. 45		
Video				
Bandwidth	[MHz]	25 Hz - 4,8		
Input level	[V _{ss} / Ω]	1 / 75		
Common data				
Power consumption	[W]	8	12	15
Ambient temperature	[°C]	0...+50		



X-Demodtw in

PAL to A/V demodulator

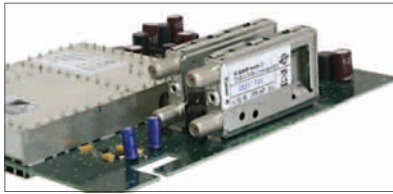


- for reception of two optional analogue RF-signals (47 - 862 MHz) and demodulation into A/V
- automatic input level adjustment

Type		X-Demod twin
Order number		330 323
EAN-Code		4026187651510
RF demodulator		
Input frequency range	[MHz]	47 - 862
Input level	[dB μ V]	55 - 85
Connectors	[Ω]	IEC jack, 75
Return loss	[dB]	> 10
TV standard		B, G
Video-signal to noise ratio	[dB]	typ. 54
Audio / Video		
Output		15-pin SUB-D jack
Frequency range		40 Hz - 15 kHz
Output level	[V RMS]	0,5 / 10 k Ω
Video		
Output level	[Vss / Ω]	1 / 75
Common data		
Power consumption	[W]	2
Ambient temperature	[$^{\circ}$ C]	0...+50

X-QAM twin 3

QPSK to QAM twin-converter



- for processing of two QPSK-modulated SAT-IF-signals into two QAM-modulated adjacent channels in the frequency range of 47 - 862 MHz
- transparent processing

Type		X-QAM twin 3
Order number		330 581
EAN-Code		4026187650889
DVB-S demodulator		
Connectors	[Ω]	F jack, 75
Input frequency range	[MHz]	920 - 2150
Input level	[dBμV]	44 - 80
Input symbol rate	[MS/s]	10,0 - 30,0
DVB-S Viterbi		1/2; 2/3; 3/4; 5/6; 7/8
QAM modulator		
Modulation		16-, 32-, 64-, 128-, 256-QAM (digital implementation)
Signal processing		according DVB standard
Shoulder attenuation	[dB]	typ. 50
Spectrum shape cos-roll-off	[%]	15
FEC		Reed-Solomon (204,188)
Output symbol rate	[MBaud]	depends on input data rate
Bandwidth	[MHz]	depends on input data rate
Brutto data rate	[MBit/s]	depends on input data rate
TS editing		
Data rate adaption		<input checked="" type="checkbox"/>
PCR correction		<input checked="" type="checkbox"/>
RF output		
Connectors	[Ω]	IEC jack, 75
Output frequency range	[MHz]	47 - 862 (C2 - C69), adjustable in 0,1 MHz steps
Output level	[dBμV]	80...90, adjustable
MER (Equalizer, 64 QAM)	[dB]	typ. 40
Spurious frequency dist. 40 - 862 MHz	[dB]	> 60 discrete interferences / > 57 noise interferences
Common data		
Power consumption	[W]	9,5
Ambient temperature	[°C]	0...+50



X-QAM twin 5 S2, X-QAM twin 6 S2

DVB-S(2) to QAM converters



- for processing of one / two DVB-S(2)-modulated SAT-IF-signals into QAM-modulated adjacent channels in the frequency range of 47 - 862 MHz
- integrated data rate adjustment, PCR-correction, PID-filter and NIT-generation

Type		X-QAM twin 5 S2	X-QAM twin 6 S2
Order number		330 476	330 478
EAN-Code		4026187651893	4026187680107
DVB-S(2) demodulator			
Connectors	[Ω]	F-jack, 75	
Input frequency range	[MHz]	950 - 2150	
Input level	[dBμV]	44 - 80	
Return loss	[dB]	≥ 10	
Input symbol rate	[MS/s]	max. 30,0 (DVB-S2); max. 45,0 (DVB-S)	
DVB-S Viterbi		1/2; 2/3; 3/4; 5/6; 6/7; 7/8	
DVB-S2 LDPC		1/2; 1/3; 1/4; 2/3; 2/5; 3/5; 4/5; 5/6; 8/9; 9/10	
DVB-S2 Roll-off-factors		0,20; 0,25; 0,35	
DVB-S2 Modulation		QPSK; 8PSK	
QAM modulator			
Modulation		16-, 32-, 64-, 128-, 256-QAM	
Signal processing		accord. DVB standard	
Spectrum shape cos-roll-off	[%]	15	
FEC		Reed-Solomon (204,188)	
Output symbol rate	[Mbaud]	3,45 - 7,5	
Bandwidth	[MHz]	4 - 8, depending on symbol rate	
Brutto data rate	[MBit/s]	max. 55,2	
TS editing			
Data rate adjustment			<input checked="" type="checkbox"/>
PCR-correction			<input checked="" type="checkbox"/>
NIT-handling			<input checked="" type="checkbox"/>
PID-filtering / -remapping			<input checked="" type="checkbox"/>
RF output			
Connectors	[Ω]	IEC-jack, 75	
Frequency range	[MHz]	47 - 862 (K2 - K69) adjustable in 0,1 MHz-steps	
Output level	[dBμV]	80...96, adjustable	
Shoulder attenuation	[dB]	typ. 50	typ. 58
MER (Equalizer, 64 QAM)	[dB]	typ. 40	typ. 45
Spurious frquency dist. 40 - 862 MHz	[dB]	> 60 discrete interferences / > 57 noise interferences	
Common data			
Power consumption	[W]	13,5	15,0
Ambient temperature	[°C]	0...+50	

X-QAM duo 7 S2, X-QAM duo 7 S2 CI

DVB-S(2) to QAM twin-converters with NIT-processing



- for processing of DVB-S(2)-modulated SAT-IF-signals into QAM-modulated adjacent channels
- integrated data rate adjustment, PCR-correction, PID-filter; pass or drop service filter and NIT-generation

Type		X-QAM duo 7 S2	X-QAM duo 7 S2 CI
Order number		330479	330 482
EAN-Code		4026187611163	4026187131296
DVB-S(2) demodulator			
Connectors	[Ω]	F-jack, 75	
Input frequency range	[MHz]	950 - 2150	
Input level	[dBμV]	44 - 80	
Return loss	[dB]	≥ 10	
Input symbol rate	[MS/s]	max. 30,0 (DVB-S2); max. 45,0 (DVB-S)	
DVB-S Viterbi		1/2; 2/3; 3/4; 5/6; 6/7; 7/8	
DVB-S2 LDPC		1/2; 1/3; 1/4; 2/3; 2/5; 3/5; 4/5; 5/6; 8/9; 9/10	
DVB-S2 Roll-off-factors		0,20; 0,25; 0,35	
DVB-S2 Modulation		QPSK; 8PSK	
QAM modulator			
Modulation		16-, 32-, 64-, 128-, 256-QAM	
Signal processing		accord. DVB standard	
Spectrum shape (cos-roll-off)	[%]	15	
FEC		Reed-Solomon (204,188)	
Output symbol rate	[Mbaud]	3,45 - 7,5	
Bandwidth	[MHz]	4 - 8, depending on symbol rate	
Brutto data rate	[MBit/s]	max. 55,2	
TS editing			
Data rate adjustment		<input checked="" type="checkbox"/>	
PCR-correction		<input checked="" type="checkbox"/>	
NIT-handling		<input checked="" type="checkbox"/>	
PID-filtering / -remapping		PID-remapping	
Service filtering		Pass- / Drop-filter	
CI Interface			<input checked="" type="checkbox"/>
RF output			
Connectors	[Ω]	IEC-jack, 75	
Frequency range	[MHz]	47 - 862 (K2 - K69), adjustable in 0,1 MHz-steps	
Output level	[dBμV]	80...96, adjustable	
MER (equalizer, 64 QAM)	[dB]	typ. 45	
Spurious frequency dist. 40 - 862 MHz	[dB]	> 60 discrete interferences / > 57 noise interferences	
Common data			
Power consumption	[W]	13,5	15,0
Ambient temperature	[°C]	0...+50	



X-QAMquad

4-times HDTV Transmodulator

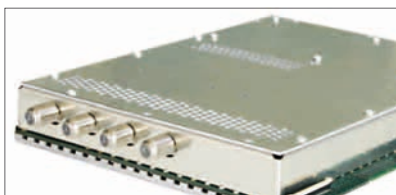


- 4 independant input channels processed into 2 pairs of adjacent channels
- MER typ. 45 dB, shoulder attenuation typ. 58 dB
- comfortable PID-filtering (Drop- or Pass-PID)
- Data rate adjustment, PCR correction & NIT-generation

Type		X-QAM quad
Order number		380 325
EAN-Code		4026187130497
DVB-S(2) demodulator		
Input frequency range	[MHz]	920 - 2150
Input level	[dBμV]	50 - 80
SAT-IF input	[Ω]	F-jack, 75
Input symbol rate	[MS/s]	maximum 30,0
DVB-S Viterbi		1/2, 2/3, 3/4, 5/6, 6/7; 7/8
DVB-S2 LDPC		1/4; 1/3; 2/5; 1/2; 3/5; 2/3; 3/4; 4/5; 5/6; 8/9; 9/10
DVB-S2 Roll-off-factors		0,20; 0,25, 0,35
DVB-S2 Modulation		QPSK, 8PSK
QAM modulator		
Modulation		16-, 32-, 64-, 128-, 256-QAM
Signal procession		according DVB standard
Spektrumsformung cos-roll-off	[%]	15
FEC		Reed-Solomon (204,188)-Code
Output symbol rate	[Msym]	depends on input data rate, 3,45 - 7,5
Bandwidth	[MHz]	depends on input data rate, 4 - 8
Brutto data rate	[MBit/s]	maximal 55,2
TS editing		
Data rate adjustment		<input checked="" type="checkbox"/>
PCR-correction		<input checked="" type="checkbox"/>
NID-handling		<input checked="" type="checkbox"/>
PID filtering / remapping		Pass or Drop service filter
Service filtering		Pass or Drop filter
RF output		
Connectors	[Ω]	IEC-jack, 75
Frequency range	[MHz]	47 - 862 (K2 - K69) adjustable in 1-MHz-steps
Output level	[dBμV]	80...96, adjustable
Shoulder attenuation	[dB]	typ. 58
MER (equalizer, 64 QAM)	[dB]	typ. 45
Spurious frequency dist. 40 - 862 MHz	[dB]	> 60 discrete interferences / > 57 noise interferences
Common data		
Power consumption	[W]	15,8
Ambient temperature	[°C]	0...+50

X-QAMR outer

4 x DVB (S2) in 2 x QAM Multiplexer



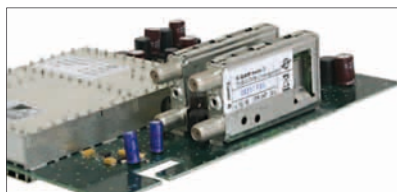
- for processing of four independent DVB-S(2) inputs into two independent QAM-output channels
- content of the QAM channels can be chosen from all four inputs

Type		X-QAM Router
Order number		380 326
EAN-Code		4026187120689
DVB-S(2) demodulator		
Connector	[Ω]	F-jack, 75
Input frequency range	[MHz]	950 - 2150
Input level	[dBμV]	55 - 80
Input symbol rate	[MS/s]	max. 30,0 (DBV-S2); max. 45,0 (DVB-S)
DVB-S Viterbi		1/2, 2/3, 3/4, 5/6, 7/8
DVB-S2 LDPC		1/4; 1/3; 2/5; 1/2; 3/5; 2/3; 3/4; 4/5; 5/6; 8/9; 9/10
DVB-S2 Roll-off-factors		0,20-; 0,25, 0,35
DVB-S2 Modulation		QPSK, 8PSK
QAM modulator		
Modulation		16-, 32-, 64-, 128-, 256-QAM
Signal processing		accord. DVB standard
Spectrum shape (cos-roll-off)	[%]	15
FEC		Reed-Solomon (204,188)
Output symbol rate	[Mbaud]	3,45 - 7,5
Bandwidth	[MHz]	4 - 8 (depending on symbol rate)
Brutto data rate	[MBit/s]	max. 55,2
TS editing		
Data rate adjustment		<input checked="" type="checkbox"/>
PCR correction		<input checked="" type="checkbox"/>
NIT handling		<input checked="" type="checkbox"/>
PID filtering / remapping		<input checked="" type="checkbox"/>
Service filtering		<input checked="" type="checkbox"/>
Service routing		<input checked="" type="checkbox"/>
RF output		
Connectors	[Ω]	IEC-jack, 75
Frequency range	[MHz]	47 - 862 (K2 - K69) adjustable in 0,1 MHz-steps
Output level	[dBμV]	80...96, adjustable
Shoulder attenuation	[dB]	typ. 58
MER (Equalizer, 64 QAM)	[dB]	typ. 45
Spurious frequency distance 0 - 862 MHz	[dB]	> 60 discrete interferences / > 57 noise interferences
Common data		
Power consumption	[W]	16,5
Ambient temperature	[°C]	0...+50



X-TQAM twin 6, X-CQAM twin 6

DVB-T / DVB-C to QAM twin-converters with NIT-processing



- for processing of two DVB-T / DVB-C input channels into two QAM adjacent channels
- outstanding output parameters by Direct Digital technology, integrated data rate adjustment, PCR-correction, PID-filter, Nit-generation

Type		X-TQAM twin 6V 503	X-CQAM twin 6
Order number		330 700	330 699
EAN-Code		4026187110703	4026187110758
Demodulator			
demodulator type		COFDM	QAM
Connectors	[Ω]	IEC-jack, 75	
Input frequency range	[MHz]	47 - 862	
Input level	[dBμV]	35 - 84	47 - 92
Input data rate	[MBAud]	-	0,5 - 7
Bandwidth	[MHz]	6 ; 7 ; 8	-
Modulation		-	16-, 32-, 64-, 128-, 256-QAM
QAM modulator			
Modulation		16-; 32-; 64-; 128-; 256-QAM	
Signal processing		accord. DVB standard	
Spectrum shape (cos-roll-off)	[%]	15	
FEC		Reed-Solomon (204-,188)	
Output symbol rate	[MS/s]	adjustable, 3,45 - 7,5	
Bandwidth	[MHz]	depending on input data rate, 4 - 8	
Brutto data rate	[MBit/s]	max. 55,2	
TS editing			
Data rate adjustment			<input checked="" type="checkbox"/>
PCR correction			<input checked="" type="checkbox"/>
NIT handling			<input checked="" type="checkbox"/>
PID filtering / remapping			<input checked="" type="checkbox"/>
RF output			
Connectors	[Ω]	IEC-jack, 75	
Frequency range	[MHz]	47 - 862 (K2 - K69) adjustable in 1-MHz-steps	
Output level	[dBμV]	80...96, adjustable	
MER (equalizer, 64 QAM)	[dB]	typ. 45	
Shoulder attenuation	[dB]	typ. 58	
Spurious frequency dist. 40 - 862 MHz	[dB]	> 60 discrete interferences / > 57 noise interferences	
Common data			
Power consumption	[W]	10,5	10,5
Ambient temperature	[°C]	0...+50	

X-DVB-C/FM twin, X-DVB-S/FM twin, X-DVB-S/FM octopus
 QPSK to FM converters, X-DVB-C/FM twin: QAM to FM converter



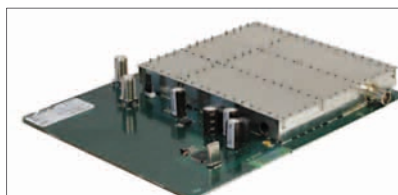
- for processing of digital SAT-radio-programmes into standard FM-signals in the frequency range 87,5 - 108 MHz
- twin: 2 programmes, octopus: 8 programmes

Type		X-DVB-C/FM twin	X-DVB-S/FM twin	X-DVB-S/FM octopus
Order number		330 644	330 643	330 645
EAN-Code 4026187...		...680145	..651763	...680121
Demodulator				
Demodulator type		QAM	QPSK	
Input frequency range	[MHz]	47 - 862	950 - 2150	
Input level	[dB μ V]	58 - 75	40 - 80	
SAT-IF-input	[Ω]	IEC-jack, 75	F-jack, 75	
Return loss	[dB]	typ. 10	≥ 10	
Range of level control	[dB]	17	-	
SAT-IF-bandwidth	[MHz]	-	36	
Spectrum shape	[%]	-	35 (cos-roll-off)	
Input data rate	[Mbaud]	-	2 - 35, adjustable	
AFC catch range		-	automatically adjusted	
Viterbi-Decoding (accord. DVB standard)		-	1/2; 2/3 3/4 5/6 7/8 automatically / manually	
FM modulators				
Output frequency	[MHz]	87,5 - 108 MHz		
step width	[kHz]	10		
RDS-data static		PS 2 x 8 signs TP, PTY, M/S, PI (all static)		PS 2 x 8 signs Radiotext / PTY / PS
dynamic				
Output level	[dB μ V]	max. 98		
Intermodulation distance	[dB]	> 70		
Return loss	[dB]	> 14		
Signal to noise ratio	[dB]	> 65	> 64	
Unweighted signal to noise ratio	[dB]	> 65	> 72	
Preemphasis	[μ s]	50		
Stereo cross talk	[dB]	typ. 60		
Distortion factor	[%]	< 0,05		
Frequency response	[dB]	< 1		
Common data				
Power consumption	[W]	7,8	8,7	5,7
Ambient temperature	[$^{\circ}$ C]	0...+50		



X-UKWtw in

Terrestrial FM to FM twin-converter

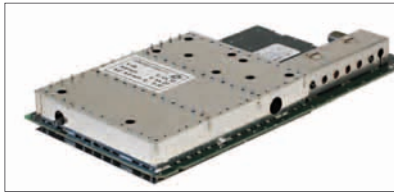


- for processing of two FM radio-programmes into standard FM-signals in the frequency range 87,5 - 108 MHz
- input of terrestrial FM programmes by shifting of the original
- processing of two independent stereo FM programmes
- integrated shiftabe input distributor for use one input signal in both tuners

Type		X-UKW twin
Order number		330 740
EAN-code		4026187651114
FM input		
Impedance	[Ω]	F jack, 75
Frequency range	[MHz]	87.5 - 108
Step by step selection	[kHz]	10
Input level	[dB μ V]	40 - 80
Return loss	[dB]	typ.10
IF		
IF range	[MHz]	10,7
IF bandwidth	[kHz]	typ. 250
FM output		
Impedance	[Ω]	75
Frequency range	[MHz]	87.5 - 108
Output level	[dB μ V]	max. 98
Step by step selection	[kHz]	10
Distortion factor	[%]	< 1
Frequency range	[dB]	\pm 2
Cross talk attenuation	[dB]	typ. 30
Return loss	[dB]	> 10
Common data		
Power consumption	[W]	12
Ambient temperature	[$^{\circ}$ C]	0...+ 50

X-UKW verstärker

Terrestrial broadband FM amplifier



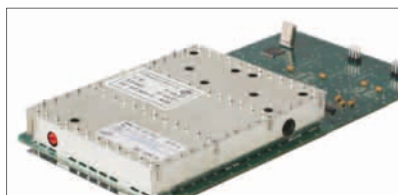
- for input of the terrestrial FM range into a cable processing
- overall level adjustment matches the complete FM range to the rest of the head-end
- 6 additional separately adjustable wave traps allow attenuation of locally received FM programmes

Type		X-UKW Verstärker
Order number		330 661
EAN-code		4026187650964
Input		
Frequency range	[MHz]	87.5 - 108
Impedance	[Ω]	75
Return loss	[dB]	> 10
Output		
Frequency range	[MHz]	87,5 - 108
Impedance	[Ω]	75
Return loss	[dB]	> 10
Output level	[dBμV]	max. 98
Level control	[dB]	20
Gain	[dB]	typ. 45 ± 1
Noise figure	[dB]	typ. 6
Filter selection	[dB]	> 30 @ ± 20MHz, > 60 @ ± 40MHz
Blocking circuits for channel lowering		
Count		6
Rejection	[dB]	typ. 12
Adjustment range	[MHz]	80 -120
Common data		
Power consumption	[W]	3
Ambient temperature	[°C]	0...+ 50



X-FM twin S

Audio in FM twin-converter



- for processing of audio-signals into standard FM signals in the frequency range of 87,5 - 108 MHz
- for use in head-ends, where - beyond TV and terrestrial radio programmes- additional FM programs must be generated
- simultaneous processing of two independent audio signals into FM channels

Type		X-FM twin S
Order number		330 642
EAN-code		4026187651527
FM modulator		
Output frequency	[MHz]	87,5 - 108, step width 10 kHz
Output level	[dB μ V]	max. 98
Signal to noise ratio	[dB]	> 55
Unweighted signal to noise ratio	[dB]	> 60
Distortion factor	[%]	< 1
Cross talk attenuation	[dB]	typ. 40
Frequency rresponse	[dB]	< 1
Return loss	[dB]	> 10
Audio		
Input		15-pin SUB-D jack
Input level	[V RMS]	0,5 / 10 k Ω
Frequency range		40 Hz - 15 kHz
Common data		
Power consumption	[W]	3
Ambient temperature	[°C]	0...+ 50



Professional SAT-processing

V-series:

Distribution networks that are build-up with the ASTRO V 16 system are future-proof by their modular structure, because they are expandable, updatable and therefore adaptable to each reception situation.

- plug-in slots for connection of different plug-in cards; fully downward-compatible to all modules of the proven X-series
- by interconnection a very extensive programme offer can be converted
- optional satellite distribution field with six switchable inputs and 16 outputs
- power supply unit can easily be exchanged; optional delivery with redundant power supply possible
- power supply of up to 4 LNBS
- integrated temperature controlled fans; integrated bus adapter
- the entire head-end can be maintained and programmed remotely
- plug-in modules are secured by a locking device, which is integrated in the housing; operation and error display for each plug-in module
- case cover is lockable; 19-inch-cabinet or wall assembly; up to 4 units can be mounted into a standard 19-inch-cabinet
- configuration via HE-programming software (laptop)



see page 127

For professional demands - the V-series

The continuous development of the approved V-series modules has matured to a complete concept offering solutions for nearly every demand. Within this series ASTRO offers the V 16 base unit in different versions:

V 16 base units in different layouts

Depending on the special needs of a Head-end project the V 16 base unit can be equipped with redundant power supply, A/V preparation, D-Sub-inputs and BNC-jacks or e. g. a SAT-distribution field.



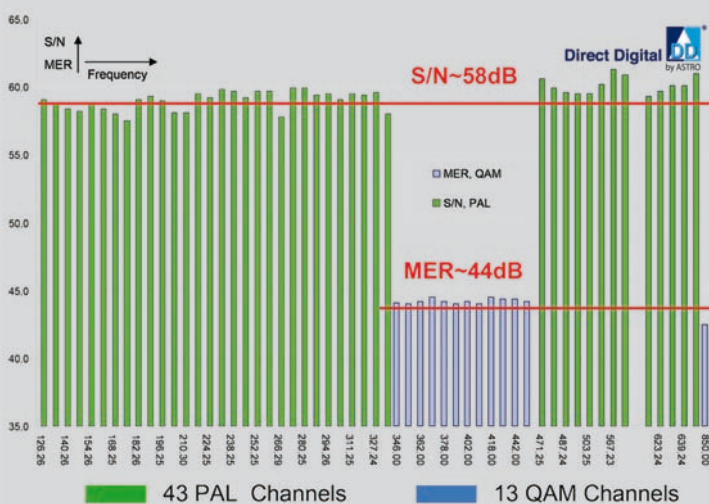
you can find a complete overview on page 85

Which signals can be converted with the V-series?

- Terrestrial converters (DVB-T and analogue TV)
- DVB-S to PAL, DVB-T to PAL, DVB-C to PAL and ASI to PAL Transcoders
- DVB-S to FM and ASI to FM Transcoders
- DVB-S(2) to QAM, DVB-T to QAM, DVB-C to QAM and DVB-S(2) to COFDM and ASI to QAM Transmodulators as well as signal multipliers
- A/V Modulators and De-Modulators
- Terrestrial FM-Converters



you can find a complete overview on pages 86 - 87



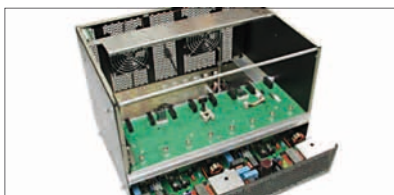
The plug-in modules of the V-series were developed especially for professional channel processing in combination with the V 16 base unit. These modules feature excellent output parameters after the combining – thanks to the optional output channel filter – and are applicable in biggest networks. The impressive advantages of the V-series are displayed in the measurement on the left.

Direct Digital by ASTRO

Using the Direct Digital technology, for the first time it is possible to reach system parameters, which seemed to be impossible in the head-end compact class. Besides a MER of more than 45 dB, offering additional system resources as well as high-end audio parameters, new benchmarks have been created regarding the flexibility of configuration.

V1 6

Base unit with power supply and mainboard



- individual mounting with plug-in cards, individually configurable
- configuration via HE programming software or via programming unit KC 3
- 2 temperature controlled fans
- versions with redundant power supply available

Type of base unit		V16.1	V16.13	V16.2	V16.23	V16.25	V16.3	V16.4
Order number		380 070	380 077	380 071	380 076	380078	380 080	380 090
EAN-code 4026187...		...651282	...651787	...651299	...680114	...111076	...651220	...651237
Configuration components								
8 plug-in slots		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Bus adapter		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2 temperature controlled cooling fans		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Power supply VSN 1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	<input checked="" type="checkbox"/>	-
Power supply VSN 2 (redundant)		-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	<input checked="" type="checkbox"/>
prepared for 16 AV- or 32 D-Sub inputs		-	<input checked="" type="checkbox"/>	-	-	<input checked="" type="checkbox"/>	-	-
SAT distribution board VMS 616		-	-	-	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
prepared for BNC connectors (for applications with ASI-modules)		-	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-
seperate outputs		-	-	-	-	<input checked="" type="checkbox"/>	-	-
Common data								
Supply voltage	[V~/Hz]	230 / 50						
EMC		compliant to EN 50083 T2 / A1						
Ambient temperature	[°C]	0...+50						
Dimensions (W xH x D) with mounting brackets frontside with mounting brackets backside	[mm]	340 x 426 x 277 (19" / 7 HE base) 340 x 491 x 277 340 x 491 x 290 + 3 HE for air flow units VAF						
Weight	[kg]	9,6						
Power consumption	[W]	maximum 200						



Plug-in cards of the V-series

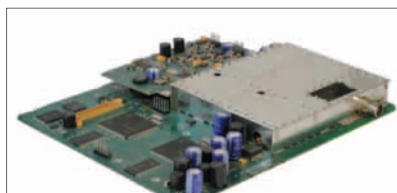
Type	Description	Page
A/V to PAL		
V 112	A/V to PAL twin-converter with output-channel filter option, Direct Digital	88
ASI to QAM		
V 202	ASI to QAM twin-converter with output-channel filter option, Direct Digital	89
ASI to PAL		
V 212	ASI to PAL twin-converter with output-channel filter option, Direct Digital	90
V 212 CI	ASI to PAL twin-converter with output-channel filter option, Direct Digital, CI-Interface	90
ASI to FM		
V 222	ASI to FM twin-converter, Direct Digital	91
V 228	ASI to FM 8-times converter, Direct Digital	91
QAM to ASI		
V 231	QAM to ASI 2 x QAM routed into up to 6 ASI-outputs, Direct Digital	92
V 231 CI	QAM to ASI 2 x QAM routed into up to 6 ASI-outputs, Direct Digital, CI-Interface	92
COFDM to ASI		
V 241	COFDM to ASI 2 x COFDM routed into up to 6 outputs, Direct Digital	93
V 241 CI	COFDM to ASI 2 x COFDM routed into up to 6 outputs, Direct Digital, CI-Interface	93
QPSK to ASI		
V 251	QPSK to ASI 2 x QPSK routed into up to 6 ASI-outputs, Direct Digital	94
V 251 CI	QPSK to ASI 2 x QPSK routed into up to 6 ASI-outputs, Direct Digital, CI-Interface	94
DVB-S2 to ASI		
V 252	DVB-S2 to ASI 2 x Q(8)PSK routed into up to 6 ASI-outputs, Direct Digital	94
V 253 CI	DVB-S2 to ASI 2 x QPSK or 8PSK routed into up to 4 ASI-outputs, Direct Digital, CI-Interface	95
Terrestrial converters		
V 311	terrestrial twin-converter (also DVB-T to DVB-T), output-channel filter option, independent output channels	96
DVB-S2 to QAM		
V 502	DVB-S2 to QAM twin-converter, output-channel filter option, Direct Digital, Operator-ID	97
COFDM to QAM		
V 503	COFDM to QAM twin-converter, output-channel filter option, Direct Digital, Operator-ID	98

Type	Description	Page
QAM to QAM		
V 504	QAM to QAM twin-converter, output-channel filter option, Direct Digital, Operator-ID	98
DVB-S2 to QAM		
V 512	DVB-S2 to QAM twin-converter with output-channel filter option, Direct Digital, Operator-ID, Pass-service-filter	97
V 512 CI	DVB-S2 to QAM twin-converter with output-channel filter option, Direct Digital, Operator-ID, Pass-service-filter, CI-Interface	97
V 514	DVB-S2 to QAM quad-transmodulator with service-filter, Direct Digital	101
DVB-S2 and ASI to QAM and ASI		
V 532	DVB-S2 and ASI to QAM and ASI 2 x DVB-S2 and 2 x ASI to 2 x QAM and 2 x ASI Transportstream router, Direct Digital	99
ASI and QAM to ASI		
V 532-ASI	ASI and QAM to ASI 4 x ASI to 2 x QAM and 2 x ASI Transportstream router, Direct Digital	100
DVB-S2 and ASI to QAM		
V 534	DVB-S2 and ASI to QAM 4 x DVB-S2 and 2 x ASI to 2 x QAM multiplexer, Direct Digital	101
QPSK to PAL		
V 612	QPSK to PAL twin-converter, output-channel filter option, Direct Digital	102
V 612 CI	QPSK to PAL twin-converter, output-channel filter option, Direct Digital, CI-Interface	102
COFDM to PAL		
V 712	COFDM to PAL twin-converter, output-channel filter option, Direct Digital	103
V 712 CI	COFDM to PAL twin-converter, output-channel filter option, Direct Digital, CI-Interface	103
QAM to PAL		
V 812	QAM to PAL twin-converter, output-channel filter option, Direct Digital	104
V 812 CI	QAM to PAL twin-converter, output-channel filter option, Direct Digital, CI-Interface	104
DVB-S2 to COFDM		
V 912	DVB-S2 to COFDM twin-converter, output-channel filter option, Direct Digital, independent output channels	105
V 912 CI	DVB-S2 to COFDM twin-converter, output-channel filter option, Direct Digital, independent output channels, CI-Interface	105
ASI to COFDM		
V 912-ASI	ASI to COFDM twin-converter, output-channel filter option, Direct Digital, independent output channels	106



V112

Audio / Video to PAL twin-modulator

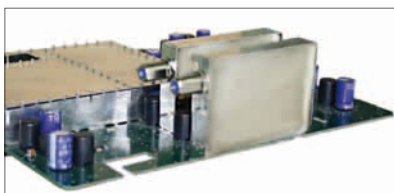


- for processing of two analogue audio / video signals into two standard PAL adjacent channels in the frequency range 47 - 862 MHz
- free configuration via software, support of all common TV standard
- outstanding signal quality by channel selective output filters (optional)

Type		V 112
Order number		380 321
EAN-code		4026187110857
RF modulator		
Output frequency range	[MHz]	47 - 862
Output channels		K2 - K69
Output level	[dB μ V]	90 - 100
Intermodulation distance	[dB]	typ. 60
Return loss	[dB]	> 10
Spurious frequency distance	[dB]	typ. 60
TV standard		PAL/SECAM, B/G/D, SECAM L, A2/NICAM
Video-signal to noise ratio	[dB]	typ. 60
Audio / Video		
Input		15-pin SUB-D-jack (per jack 2 A/V-input signals)
Audio		
Input level	[V RMS]	0,5 / 600 Ω
Frequency range	[Hz]	40 - 15000
Signal to noise ratio	[dB]	typ. 45
Video		
Bandwidth		25 Hz - 4,8 MHz
Input level	[V _{ss} / Ω]	1 / 75
Common Daten		
Power consumption	[W]	12
Ambient temperature	[°C]	0...+50

V2 02

ASI to QAM twin-converter



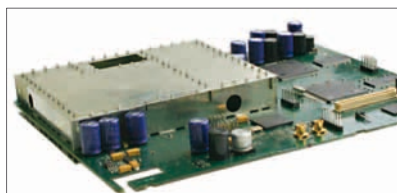
- for processing of two independent ASI input streams into two QAM adjacent channels in the frequency range of 47 - 862 MHz
- outstanding output parameters by Direct Digital technology: MER typ. 45 dB, shoulder attenuation typ. 58 dB

Type		V 202
Order number		380 202
EAN-code		4026187680060
ASI inputs		
Connectors	[Ω]	F jack / BNC at the chassis, 75
Data rate	[MBit/s]	270
Transmission mode		Packet burst / continuous
Packet length		188, 204
QAM modulator		
Modulation		16-, 32-, 64-, 128-, 256-QAM
Signal processing		according DVB standard
Spectrum shape	[%]	15 (cos-roll-off)
FEC		Reed-Solomon (204,188)-Code
Output symbol rate	[Mbaud]	3,45 - 7,5
Bandwidth	[MHz]	4 - 8, dependent on symbol rate
Brutto data rate	[MBit/s]	max. 55,2
TS editing		
Dat rate adaption		<input checked="" type="checkbox"/>
PCR correction		<input checked="" type="checkbox"/>
NIT handling		<input checked="" type="checkbox"/>
PID filtering / remapping		<input checked="" type="checkbox"/>
RF output		
Connectors	[Ω]	IEC jack, 75
Frequency range	[MHz]	47 - 862 (C02 - C69) in 1 MHz-steps adjustable
Output level	[dBμV]	80...90, adjustable
Shoulder attenuation	[dB]	typ. 58
MER (Equalizer, 64 QAM)	[dB]	typ. 45
Spurious frequency dist. 40 - 862 MHz	[dB]	> 60 discrete interferences / > 57 noise interferences
Common data		
Power consumption	[W]	8,5
Ambient temperature	[°C]	0...+50



V 212, V 212 CI

ASI to PAL twin-converter



- for processing of two TV-programmes from two independent ASI input streams into two PAL adjacent channels
- outstanding output parameters by Direct Digital technology: Video-S/N typ. 60 dB, residual carrier accuracy of 1%
- adjustment of the output level electronically via HE programming software
- CI Interface (only V 212 CI)

Type		V 212	V 212 CI
Order number		380 203	380 201
EAN-code		4026187680077	4026187680206
ASI input			
Inputs		2 x DVB ASI	
Connectors	[Ω]	F jack / BNC at the chassis, 75	
Bitrate	[MBit/s]	max. 67 netto	
Transmission mode		Packet burst / continuous	
Packet length		188, 204	
Reed-Solomon Decoding		optional in 204	
CI Interfaces		-	<input checked="" type="checkbox"/>
RF modulator			
Connectors	[Ω]	IEC jack, 75	
Frequency range	[MHz]	47 - 862 (C2 - C69)	
Output level	[dBμV]	90...100, adjustable	
Intermodulation distance		typ. 60	
Return loss	[dB]	> 10	
Spurious frequency distance	[dB]	typ. 60	
Intercarrier signal to noise ratio	[dB]	typ. 60	
Stereo cross talk	[dB]	> 55	
Residual carrier accuracy	[%]	1	
TV standard	[dB]	PAL/SECAM, B/G/D, SECAML, A2/NICAM	
Video-signal to noise ratio	[dB]	typ. 60	
Common data			
Power consumption	[W]	11	13,5
Ambient temperature	[°C]	0...+50	

V 222, V 228

ASI to FM twin-converter (V 222) / ASI in FM 8 x converter (V 228)



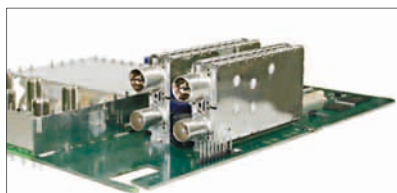
- for processing of two / eight radio-programmes of two independent ASI-input streams in two / eight radio (FM) programmes in the frequency range of 87,5 - 108 MHz
- outstanding output parameters by Direct Digital technology: stereo cross talk attenuation > 60 dB, distortion factor < 0,05 %
- adjustment of the output level electronically via HE programming software

Type		V 222	V 228
Order number		380 204	380 209
EAN-code		4026187680084	4026187735074
ASI inputs			
Inputs		2 x DVB ASI	
Connectors	[Ω]	F jack / BNC at the chassis, 75	
Bitrate	[MBit/s]	max. 67 netto	
Transmission mode		Packet burst / continuous	
Packet length		188, 204	
Reed-Solomon decoding		optional in 204	
FM modulator			
Output frequency	[MHz]	87,5 - 108 MHz	
Step by step selection	[kHz]	10	
RDS data static dynamic		PS 2x8 signs radiotext / PTY / PS / CT	
Output level	[dBμV]	maximum 98	
Intermodulation distance	[dB]	> 70	
Return loss	[dB]	> 14	
Signal to noise ratio	[dB]	> 66	
Unweighted signal to noise ratio	[dB]	> 72	
Preemphasis	[μs]	50	
Stereo cross talk attenuation	[dB]	60	
Distortion factor	[%]	< 0,05	
Frequency range	[dB]	< 1	
Common data			
Power consumption	[W]	5	
Ambient temperature	[°C]	0...+50	



V 231, V 231 CI

QAM to ASI converters, 2 x QAM routed into 6 ASI-outputs

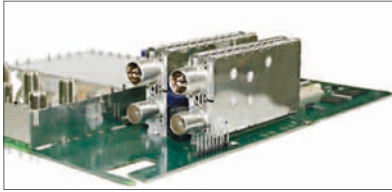


- for processing of two independent QAM input signals into ASI data streams
- routing on up to 6 outputs via software
- postprocessing of the streams with the ASTRO IP gateway U 262 or with any other ASI-transportstream compatible equipment (for example multiplexer)
- outstanding output parameters by Direct Digital technology
- CI Interface (only V 231 CI)

Type	V 231		V 231 CI
Order number		380 206	380 210
EAN-code		4026187680220	4026187735081
QAM demodulator			
Input frequency range	[MHz]	47 - 862	
Input level	[dBμV]	58 - 75	
SAT-IF input	[Ω]	IEC jack, 75	
Return loss	[dB]	typ. 10	
Range of level control	[dB]	typ. 45	
CI interfaces		-	<input checked="" type="checkbox"/>
ASI outputs			
Outputs		6 x DVB ASI	
Connectors	[Ω]	F jack / BNC at the chassis, 75	
Bitrate	[MBit/s]	Burst 270 / constant 75	
Transmission mode	[dBμV]	Packet burst / continuous	
Packet length	[Bytes]	188, 204	
Reed-Solomon Decoding		DVB at packet length 204	
Common data			
Power consumption	[W]	6	9,5
Ambient temperature	[°C]	0...+50	

V 241, V 241 CI

COFDM to ASI converters, 2 x COFDM routed into 6 ASI-outputs



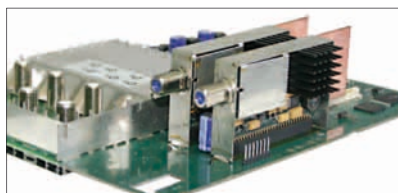
- for processing of two independent COFDM input signals into ASI data streams
- routing on up to 6 outputs via software
- postprocessing of the streams with the ASTRO IP gateway U 262 or with any other ASI-transportstream compatible equipment (for example multiplexer)
- outstanding output parameters by Direct Digital technology
- CI Interface (only V 241 CI)

Type		V 241	V 241 CI
Order number		380 208	380 211
COFDM modulator			
Input frequency range	[MHz]	47 - 862	
Input level	[dBμV]	58 - 85	
Input	[Ω]	IEC jack, 75	
Return loss	[dB]	typ. 10	
Range of level control	[dB]	35	
CI Interfaces		-	<input checked="" type="checkbox"/>
ASI outputs			
Outputs		6 x DVB ASI	
Connectors	[Ω]	F jack / BNC at the chassis, 75	
Bitrate	[MBit/s]	Burst 270 / constant 75	
Transmission mode	[dBμV]	Packet burst / continuous	
Packet length	[Bytes]	188, 204	
Reed-Solomon Decoding		DVB at packet length 204	
Common data			
Power consumption	[W]	6	9,5
Ambient temperature	[°C]	0...+50	



V 251, V 251 CI, V 252

DVB-S (V 251) or DVB-S2 (V 252) to ASI



- for processing of two independent QPSK or 8PSK input signals into ASI data streams
- routing on up to 6 outputs via software
- postprocessing of the streams with the ASTRO IP gateway U 262 or with any other ASI-transport stream compatible equipment (for example multiplexer)
- CI Interface (only V 251 CI)

Type		V 251	V 251 CI	V 252
Order number		380 205	380 207	380 217
EAN-code		4026187680091	40261876800251	4026187680268
Demodulator				
Demodulator type		QPSK		DVB-S(2)
Input frequency range	[MHz]	950 - 2150		
Input level	[dBμV]	40 - 80		
SAT-IF input	[Ω]	F jack, 75		
AFC-catch range		automatically adjusted		
Input data rate	[mBaud]	2 - 35, adjustable		
Return loss	[dB]	≥ 10		
Input symbol rate	[MS/s]	maximum 30,0		max. 30,0 / 27,5 @ 8PSK
DVB-S Viterbi		1/2, 2/3, 3/4, 5/6, 7/8, auto		
DVB-S2 LDPC		-		1/4; 1/3; 2/5; 1/2; 3/5; 2/3; 3/4; 4/5; 5/6; 8/9; 9/10
DVB-S2 Roll-off-factors		-		0,20; 0,25; 0,35
DVB-S2 Modulation		-		QPSK, 8PSK
Spectrum shape		0,35		0,20; 0,25; 0,35
CI interfaces		-	<input checked="" type="checkbox"/>	-
ASI outputs				
Outputs		6 x DVB ASI		
Connectors	[Ω]	F jack / BNC at the chassis, 75		
Bitrate	[MBit/s]	Burst 270 / constant 75		
Transmission mode	[dBμV]	Packet burst / continuous		
Packet length	[Bytes]	188, 204		
Reed-Solomon Decoding		DVB at packet length 204		
Common data				
Power consumption	[W]	6,5	10	9,5
Ambient temperature	[°C]	0...+50		

V 253 CI

DVB-S(2) to ASI converter



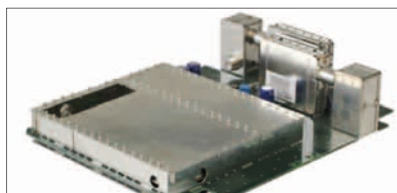
- processing of two independant QPSK- or 8PSK input signals into ASI data streams
- routing on up to 4 outputs via software
- post processing of streams via ASTRO IP-gateway or with any other ASI transport stream compatible equipment (e. g. multiplexer)
- Multiservice Descrambling

Type		V 253 CI
Order number		380 271
EAN-Code		4026187131463
DVB-S(2) demodulator		
Connectors	[Ω]	F-jack, 75
Input frequency range	[MHz]	950 - 2150
Input level	[dBμV]	40 - 80
Input symbol rate	[MS/s]	max. 30,0 (DVB-S2); max. 45,0 (DVB-S)
DVB-S Viterbi		1/2, 2/3, 3/4, 5/6, 7/8
DVB-S2 LDPC		1/4; 1/3; 2/5; 1/2; 3/5; 2/3; 3/4; 4/5; 5/6; 8/9; 9/10
DVB-S2 Roll-off-factors		0,20; 0,25; 0,35
DVB-S2 Modulation		QPSK, 8PSK
ASI output		
Connectors	[Ω]	MCX jack, 75
Data rate	[MBit/s]	270
Transmission modes		Packet burst / continuous
Packet length		188 / 204
TS editing		
Data rate adjustment		<input checked="" type="checkbox"/>
PCR-correction		<input checked="" type="checkbox"/>
NIT-handling		<input checked="" type="checkbox"/>
PID-filtering / -remapping		PID-Remapping
Service-filtering		Pass- / Drop-Filter
CI Interface		<input checked="" type="checkbox"/>
Common data		
Power consumption	[W]	11,5
Ambient temperature	[°C]	0...+50



V311

Digital / analogue terrestrial TV twin-converter



- for processing and input of terrestrial TV-programmes in CATV-or SAT-IF distribution networks
- both output channels freely selectable
- also DVB-T to DVB-T
- automatic input level adjustment
- electronic level adjustment
- outstanding output parameters by channel selective output filters (optional)

Type		V 311
Order number		380 311
EAN-code		4026187002985
Input		
Impedance	[Ω]	75
Connector		IEC jack
Input frequency range	[MHz]	47 - 862
Input level		
analogue / digital	[dBμV]	50 - 80 / 40 - 70
Return loss	[dB]	typ. ≥ 8
TV standard		B/G, (D/K on demand) / DVB-T 7/8 MHz
Range of level control	[dB]	> 45
Output (RF modulator)		
Output frequency	[MHz]	47 - 862 / C 2 - C 69
Output level		
analogue / digital	[dBμV]	90 - 100 / 85 - 95
Intermodulation distance	[dB]	typ. 60
Return loss	[dB]	> 10
Common data		
Power consumption	[W]	11,5
Ambient temperature	[°C]	0...+ 50

V 502, V 512, V 512 CI

DVB-S2 to QAM converter



- for processing DVB-S(2)-modulated SAT-IF-signals into QAM adjacent channels (V 512: independent output channels)
- integrated data rate adjustment, PCR-correction, PID-filter (V 502: drop PID / V 512: pass and drop service filter) and NIT-generation
- V 512 CI features 2 cascadable CI Interfaces with Multi Channel Descrambling

Type		V 502	V 512	V 512 CI
Order number		380 504	380 506	380 510
EAN-Code		4026187651923	4026187630300	4026187131289
DVB-S(2) demodulator				
Connectors	[Ω]	F-jack, 75		
Input frequency range	[MHz]	920 - 2150		
Input level	[dBμV]	44 - 80		
Input symbol rate	[MS/s]	max. 30,0 (DVB-S); max. 45,0 (DVB-S)		
DVB-S Viterbi		1/2, 2/3, 3/4, 5/6, 6/7; 7/8		
DVB-S2 LDPC		1/4; 1/3; 2/5; 1/2; 3/5; 2/3; 3/4; 4/5; 5/6; 8/9; 9/10		
DVB-S2 roll-off-factors		0,20; 0,25; 0,35		
DVB-S2 modulation		QPSK, 8PSK		
QAM modulator				
Modulation		16-, 32-, 64-, 128-, 256-QAM		
Signal processing		accord. DVB standard		
Spectrum shape (cos-roll-off)	[%]	15		
FEC		Reed-Solomon (204,188)		
Output symbol rate	[Msym]	3,45 - 6,9		
Bandwidth	[MHz]	4 - 8,6 (depending on symbol rate)		
Brutto data rate	[MBit/s]	maximum 55,2		
TS editing				
Data rate adjustment			<input checked="" type="checkbox"/>	
PCR-correction			<input checked="" type="checkbox"/>	
NIT-handling			<input checked="" type="checkbox"/>	
PID-filtering / -remapping		<input checked="" type="checkbox"/>		PID-remapping
Service-filtering		-		Pass- / Drop-filter
CI Interface				<input checked="" type="checkbox"/>
RF output				
Connectors	[Ω]	IEC-jack, 75		
Frequency range	[MHz]	47 - 862 (K2 - K69) adjustable in 0,1-MHz-steps		
Output level	[dBμV]	80...96, adjustable		
MER (equalizer, 64 QAM)	[dB]	typ. 45		typ. 43
Spurious frequency dist. 40 - 862 MHz	[dB]	> 60 discrete interferences / > 57 noise interferences		
Common data				
Power consumption	[W]	16,5	13,5	15,0
Ambient temperature	[°C]	0...+50		



V 503, V 504

DVB-T DVB-C to QAM twin-converter

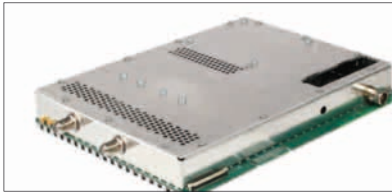


- for processing of two DVB-T / DVB-C input channels into two QAM adjacent channels
- outstanding output parameters by Direct Digital technology, integrated data rate adjustment, PCR-correction, PID-filter, NIT-generation

Type		V 503	V 504
Order number		380 507	380 508
EAN-Code		4026187630317	4026187630324
Demodulator			
Demodulator type		COFDM	QAM
Connectors	[Ω]	IEC-jack, 75	
Input frequency range	[MHz]	47 - 862	
Input level	[dBμV]	35 - 84	47 - 92
Input data rate	[MBaud]	-	0,5 - 7
Bandwidth	[MHz]	6 ; 7 ; 8	-
Modulation		-	16-, 32-, 64-, 128-, 256-QAM
QAM modulator			
Modulation		16-; 32-; 64-; 128-; 256-QAM	
Signal processing		accord. DVB standard	
Spectrum shape (cos-roll-off)	[%]	15	
FEC		Reed-Solomon (204-,188)	
Output symbol rate	[MS/s]	adjustable, 3,45 - 7,5	
Bandwidth	[MHz]	depends on input data rate, 4 - 8	
Brutto data rate	[MBit/s]	max. 55,2	
TS editing			
Data rate adjustment			<input checked="" type="checkbox"/>
PCR-correction			<input checked="" type="checkbox"/>
NIT-handling			<input checked="" type="checkbox"/>
PID-filtering / -remapping			<input checked="" type="checkbox"/>
RF output			
Connectors	[Ω]	IEC-jack, 75	
Frequency range	[MHz]	47 - 862 (K2 - K69) adjustable in 1-MHz-steps	
Output level	[dBμV]	80...96, adjustable	
MER (equalizer, 64 QAM)	[dB]	typ. 45	
Shoulder attenuation	[dB]	typ. 58	
Spurious frequency dist. 40 - 862 MHz	[dB]	> 60 discrete interferences / > 57 noise interferences	
Channel filter		optional	
Common data			
Power consumption	[W]	10,5	10,5
Ambient temperature	[°C]	0...+50	

V5 32

Transportstreamr outer



- for processing of two independent DVB-S(2) and two ASI-inputs into two independent and DVB-standard QAM-output channels and two ASI-outputs
- EPG of the whole QAM-network by exchange and multiplexing of the EIT possible

Type		V 532
Order number		380 505
EAN-Code		4026187651930
DVB-S(2) demodulator		
Input frequency range	[MHz]	950 - 2150
Input level	[dBμV]	44 - 80
Input symbol rate	[Ms/s]	max. 30,0 (DVB-S2); max. 45,0 (DVB-S)
DVB-S Viterbi		1/2; 2/3; 3/4; 5/6; 6/7; 7/8
DVB-S2 LDPC		1/2; 1/3; 1/4; 2/3; 2/5; 3/5; 4/5; 5/6; 8/9; 9/10
DVB-S2 Roll-off-factors		0,20; 0,25; 0,35
DVB-S2 Modulation		QPSK; 8PSK
ASI input and output		
Data rate	[MBit/s]	270
Transmission modes		Packet burst / continuous
Packet length		188 / 204
QAM modulator		
Modulation		16-, 32-, 64-, 128-, 256-QAM
Signal processing		accord. DVB standard
Spectrum shape	[%]	15 (cos-roll-off)
FEC		Reed-Solomon (204,188)
Output symbol rate	[MS/s]	3,45 - 7,5
Bandwidth	[MHz]	4 - 8, depending on symbol rate
Brutto data rate	[MBit/s]	max. 55,2
TS editing		
Data rate adjustment		<input checked="" type="checkbox"/>
PCR-correction, PID-filtering		<input checked="" type="checkbox"/>
PID-remapping, NIT-handling		<input checked="" type="checkbox"/>
Service-filtering, Service-routing		<input checked="" type="checkbox"/>
RF output		
Frequency range	[MHz]	47 - 862 (K2 - K69)
Output level	[dBμV]	80...90, adjustable
Shoulder attenuation	[dB]	typ. 58
MER (equalizer, 64 QAM)	[dB]	typ. 45
Spurious frequency dist. 40 - 862 MHz	[dB]	> 60 discrete interferences / > 57 noise interferences
Common data		
Power consumption	[W]	16
Ambient temperature	[°C]	0...+50



V532-A SI

ASI to QAM transportstream router



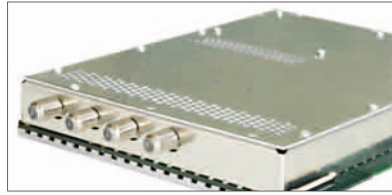
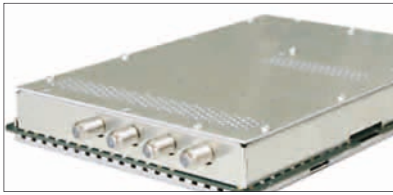
- for processing of four independent ASI inputs into two independent QAM output channels
- the content of the QAM channels can be selected from all of the 4 inputs
- optional output channel filters

Type		V 532-ASI
Order number		380 509
EAN-Code		4026187611088
ASI input and output		
Connectors	[Ω]	MCX-jack, 75
Data rate	[MBit/s]	270
Transmission modes / Transport stream data rate		Packet burst / continuous
Packet length		188 / 204
QAM modulator		
Modulation		16-, 32-, 64-, 128-, 256-QAM
Signal processing		accord. DVB standard
Spectrum shape (cos-roll-off)	[%]	15
FEC		Reed-Solomon (204,188)
Output symbol rate	[Mbaud]	3,45 - 7,5
Bandwidth	[MHz]	4 - 8, depending on symbol rate
Brutto data rate	[MBit/s]	max. 55,2
TS editing		
Data rate adjustment		<input checked="" type="checkbox"/>
PCR-remapping, PID-filterung		<input checked="" type="checkbox"/>
PID-correction		<input checked="" type="checkbox"/>
NIT-handling		<input checked="" type="checkbox"/>
Service-filtering, Service-routing		<input checked="" type="checkbox"/>
RF output		
Connectors	[Ω]	IEC-jack, 75
Frequency range	[MHz]	47 - 862 (K2 - K69) adjustable in 0,1 MHz-steps
Output level	[dBμV]	80...90, adjustable
Shoulder attenuation	[dB]	typ. 58
MER (equalizer, 64 QAM)	[dB]	typ. 45
Spurious frequency dist. 40 - 862 MHz	[dB]	> 60 discrete interferences / > 57 noise interferences
Channel filter		optional
Common data		
Power consumption	[W]	12,5
Ambient temperature	[°C]	0...+50

V 514, V 534

V 514: 4 x HDTV Transmodulator

V 534: 4 x DVB-S2 to 2 x QAM Multiplexer



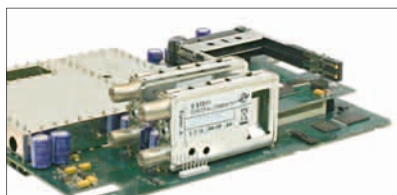
- V 514: transmodulation of 4 independent DVB-S(2) inputs into 4 QAM output channels
- V 534: multiplexing of 4 independent DVB-S(2) inputs to 2 independent QAM output channels
- the content of the QAM channels can be selected from all of the 4 inputs

Type		V 514	V 534
Order number		380514	380 530
EAN-Code		4026187611132	4026187611101
DVB-S(2) demodulator			
Input frequency range	[MHz]	950 - 2150	
Input level	[dBμV]	55 - 80	
Return loss	[dB]	≥ 10	
Input symbol rate	[MS/s]	max. 30,0 (DVB-S2); max. 45,0 (DVB-S)	
DVB-S Viterbi		1/2; 2/3; 3/4; 5/6; 6/7; 7/8	
DVB-S2 LDPC		1/2; 1/3; 1/4; 2/3; 2/5; 3/5; 4/5; 5/6; 8/9; 9/10	
DVB-S2 Roll-off-factors		0,20; 0,25; 0,35	
DVB-S2 Modulation		QPSK; 8PSK	
QAM modulator			
Modulation		16-, 32-, 64-, 128-, 256-QAM	
Signal processing		accord. DVB standard	
Spectrum shape	[%]	15 (cos-roll-off)	
FEC		Reed-Solomon (204,188)	
Output symbol rate	[Mbaud]	3,45 - 7,5	
Bandwidth	[MHz]	4 - 8, depending on symbol rate	
Brutto data rate	[MBit/s]	max. 55,2	
TS editing			
Data rate adjustment			<input checked="" type="checkbox"/>
PCR-correction			<input checked="" type="checkbox"/>
NIT-handling			<input checked="" type="checkbox"/>
PID-filtering / -remapping		PID-remapping	<input checked="" type="checkbox"/>
Service-filtering		Pass- / Drop-filter	<input checked="" type="checkbox"/>
Service-routing			<input checked="" type="checkbox"/>
RF output			
Frequency range	[MHz]	47 - 862 (K2 - K69) adjustable in 0,1 MHz-steps	
Output level	[dBμV]	80...96, adjustable	
Shoulder attenuation	[dB]	typ. 58	
MER (equalizer, 64 QAM)	[dB]	typ. 45	
Spurious frequency dist. 40 - 862 MHz	[dB]	> 60 discrete interferences / > 57 noise interferences	
Common data			
Power consumption	[W]	18,0	16,5
Ambient temperature	[°C]	0...+50	



V 612, V 612 CI

QPSK to PAL twin-converters

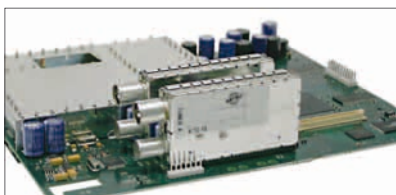


- for processing of two digital SAT-TV-programmes into two standard PAL adjacent channels in the frequency range 47 - 862 MHz
- free configuration via software, support of all common TV standards
- outstanding signal quality by channel selective output filters (optional)
- CI Interface (only V 612 CI)

Type		V 612	V 612 CI
Order number		380 603	380 613
EAN-Code		4026187651695	4026187680282
QPSK demodulator			
Input frequency range	[MHz]	950 - 2150	
Input level	[dBμV]	40 - 80	
SAT-IF input	[Ω]	F-jack, 75	
Return loss	[dB]	≥ 10	
AFC catch range		adjusted automatically	
SAT-IF-bandwidth	[MHz]	36	
Spectrum shape (cos-roll-off)	[%]	35	
Input data rate	[mBaud]	2 - 35, adjustable	
Viterbi-Decoding (accord. DVB standard)		1/2; 2/3; 3/4; 5/6; 7/8 automatically / manually	
CI Interface		-	<input checked="" type="checkbox"/>
RF modulators			
Connectors	[Ω]	IEC-jack, 75	
Output frequency	[MHz]	47 - 862 (K2 - K69)	
Output level	[dBμV]	90 - 100	
Intermodulation distance	[dB]	typ. 60	
Return loss	[dB]	> 10	
Spurious frequency distance	[dB]	typ. 60	
TV standard		PAL/SECAM, B/G/D, SECAM L, A2/NICAM	
Intercarrier signal to noise ratio	[dB]	typ. 60	
Stereo cross talk	[dB]	> 55	
Residual carrier accuracy	[%]	1	
Video-signal to noise ratio	[dB]	typ. 60	
Common data			
Power consumption	[W]	12,5	15,5
Ambient temperature	[°C]	0...+50	

V 712, V 712 CI

COFDM to PAL twin-converter



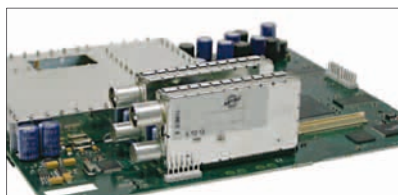
- for processing of two digital terrestrial TV-programmes into two standard PAL adjacent channels in the frequency range 47 - 862 MHz
- free configuration via software, support of all common TV standards
- electronic level adjustment
- CI Interface (only V 712 CI)

Type		V 712	V 712 CI
Order number		380 714	380 713
EAN-code		4026187002664	4026187002657
COFDM demodulator			
Input frequency range	[MHz]	47 - 862	
Input level	[dBμV]	35 - 84	
Connectors	[Ω]	IEC jack, 75	
Return loss	[dB]	typ. 8	
Range of level control	[dB]	65	
CI interfaces		-	<input checked="" type="checkbox"/>
RF modulator			
Connectors	[Ω]	IEC jack, 75	
Output frequency	[MHz]	47 - 862 (C2 - C69)	
Output level	[dBμV]	90 - 100	
Intermodulation distance	[dB]	typ. 60	
Return loss	[dB]	> 10	
Spurious frequency distance	[dB]	typ. 60	
TV standard		PAL/SECAM, B/G/D, SECAM L, A2/NICAM	
Inter-carrier signal to noise ratio	[dB]	typ. 60	
Stereo cross talk	[dB]	> 55	
Residual carrier accuracy	[%]	1	
Video-signal to noise ratio	[dB]	typ. 60	
Common data			
Power consumption	[W]	14,5	18
Ambient temperature	[°C]	0...+50	



V 812, V 812 CI

QAM to PAL twin-converter



- for processing of two digital DVB-C TV-programs into two standard PAL adjacent channels in the frequency range 47 - 862 MHz
- free configuration via software, support of all common TV standards
- CI Interface (only V 812 CI)

Type		V 812	V 812 CI
Order number		380 813	380 813
EAN-Code		4026187002992	4026187003005
QAM demodulator			
Input frequency range	[MHz]	47 - 862	
Input level	[dBμV]	47 - 92	
SAT-IF-input	[Ω]	F-jack, 75	
Return loss	[dB]	≥ 8	
AFC catch range		automatically adjusted	
Range of level control	[dB]	typ. 45	
Input data rate	[mBaud]	0,5 - 7, adjustable	
CI Interface		-	<input checked="" type="checkbox"/>
RF modulators			
Connectors	[Ω]	IEC-jack, 75	
Output frequency	[MHz]	47 - 862 (K2 - K69)	
Output level	[dBμV]	90 - 100	
Intermodulation distance	[dB]	typ. 60	
Return loss	[dB]	> 10	
Spurious frequency distance	[dB]	typ. 60	
TV standard		PAL/SECAM, B/G/D, SECAM L, A2/NICAM	
Intercarrier signal to noise ratio	[dB]	typ. 60	
Stereo cross talk	[dB]	> 55	
Residual carrier accuracy	[%]	1	
Video-signal to noise ratio	[dB]	typ. 60	
Common data			
Power consumption	[W]	13,5	17
Ambient temperature	[°C]	0...+50	

V 912, V 912 CI

DVB-S2 to COFDM twin-converter



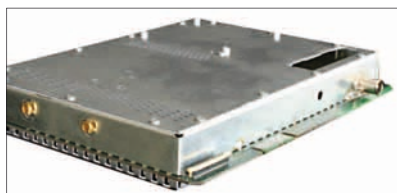
- for processing of DVB-S(2)-modulated SAT-IF-signals into two independent COFDM output channels
- selection of programmes for transmodulation via pass-or drop-service filter
- CI Interface (only V 912 CI)

Type		V 912	V 912 CI
Order number		380 922	380924
EAN-Code		4026187111007	4026187121167
DVB-S(2) demodulator			
Connectors	[Ω]		F-jack, 75
Input frequency range	[MHz]		950 - 2150
Input level	[dBμV]		44 - 80
Input symbol rate	[MS/s]		max. 30,0
DVB-S Viterbi			1/2, 2/3, 3/4, 5/6, 6/7; 7/8
DVB-S2 LDPC			1/4; 1/3; 2/5; 1/2; 3/5; 2/3; 3/4; 4/5; 5/6; 8/9; 9/10
DVB-S2 Roll-off-factors			0,20; 0,25, 0,35
DVB-S2 Modulation			QPSK, 8PSK
COFDM modulator			
Modulation			QPSK; 16 QAM; 64 QAM
Signal processing			accord. DIN EN 300744
Transmission modes			2k (8k on request)
Coding rates			1/2; 2/3; 3/4; 5/6; 6/7; 7/8
Bandwidth	[MHz]		6; 7; 8
TS editing			
Data rate adjustment			<input checked="" type="checkbox"/>
PCR-correction			<input checked="" type="checkbox"/>
PID filtering / -remapping			PID-remapping
Service-filterung			Pass- / Drop-filter
CI Interface			<input checked="" type="checkbox"/>
RF output			
Connectors	[Ω]		IEC-jack, 75
Frequency range	[MHz]		47 - 862 (K2 - K69) adjustable in 0,1 MHz-steps
Output level	[dBμV]		80...96 adjustable
MER	[dB]		typ. 36
Spurious frequency dist. 47 - 862 MHz	[dB]		> 60 discrete interferences / > 57 noise interferences
Common data			
Power consumption	[W]	13,5	17,0
Ambient temperature	[°C]		0...+50



V912-A SI

2 x ASI to COFDM transmodulator



- for processing of two ASI signals into two independent COFDM output signals
- selection of programmes for transmodulation via pass- or drop-service-filter
- two output channel filters for performance optimization

Type		V 912-ASI
Order number		380 923
EAN-Code		4026187611095
ASI input		
Connectors		MCX-jack, 75 Ω
Data rate	[MBit/s]	270
Transmission modes		Packet burst / continuous
Paket length		188, 204
COFDM modulator		
Modulation		QPSK; 16 QAM; 64 QAM
Signal processing		according DIN EN 300744
Transmission modes		2k (8k on demand)
Coding rates		1/2; 2/3; 3/4; 5/6; 6/7; 7/8
Bandwidth	[MHz]	6, 7 oder 8
TS editing		
Data rate adjustment		<input checked="" type="checkbox"/>
PCR-correction		<input checked="" type="checkbox"/>
NIT-handling		<input checked="" type="checkbox"/>
PID-filtering -remapping		PID-remapping
Service-Filtering		Pass- / Drop-filter
RF output		
Connectors	[Ω]	IEC-jack, 75
Frequency range	[MHz]	47 - 862 (K2 - K69) adjustable in 0,1 MHz-steps
Output level	[dBμV]	80...96, adjustable
MER	[dB]	typ. 36
Spurious frequency dist. 47 - 862 MHz	[dB]	> 60 discrete interferences / > 57 noise interferences
Channel filter		optional
Common data		
Power consumption	[W]	10,5
Ambient temperature	[°C]	0...+50



Carrier Class signal-processing

U-series:

Head-end components of the U-series were designed and developed as 19-inch-modules for professional applications in largest cable networks.

ASTRO offers components for the following needs:

- Carrier Class Edge technology
- IP transmission- and reception-gateways
- Active and passive combining
- Professional SAT-distribution technology
- Head-end management system



Carrier Class - the U-series

Head-end components of the U-series are designed and developed for professional applications in ultra large cable networks. All devices of this series are designed for installation in 19" mounting cabinets and redundant power supply. They therefore can optionally be equipped with redundant power supplies easily.

- **Professional SAT-distribution technology**

The U 9xx SAT-distribution field can be ordered in different versions. 1 x 1 in 16 or 2 x 1 in 8, in 75 Ω or 50 Ω design– anything is possible. Furthermore these devices can be embedded into the ASTRO Bus-system to configure attenuation and slope from apart. It is also possible to monitor the LNB-power consumption.



- **IP transmission- and reception-gateways**

The U 261 IP / ASI reception-gateway processes up to 16 IP MPTS into 16 DVB ASI Output streams. The U 262 ASI / IP transmission-gateway can process up to 16 DVB ASI signals into IP MPTS. These devices support RTP and FEC. A transport stream analyzer is optionally available.



- **Head-end Management System**

The U 953 enables configuration and management of the ASTRO Head-end via IP. Depending on the configuration the U 953 executes automatic, time controlled updates and equivalent circuits. Also possible: Monitoring of the head-end via SNMP-Traps.



- **Active and passive Combining**

For combining of Head-end signals ASTRO offers active and passive components. The U 960 can be custom-built with splitters while the active U 901 (1 x 1 in 8) delivers amplification with lowest intermodulation. The redundant power supply is achieved by separate power supplies or by remote supply via RF-jack.



- **Carrier Class Edge Technology**

The U 100 series is a modular built IP Head-end concept. The base unit can house up to three signal transformers (IP-PAL, -QAM, -FM) which are optionally equipped with redundant power supply. Hardware and software are built to provide the best signal supply.



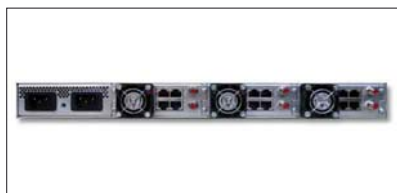
Modules of the U-series

Type	Description	Page
Carrier Class Edge Technology		
U 100-230	Base unit for installation of up to 3 modules of the U 1xx series Power supply 230 V AC	110
U 100-48	Base unit for installation of up to 3 modules of the U 1xx series Power supply - 48 V DC	110
U 114	IP to PAL converter quad-converter, 4 IP multicastgroups into 4 standard PAL-programmes	111
U 124	IP to FM converter 16-times converter, 4 IP multicastgroups into 16 standard FM-programmes	112
U 154	IP to QAM converter quad-converter, 4 IP multicastgroups into 4 standard QAM-channels	113
IP transmission- and reception-gateways		
U 261	IP / ASI Gateway Conversion of up to 16 multicastgroups into up to 16 DVB ASI-outputs, 230 V input voltage	114
U 261 i	IP / ASI Gateway Conversion of up to 16 multicastgroups into up to 16 DVB ASI-outputs, 48 V input voltage	114
U 262	ASI / IP Gateway Conversion of up to 16 DVB ASI-outputs into up to 16 multicastgroups, 230 V input voltage	114
U 262 i	ASI / IP Gateway Conversion of up to 16 DVB ASI-outputs into up to 16 multicastgroups, 48 V input voltage	114
Encoder		
U 671	HDMI into ASI / IP Encoder HD / SD Encoder	120
Head-end managementsystem		
U 953	Head-end managementsystem 2 x 230 V AC power supply; trims installation version (X-BC 4) available	119
U 953 i	Head-end managementsystem 2 x -48 V DC power supply	119
Active and passive combining		
U 901	Active combining network combining of up to 8 base units; trims installation version (VZN 8) available	116
U 960	Passive combining network distribution of input signals in the frequency range 5 to 1000 MHz	116
Professional SAT-distribution technology		
U 911 - 946	Active SAT-distribution fields 2 SAT-inputs into 8 outputs at a time or 1 SAT-input into 16 outputs	118



U 100-48, U 100-230

Base unit without plug-in modules



- power supply and signal supply for signal converters
- installation of up to three plug-in modules possible
- every module has redundant / passive network interfaces for network management and data connection
- monitored fans
- output signals separately led through via F-jacks
- redundance circuit by passive connections to signal converters leads to high reliability

Type		U 100 - 48	U 100 - 230
Order number		380 100	380 101
EAN-Code		4026187611064	4026187611149
Network interfaces (passive routing to U 1xx)			
Management		2 x 100 Base-T Ethernet (RJ 45)	
Data		2 x 1000 Base-T Ethernet (RJ 45)	
Protocol		IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNMP, IGMPv3	
Transportstream editing			
TS capsulation		UDP, UDP / RTP, 1-7 packets, FEC	
Transport stream editing		transparent (188 oder 204 packets)	
Control and management			
Features		Control via HTTP / WEB	
Protocol		HTTP / SNMP (error messages)	
Common data			
Voltage supply	[V]	- 48 V DC	230 V AC
Power consumption	[W]	depends on mounting	
Dimensions		19" / 1 HE	
Ambient temperature	[°C]	0...+45	

U 114

4 x IP to PAL converter



- for processing of up to 4 IP multicast groups of a Gigabit Ethernet MPEG TS in 4 standard PAL-programmes
- PAL-programmes led through as two pairs of adjacent channels
- outstanding signal parameters by Direct Digital technology (Video-S/N: typ. 66 dB; residual carrier accuracy: 1 %)
- optionally available output channel filters (U-KF) allow for maintaining the high signal quality even after combining
- user friendly configuration via webbrowser

Type		U 114
Order number		380 114
EAN-Code		4026187611125
Network interfaces (passive routing to U 1xx)		
Management		2 x 100 Base-T Ethernet (RJ 45)
Data		2 x 1000 Base-T Ethernet (RJ 45)
Protocol		IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNMP, IGMPv3
Transportstream editing		
TS Decapsulation		UDP, UDP / RTP, 1-7 packets, FEC
Packet length	[Bytes]	188 / 204
Decoding		
Video		MPEG 2 Main Profile @ Main Layer MP @ ML
Audio		2 x MPEG 1 Layer 2, Mono / Stereo, 2-channel audio / Audio Description
Data		Teletext, VPS, WSS, Teletext subtitles, DVB Subtitling
PAL modulator		
Connectors	[Ω]	75, 2 x F-jack
Frequency range	[MHz]	47 - 862, digital modulation
Output level	[dBμV]	118
Return loss	[dB]	≥ 14
Spurious frequency distance	[dB]	≥ 60
Inter-carrier signal to noise ratio	[dB]	> 60
Stereo cross talk	[dB]	> 55
Residual carrier accuracy	[%]	1
TV standard		PAL/SECAM, B/G, D/K, SECAML, A2/NICAM
Video-signal to noise ratio	[dB]	typ. 65
Common data		
Power consumption	[W]	28
Dimensions		19", 1 HE
Ambient temperature	[°C]	0...+45



U 124

16 x IP to FM converter



- for processing of up to 4 IP multicast groups of a Gigabit Ethernet MPEG TS in 16 standard FM-programs
- FM programmes are led through as two 8 x groups
- outstanding signal parameters by Direct Digital technology
- static and dynamic RDS are supported (radiotext, PTY, PS & CT)
- user friendly configuration via webbrowser

Type		U 124
Order number		380 124
EAN-Code		4026187611118
Network interfaces (passive routing to U 1xx)		
Management		2 x 100 Base-T Ethernet (RJ 45)
Data		2 x 1000 Base-T Ethernet (RJ 45)
Protocol		IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNMP, IGMPv3
Transportstream editing		
Decapsulation		UDP, UDP / RTP, 1-7 packets, FEC
Packet length	[Bytes]	188 / 204
Decoding		
Audio		MPEG 1 Layer 2, Stereo
RDS-Data		UECP, ancillary data / sep. PID
FM modulator		
Output frequency	[MHz]	87,5 - 108
Step width	[kHz]	10
static		TP / PI / PS 8 x 8 signs
dynamic		PI / Radiotext / PTY / PS / CT / MS
Output level	[dBμV]	114
Intermodulation distance	[dBc]	> 60
Return loss	[dB]	> 14
Signal to noise ratio	[dB]	> 64
Unweighted signal to noise ratio	[dB]	> 70
Preemphasis	[μs]	50
Stereo cross talk attenuation	[dB]	60
Harmonic factor	[%]	< 0,05
Frequency range	[dB]	< 1
Common data		
Power consumption	[W]	25,5
Dimensions		19", 1 HE
Ambient temperature	[°C]	0...+45

U 154

4 x IP to QAM converter



- for processing of up to 4 IP multicast groups of a Gigabit Ethernet MPEG TS in 4 standard QAM channels
- QAM channels are led through as two adjacent channels
- outstanding signal parameters by Direct Digital technology (MER: typ. 44 dB; shoulder attenuation: typ. 58 dB)
- optionally available output channel filters (U-KF) allow for maintaining the high signal quality even after combining
- user friendly configuration via webbrowser

Type		U 154
Order number		380 154
EAN-Code		4026187611071
Network interfaces (passive routing to U 1xx)		
Management		2 x 100 Base-T Ethernet (RJ 45)
Data		2 x 1000 Base-T Ethernet (RJ 45)
Protocol		IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNMP, IGMPv3
Transportstream editing		
TS capsulation		UDP, UDP / RTP, 1-7 packets, FEC
Packet length	[Bytes]	188 / 204
QAM modulator		
Modulation		16-, 32-, 64-, 128-, 256-QAM
Signal processing		accord. DVB standard
Spectrum shape (cos-roll-off)	[%]	15
FEC		Reed-Solomon (204, 188)
Data rate adjustment		<input checked="" type="checkbox"/>
PCR-correction		<input checked="" type="checkbox"/>
NIT-handling, PID-remapping		<input checked="" type="checkbox"/>
Output symbol rate	[Msymb/s]	3,45 - 7,5 (for 2 adjacent channels)
Bandwidth	[MHz]	4 - 8 depending on output symbol rate
Brutto data rate	[Mbit/s]	55,2
MER (Equalizer)	[dB]	≥ 44
RF modulator		
Connectors	[Ω]	75, 2 x F-jack
Frequency range	[MHz]	47 - 862, digital modulation
Output level	[dBμV]	114
Return loss	[dB]	> 14
Spurious frquency distance	[dB]	> 60
Common data		
Power consumption	[W]	27
Dimensions		19", 1 HE
Ambient temperature	[°C]	0...+45



U 261, U 262

IP/ASI-gateway, ASI/IP-gateway



- U 261: Processing of up to 16 multicast-groups of one Gigabit-Ethernet-Stream into up to 16 DVB ASI outputs (one reception & broadcast license included)
- U 262: Processing of up to 16 DVB ASI inputs into up to 16 multicast-groups of one Gigabit-Ethernet-Stream (one broadcast & reception license included)
- RTP & FEC implemented
- TS analyzer optionally available
- for installation of master and regional head-ends

Type		U 261	U 261 i	U 262	U 262 i
Order number		380 261	380 262	380 263	380 264
EAN-code		4026187680213	4026187002701	4026187680282	4026187002725
Transportstream interfaces					
DVB ASI		16			
Connectors		BNC jack			
Bitrate	[Mbit/s]	213, maximum			
Network interfaces					
Interface type		1000 Base-T Ethernet			
Protocol		IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNMP, IGMP			
Connector		2 x RJ 45			
Total bitrate	[Mbit/s]	700, maximum			
Ethernet MTU-length	[bytes]	1500, maximum			
Stream processing					
TS encapsulation		UDP, UDP+RTP, 1-7 packets, FEC			
Stream processing		transparent (188 oder 204 packets)			
Control and management					
Type		10/100 Base-T Ethernet			
Features		Element control through HTTP/WEB,			
Protocol		HTTP, SNMP (error messages)			
Connectors		2 x RJ 45			
Common data					
Input voltage	[VDC]	230 V	- 48 V	230 V	- 48 V
Power consumption	[W]	22	17	22	17
Dimensions		1 HE / 19"			
Ambient temperature	[°C]	0...+50			

U 261 and U 262 - the video over IP solution

The ASTRO video over IP gateways offer the possibility to distribute up to 16 MPEG-transport streams with audio & video data over an IP-backbone. The configuration of the gateways takes place user friendly via a webbrowser interface.

ASTRO TS over IP Gateway U261
Main Settings
 SW: Jan 21 2009 FW: 1.5 HW: 2, Up: 0d 00h 33m 39s, Time (UTC): Thu Jan 01 00:33:38 1970
 Location: Headend in Cablecity, Contact: John Doe, admin@example.com

IP Interface Settings

Property	Management A (eth0)	Management B (eth1)	Data A (eth2)	Data B (eth3)
MAC	00:17:72:01:02:0c	00:17:72:01:02:0d	00:17:72:00:02:0c	00:17:72:00:02:0d
Active	<input checked="" type="radio"/> on <input type="radio"/> off	<input checked="" type="radio"/> on <input type="radio"/> off	<input checked="" type="radio"/> on <input type="radio"/> off	<input checked="" type="radio"/> on <input type="radio"/> off
Mode	10 Mbit/s, full duplex	10 Mbit/s, full duplex	1 Gbit/s, full duplex	1 Gbit/s, full duplex
Address	192 168 1 133	192 168 2 133	192 168 3 133	192 168 4 133
Subnet	255 255 255 0	255 255 255 0	255 255 255 0	255 255 255 0
Broadcast	192.168.1.255	192.168.2.255	192.168.3.255	192.168.4.255
Gateway	192 168 1 100	192 168 2 100	192 168 3 100	192 168 4 100

Note: Please use different IP address settings for each interface. Use 0.0.0.0 for unused or unknown gateway, DNS, SNMP or SNTP addresses.

Thanks to a licensing of the transport streams and further optional features (for example transport stream analyzer) the distribution of investment costs can be tailored to the market's needs. Forward Error Correction (FEC) according to PromPEG CoP and encapsulation of Ethernet frames with RTP are already integrated.

The display on the front shows the management IP addresses of the device, which allows for fast access via webbrowser. Warnings that eventually must be indicated are displayed as well.



To achieve maximum reliability, the management as well as the data ports on the back of the device are implemented redundant.



The power supply of the IP gateways is implemented redundant as well. Optionally the devices are equipped with two 230 V power supplies or two -48 V power supplies.



U 261 TSL, U262 TSL, TS-Analyzer

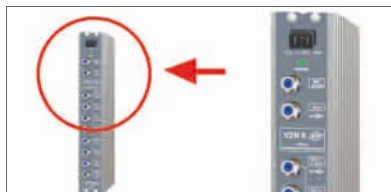
Licenses for complement of the U 261 / U 262 functionality

Type	U 261 TSL	U 262 TSL	TS-Analyzer
Order number	380 266	380 265	380 267
EAN-code	4026187002718	4026187002732	4026187000097
Feature	additional reception license for U 261 & U 261 i	additional reception license for U 262 & U 262 i	License for clearing of the transport stream analyzer for checking of MPEG-TS on PID-level



U 901, VZN 8

Active combining network, 19-inch rack & trims installation version



- for extremely low-noise and low-distortion combining of up to 8 base units
- gain matching can be effected individually either for each input or all inputs by means of fixed attenuation pads



Pads short see page 154

- preemphasis adjustable
- testpoint (-20 dB, directional coupler) for measuring purposes
- U 901 and VZN 8 can receive the operating voltage either directly via the RF inputs (remote feeding via V 16) or via an external power supply

Type		U 901	VZN 8
Order number		380 190	380 191
EAN-code		4026187651244	4026187651381
Impedance	[Ω]	75	
Frequency range	[MHz]	47 - 862	
Attenuation distortion	[dB]	≥ 1, full range ≥ 0,2, in 8 MHz channel	
Gain	[dB]	0 - 7 pluggable in 0,5 steps by attenuation pads (short)	
Preemphasis	[dB]	0 - 15	
Intermodulation distance EN 50083-3 @ 81 dBμW (100 dBμV)	[dB] [dB]	3.0. ≥ 92 2.0. ≥ 79	
Return loss Inputs-Outputs	[dB]	≥ 16	
Isolation inputs	[dB]	typ. ≥ 20, minimum 18	
Testpoint	[dB]	- 20 ± 1 directional coupler	
Remote powering	[V~]	12 - 19 via output 1 and 8 or external connector	
Power consumption	[W]	12	
Ambient temperature	[°C]	0...+50	

U9 60

Passive interconnection network, 19-inch rack version



- for distribution of input signals in the frequency range 5 - 1000 MHz
- individual mounting subject to customer request

Type	U 960	
Order number		380 185
EAN-code		4026187680152
Impedance	[Ω]	75
Frequency range	[MHz]	5 - 1000
Screening	[dB]	> 100
Connectors	[Ω]	F jacks, 75

can be assembled with:

2-way splitter		
Through loss	[dB]	3,8 ± 0,5
Isolation	[dB]	> 24
Return loss	[dB]	> 21
3-way splitter		
Through loss	[dB]	6,5 ± 0,5
Isolation	[dB]	> 24
Return loss	[dB]	> 22
4-way splitter		
Through loss	[dB]	7,5 ± 0,5
Isolation	[dB]	> 23
Return loss	[dB]	> 23
8-way splitter		
Through loss	[dB]	11,2 ± 0,5
Isolation	[dB]	> 29
Return loss	[dB]	> 21
Common data		
Ambient temperature	[°C]	0...+50



U 911 bis U 946

Active SAT-distribution fields, 19-inch rack-version



- for distribution fields, 19-inch rack-version
- attenuation and slope adjustable via HE programming software, completely remote maintenance, transmission of system-error indication

Type		U 911	U 912	U 913	U 914	U 915	U 916
Order number		380 192	380 212	380 213	380 214	380 215	380 216
EAN-code 4026187...		...651435	...002749	...002756	...651909	...002763	...002770
Connectors	[Ω]	Inputs - Outputs: F jacks, 75					

Type		U 921	U 922	U 923	U 924	U 925	U 926
Order number		380 221	380 222	380 223	380 224	380 225	380 226
EAN-code 4026187...		...735180	...002787	...002794	...735173	...002800	...002817
Connectors	[Ω]	Inputs - Outputs: SMA-connectors, 50					

Type		U 931	U 932	U 933	U 934	U 935	U 936
Order number		380 231	380 232	380 233	380 234	380 235	380 236
EAN-code 4026187...		...002824	...002831	...002848	...002855	...002862	...002879
Connectors	[Ω]	Inputs: SMA-connectors, 50 & Outputs: F jacks, 75					

Type		U 941	U 942	U 943	U 944	U 945	U 946
Order number		380 241	380 242	380 243	380 244	380 245	380 246
EAN-code 4026187...		...002886	...002893	...002909	...002916	...002923	...002930
Connectors	[Ω]	Inputs: F jacks, 75 & Outputs: SMA-connectors, 50					

Common data							
Inputs / Outputs		2 x 1 in 8			1 x 1 in 16		
Num. of power suppl. 230 V / 28VA		2	1	0	2	1	0
Remote current	[ma]	350	350	1500*	350	350	1500*
LNB voltage	[V]	16	16	13 - 18*	16	16	13 - 18*
Input frequency range	[MHz]	950 - 2150					
Input level value	[dBμV]	85					
Through loss	[dB]	0 ± 2					
Isolation	[dB]	> 40					
Level control (0,5 dB steps)	[dB]	0...-15					
Equalizer	[dB]	0 / 7 ± 1					
Frequency range insertion loss in 36 MHz bandwidth	[dBss]	< 1					
in nominal frequency range	[dBss]	< 2					
Return loss Inputs / Outputs	[dB]	≥ 12 / ≥ 14					
Output isolation	[dB]	> 20					
Testpoints (1 per polarisation)							
Value output isolation	[dB]	10					
Return loss	[dB]	12					

* maximum 1,5 A, depending on power supply and internal securing

U 953, X-BC 4

Head-end management system, 19-inch rack & trims installation version



- time-controlled update
- transmission of SNMP traps
- permanent testing of HE operating parameters
- automatic programming of exchanged head-end modules
- programming of up to 10 time-shared channels
- 2 programmable alarm contacts for the connection of alarm detectors (fire detector, water detector...)
- also available as U 953 19-inch version (X-BC4)
- configuration via HE programming software and webbrowser



see page 126

Type		U 960	U 953 i	X-BC 4
Order number		380 405	380 406	380 404
EAN-code		4026187002572	4026187110765	4026187651824
Supply voltage	[V]	2 x 230 AC	2 x -48 DC	12 DC
Power consumption	[A]	0,19 - 0,34		
Ambient temperature	[°C]	0...+45		



U671

H.264 / MPEG2 HD/SD Encoder



- professional encoder; H.264 / MPEG4-AVC standard
- HD video input format: SMPTE-274M / SMPTE-296M-2001, ITU-R BT.656
- H.264 HD / SD encoding
- supports most audio and video input signals, including analogue audio and video, HD / SD-SDI, YPbPr, HDMI
- supports TS over IP (standard, UDP protocol)
- MPEG1 Layer II audio encoding (48 kHz), support of AC 3 pass through
- supports SDT
- including management software

Type		U 671
Order number		380 671
EAN-Code		4026187131562
Network management		
Control via web		Professional management software
Network connection		Ethernet (10/100M adaptive)
Video encoding		
Supported coding		H.264/MPEG4 AVC High Profile Level 4.0
Resolutions		1920x1080x60i/50i; 1440x1080x60i/50i; 1280x720x60p/50p; 720x480x60i; 720x576x50i
Maximum bit rate	[Mbps]	20
Audio encoding		
Supported coding		MPEG-1 Layer II format, Stereo coding supported
Sampling frequency		48K
Channels		1 channel; 2 channels stereo
Inputs		
Video		CVBS; SDI/HD_SDI(BNC); HD YPbPr; HDMI
Audio		Analogue Audio-input (left and right channels); SDI embedded audio supported
Outputs		
TS		Two TS stream output interfaces (1 x standard, 1 x backup)
IP		TS over IP, 1G RJ45 interface
Common data		
Voltage supply	[V]	90 - 240 AC
Power consumption	[W]	40
Dimensions		19'', 1 HE
Ambient temperature	[°C]	0...+55



Head-end accessories

The versatile accessories for the ASTRO head-ends offer the integration of base units and processing modules as well as the professional mounting of these components. Furthermore a range of different components for the management of the head-end are available.

The following accessories are available:

- mounting cabinets and accessories
- bus controls
- jumper- and adapter-cables
- channel selective input and output filters
- power supplies for base units
- KC 3 programming unit for plugging on
- HE-programming software



X-BC 2, X-BC 3

Bus controllers

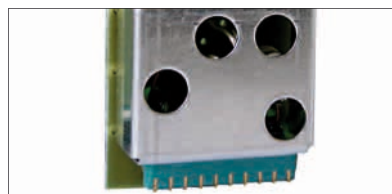


- for common programming of all bus-compatible head-end units via PC, remote access to the head-end via modem
- remote programming via GSM-modem, alarm indication via SMS (alarm message at up to 3 call numbers)
- 10 time-shared RF-channels definable (per each time-shared RF-channel 6 switching events possible)
- X-BC 3: multifunctional NIT-processing (creation of the cable-NIT including Service List Descriptors)
- operation only via HE programming software

Type		X-BC 2	X-BC 3
Order number		330 400	330 403
EAN-code		4026187651398	4026187670320
Power supply	[DC]	6 V via plug-in power supply (230V~/50Hz)	
Power consumption	[mA]	35	
Dimensions	[W x H x D]	86 x 40 x 145	
Ambient temperature	[°C]	0...+50	

X-KF, V-KF, U-KF

Channel selective input and output filters



- for compliance of European specifications (EN 50 083-2) the channel selective input filter X-KF is required
- the V-KF and U-KF (U-series) is used for maintaining the outstanding output parameters even after interconnection

Type	X-KFV K...	X-KFU K...	X-KFBI K...
Order number	340 030	340 040	340 050
EAN-code	4026187651053	4026187651060	4026187651336
Channel range in MHz	5...12	21...68	2...4

Please order with indication of input channel

Type	U-KF	V-KF...
Order number	380...	380...
Channel range in MHz	47...860	111...862

Please order with indication of output channel and V-plug-in card type.

VMS616

SAT-distribution field with 6 switchable inputs and 16 outputs



Type		VMS 616
Order number		380 260
EAN-code		4026187651336
Input frequency range	[MHz]	950 - 2150
Inputs / Outputs		6 / 16
Optimum input level	[dBμV]	72 - 78
Through loss	[dB]	12
Isolation inputs / inputs	[dB]	25
Remote supply powering	[mA]	4 outputs, each 12 V, 250
Current consumption @ 5 V	[mA]	650
Ambient temperature	[°C]	0...+50

VSF 8, VSF 42

SAT-distribution field 1 x 1 in 8 and 1 loop-through output (VSF 8)

SAT-distribution field 2 x 1 in 4 and 2 loop-through outputs (VSF 42)



Type		VSF 8	VSF 42
Order number		380 280	380 281
EAN-code		4026187651442	4026187651459
Input frequency range	[MHz]	950 - 2150	
Optimum input level	[dBμV]	68 - 74	
Ripple	[dB]	> 1	
Tilt	[dB]	2 ± 1	
Reflection loss Input / Output	[dB]	> 10	
Isolation of outputs	[dB]	> 30	
Through loss: Loop through output	[dB]	0 ± 1	
Output 1 - 8	[dB]	8 ± 1	
Inputs / Outputs	[Ω]	F jacks, 75	
Current consumption @ 5 V	[mA]	80	
Ambient temperature	[°C]	0...+50	



VH5

Adapter plate for mounting of up to 5 x VSF



Type	VH 5	
Order number	380 250	
EAN-Code	4026187651466	

VAF

Air flow unit for optimum heat leading when mounting the V 16 into 19-inch racks



Type	VAF	
Order number	380 980	
EAN-Code	4026187651374	
Rack units	3 RU afforded	

VSN 1, VSN 2

V 16 single power supply (VSN 1)

V 16 twin power supply (VSN 2), redundant



Type	VSN 1		VSN 2
Order number	350 210		350 220
EAN-code	4026187651312		4026187651329
Nominal voltage	[V~]	230, (+6 / -10%) 50 / 60 Hz	
Power consumption	[VA] [W]	196 / 190	208 / 200
Output lines	5 V / 13,5A, 12 V / 6,5A 28 V / 200 mA		
Fuse	T 1,25 A „L“, IEC60127-2/3		
Ambient temperature	[°C]	0...+50	

KC3

External programming unit (*not for transmodulator modules with NIT-processing and digital FM-converters)



- easy and intuitive operation
- practical, attractive design, illuminated display and large keyboard
- protection against unauthorized programming by easy removal control unit
- display of operating parameters in a 4-line, 16-character LC display

Type		KC 3
Order number		330 350
EAN-code		4026187690106

VCP 15-2

Adapter cable for connection to X...AV-modules and V 112



Type		VCP-15-2
Order number		350 151
EAN-code		4026187651718
Length	[mm]	1400
Connectors		15-pin SUB-D-plug & Cinch / RCA

XF-450, XF-700

Internalj umper-cable



Type		XF-450	XF-700
Order number		790 450	790 700
EAN-code		4026187651411	4026187651428
Length	[mm]	450	700
Screening	[dB]	90	
Connectors	[Ω]	75, F-connector	



HE programming software

clearly arranged programming of X-5, X-8, V16 head-end systems via PC or laptop



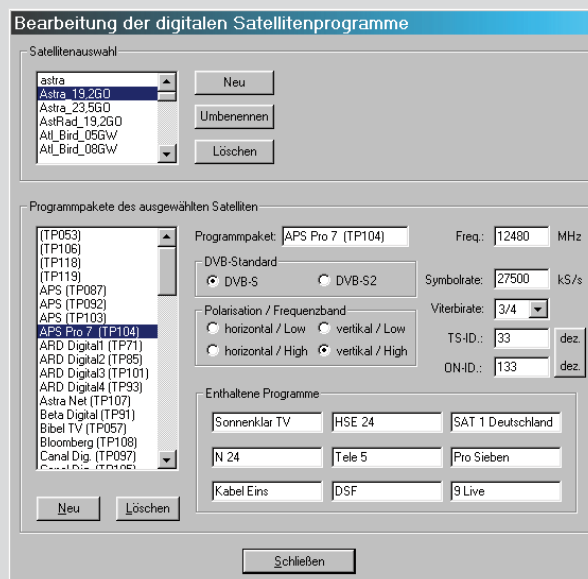
- received satellite / SAT-programmes / output channel
- video- and audio parameters of analogue output channels
- symbol rate and modulation mode for digital output channels
- input frequencies for terrestrial converters and output frequencies

Type	HE programming software
Order number	330 360
EAN-code	4026187650728

Programming the head-end

Configuration

With the HE programming software, up to 20 bus-compatible X-5 / X-8 / V16 base units can be saved in a configuration file. From the menu item "Display unit" the user has the option of accessing the programme parameters of an already existing headend and easily edit and modify them. Current programme satellite assignments are stored in their own "SAT program files". These files can be updated and changed by the user. ASTRO offers updating of programme assignments of the most common satellites via the internet.

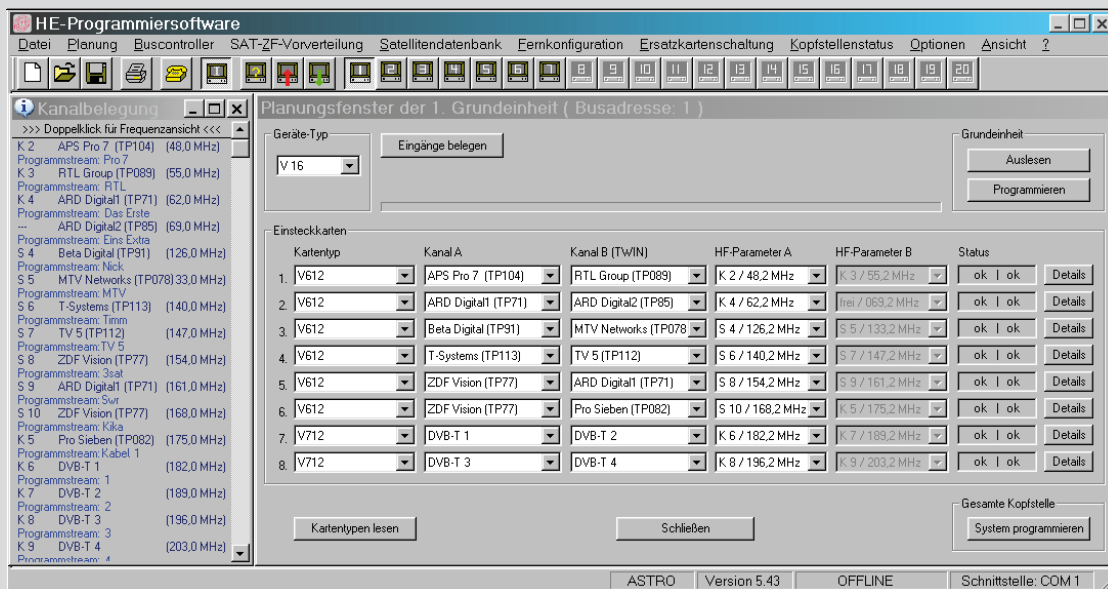


Remote maintenance

The user has the option of remotely programming and maintaining head-end devices. Depending on the use of bus controllers different possibilities are offered: analogue modem, GSM-modem or connection via IP. These added features save the network operator service costs, e. g. when changes occur in transponder assignments. They imply rapid response in the event of processing card failure by replacement signal switching. In order to activate the backup signal circuit, the network operator merely has to select the failed module and the backup module redundancy. A renewed manual configuration of the operating parameters for the redundancy module is not necessary.

The following processes are carried out in an automated manner:

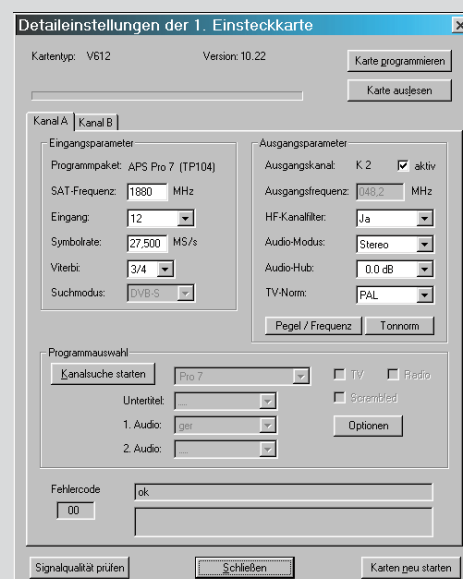
- switch-off (RF) of the failed module
- copying of the operating parameters of the faulty module to the redundancy module
- switch-off (RF) of the redundancy module



Detail adjustments

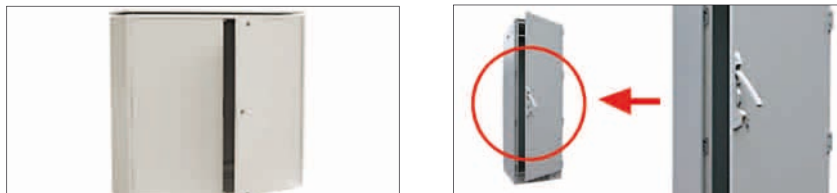
Via a menu for detail adjustments all relevant parameters of signal processing can be configured for every head-end module. The options are clearly arranged and assorted according to input and output parameters. Input parameters can – depending on the module – be entered manually or carried over from the satellite data base in a user friendly manner. Output parameters can be adjusted as needed. Depending on the module the level adjustment occurs electronically and different options for the output signal can be activated or deactivated.

If error messages should occur, these are displayed in the detail menu as well.



LGH 1800, LGH 2000

Mounting cabinet designed for assembling SAT-distribution systems



- protective housing made of 1,2 mm sheet steel with PURAL-coating 7032
- eight pre-punches that can be tweaked out if required for cable feed
- ventilation grills for good ventilation
- uniform locking safety lock
- delivered with particle board for mounting

Type	LGH 1800	LGH 2000
Order number	189 921	189 931
EAN-code	4026187591724	4026187591731
Dimensions (W x H x D)	600 x 1800 x 600 2 doors / 38 RU	600 x 2000 x 600 2 doors / 42 RU

LGH 97 W

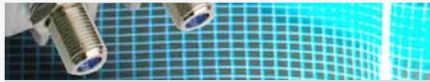
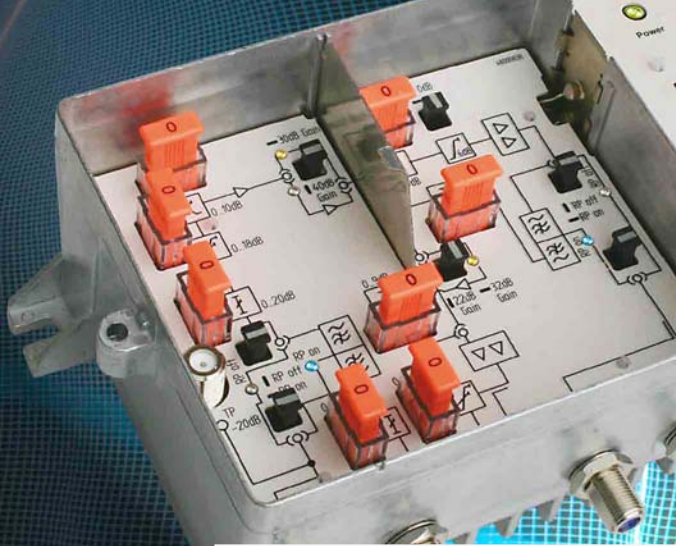
Mounting cabinet designed for assembling SAT-distribution systems



- protective housing made of 1,2 mm sheet steel with PURAL-coating 7032
- 2 fans, 2 temperature controllers and a socket panel
- ALSP mounting plate
- 3 safety locks

Type	LGH 97 W	
Order number		189 097
EAN-Code		4026187131302
Dimensions (W x H x D)	[mm]	970 x 1000 x 380 2 doors
Weight	[kg]	46,5

Broadband amplifiers



Overview of amplifiers

Amplifiers for
in-house distribution

AL-series

Amplifiers for in-house distribution networks

Page 130

Page 132



Universal
broadband amplifiers

HL-series

Universal broadband amplifiers for in-house distribution and broadband communication systems

Page 141



Universal
broadband amplifiers

HV-series

Universal broadband amplifiers for in-house distribution and broadband communication systems

Page 145



Modular
broadband amplifiers

VARIO-series

Universal broadband amplifiers with pluggable modules for CATV systems

Page 155



Which amplifier for which application?

„All on board“-amplifiers

Small in-house distribution

AL-series



Forward path gain
20 to 36 dB

Medium in-house distribution

AL-series



Forward path gain
20 to 36 dB

HL-series



Forward path gain
22 to 38 dB

Large in-house distribution

HL-series



Forward path gain
22 to 38 dB

Modular amplifiers

Large in-house distribution

HV-series



Forward path gain
30 to 40 dB

CATV- and broadband networks

HV-series



Forward path gain
30 to 40 dB

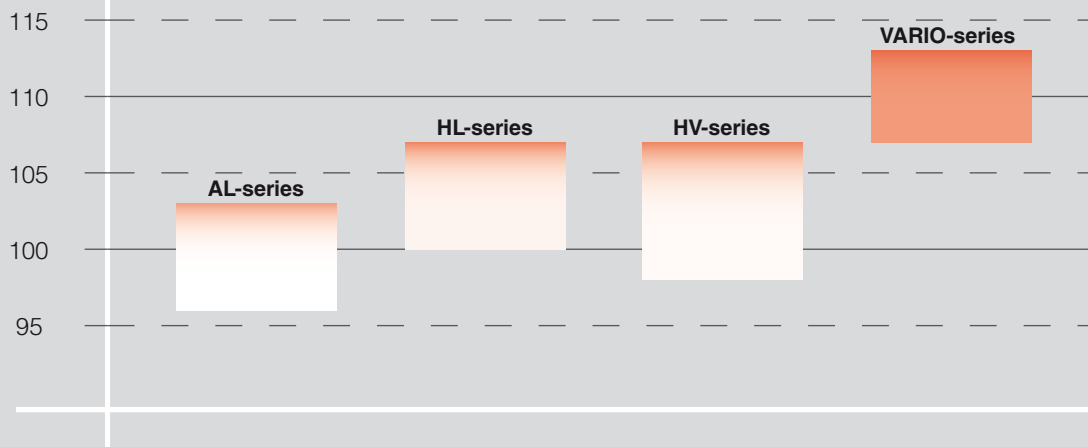
VARIO-series



Forward path gain
35,5 to 40 dB




Output level*

[dB μ V]



* accord. EN 50083 @ 60 dB CSO, CTB

Overview of amplifier lines

Type		Gain forward path [dB]	Gain return path [dB]	Return path	Output level [dBμV]	Configuration via	Test jacks	Page
AL-series 	AL 108	20	-	-	96	Pot.	-	133
	AL 308E	30	-	-	96	Pot.	-	133
	AL 1	20	-	-	97	Pot.	-	134
	AL 3E	30	-	-	98	Pot.	-	134
	AL 1R	20	> -2	passive 30 MHz, integrated	97	Pot.	-	135
	AL 1RE	20	> -2	passive 30 MHz, integrated	97	Pot.	-	135
	AL 3RE	30	> -2	passive 30 MHz, integrated	98	Pot.	-	135
	AL 020	-1...-0,9	20	5 - 65 MHz, integrated		Pot.	-	139
	AL 311	30	> -2	passive 5 - 65 MHz, integrated	98	Pot.	-	136
	AL 223	24	22	active 5 - 65 MHz, integrated	98	Pot.	-	137
	AL 325	30	23	active 5 - 65 MHz, integrated	98	Pot.	-	137
	AL 331	32	27	active 5 - 65 MHz, integrated	98	Pot.	-	137
	AL 431	36	27	active 5 - 65 MHz, integrated	103	Pot.	-	137
	MMV 2	0 ± 1	0 ± 1	active 5 - 65 MHz, integrated	83	-	-	140
HL-series 	HLB 43	38	30 / 20	active 5 - 65 MHz, integrated	107	Pot., Jumpers	Outp.	142
	HLC 12	22	20	active 5 - 65 MHz, integrated	100	Pot., Jumpers	Inp. Outp.	143
	HLC 32	32	27	active 5 - 65 MHz, integrated	101	Pot., Jumpers	Inp. Outp.	143
	HLC 43	38	28	active 5 - 65 MHz, integrated	107	Pot., Jumpers	Inp. Outp.	143
	RB 12	22 ± 1	20 ± 1	active 5 - 65 MHz, integrated	100	Pot., Jumpers	Inp. Outp.	146
HV-series 	HVO/F V38	38 / 32	dep. on module	option. HV RD mod. 5 - 65 MHz	107	Pot., Jumpers	Inp. Outp.	144
	HV 331	30 / 24	dep. on module	option. HV RD mod. 5 - 65 MHz	98	Pot., Jumpers	Inp. Outp.	146
	HVO V38 P	40 / 30	32 / 22	5 - 65 MHz, integrated	107	Pot., Jumpers	Inp. Outp.	146
	HVF V38 P	40	32 / 22	5 - 65 MHz, integrated	107	Pot., Jumpers	Inp. Outp.	148
	HVO/F 331 P	30	25	5 - 65 MHz, integrated		Pads, Switches	Inp. Outp.	152
VARIO-series 	VARIO 561 O/F	36	dep. on module	option. VR-modules	110	Pads	Inp. Outp.	156
	VARIO 567 O/F	35,5	dep. on module	option. VR-modules	110	Pads	Inp. Outp.	157
	VARIO 662 O/F	35,5	dep. on module	option. VR-modules	112	Pads	Inp. Outp.	156
	VARIO 681 O/F	40	dep. on module	option. VR-modules	113	Pads	Inp. Outp.	158
	VARIO 682 O/F	40	dep. on module	option. VR-modules	113	Pads	Inp. Outp.	159
	VARIO 683 O/F	40	dep. on module	option. VR-modules	113	Pads	Inp. Outp.	158
	VARIO 684 O/F	40	dep. on module	option. VR-modules	113	Pads	Inp. Outp.	159





KLASSE
A
CLASS

Amplifiers for in-house distribution

AL-series:

Amplifiers for in-house distribution networks that can be used in future-proof, bidirectional distribution systems in family homes and apartment buildings.

- aluminium die-cast housing with high screening and cooling
- according to (EN 50083-2/A1)
- safe against spurious radiation thanks to a housing screening factor ≥ 90 dB
- gain and slope adjustment
- versions with active and passive 65 MHz return path available
- excellent price/performance ratio

Common data		
Return loss RF-inputs / outputs	[dB]	EN 50083-3 categorie C
Connectors	[Ω]	F-jacks, 75
EMC	[Ω]	accord. EN 50083 -2
Supply voltage	[V~/Hz]	230 / 50
Ambient temperature	[$^{\circ}$ C]	-15...+55
Dimensions (W x H x D)	[mm]	121 x 138 x 55
Protection		DIN 45 050-IP 20

AL 108, AL 308E

Price-competitive amplifiers for in-house distribution without return path



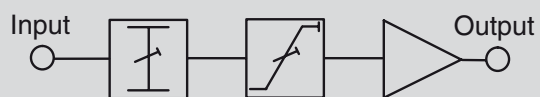
KLASSE **A**
CLASS

- for in-house distribution in cable TV networks
- high output level and high operating level for multichannel use
- level controller for exact level adjustment

AL 108



AL 308E



Type		AL 108	AL 308E
Order number		214180	214380
EAN-code		4026187150013	4026187150303
Frequency range	[MHz]	45 - 862	
Gain	[dB]	20	30
Maximum output level			
EN 50083-3, 42 channels @ 60 dB CSO, CTB	[dBμV]	96	
Common data			
Noise figure	[dB]	6,5	
Attenuator	[dB]	0 - 10	
Slope correction	[dB]	-	0 - 10
Power consumption	[VA] / [W]	3 / 2,5	4,5 / 3,5
Weight	[kg]	0,6	



AL 1, AL 3E

Amplifiers for in-house distribution without return path



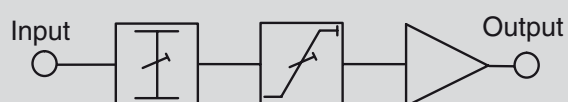
KLASSE
A
CLASS

- for in-house distribution in cable TV networks
- high output level and high operating level for multichannel use
- level controller for exact level adjustment

AL 1



AL 3E



Type		AL 1	AL 3E
Order number		214 010	214 040
EAN-code		4026187150365	4026187150396
Frequency range	[MHz]	47 - 862	
Gain	[dB]	20 ± 1	30 ± 1
Interstage Slope		-	3 typ.
Maximum output level			
EN 50083-3, 42 channels @ 60 dB CSO, CTB	[dBμV]	97	98
Common data			
Noise figure	[dB]	5,5	4
Attenuator	[dB]	0 - 10	0 - 20
Equalizer	[dB]	-	0 - 18
Power consumption	[VA] / [W]	3 / 2,5	6,5 / 5,5
Weight	[kg]	0,8	

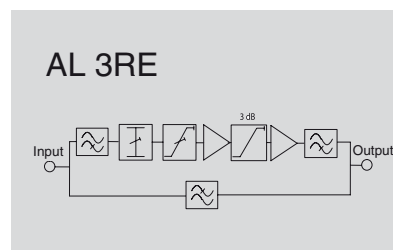
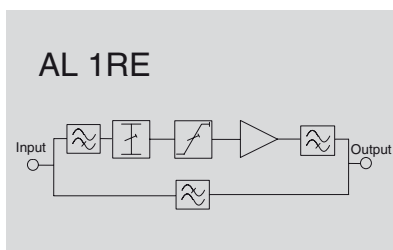
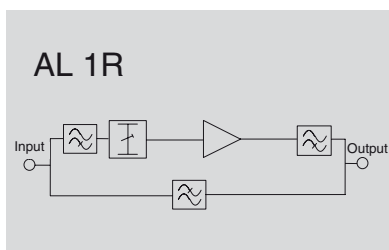
AL 1R, AL 1RE, AL 3RE

Amplifiers for in-house distribution with passive 30 MHz return path



KLASSE **A**
CLASS

- for in-house distribution in cable TV networks
- high output and high operating level for multichannel use



Type		AL 1 RE	AL 3 RE
Order number		214 060	214 050
EAN-Code		4026187150389	4026187150402
Frequency range	[MHz]	47 - 862	
Gain	[dB]	20 ± 1	30 ± 1
Interstage Slope	[dB]	-	3 typ.
Maximum output level			
EN 50083-3, 42 channels @ 60 dB CSO, CTB	[dBμV]	97	98
Return path			
Frequency range	[MHz]	5 - 30	5 - 33
Gain	[dB]	> -2	> -2
Common data			
Noise figure	[dB]	6	5
Attenuator	[dB]	0 - 10	0 - 20
Equalizer	[dB]	0 - 18	0 - 18
Power consumption	[VA] / [W]	3 / 2,5	6,5 / 5,5
Weight	[kg]	0,8	



AL311

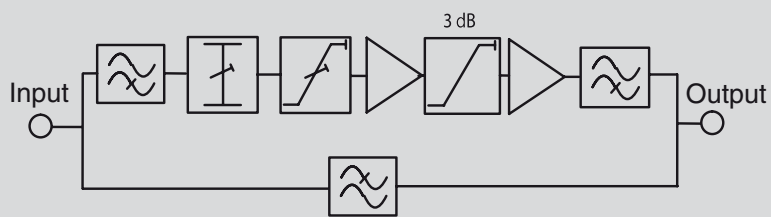
In-house amplifier with passive 65 MHz return path



KLASSE
A
CLASS

- for in-house distribution in cable TV networks
- high output level and high operating level for multichannel use

AL 311



Type		AL 311
Order number		214 110
EAN-code		4026187150600
Forward path		
Frequency range	[MHz]	80 - 862
Gain	[dB]	30 ± 1
Attenuator	[dB]	0 - 20
Equalization: Interstage slope variable in the input	[dB]	typ. 3 0 - 18
Maximum output level		
EN 50083-3, 42 channels @ 60 dB CSO, CTB	[dBμV]	98
Return path		
Frequency range	[MHz]	5 - 65
Gain	[dB]	> -2
Common data		
Power consumption	[VA] / [W]	5,5 / 5,5
Noise figure	[dB]	typ. 5
Weight	[kg]	0,8

AL 223, AL 325, AL 331, AL 431

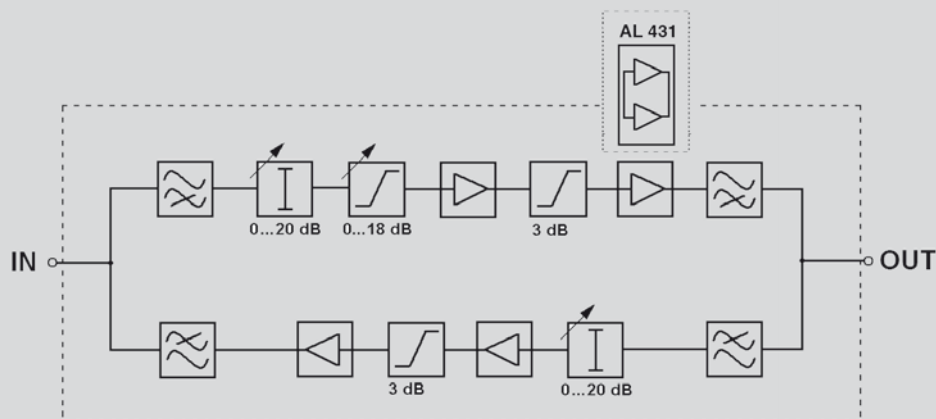
In-house amplifiers with active 65 MHz return path



■ KLASSE **A**
■ CLASS

- different forward path gain levels; integrated return path amplifier and diplexfilter
- attenuator for level adjustment in the input of forward and return path
- equalizer in the input of the forward path
- high modulation of return path to achieve operation safety even at multi channel load
- integrated equalizer in forward and return path

AL 223,, AL 325, AL 431



AL 223, AL 325, AL 331, AL 431

In-house amplifier with active 65 MHz return path



KLASSE
A
CLASS

- different forward path gain levels; integrated return path amplifier and diplexfilter
- attenuator for level adjustment in the input of forward and return path
- equalizer in the input of the forward path
- high modulation of return path to achieve operation safety even at multi channel load
- integrated equalizer in forward and return path

Type		AL 223	AL 325	AL 331	AL 431
Order number		214 223	214 325	214 331	214 431
EAN-code		4026187150877	4026187150853	4026187150921	4026187150822
Forward path					
Frequency range	[MHz]	80 - 862	80 - 1006		
Gain	[dB]	24 ± 1	30 ± 1	32 ± 1	36 ± 1
Interstage Slope (fixed), typical	[dB]	3			
Noise figure	[dB]	typ. 6	typ. 5,5	typ. 4	typ. 5,5
Equalizer in the input	[dB]	0 - 18			
Attenuator in the input	[dB]	0 - 20			
Maximum output level					
42 channels 60 dB CSO, CTB linear control	[dBμV]	98	98	98	103
System load accord. KDG 1TS11/0		medium system load			
Return path					
Frequency range	[MHz]	5 - 65			
Gain	[dB]	22 ± 1	23 ± 1	27 ± 1	27 ± 1
Interstage Slope (fixed), typical	[dB]	3			
Noise figure	[dB]	typ. 7	typ. 6	typ. 5	typ. 5
Attenuator	[dB]	0 - 20			
Maximum output level					
2 carriers, linear	[dBμV]	105 @ 60 dB IMA 2 (EN 50083-3)			
3 carriers	[dBμV]	114 @ 60 dB KMA (DIN 45004B)			
Common data					
Power consumption	[VA] / [W]	7,5 / 6,5	7,5 / 6,5	7,5 / 6,5	9,5 / 8,5
Weight	[kg]	0,8			ca. 1,0

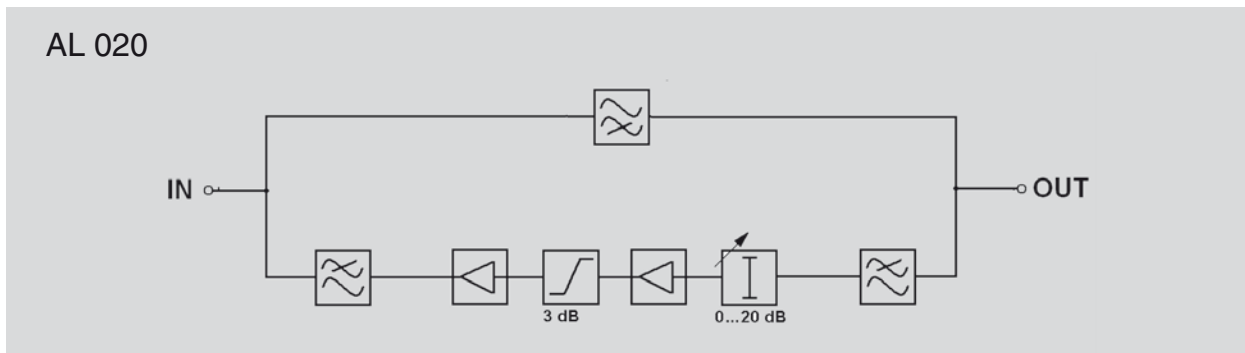
AL0 20

Return path booster 5- 65 MHz



KLASSE **A**
CLASS

- integrated duplex filter, integrated pre-emphasis in the return path
- attenuation controller for level adjustment at the input of the return path
- high output level at the return path for more reliability at multichannel load



Type		AL 020
Order number		214 021
EAN-Code		4026187150891
Forward path		
Frequency range	[MHz]	80 - 862
Gain	[dB]	-1...-0,9
Return path		
Frequency range	[MHz]	5 - 65
Gain	[dB]	20 ± 0,5
Maximum output level	[dBμV]	accord. EN 50083 60 dB IMA 2: 105 accord. DIN 450043 60 dB KMA: 114
Common data		
Power consumption	[VA] / [W]	2 / 2,5
Noise figure	[dB]	typ. 6
Weight	[kg]	0,8



MMV2

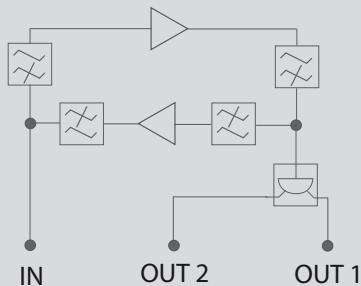
Multimedia distribution amplifier



KLASSE **A**
CLASS

- Multimedia distribution amplifier with 2 outputs

MMV 2



Type		MMV 2
Order number		214 012
EAN-Code		4026187121181
Forward path		
Frequency range	[MHz]	80 - 1006
Gain	[dB]	0 ± 1
Noise figure	[dB]	< 6 (at 80 - 110 MHz ca. 7 ± 1)
Maximum output level		
accord. Unity Media 3 carriers 64-QAM with 117 dBμV in return path, Phase-Noise-distance in forward path at 60 dBμV input level	[dBc/Hz]	-118
accord. EN 50083-3, 41 channels 60 dB CSO, CTB (without band 1)	[dBμV]	83
Return path		
Frequency range	[MHz]	5 - 65
Gain	[dB]	0 ± 1
Noise figure	[dB]	< 19 (measured from ca. 10 MHz)
Maximum output level		
2 carriers, linear	[dBμV]	115 @ 60 dB IMA 2 (EN 50083-3)
3 carriers	[dBμV]	113 @ 60 dB IMA 3 (EN 50083-3)
Common data		
Power consumption with provided power supply	[VA; W]	typ. 4,5; 2,5
Input voltage amplifier	[V ---]	5
Current demand amplifier	[mA]	typ. ≤ 320
Connectors		F-connector at input, 2 x F-connector at outputs
EMC (at 60 dBμV operating level)		Interference resistance within band accord. EN 60728-2; Interference resistance without band deflecting from EN 60728-2 with field strength 118 dBμV
Dimensions (W x H x D)	[mm]	100 x 117 x 33
Weight	[kg]	ca. 0,5
Ambient temperature	[C°]	0...40
Prot. accord. DIN EN 60 529 resp. DIN 40 050		IP 30



Universal broadband amplifiers

HL-series:

Broadband amplifiers for bidirectional in-house distribution and broadband communication systems

- forward path gain from 24 dB to 38 dB available
- integrated return path amplifiers and diplex filters
- fixed (HLB 43) or pluggable (HLC 12, HLC 32, HLC 43) interstage slope in forward path
- attenuator for level adjustment at the input of forward and return path
- integrated slope at the input of the forward path
- compact aluminium die-cast housing for best screening and cooling
- excellent price/performance ratio

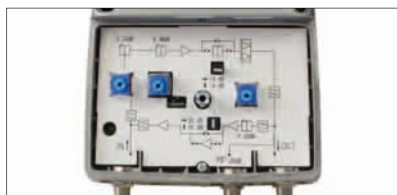
Common data

Frequency range		
Forward path / Return path	[MHz]	80 - 862 / 5 - 65
Ripple	[Ω]	75
Return loss	[dB]	≥ 18 u. ab 40 MHz - 1,5 / octave (at least 10)
Connectors		F jack, 75
EMC	[Ω]	compliant EN 50083 -2
Power supply	[V~/Hz]	230 / 50
Ambient temperature	[°C]	-15...+55
Dimensions (W x H x D)	[mm]	121 x 138 x 55
Weight	[kg]	0,8
Protection		DIN 45 050-IP 20
Main fuse		T1A L250V IEC 60127-3/4



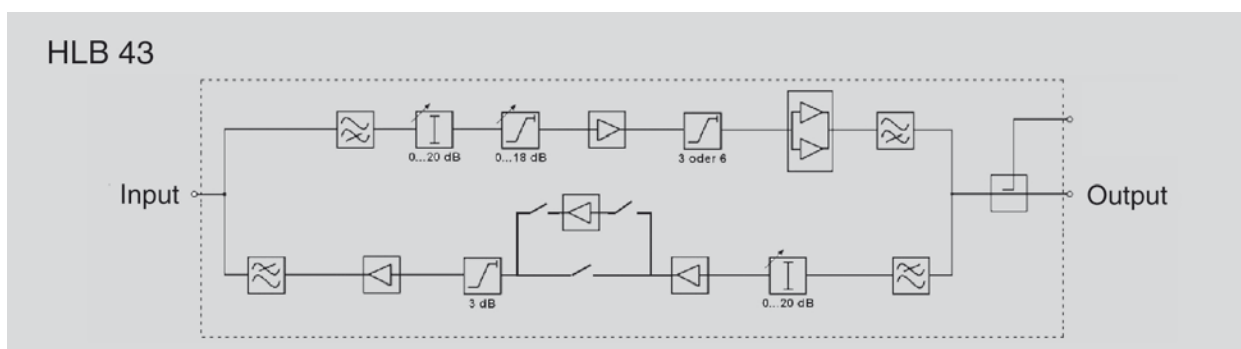
HLB43

Broadband amplifier with active 65 MHz return path



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A
CLASS

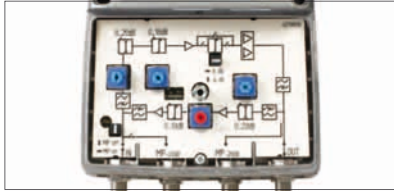
- Broadband amplifier with active 65 MHz return path
- high upstream output level for reliable operation even at multi channel operation, excellent price-performance ratio



Type		HLB 43
Order number		214 435
EAN-code		4026187002534
Forward path		
Frequency range	[MHz]	80 - 862
Gain	[dB]	38 ± 1
Interstage Slope	[dB]	0 or 6, pluggable
Noise figure	[dB]	typ. 5
Equalizer in the input	[dB]	0 - 18
Attenuator in the input	[dB]	0 - 20
Testpoint	[dB]	20 ± 1
Maximum output level		
42 channels 60 dB CSO, CTB	[dBμV]	106 linear; 107 with 6 dB slope
Return path		
Frequency range	[MHz]	5 - 65
Gain	[dB]	30 / 22 ± 1
Interstage Slope (fixed), typical	[dB]	3
Noise figure	[dB]	typ. 6 at 30 dB gain
Attenuator	[dB]	0 - 20
Maximum output level		
2 carriers, linear @ 60 dB IMA 2 (EN 50083-3)	[dBμV]	105
3 carriers, @ 60 dB KMA (DIN 45004B)	[dBμV]	115
according KDG 1TS140		according to transmission: medium system load
Common data		
Power consumption	[VA] / [W]	17 / 8,5

HLC 12, HLC 32, HLC 43

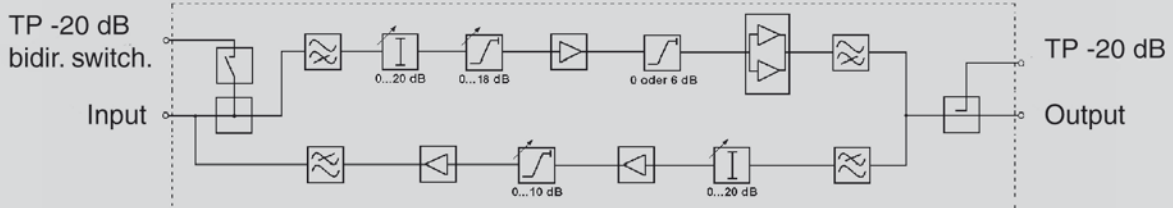
Broadband amplifier with active 65 MHz return path



KLASSE A
CLASS

- high upstream output level for reliable operation even at multichannel operation
- testpoints at input and output

HLC 12, HLC 32, HLC 43



Type		HLC 12	HLC 32	HLC 43
Order number		217 012	217 338	217 388
EAN-code		4026187110574	4026187002503	4026187002510
Forward path				
Frequency range	[MHz]	80 - 862		
Gain	[dB]	22 ± 1	32 ± 1	38 ± 1
Interstage slope, typical	[dB]	0 / 6 pluggable		
Noise figure	[dB]	typ. 5	typ. 6	typ. 5
Equalizer in the input	[dB]	0 - 18		
Attenuator in the input	[dB]	0 - 20		
Testpoints				
Input	[dB]	20 ± 2,5 shiftable		
Output	[dB]	20 ± 1		
Maximum output level				
41 channels, 60 dB CSO, CTB linear control	[dBμV]	100 (103 with 6 dB Slope)	101 (103 with 6 dB Slope)	107 (109 with 6 dB Slope)
Return path				
Frequency range	[MHz]	5 - 65		
Gain	[dB]	20 ± 1	27 ± 1	28 ± 1
Interstage Slope (fixed), typical	[dB]	0 - 10 adjustable		
Noise figure	[dB]	typical 6		
Attenuation in the input	[dB]	0 - 20		
Testpoint shiftable		Input 20 ± 1,5	Input 20 ± 1	Input 20 ± 1
Maximum output level				
2 carriers, linear @ 60 dB IMA 2 (EN 50083-3)	[dBμV]	105	105	105
3 carriers, @ 60 dB KMA (DIN 45004B)	[dBμV]	115	114	114
according KDG 1TS140		medium system load		
Common data				
Power consumption	[VA] / [W]	10,5 / 5,5	14 / 7,3	17 / 8,5



RB12

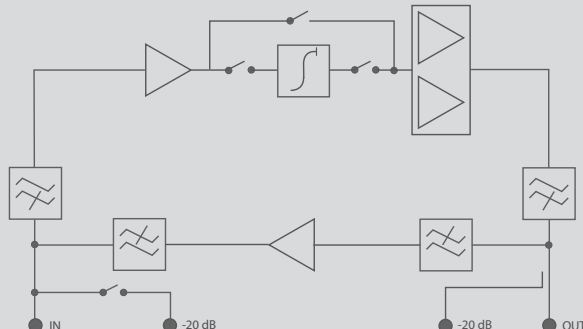
Return path booster



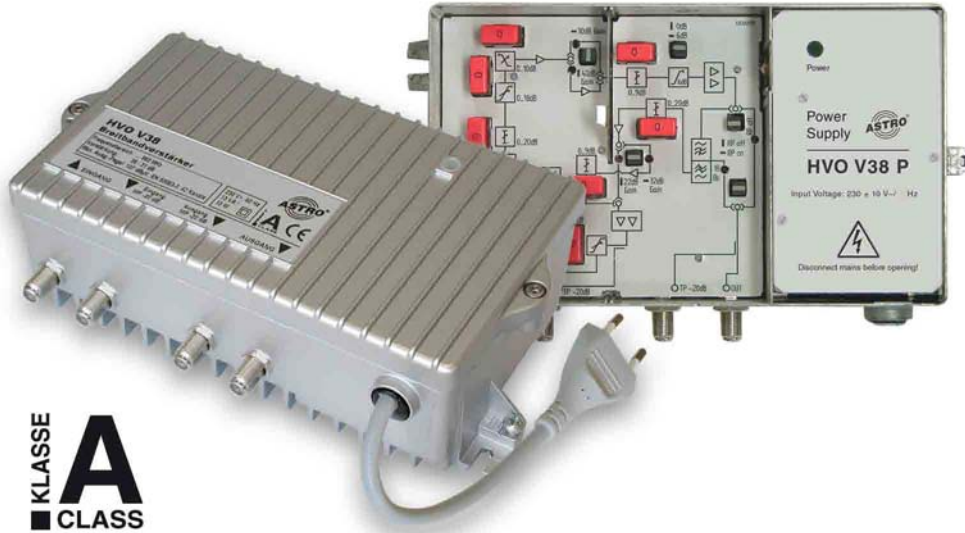
KLASSE **A**
CLASS

- active 65 MHz return path
- testpoints at input and output

RB 12



Type		RB 12
Order number		217 014
EAN-Code		4026187170578
Forward path		
Frequency range	[MHz]	80 - 862
Gain	[dB]	22 ± 1
Interstage slope, typ.	[dB]	0 or 6, pluggable
Noise figure	[dB]	typ. 5
Testpoints		
Input	[dB]	20 ± 2,5 shiftable
Output	[dB]	20 ± 1
Maximum output level		
41 channels 60 dB CSO, CTB linear controlled	[dBμV]	100 (103 with 6 dB slope)
Return path		
Frequency range	[MHz]	5 - 65
Gain	[dB]	20 ± 1
Interstage slope	[dB]	3
Noise figure	[dB]	typ. 7 (measured from ca. 10 MHz)
Testpoint shiftable		Input 20 ± 1,5
Maximum output level		
2 carriers, linear @ 60 dB IMA 2 (EN 50083-3)	[dBμV]	105
3 carriers, @ 60 dB KMA (DIN 45004B)	[dBμV]	115
Common data		
Power consumption	[VA] / [W]	10,5 / 5,5



KLASSE
A
CLASS

Universal broadband amplifiers

HV-series:

Universal broadband amplifiers for in-house distribution and broadband communication systems

- high output level and gain by GaAs-technology
- diplex filter and return path gain in one pluggable module (V38 and HV 331)
- attenuator and slope for level adjustment
- testpoints at input and output
- interstage slope and interstage attenuation selectable
- low power consumption by switching power supply (V 38)
- locally and remote powered version (except HV 331)

Common data		
Ripple	[Ω]	75
EMC		compliant EN 50083 -2
Ambient temperature	[°C]	-15...+55
Dimensions (W x H x D)	[mm]	210 x 120 x 66
Weight	[kg]	1,6
Protection		IP 50 according EN 60529



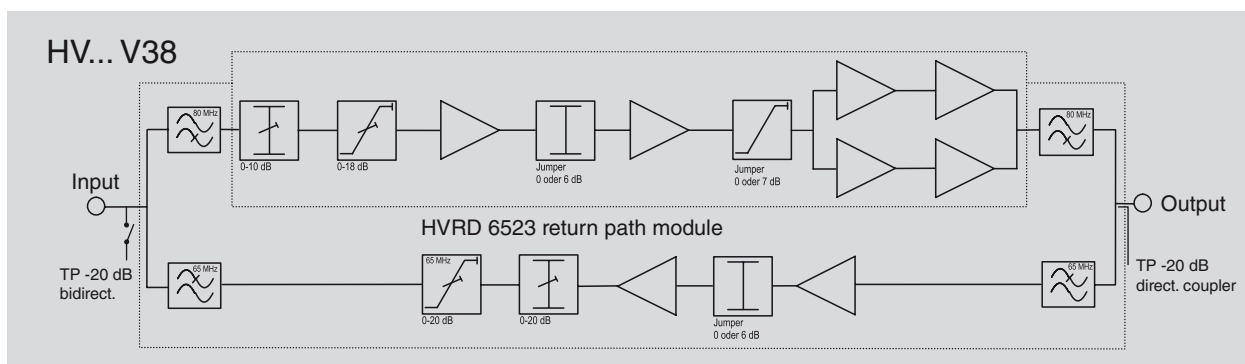
HVO/F V38, HV 331

Broadband amplifier for in-house distribution and CATV



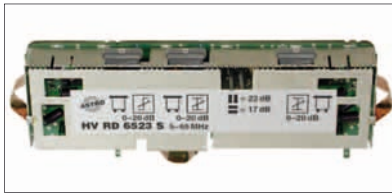
KLASSE
A
CLASS

- high upstream output level for reliable operation even at multichannel operation
- outstanding price-performance ratio
- locally and remote powered versions available (HV 331 only locally powered)
- optional return path amplifier modules (HV RD series)



Type		HVO/F V 38		HV 331	
Order number	local powering remote powering		217 381 217 391		217 331 -
EAN-Code	local powering remote powering		4026187140304 4026187140311		4026187140328 -
Frequency range		[MHz]	47 - 862		
Gain		[dB]	38 ± 1		30 ± 1
Ripple			± 1		± 1
Interstage slope, typ.		[dB]	0 / 7 pluggable		
Attenuation at the input		[dB]	0 - 10 variable		0 - 10 variable
Input equalizer			0 - 18 variable		0 - 18 variable
Noise figure		[dB]	typ. 8 (+1,4 dB at 6 dB Interstage attenuation)		
Base of equalizer		[dB]	862, fixed		
Interstage (fixed)		[dB]	0 or 6, pluggable		
Interstage slope (fixed)		[dB]	0 or 7, pluggable		
Return loss		[dB]	18, at 40 MHz -1,5 dB / octave		
Input, output, testpoints		[dB]			
Maximum output level					
42 channels, EN 50083-3 for CTBA/CSOA ≥ 60 dB		[dBμV]	107		98
Testpoint					
Input		[dB]	20 ± 2,5 bidirectional		
Output		[dB]	20 ± 1 directional coupler		
Common data					
Power consumption		[W] / [VA]	12 / 20		9 / 9,5
local powering		[W]	12		-
remote powering					

HVR D...



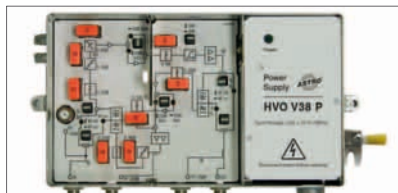
Return path modules for configuration of the return path; different modules with diplex filter and return path amplifier available; attenuation and slope of the modules are variable; modules with attenuation pads are additionally equipped with an adjustable attenuation at the input of the return path amplifier.

Type	HVRD	6523	6523 S	6527	6527 S	6532	6532S
Order number		216 261	216 271	216 350	216 340	216 351	216 352
EAN-code 4026187...		...190903	...190910	...190958	...190965	...191061	...191085
Frequency range							
Return path		5 - 65	5 - 65	5 - 65	5 - 65	5 - 65	5 - 65
Forward path	[MHz]	80 - 862	80 - 862	80 - 862	80 - 862	80 - 862	80 - 862
Common data							
Gain (pluggable)	[dB]	23 / 17	23 / 17	27 / 21	27 / 21	32 / 25	32 / 25
Attenuation / Equalizer		actuator	pad	actuator	pad	actuator	pad



HVO V38 P

Locally powered universal broadband amplifier with integrated return path



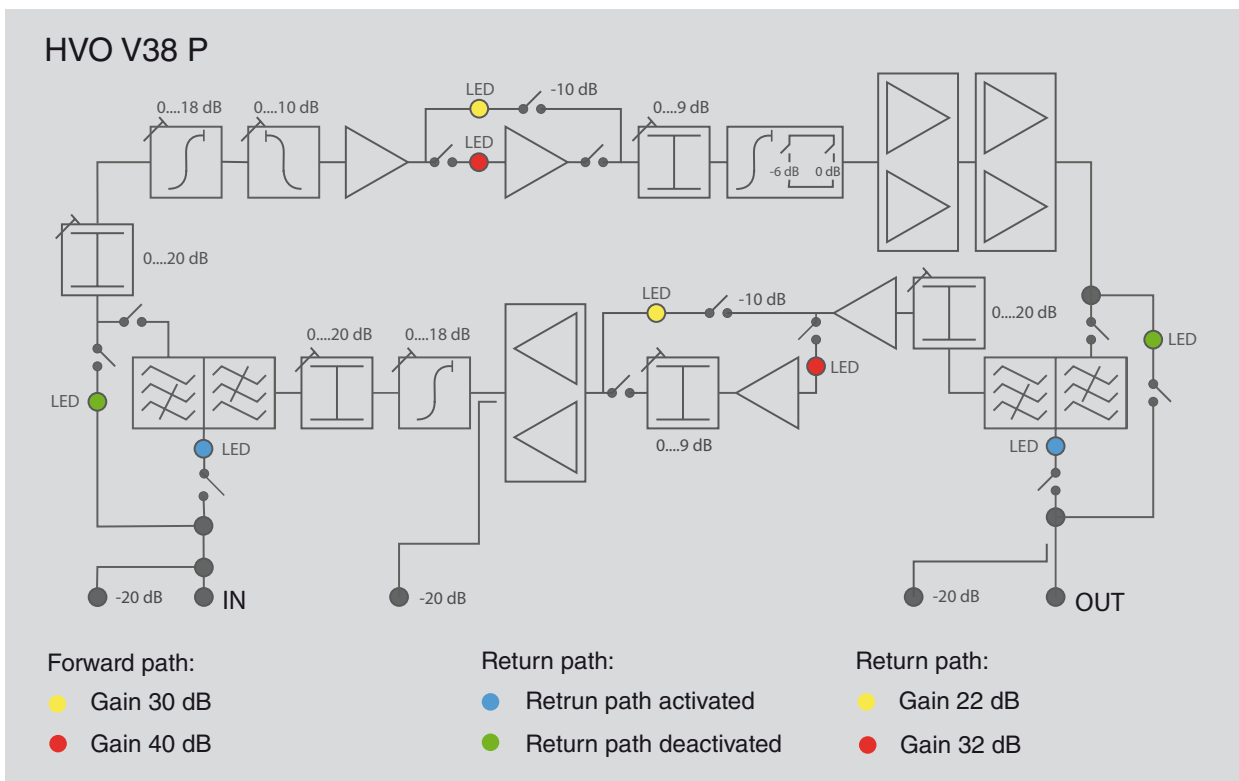
KLASSE **A**
CLASS

- high output level at high C/N by Push-Pull
- diplex filters and return path amplifier on-board
- 40 / 30 dB gain in forward path
- 32 / 22 dB gain in return path
- configuration via jumpers and pads, long



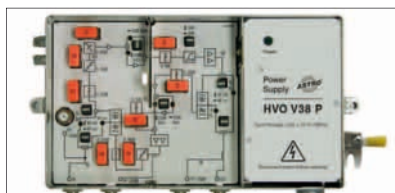
see „PAD long“ on page 154

- plugged signal paths indicated via LED
- testpoints in input and output



HVO V38 P

Locally powered universal broadband amplifier with integrated return path



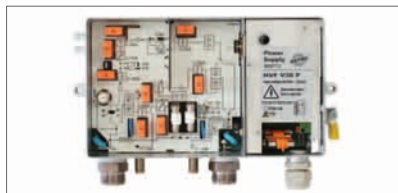
KLASSE **A**
CLASS

Type		HVO V38 P
Order number		217 390
EAN-code		4026187140373
Forward path		
Frequency range	[MHz]	47 - 862 bzw. 5 - 65 / 80 - 862 pluggable
Gain	[dB]	40 / 30 pluggable
Amplitude ripple	[dB]	± 1
Output level	[dBμV]	109 at 40 dB respectively 107 at 30 dB CENELEC 42
Noise figure	[dB]	typical 6 at 40 dB, resp. typical 7 at 30 dB
Return loss	[dB]	Categorie B, 18 and at 40 MHz -1,5 dB/octave
Cable simulation in the input	[dB]	0 bis 10, pad, deemphase
Attenuation in the input	[dB]	0-20, pad
Interstage attenuation	[dB]	0 to 9 at 40 dB, respectively 0 to 6 at 30 dB, pad
Input equalizer	[dB]	0 - 18, pad preemphase
Interstage-slope	[dB]	0 or 6, jumper, preemphase
Testpoints input / output	[dB]	Bi, 20 ± 2,5 / RK, 20 ± 1
Return path		
Frequency range	[MHz]	5 - 65, activated with jumper
Gain	[dB]	32 / 22 jumper
Output level	[dBμV]	KDG: medium load; Kabel BW: standard load
Noise figure	[dB]	typically 5,5 at 32 dB, respectively typically 5 at 22 dB
Attenuation	[dB]	0 - 20, pad, (input and output)
Interstage attenuation	[dB]	0 to 8, pad, only by gain 32 dB
Output equalizer	[dB]	0-18, pad, preemphase
Testpoints	[dB]	RK, 20 ± 1 (before and behind positioning elements)
Common data		
Power consumption	[VA] / [W]	24 / 12,5



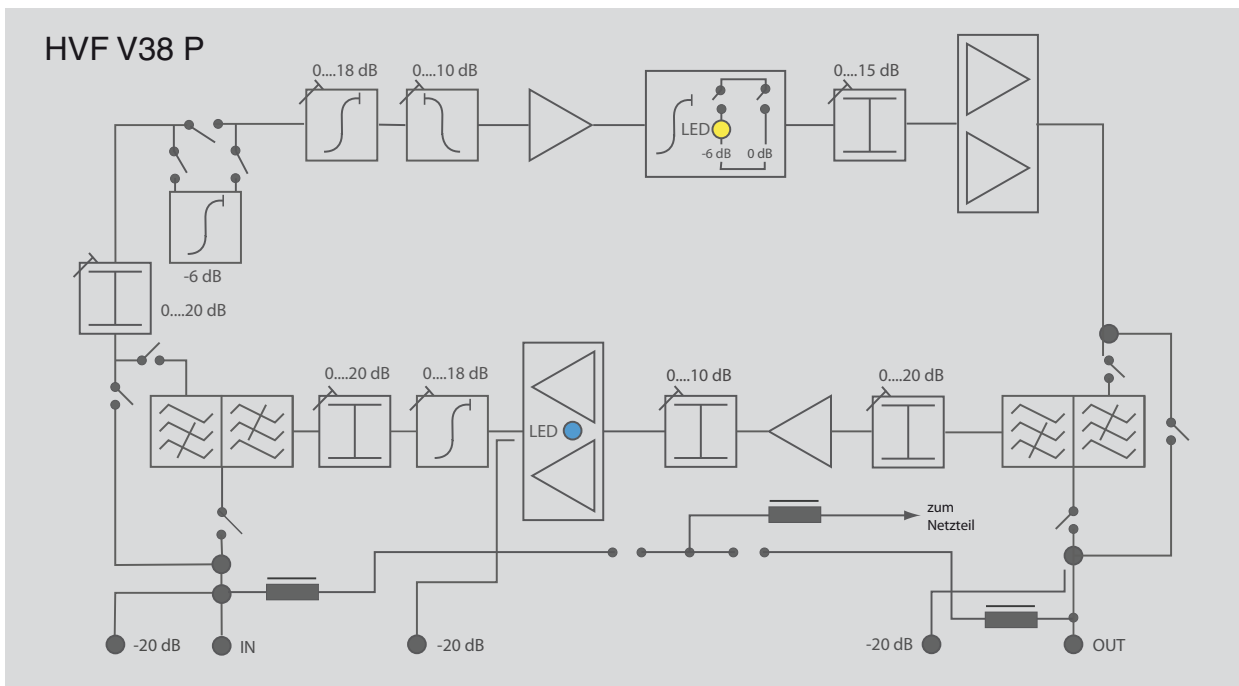
HVF V38 P

Remote powered universal broadband amplifier with integrated return path



KLASSE **A**
CLASS

- high output level at high C/N by Push-Pull
- diplex filters and return path amplifier on-board
- 40 dB gain in forward path
- 32 dB gain in return path
- configuration via switches and pads, long
- testpoints in input and output
- different versions (connectors, fuses) available



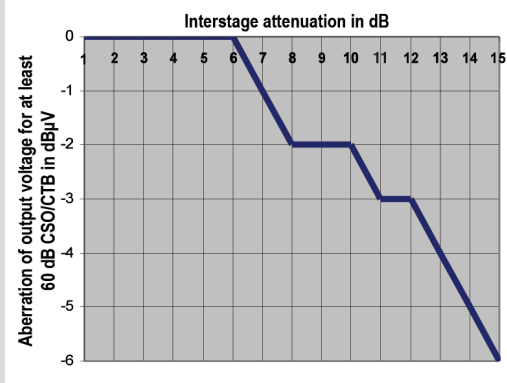
Type		HVF V38 P
Order number		217395
EAN-code		4026187120740
Connectors (75 Ω), Fuses*		PG-11m - 3,5/12 F, G5x20
Forward path		
Frequency range	[MHz]	47 - 1006 or 5 - 65 / 80 - 1006 switchable
Gain	[dB]	40 ± 1
Ripple	[dB]	± 1
Output level	[dBμV]	111 accord. EN80083-3 (see diagram), 60 dB CSO/CTB
Noise figure	[dB]	typ. 7**
Cable simulation in the input	[dB]	0 to 10, pad, deemphase
Attenuator, input	[dB]	0-20, pad
Interstage-attenuator	[dB]	0 to 15, pad (see diagram)
Input equalizer	[dB]	0 - 18, pad, preemphase
Interstage slope	[dB]	0 or 6, switch, preemphase
Testpoints input / output	[dB]	bidirectional, 20 ± 2 / directional coupler 0 ± 1
Return path		
Frequency range	[MHz]	5 - 65, switchable
Gain	[dB]	32 + 1
Output level	[dBμV]	acc. KDG: full load; acc. EN50083-3 IMA2 112; acc. EN 50083-5 KMA3: 117
Noise figure	[dB]	typ. 7 dB***
Attenuator	[dB]	0 - 20, pad (input and output)
Output equalizer	[dB]	0-18, pad, preemphase
Testpoints	[dB]	directional coupler, 20 ± 1 (before controls), bidirectional, 20 ± 1 (behind controls)
Common data		
Return loss	[dB]	≥ 18 dB & at 40 MHz -1,5 dB/octave
max. remote current incl. power consumption	[A~]	3 (through in- or output); 5 (through external power supply clamp)
Power consumption typ.	[A]	0,75 / 24 V~; 0,45 / 40 V~; 0,32 / 65 V~
Remote powering voltage	[V~]	24 to 65
Power consumption	[VA] / [W]	max. 18,5 / 13 with upstream; 10,5 without upstream

* Other connector and fuse types on request

** at 15 dB Interstage-attenuation typ.10,5 dB

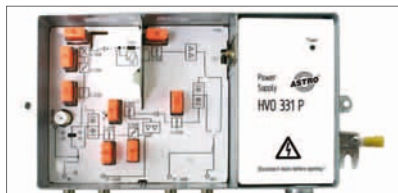
*** at 6 dB Interstage-attenuation noise figure typ.6,5 dB, at 10 dB Interstage-attenuation typ. 7 dB

Output voltage depending on Interstage attenuation



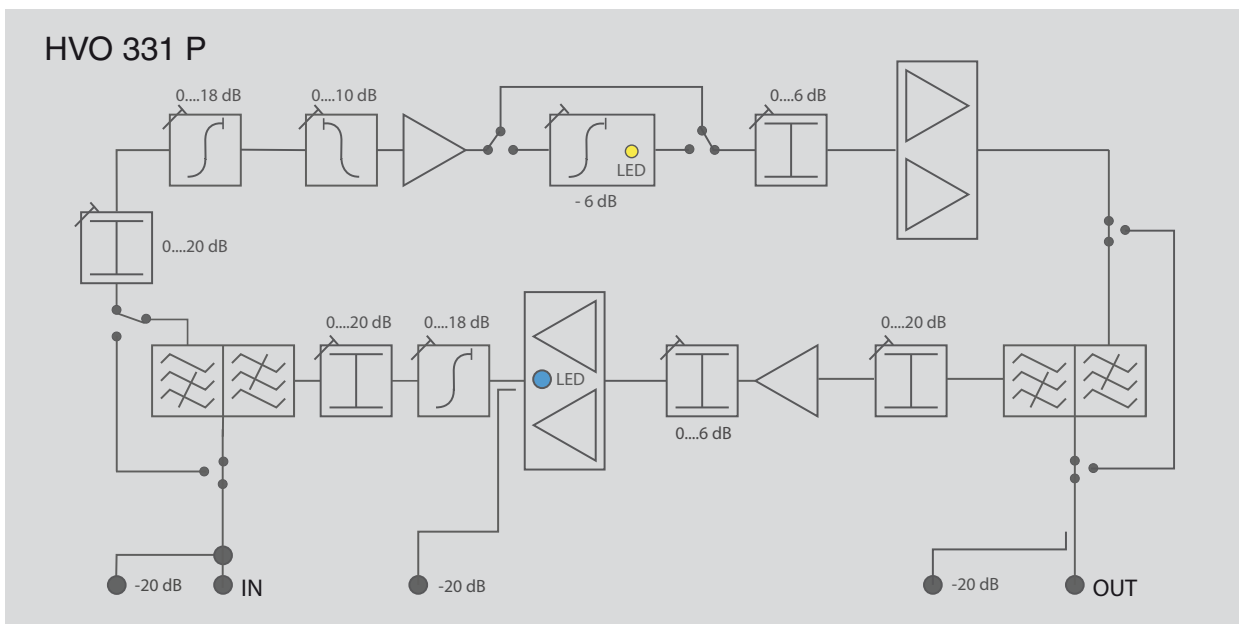
HVO 331 P, HVF 331 P

Universal broadband amplifier with integrated return path



KLASSE **A**
CLASS

- high output level at high C/N by Push-Pull
- diplex filters and return path amplifier on-board
- 30 dB gain in forward path
- 25 dB gain in return path
- configuration via switches and pads, long
- testpoints in input and output
- HVF 331 P in different versions (connectors, fuses) available



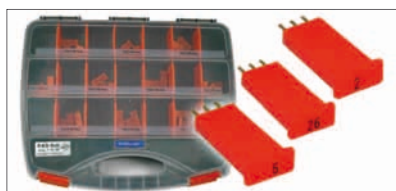
Type	HVO 331 P		HVF 331 P
Order number		217 335	217 340
EAN-Code		4026187141028	4026187131272
Connectors		F-jacks	PG 11m - 3,5/12 F*
Fuses		-	G5x20
Forward path			
Frequency range	[MHz]	47 - 862 or 5 - 65 / 80 - 862 switchable	
Gain	[dB]	30 ± 1	
Ripple	[dB]	± 0,7	
Output level**	[dBμV]	accord. EN50083-3 CENELEC 42 channels: 104; with 6 dB Interstage slope: 105; with Unity Media grid: 104	
Noise figure	[dB]	typ. 7	
Return loss	[dB]	18 u. at 40 MHz-1,5 dB/octave	
Cable simulation at the input	[dB]	0 to 10, pad	
Attenuator at input	[dB]	0-20, pad	
Interstage attenuator	[dB]	0...6, pad	
Input equalizer	[dB]	0 - 18, pad	
Interstage slope	[dB]	0 or 6, switchable	
Testpoints input / output	[dB]	bidirectional, 20 ± 2 / directional coupler, 20 ± 1	
Return path			
Frequency range	[MHz]	5 - 65, switchable	
Gain	[dB]	25	
Output level	[dBμV]	KDG: medium load; accord. EN 50083-3 IMA2: 111, accord. EN50083-5 KMA3: 116	
Noise figure	[dB]	6	
Attenuator	[dB]	at the input 0 - 20, pad; at the output 0 - 20, pad	
Interstage attenuator	[dB]	0 to 6, pad	
Output equalizer	[dB]	0-18, pad	
Testpoints	[dB]	directional coupler 20 ± 1 before controls; bidirectional 20 ± 1 behind controls	
Common data			
Power cons. without return path	[VA] / [W]	ca. 11,5 / 6,5	6,5 W
Power cons. with return path	[VA] / [W]	ca. 17 / 8,5	8,5 W

* Other connector types on request, delivery with FKS-fuse brackets possible

** from 5 dB Interstage-attenuation the output level value decreases 1 dBμV

PAD SET long, PAD SET short

Attenuation pads long, attenuation pads short



- attenuation pads long 1 - 10 dB pluggable, 10 x 10 pieces per dB (100 pieces) in hardcover box with separated partitions; attenuation pads short 1 - 10 dB pluggable, 10 x 10 pieces per dB (100pieces) in hardcover box with separated partitions

Type	PAD Set lang		PAD Set kurz
Order number		521 398	521 399
EAN-code		4026187120399	4026187140441



PADshor t

Attenuation pads long for HV- and VARIO amplifiers



Type value	Order no.	EAN-Code
Pad 0 dB lang	521 403	4026187003111
Pad 1 dB lang	521 413	4026187003159
Pad 2 dB lang	521 423	4026187003197
Pad 3 dB lang	521 433	4026187003234
Pad 4 dB lang	521 443	4026187003272
Pad 5 dB lang	521 453	4026187003319
Pad 6 dB lang	521 463	4026187003357
Pad 7 dB lang	521 473	4026187003395
Pad 8 dB lang	521 483	4026187003432
Pad 9 dB lang	521 493	4026187003470
Pad 10 dB lang	521 503	4026187140489
Pad 11 dB lang	521 513	4026187140526
Pad 12 dB lang	521 523	4026187140564
Pad 13 dB lang	521 533	4026187140601

Type value	Order no.	EAN-Code
Pad 14 dB lang	521 543	4026187140649
Pad 15 dB lang	521 553	4026187140687
Pad 16 dB lang	521 563	4026187140724
Pad 17 dB lang	521 573	4026187140762
Pad 18 dB lang	521 583	4026187140809
Pad 19 dB lang	521 593	4026187140847
Pad 20 dB lang	521603	4026187140878
Pad 21 dB lang	521613	4026187140892
Pad 22 dB lang	521623	4026187140908
Pad 23 dB lang	521633	4026187140915
Pad 24 dB lang	521643	4026187140922
Pad 25 dB lang	521653	4026187140939
Pad 26 dB lang	521663	4026187140946

PADshor t

Attenuation pads short, pluggable for HVRD...S, U 901 and VZN 8



Type value	Order no.	EAN-Code
Pad 0 dB	521 401	4026187003098
Pad 1 dB	521 411	4026187003135
Pad 2 dB	521 421	4026187003173
Pad 3 dB	521 431	4026187003210
Pad 4 dB	521 441	4026187003258
Pad 5 dB	521 451	4026187003296
Pad 6 dB	521 461	4026187003333
Pad 7 dB	521 471	4026187003371
Pad 8 dB	521 481	4026187003418
Pad 9 dB	521 491	4026187003470

Type value	Order no.	EAN-Code
Pad 10 dB	521 501	4026187140465
Pad 11 dB	521 511	4026187140502
Pad 12 dB	521 521	4026187140540
Pad 13 dB	521 531	4026187140588
Pad 14 dB	521 541	4026187140625
Pad 15 dB	521 551	4026187140663
Pad 16 dB	521 561	4026187140700
Pad 17 dB	521 571	4026187140748
Pad 18 dB	521 581	4026187140786
Pad 19 dB	521 591	4026187140823



KLASSE **A**
CLASS

Modular broadband amplifiers

VARIO-series:

Future-proof, adaptable amplifier concept for multimedia networks; the locally or remote powered VARIO amplifiers offer - thanks to the GaAs-technology - a high dynamic range with a low current consumption. Each type is temperature-compensated and equipped with pluggable interstage attenuation and slope. The incoming and outgoing cable attenuation can be compensated at the input. This is why the maximum output level can be increased.

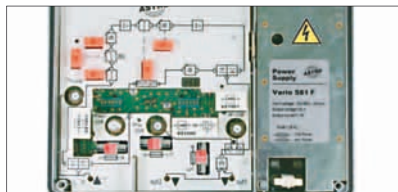
- flexible configuration thanks to pluggable modules
- all return path amplifiers interruption-free
- passive return path with zero-module VZ 1001 (included)
- additional testpoints for easy configuration and service

Common data VARIO series		Vario ... F	Vario ... O
		remote powering	local powering
Return path			
Frequency range	[MHz]	5 - 65 / 5 - 33	
Gain	[dB]	depends on return path module	
Diplexfilter	[MHz]	5 - 33 / 47 - 862 (VD 33), 5 - 65 / 80 - 1000 (VD 65)	
Common data			
Connectors	[Ω]	IEC jack or PG 11	F jack, 75
Feed-through current	[A]	5	-
Power supply	[V~/Hz]	24 - 65	230 / 50
Ambient temperature	[°C]	-15...+55	
Dimensions (W x H x D)	[mm]	240 x 73 x 150	
Weight	[kg]	2,7	
Return loss	[dB]	≥ 18 (>14 MHz -1,5 dB/octave) inputs / outputs & testpoints	
EMC		compliant EN 50083-2	
Protection		IP 54 category 2, according EN 60529	
Main fuse		T1,25A L 250V IEC60127 -3/4	
Remote powering fuse		T5A L 250V IEC60127 -2/3	-



VARIO 561, VARIO 662

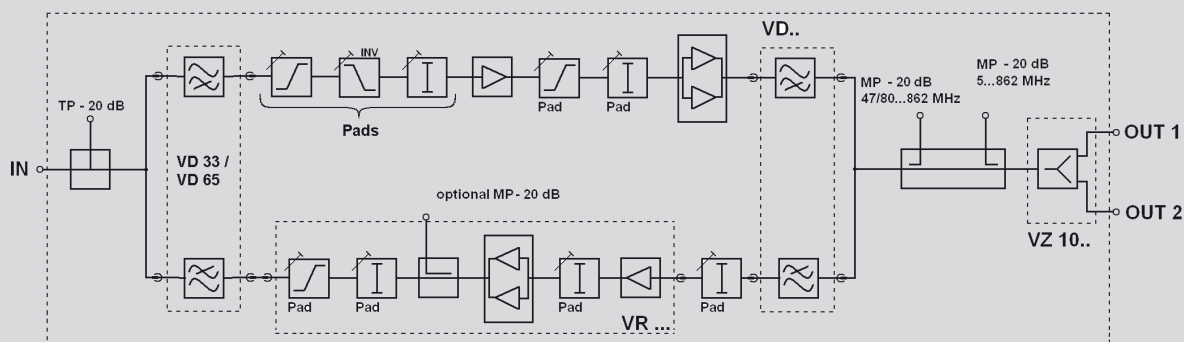
Universal broadband amplifier



KLASSE **A**
CLASS

- configuration via pads
- 4 testpoints
- locally and remote powered version available

VARIO 662

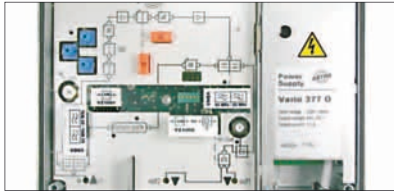


Type		Vario 561 O / F	Vario 662 O / F
Order number local powering		217 570	217 660
EAN-Code local powering		4026187130398	4026187130459
Order number remote powering		217 571	217 662
EAN-Code remote powering		4026187130381	4026187130442
Forward path			
Gain	[dB]	36 ± 0,8	36,5 ± 0,8
Maximum output level			
42 channels / linear	[dBμV]	110 (CTBA & CSOA ≥ 60 dB)	112 (CTBA & CSOA ≥ 60 dB)
42 channels / 7 dB slope	[dBμV]	112	114
Common data			
Frequency range	[MHz]	47 - 862	
Ripple	[dB]	± 0,8 incl. temperature drift	
Noise figure	[dB]	typ. 5 (± 0,5) / > 800 MHz: + 0,5 dB	
Attenuation at input	[dB]	0 - 20 (0,5 dB - steps)	
Attenuation interstage	[dB]	0 - 7 (0,5 dB steps)	
Input equalizer	[dB]	0 - 20 (0,5 dB - steps)	
Interstage equalizer	[dB]	0 - 10	
Base of equalizer	[MHz]	862	
Inverse equalizer at input	[dB]	0 - 10 (0,5 dB - steps)	
Base of inverse equalizer	[MHz]	47	
Input testpoint	[dB]	Return path 20 ± 1 / Forward path 20 ± 2	
Output testpoint	[dB]	20 ± 1 (directional coupler) 5 - 862 MHz	
Power consumption with / without return path	[W]	14,5 / 12 (F) 17 / 16 resp.. 28 / 24 VA (O)	15,5 / 13 (F) 17 / 16 resp. 29 / 24 VA (O)
Testpoints		4	

Other connector types on request

VARIO56 7

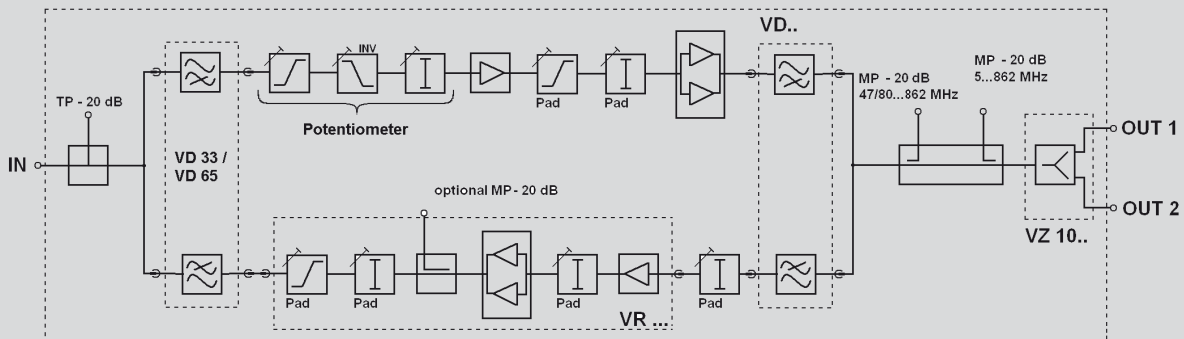
Universal broadband amplifier



KLASSE **A**
CLASS

- configuration via potentiometers as the input
- 2 testpoints
- locally and remote powered version available

VARIO 567

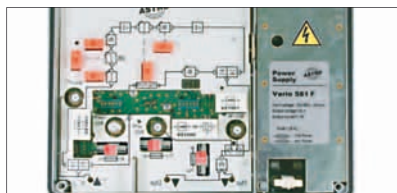


Type		Vario 567 O / F
Order number local powering		217 567
EAN-code local powering		4026187130476
Order number remote powering		217 577
EAN-code remote powering		4026187130404
Forward path		
Gain	[dB]	35,5 ± 1
Maximum output level		
42 channels / linear	[dBuV]	110 (CTBA & CSOA ≥ 60 dB)
42 channels / 7 dB Slope	[dBuV]	112
Common data		
Frequency range	[MHz]	47 - 862
Ripple	[dB]	± 1 including temperature drift
Noise figure	[dB]	typ. 5; > 800 MHz: 5,5
Attenuation at the input	[dB]	0 - 20 (continuous)
Attenuation interstage	[dB]	0 - 7 (0,5 steps)
Equalizer in the input	[dB]	0 - 20 (continuous)
Equalizer interstage	[dB]	0 - 10 (0,5 dB-steps)
Base of equalizer	[MHz]	862
Inverted equalizer in the input	[dB]	0 - 7 (continuous)
Base of inverted equalizer	[MHz]	47
Input testpoint	[dB]	return path 20 ± 1 / forward path 20 ± 2
Output testpoint	[dB]	20 ± 1 (directional coupler) 5 - 862 MHz
Power consumption with / without return path	[W]	14,5 / 12 (F) 14 / 12 resp. 28 / 24 VA (O)
Testpoints		2



VARIO 683, VARIO 681

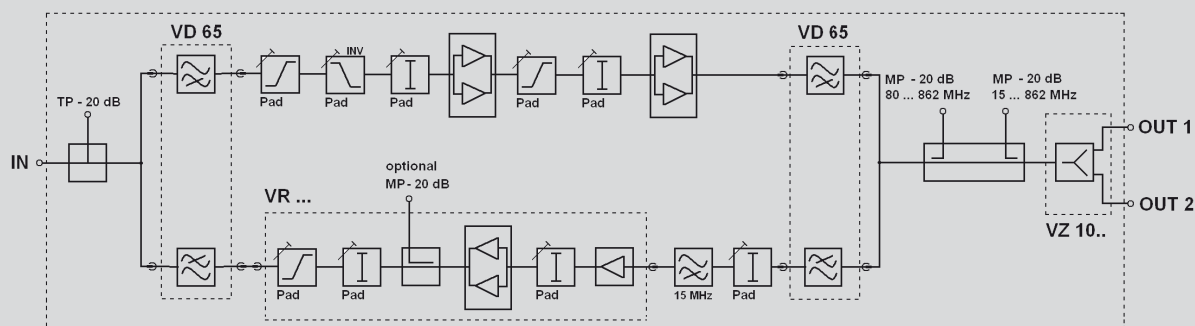
Universal broadband amplifier



KLASSE
A
CLASS

- configuration via pads
- VARIO 681: 15 MHz high-pass at the return path
- 4 testpoints

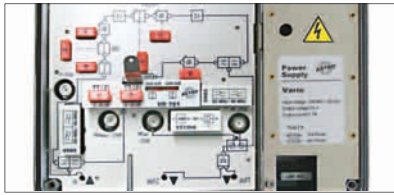
VARIO 683, VARIO 681



Type		Vario 683 O / F	Vario 681 O / F
Order number local powering		217 685	217 681
EAN-code local powering		4026187003067	4026187003029
Order number remote powering		217 684	217 680
EAN-code remote powering		4026187003050	4026187003012
Forward path			
Gain	[dB]	40 ± 0,8	
Maximum output level			
42 channels / linear	[dBμV]	113 (CTBA & CSOA ≥ 60 dB)	
42 channels / 7 dB Slope	[dBμV]	115	
Common data			
Frequency range	[MHz]	47 - 862	47 - 862 with 15 MHz high-pass filter
Ripple	[dB]	± 0,8 including temperature drift	
Noise figure	[dB]	typ. 5,5	
Attenuation in the input	[dB]	0 - 20 (0,5 dB - steps)	
Attenuation interstage	[dB]	0 - 7 (0,5 dB - steps)	
Equalizer in the input	[dB]	0 - 20 (0,5 dB - steps)	
Equalizer interstage	[dB]	0 - 10 (0,5 dB - steps)	
Base of equalizer	[MHz]	862	
Inverted equalizer in the input	[dB]	0 - 10 (0,5 dB - steps)	
Base of inverted equalizer	[MHz]	47	
Input testpoint	[dB]	return path 20 ± 1 / forward path 20 ± 2	
Output testpoint	[dB]	20 ± 1 (directional coupler) 5 - 862 MHz	
Power consumption with / without return path	[W]	19,5 / 17 (F) 18 / 16; 35 / 32 VA (O)	
Testpoints		4	

VARIO 684, VARIO 682

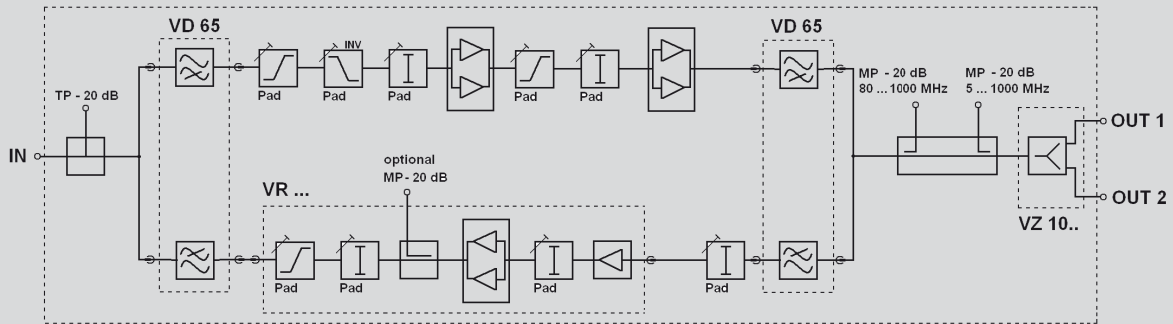
Universal broadband amplifier



KLASSE A
CLASS

- 1 GHz version
- configuration via pads
- VARIO 682: 15 MHz high-pass at the return path
- 4 testpoints

VARIO 684, VARIO 682

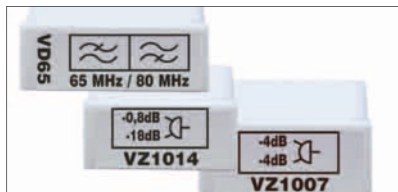


Type	Vario 684 O / F		Vario 682 O / F	
Order number local powering	217 687		217 683	
EAN-code local powering	4026187003081		4026187003043	
Order number remote powering	217 686		217 682	
EAN-code remote powering	4026187003074		4026187003036	
Forward path				
Gain	[dB]	40 ± 0,8 / > 862 MHz ± 1 dB		
Maximum output level				
42 channels / linear	[dBμV]	113 (CTBA & CSOA ≥ 60 dB)		
42 channels / 7 dB Slope	[dBμV]	115		
Common data				
Frequency range	[MHz]	47 - 1000	47 - 1000 with 15 MHz high-pass filter	
Ripple incl. temperature drift	[dB]	± 0,8 / > 862 MHz ± 1 dB		
Noise figure	[dB]	typ. 5,5 / > 862 MHz: typ. 6		
Attenuation in the input	[dB]	0 - 20 (0,5 dB - steps)		
Attenuation interstage	[dB]	0 - 7 (0,5 dB - steps)		
Equalizer in the input	[dB]	0 - 20 (0,5 dB - steps)		
Equalizer interstage	[dB]	0 - 10 (0,5 dB - steps)		
Base of equalizer	[MHz]	1000		
Inverted equalizer in the input	[dB]	0 - 10 (0,5 dB - steps)		
Base of inverted equalizer	[MHz]	47		
Input testpoint	[dB]	return path 20 ± 1 / forward path 20 ± 2		
Output testpoint	[dB]	20 ± 1 (directional coupler) 5 - 862 MHz		
Power consumption with / without return path	[W]	19,5 / 17 (F) 18 / 16; 35 / 32 VA (O)		
Testpoints		4		



VZ...,VD...

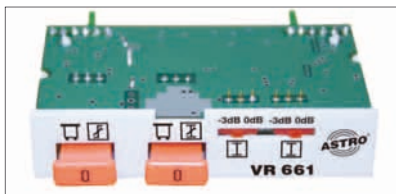
Plug-in modules, diplex filters



Type	VZ 1021	VZ 1012	VZ 1013	VZ 1014
Order number	416 030	416 006	416 007	416 008
EAN-code	4026187240370	4026187130527	4026187130534	4026187130541
Function	tap	tap	tap	tap
Attenuation	- 7 dB	- 10 dB	- 15 dB	- 18 dB
Frequency range	5 - 1000 MHz			

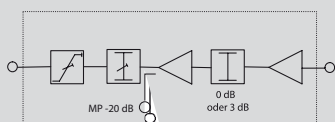
Type	VZ 1001	VZ 1006	VZ 1007	VD 33	VD 65
Order number	216 278	416 001	416 002	216 653	216 652
EAN-code	4026187130466	4026187130473	4026187130480	4026187130565	4026187130572
Function	zero card passive-return path	zero card 1 output	splitter 2-way	diplexfilter	diplexfilter
Frequency range	-	-	5 - 1000 MHz	5 - 33 MHz / 47 - 862	5 - 65 MHz / 80 - 1000

VR 411, VR 561, VR 661, VR 761

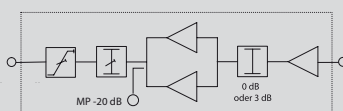


Low-noise return path amplifiers; all modules are interruption-free, attenuation and equalizing at the output are variable; furthermore the gain can be configured interstage using the included switches

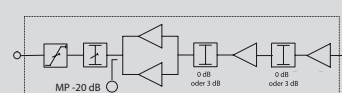
VR 411



VR 561



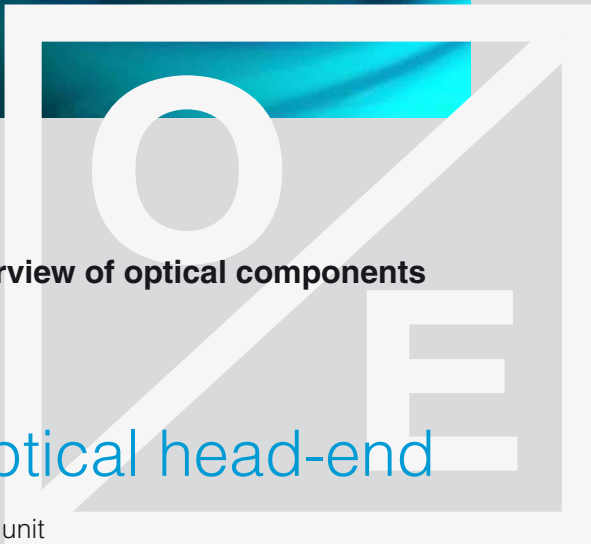
VR 661, VR 761



Type	VR 411	VR 561	VR 661	VR 761
Order number		216 401	216 561	216 661
EAN-code		4026187130589	4026187130596	4026187130502
Frequency range	[MHz]	5 - 65		
Gain	[dB]	14 / 11	20 / 17	27 / 24 / 21
Output level 60dB IMA2 / KMA	[dBμV]	105 / 116	117 / 116	117 / 116
Noise figure	[dB]	4,5		



Optical transmission



Overview of optical components

Page 162

Optical head-end

Page 163

- Base unit
- Power supplies
- Control units
- Forward path transmitters
- Return path receivers



Optical nodes

Page 172

- Fibre Deep Nodes



Optical reception and distribution

Page 178

- Optical LNB
- Optical fibres
- Optical connectors
- Opto-/Electro transformers
- Splitters



Which optical components for which application?

To enable the transmission of CATV signals over large distances, the application of optical transmission technology is essential. While the signal gets corrupted after only a few kilometers of transmission when using ordinary coax-cable connections, an optical transmission line can bypass a much larger distance - with much lower impact on the signal quality. For optical transmission purposes ASTRO offers a complete component system:

Optical Head-end platform

LWZ-series: Basic element of the optical Head-end platform is the 19" base unit LWZ B. This module rack is designed for housing different optional modules: optical transmitters in 1310 nm and 1550 nm, quad return path receiver, controller and power supplies. The compact design of this technology allows installation of up to 12 modules in only three HU. The power supply is achieved by modular built, hot-swappable power supply units.



As a supplement to this series and to satisfy special needs of customers ASTRO offers also 19" Stand-alone solutions for optical transmission and reception technology.

Optical Nodes

LWO-series: ASTRO offers optical nodes at different power ratings. The LWO 2xx are fully integrated forward path receivers in compact housing while the LWO 3xx are built modular and can be matched to individual requirements in transmission networks. In this series different return path transmitters are available and the configuration of the RF output is highly variable by the use of pluggable splitters and taps.



Optical reception and distribution technology

ASTRO offers optical splitters in 19" housing for splitting optical CATV signals. For optical SAT-IF splitting there are an optical LNB, different splitters and opto-electrical converters with Twin, Quad and Quatro-universal outputs available.





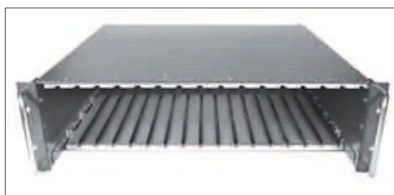
Optical head-end platform

The LWZ series is a new high density modular optical head-end platform. It is designed for 19-inch standard rack (3 RU height) and the 16 slots can be equipped with a variety of combinations of plug-in modules and power supplies.

- 1 GHz platform
- plug & play
- changing of modules without special tools
- 6 cooling fans to avoid over-heating
- hot swappable
- optical transmitters of the LWS series are designed for conversion of electrical CATV input signals like QAM, FM or PAL into optical output signals
- the optical return path receiver features two independant, seperately switchable optical receivers



LWZB



base unit (only 3 RU); allows installation of up to 16 modules of the LWZ-series, like forward path transmitters, return path receivers, controllers and power supplies

Type		LWZ B
Order number		212 500
EAN-code		4026187240479
Common parameters		
Cooling fans		6
Number of slots		16
Interfaces		RS 485, LAN
Ambient temperature		0... 50
Dimensions (W x H x D)		133 x 485 x 485

LWZC



control unit; used for local monitoring and configuration of LWZ plug-in modules, LCD panel and control, hot swappable, local monitor post RS 232, remote monitoring by HMS or SNMP remote management (ethernet), up to 192 modules controlled by one LWZ C

Type		LWZ C
Order number		212 501
EAN-code		4026187240493

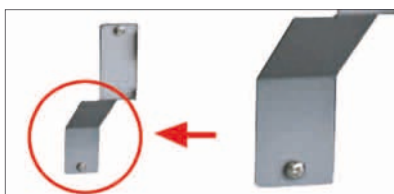
LWZP



power supply module for LWZ platform, redundancy provided if two LWZ P are used in one LWZ B base unit, 2 cooling fans, 1 power supply for up to 12 LWZ modules

Type		LWZ P
Order number		212 502
EAN-code		4026187240486

LWZSL



cover for unused slots of the LWZ B

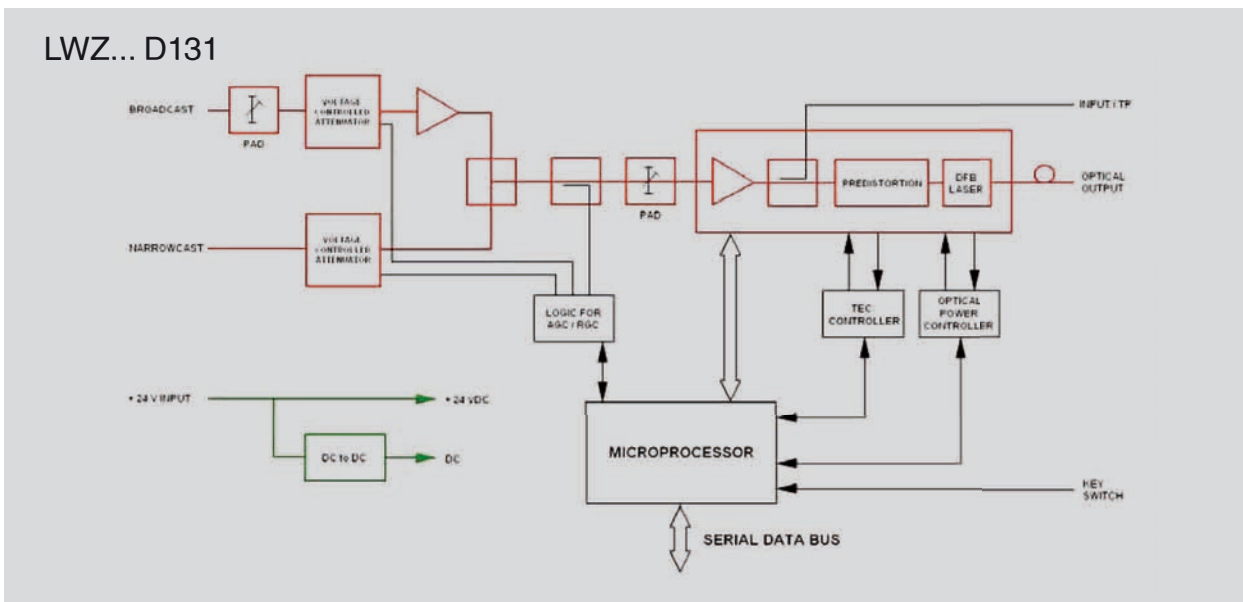
Type		LWZ SL
Order number		212 512
Ean-code		4026187240646

LWZ 13D131, ...10D131, ...6D131, ...4D131

Forward path transmitters



- 1310 nm optical wavelength
- up to 1 GHz transmission bandwidth
- up to 12 modules can be used in the LWZ B base unit
- plug-in JXP attenuator pads for RF gain control
- hot swappable
- remote monitor and control function by HMS or SNMP
- RF front panel testpoint
- SC / APC or E 2000 optional connector types



Common data		LWZ ...D131
Optical specifications		
Laser-type	[nm]	cooled DFB with isolator
Optical wavelength	[nm]	980 / 1480 (typ.)
Optical return loss	[dB]	> 40
Optical output parameters		
Optical wavelength	[nm]	1550 ± 10
CSO with CENELEC 42	[dBc]	-80
CTB with CENELEC 42	[dBc]	-90
Common data		
Interface		RS 485 (adapted to LVM 11)
Supply voltage	[V~]	100...240
Power consumption	[W]	12
Ambient temperature	[°C]	0...40

Type	LWZ 13D131 SC/APC	LWZ 13D131 E2000
Order number	212 510	212 511
EAN-Code	4026187240561	4026187240578
Optical power	[dBm]	13
Optical connector	SC / APC	E2000

Type	LWZ 10D131 SC/APC	LWZ 10D131 E2000
Order number	212 503	212 506
EAN-Code	4026187240547	4026187240554
Optical power	[dBm]	10
Optical connectors	SC / APC	E2000

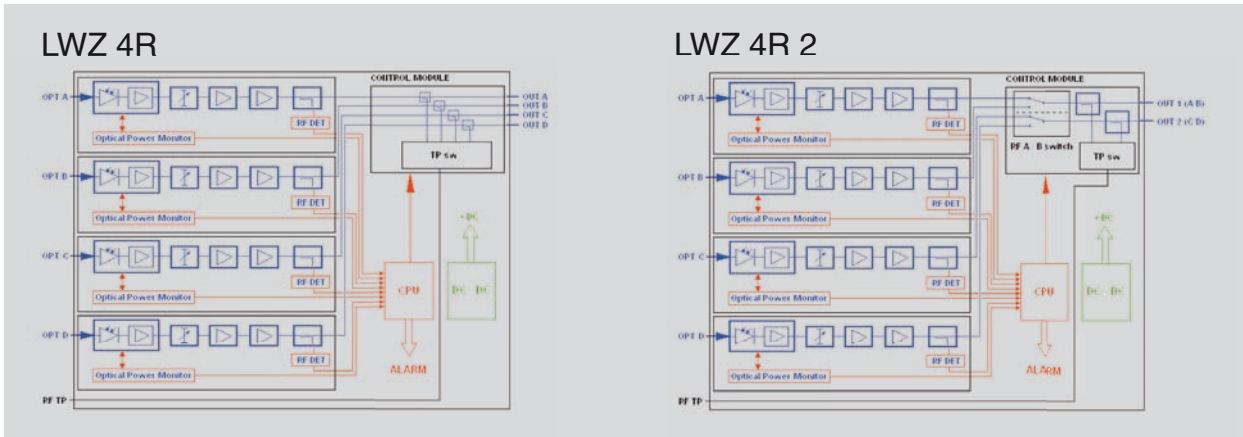
Type	LWZ 6D131 SC/APC	LWZ 6D131 E2000
Order number	212 516	212 517
EAN-Code	4026187240622	4026187
Optical power	[dBm]	6
Optical connectors	SC / APC	E2000

Type	LWZ 4D131 SC/APC	LWZ 4D131 E2000
Order number	212 508	212 509
EAN-Code	4026187240523	4026187240530
Optical power	[dBm]	4
Optical connectors	SC / APC	E2000

LWZ 4R, LWZ 4R 2



quad return path receivers; max. 48 return paths per chassis, wide optical input range, optical front inputs and RF rear outputs, optical wavelength 1200... 1600 nm, remote monitor and control function by HMS or SNMP hot swappable



Type	LWZ 4R SC/APC		LWZ 4R E2000	
Order number		212 504		212 507
EAN-code		4026187240516		4026187240509
Type	LWZ 4R2 SC/APC		LWZ 4R2 E2000	
Order number		212 515		212 514
		4026187240639		4026187002350
Optical specifications				
Optical wavelength	[nm]	1200...1600		
Optical input power	[dBm]	- 17...0		
Connector type		SC / APC	E2000	
RF specifications				
Impedance	[Ω]	75		
Return loss	[dB]	min. 17 @ 5 - 7 MHz / min. 18 @ 7 - 200 MHz		
Output level	[dBμV]	102*		
RF gain adjustment	[dB]	0...20		
Operating bandwidth	[MHz]	5...200		
Flatness	[dB]	+/- 0,5		
Slope	[dB]	+ 0,75 ... - 0,5		
Test point	[dB]	- 20 +/- 0,5		
RF gain	[dB]	54		
Isolation	[dB]	>70 (Receiver to Receiver)		
Equivalent noise input	[pA/Hz0,5]	7		
Second order distortion	[dB]	>60		
Third order distortion	[dB]	>53		
Common parameters				
Module width		1 slot		
Dimensions (D x H x W)	[mm]	26 x 127 x 410		
Ambient temperature	[°C]	0...50		
Power consumption	[W]	17,6		

* max. gain / -10 dBm opt. input & 10 % OMI from return transmitter



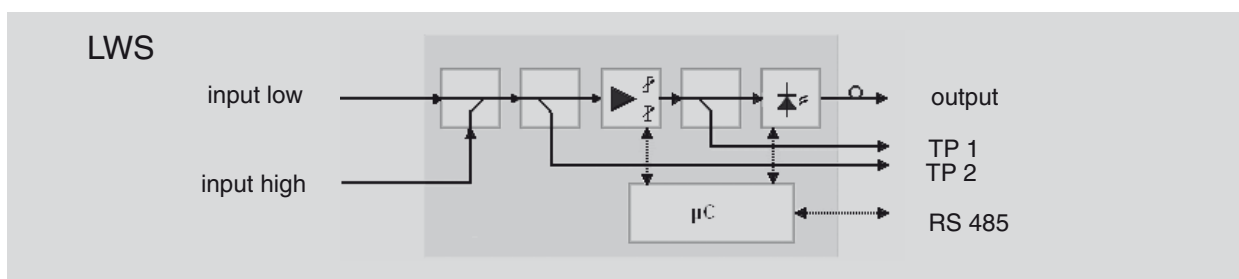
LWS61

Optical transmitter



KLASSE
A
CLASS

- for conversion of electrical CATV input signals, as QAM, FM or AM-VSB, two optical output signals in the second optical window (1310 nm)
- low-noise DFB-laser-diode (output power 6 dBm)
- two inputs for different input levels
- slope, gain and output power can be adjusted electronically
- further types 1310 nm per request



Type		LWS 61
Order number		212 201
EAN-code		4026187240318
RF input parameters		
Frequency range	[MHz]	5...1000
Input level Inputs single / coupled	[dBµV]	79 / 93
Gain adjustment	[dB]	0...24
Slope adjustment	[dB]	- 2...16
Impedance	[W]	75
Return loss on RF terminals	[dB]	>20 (bei / at 47 MHz); - 1,5 dB / oct; min. 15
Testing point 1 attenuation	[dB]	20
Testing point 2 AC voltage for optical output power indication	[dBµV] [V/mW]	80 + 2Δ P opt ± 2,0 dB @ OMI = 5% (AC) 0,1 +/- 0,02 (DC)“
Optical output parameters		
Optical output power / wavelength	[dBm]	6 / 1310 nm
Attenuation optical output power	[dB]	0... -3
Optical return loss	[dB]	> 45
C/N	[dB]	≥ 51 (Cenelec 42 channels; OMI = 4%; 20 km opt. fibre; P opt, in = 0 dBm)
CSO	[dBc]	≥ 60 (Cenelec 42 channels; OMI = 4%; 20 km opt. fibre; P opt, in = 0 dBm)
CTB	[dBc]	≥ 62 (Cenelec 42 channels; OMI = 4%; 20 km opt. fibre; P opt, in = 0 dBm)
Common data		
Voltage supply	[V~]	100...240
Power consumption	[W]	≤ 11,5
Ambient temperature	[°C]	0...40

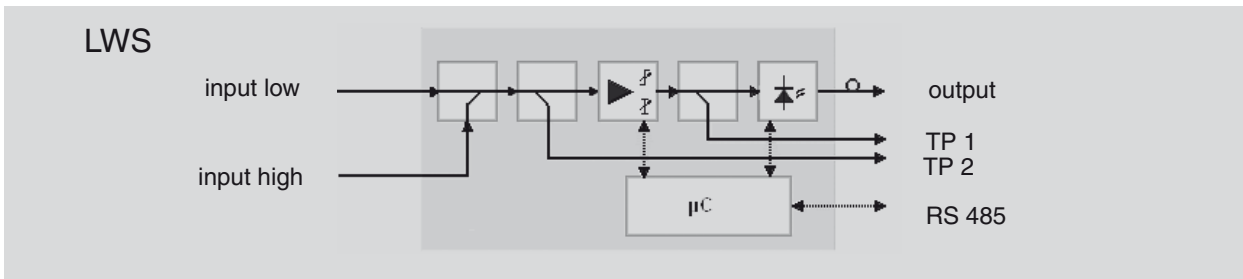
LWS151

Optical transmitter



KLASSE **A**
CLASS

- for conversion of electrical CATV input signals, as QAM, FM or AM-VSB, two optical output signals in the third optical window (1550 nm)
- low-noise DFB-laser-diode (output power 15 dBm)
- two inputs for different input levels
- slope, gain and output power can be adjusted electronically
- further types 1550 nm per request



Type		LWS 151
Order number		212 151
EAN-code		4026187240592
RF input parameters		
Frequency range	[MHz]	5...1000
Input level Inputs single / coupled	[dBµV]	79 / 93
Gain adjustment	[dB]	0...24
Slope adjustment	[dB]	- 2...16
Impedance	[W]	75
Return loss on RF terminals	[dB]	>20 (bei / at 47 MHz); - 1,5 dB / oct; min. 15
Testing point 1 attenuation	[dB]	20
Testing point 2 AC voltage for optical Output power indication	[dBµV] [V/mW]	80 + 2Δ P opt ± 2,0 dB @ OMI = 5% (AC) 0,1 +/- 0,02 (DC)*
Optical output parameters		
Optical output power / wavelength	[dBm]	15 / 1550 nm
Attenuation optical output power	[dB]	0...-3
Optical return loss	[dB]	> 45
C/N	[dB]	≥ 51 (Cenelec 42 channels; OMI = 4%; 20 km opt. fibre; P opt, in = 0 dBm)
CSO	[dBc]	≥ 60 (Cenelec 42 channels; OMI = 4%; 20 km opt. fibre; P opt, in = 0 dBm)
CTB	[dBc]	≥ 62 (Cenelec 42 channels; OMI = 4%; 20 km opt. fibre; P opt, in = 0 dBm)
Common data		
Voltage supply	[V~]	100...240
Power consumption	[W]	≤ 11,5
Ambient temperature	[°C]	0...40



LWE21

Dual optical return path receiver



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- two independent, separately switchable optical receivers
- two single outputs or one combined output in the frequency range 5 - 65 MHz
- measurement function for the optical input power
- 19" housing (one RU)

Type		LWE 21
Order number		212 200
EAN-code		4026187240295
Optical receiver		
Optical input power	[dBm]	- 11...+2 (max. +4)
Optical wavelength	[nm]	1280...1580 typ. 1310 / 1550
Optical return loss	[dB]	typ. 45
Responsivity	[AW]	0,8...1
Optical connector		E2000
RF Parameters		
RF bandwidth	[MHz]	5...65
Impedance	[W]	75
Ripple	[dB]	+ / - 0,75
Output level	[dBμV]	80 / 86
Output level testing point	[dBμV]	60 / 66
C/N	[dB]	49,5
Return loss on RF terminals	[dB]	19
Frequency of ALC pilot tone	[MHz]	590...630
RF connectors		IEC jack
Common data		
Voltage supply	[V~]	100...240
Ambient temperature	[°C]	0...40

LWM11



Management system for LWS...and LWE 21;
translation of RS 485 data to SNMP, Ethernet &
webbrowser, Ethernet protocol

Type		LWM 11
Order number		212 202
EAN-code		4026187240301

LWV171

Optical amplifier



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- for amplification of optical input signals on single mode fibres, can be used in HFC- (Hybrid Fibre Coax) networks
- optical power output 17 dBm at 1550nm
- optical input power, output power and pump laser current are supervised internally
- automatically switched-off in case of insufficient optical input power to prevent the optical PIN diode receiver from damage
- 19" housing (1 RU)

Type		LWV 171
Order number		212 171
EAN-code		4026187002343
Optical input parameters		
Optical wavelength	[nm]	1550 ± 10
Wavelength pump laser	[nm]	980 / 1480 (typ.)
Optical return loss	[dB]	> 40
Minimum optical input power	[dBm]	-3
Maximum optical input power	[dBm]	6
Optical connector		E2000
Optical output parameters		
Optical wavelength	[nm]	1550 ± 10
Optical output power	[dBm]	17
CSO with CENELEC 42	[dBc]	-80
CTB with CENELEC 42	[dBc]	-90
Optical connector		E2000
Common Data		
Interfaces		RS 485 (adapted to LVM 11)
Voltage supply	[V~]	100...240
Power consumption	[W]	12
Ambient temperature	[°C]	0...40





Optical nodes

The manageable Fibre Deep Nodes (LWO/F) perform the opto/electrical conversion of broadband forward signals by a very low-noise optical front end.

- Fibre Deep Nodes with extremely low noise front ends, high RF-output level by GaAs Push-Pull technology and pluggable duplex filter
- Return path receivers with two independent, separately switchable receivers; two single outputs and one combined output
- optical transmitters with low noise laser diode; slope, gain and output level electronically adjustable
- ready for management

LWO 301, 311, 303, 313, 304, 314

Optical Fibre Deep Nodes



- ultra low-noise front end
- high RF output power driven by GaAs push-pull hybride
- pluggable diplex filter
- output test port
- E 2000 (LWO 311, 313, 314) or SC / APC (LWO 301, 303, 304)
- optionally remote powered (LWF...)

Common Data		
Optical receiver		
Wavelength	[nm]	1290...1600
Input power	[dBm]	0... -8
Optical return loss	[dB]	> 40
Equivalent input noise (EIN)	[pA \sqrt /Hz]	typ. 3,8 / max. 4,5
Maximum RF output level at 4,1 % OMI acc. CENELEC 42; ≥ 60 dB CSO CTB	[dB μ V]	min. 106, typ. 107 *
Input attenuation (pad)	[dB]	0...16
Interstage attenuation (pad)	[dB]	0...8
Interstage slope (pad)	[dB]	0...8
Frequency range depending on diplex filter	[MHz]	40 / 85...862
Frequency flatness	[dB]	± 1,5
Responsivity	[dB Δ W]	57 @ 1310 nm without AGC / 55,5 @ 1310 nm with AGC
RF Impedance	[Ω]	75
RF Return loss	[dB]	18 @ 40 MHz - 1,5 dB / oct.
Test point attenuation	[dB]	20
AGC		optional
Connector type		SC / APC E2000
Common parameters		
EMC		DIN EN 50083-2
Ambient temperature	[°C]	- 15 ... + 55
Dimensions (D x H x W)	[mm]	215 x 145 x 85
Weight	[kg]	app. 2,5

* incl. AGC-module min. 105, typ. 106 @ Popt = 0...-2 dBm



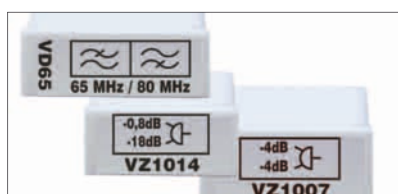
Type	LWO 301	LWO 311
Order number	212 301	212 305
EAN-code	4026187240097	4026187240257
Optical receiver		
Optional modules	AGC in the input plus control module (VZ 1018 + VZ 1020)	
Connector type	SC / APC	E2000

Type	LWO 303	LWO 313
Order number	212 306	212 313
EAN-code	4026187240363	4026187240264
Optical receiver		
Included modules	AGC in the input plus control module (VZ 1018 + VZ 1020)	
Connector type	SC / APC	E2000

Type	LWO 304	LWO 314
Order number	212 307	212 314
EAN-Code	4026187002695	4026187240271
Optical receiver		
Modules	including AGC in the input (control module VZ 1020 or LWR... required)	
Connector type	SC / APC	E2000

VZ...,VD...

Accessories for optical nodes of the LWO/F 3xx series



Type	Order number	EAN-code	Function
VZ 1007	416 002	4026187130480	output splitter 2-way
VD 33	216 653	4026187130565	diplexfilter 5 - 33 MHz
VD 65	216 652	4026187130572	diplexfilter 5 - 65 MHz
VZ 1018	212 319	4026187240332	AGC card
VZ 1020	212 312	4026187240226	control card for AGC only necessary if LWO is operated with AGC but without LWR...
VZ 1021	416 030	4026187002473	output tap -7 dB
VZ 1012	416 006	4026187130527	output tap -10 dB
VZ 1013	416 007	4026187130534	output tap -15 dB
VZ 1014	416 008	4026187130541	output tap -18 dB

LWR...

Optical DFB return path transmitter for LWO/F 3xx series



Type		LWR xxx
Order number		212 xxx
EAN-code		4026187xxx
RF Input frequency range	[MHz]	5 - 200
RF input level @ OMI 15%	[dBμV]	typ. 70 (PAD for OMI setting)
RF Impedance	[Ω]	75
RF Return loss	[dB]	min. 18 /min 15 @ > 65 MHz
Wavelength / Optical output power	[nm] / [dBm]	see below
Optical return loss	[dB]	minimum 30
Relative Intensity Noise (RIN)	[dB/Hz]	typ. - 155, maximum 140
Testpoint attenuation	[dB]	0

Type	Order number	EAN-Code	Optical output power	DWDM	CWDM	Wavelength
LWR 0D131	212 031	4026187002329	0 dBm	<input checked="" type="checkbox"/>		1310 nm
LWR 3D131	212 310	4026187240233	3 dBm	<input checked="" type="checkbox"/>		1310 nm
LWR 3D155	212 311	4026187240615	3 dBm	<input checked="" type="checkbox"/>		1550 nm
LWR 6D147	212 600	4026187240462	6 dBm		<input checked="" type="checkbox"/>	1470 nm
LWR 6D149	212 601	4026187240387	6 dBm		<input checked="" type="checkbox"/>	1490 nm
LWR 6D151	212 602	4026187240394	6 dBm		<input checked="" type="checkbox"/>	1510 nm
LWR 6D153	212 603	4026187240400	6 dBm		<input checked="" type="checkbox"/>	1530 nm
LWR 6D155	212 604	4026187240417	6 dBm		<input checked="" type="checkbox"/>	1550 nm
LWR 6D157	212 605	4026187240424	6 dBm		<input checked="" type="checkbox"/>	1570 nm
LWR 6D159	212 606	4026187240431	6 dBm		<input checked="" type="checkbox"/>	1590 nm
LWR 6D161	212 607	4026187240448	6 dBm		<input checked="" type="checkbox"/>	1610 nm



LWO 201, LWO 211

Optical receiver for broadband TV- and radio signals



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- variable operation thanks to wide input power range
- extreme low-noise optical receiver, best S/N values are reached
- output voltage optimized for the use in single and multifamily residences
- compact, space saving design
- die-cast housing for best screening (Class A) and cooling
- high efficiency by an outstanding price-performance ratio

Type		LWO 201	LWO 211
Order number		212 211	212 212
EAN-code		4026187002671	4026187002688
Optical receiver			
Optical wavelength	[nm]	1290...1600	
Optical input power	[dBm]	- 12...0	
Optical return loss	[dB]	45	
Equivalent input noise	[pA/√Hz]	typ. 3,8, max. 4,5	
Optical input		SC/APC	E2000
RF output			
Frequency range	[MHz]	40...862	
Output voltage at 0 dBm input power	[dBμV]	min. 93, typ.94 4% OMI, CENELEC 42 channels CTB/CSO ≥ 60 dB	
Impedance	[Ω]	75	
Return loss	[dB]	≥ 18 @ 40 MHz, -1,5 / octave	
Connectors		F jack (RF output)	
Common parameters			
EMC		according EN 50083 T2 / A1	
Voltage supply	[V~]	230, 50 Hz	
Ambient temperature	[°C]	- 15... + 55	
Dimension (W x H x D)	[mm]	116,5 x 132 x 50	
Weight	[kg]	0,8	
Protection class		IP 20	

LWO202

Optical receiver for broadband TV- and radio signals



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CLASS

- low noise receiver technology
- optical burst mode transmitter for DOCSIS return path signals
- cost-effective FP laser technology with 1310 nm or DFB 1610 nm wavelength
- LED controls for voltage supply, optical input- and output level and return path transmission activity
- optical interface with integrated WDM; combined input/output jack (F-type, 75 Ω)
- low power consumption; optionally with PON WDM port

Type		LWO 202
Order number		212212
EAN-Code		4026187000073
Optical receiver		
Optical wavelength	[nm]	1240...1560
Optical input power	[dBm]	- 6...2
Extended optical input power	[dBm]	-8...3
Optical return loss	[dB]	45
Equivalent input noise	[pA/ $\sqrt{\text{Hz}}$]	typ. 4,0; max. 5,0
Optical connectors		SC/APC
RF output		
Frequency range	[MHz]	85...1006
Output voltage at -6 dBm input power	[dB μ V]	min. 94 (4 dB slope)
RF-slope (85...1006 MHz)	[dB]	0, 2, 4 or 6
Impedance	[Ω]	75
Return loss	[dB]	≥ 18 @ 40 MHz, -1,5 / octave, min. 12 dB
CSO, CTB*	[dBc]	> 60 (68 dBc für Popt \leq -2 dBm)
Testpoint	[dB]	-20
Optical transmitter		
Type		DFB
Wavelength	[nm]	1610
Output power	[dBm]	0 / 3 (optional)
Return loss	[dB]	> 18
Input level	[dB μ V]	75 - 105
Frequency range	[MHz]	5 - 65
Testpoint	[dB]	-20
Common parameters		
EMC		accord. EN 50083 T2 / A1
Supply voltage	[V~]	230, 50 Hz
Ambient temperature	[$^{\circ}$ C]	- 15... + 55
Dimensions (W x H x D)	[mm]	121 x 138 x 55
Protection		IP 20

* Cenelec 42, OMI = 4.1%, Popt = -6 ... +2 dBm





Optical reception and distribution

As an extension for the optical head-end platform LWZ and LWS ASTRO offers passive optical components for the distribution of optical signals. Also available are active components for low attenuation SAT-IF distribution.

- optical LNB
- optical fibre including FC/PC connectors from 1 m to 500 m length
- optical connector AOB 2 (FC/PC to FC/PC)
- opto/electrical converters of the AOE-series with 2 or 4 receiver-outputs
- optical splitters of the AOV-series with 2,3,4 or 8 outputs (FC/PC connectors)
- optical splitters of the LFT-series with 8, 16 or 32 outputs (SC/APC connectors; suitable for 19"-mounting, 1 RU)

SBF 4

OpticalLN B



- combines all of the 4 IF bands to one optical output signal (950 MHz - 5,45 GHz)
- supply of up to 32 splitters with optical signals (radius of 10 km)
- 40 mm feed horn; power supply via standard 12 V connection (F-type)
- standard FC/PC connector for connection of optical cable

Type		SBF 4
Order number		390 000
EAN-Code		4026187130510
RF range		
Input frequency range	[GHz]	10,7 - 12,75
Optics		
Wavelength	[nm]	1310
Common data		
Optical output power at 25 °C	[dBm]	7 (± 2 across the temperature range)
Noise figure	[dB]	typ. 0,5 (max. 1,1 at 25 °C)
Maximum gain	[dB]	72 (minimum gain 62)
L.O-Frequency, vertical	[GHz]	9,75
L.O-Frequency, horizontal	[GHz]	7,3
Image frequency suppression (min.)	[dB]	40
Cross polarisation discrimination	[dB]	typ. 30
Power supply		
Current demand	[mA]	< 450
Voltage supply	[V]	12
Common data		
Optical output		FC/PC
Connector at input, DC		F-jack
Feed-diameter	[mm]	40
Ambient temperature	[°C]	-30...60

AOB2

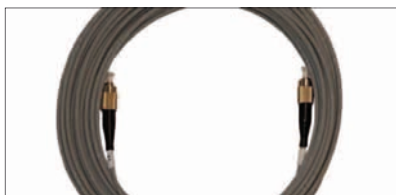


Optical connector; FC/PC to FC/PC

Type		AOB 2
Order number		390 044
EAN-Code		4026187131104
Connectors		2 x FC/PC



AOF...



optical fibre including FC/PC connectors; 2 x single mode; warp resistant; low weight, 5,9 mm isolation

Type	Order number	EAN-Code	Length
AOF 1	390 030	4026187130961	1 m
AOF 3	390 031	4026187130978	3 m
AOF 5	390 032	4026187130985	5 m
AOF 10	390 033	4026187130992	10 m
AOF 15	390 034	4026187131005	15 m
AOF 20	390 035	402618713012	20 m
AOF 30	390 036	4026187131029	30 m
AOF 40	390 037	4026187131036	40 m
AOF 50	390 038	4026187131043	50 m
AOF 75	390 039	4026187131050	75 m
AOF 100	390 040	4026187131067	100 m
AOF 150	390 041	4026187131074	150 m
AOF 200	390 042	4026187131081	200 m
AOF 500	390 043	4026187130098	500 m

AOE twin, AOE quad, AOE quatro

2 x, 3 x and 4 x Opto/Electro-transformers



- for converting the optical signal to SAT-IF frequency
- for use with the optical LNB SBF 4
- connection of up to 2 (AOE twin), resp. up to 4 (AOE quad) receivers
- AOE quatro: transmission of one polarisation per output; a conventional multiswitch can be connected
- external 20 V-power supply (included)
- FC/PC input
- 4 polarisations in one fibre optical cable

Type		AOE twin	AOE quad	AOE quatro
Order number		390 010	390 011	390 012
EAN-Code		4026187130893	4026187130909	4026187130916
Input				
Input frequency range, vertical	[GHz]	0,95...3		
Input frequency range, horizontal	[GHz]	3,4...5,45		
Optics, input				
Opt. power, small PON-adjust. = min	[dBm]	-13		
Opt. power, small PON-Einst. = max	[dBm]	0		
Opt. power, large PON-adjust. = min	[dBm]	-18		
Opt. power, large PON-adjust. = max	[dBm]	-14		
Satellite transponder		120		
Output frequency range				
Horizontal High band	[MHz]	1100 - 2150		
Vertical High band	[MHz]	1100- 2150		
Horizontal Low band	[MHz]	950 - 1950		
Vertical Low band	[MHz]	950 - 1950		
Impedance, nominal	[Ω]	75		
Return loss (min.)	[dB]	10		
Output level (Popt = 0...-18 dB)	[dBμV]	82 - 46		
Common data				
Outputs		switch	switch	fix
Connectors at output		2 x F	4 x F	4 x F
Current demand (12 VDC)	[mA]	< 300		
Power supply		via receiver	via receiver	external power supply



AOV 2, AOV 3, AOV 4, AOV 8

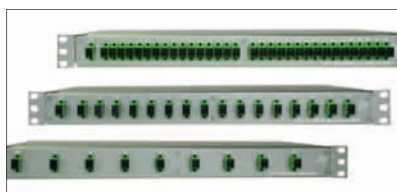


optical splitters with 2, 3, 4 or 8 outputs; FC/PC connectors; supports 1310 nm and 1550 nm wavelength

Type		AOV 2	AOV 3	AOV 4	AOV 8
Order number		390 020	390 021	390 022	390 023
EAN-Code		4026187130923	4026187130930	4026187130947	4026187130954
Outputs		2	3	4	8
Optical wavelength	[nm]	1310 and 1550			
Wavelength bandwidth	[dB]	40			
Tap loss	[dB]	3,8	5,2	6,8	10,6
Connectors		FC/PC			

LFT 8, LFT 16, LFT 32

Optical splitter with 8, 16 or 32 outputs



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- 19" rack mounting
- 1 RU
- including measurement protocol for each port
- SC/APC connectors

Type		LFT 8	LFT 16	LFT 32
Order number		212 700	212 701	212 702
EAN-Code		4026187110710	4026187110734	4026187110727
Optical parameters				
Optical wavelength	[nm]	1260 - 1620		
Tap loss	[dB]	11 ± 0,5	13 ± 0,5	16 ± 0,7
Connectors		SC / APC		
Ambient temperature	[°C]	- 40...85		

Passives

Wall outlets

Overview of GUT wall outlets

High class wall outlets for use in multimedia broadband installations and SAT-IF installations

Page **186**



Splitters and taps

Distribution material for broadband installations and SAT-IF installations

Page **198**



GUT... wall outlet types

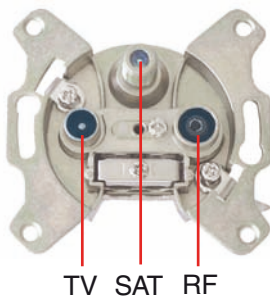
GUT 121 / 123 / 152 / 162

for terrestrial signals and CATV



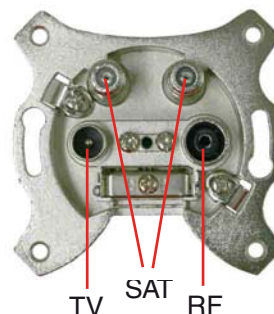
GUT 3..

for SAT, single and group installations



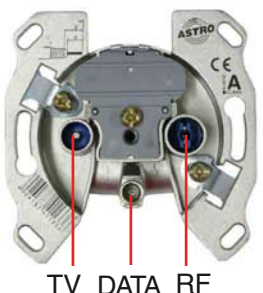
GUT 4..

for SAT, single and group installations



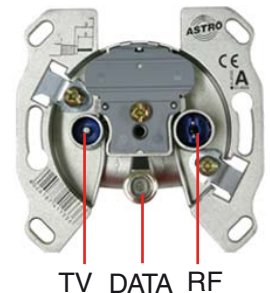
GUT MMD..

for multimedia broadband and data (WICLIC-data jack)



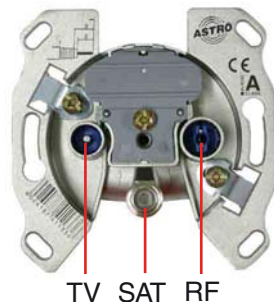
GUT MMD..F

for multimedia broadband and data (F-data jack)



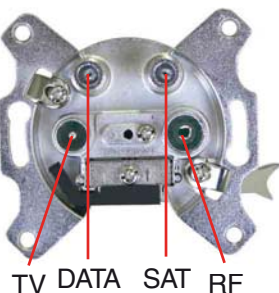
GUT 103

for SAT, terrestrial signals and CATV



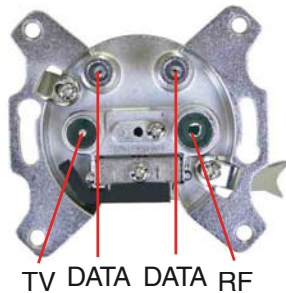
GUT MMD 7 SAT

for SAT, terrestrial signals, CATV, multimedia broadband and data



GUT MMD 2 ...

for multimedia broadband



Which wall outlet for which application?

Type	Description	Connectors			Appl. in broadband networks		Application in SAT networks			Page
		IEC-plug	IEC-coupling	F-/Wiclic plug	with splitter*	single or with taps	Single and multiswitch	Unicable	Twin-Receiver	
GUT 103	3-jacks SAT-single outlet	TV	FM	SAT/DC			<input checked="" type="checkbox"/>			186
GUT 121	Broadband-single outlet	TV	FM			<input checked="" type="checkbox"/>				189
GUT 123	Broadband-trunkline outlet	TV	FM		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				190
GUT 152	Broadband-trunkline outlet	TV	FM		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				190
GUT 162	Broadband-trunkline outlet	TV	FM		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				191
GUT 300	3-jacks SAT-single outlet	TV	FM	SAT/DC			<input checked="" type="checkbox"/>			187
GUT 311	3-jacks SAT-trunkline outlet	TV	FM	SAT/DC Block.				<input checked="" type="checkbox"/>		187
GUT 312	3-jacks SAT-trunkline outlet	TV	FM	SAT/DC 0,5 A			<input checked="" type="checkbox"/>			188
GUT 400	4-jacks SAT (Twin)	TV	FM	2 x SAT/DC			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	188
GUT MMD 2 6S	Modem-stubline outlet	TV	FM	Modem		<input checked="" type="checkbox"/>				194
GUT MMD 2 12D	Modem-trunkline outlet	TV	FM	Modem	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				194
GUT MMD 2 12E	Modem-end outlet	TV	FM	Modem	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				194
GUT MMD 2 14D	Modem-trunkline outlet	TV	FM	Modem	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				194
GUT MMD 4	Modem-stubline outlet	TV	FM	Modem		<input checked="" type="checkbox"/>				192
GUT MMD 10	Modem-end outlet	TV	FM	Modem	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				192
GUT MMD 13	Modem-trunkline outlet	TV	FM	Modem	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				192
GUT MMD 15	Modem-trunk line outlet	TV	FM	Modem	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				192
GUT MMD 17	Modem-trunkline outlet	TV	FM	Modem	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				192
GUT MMD 19	Modem-trunkline outlet	TV	FM	Modem	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				192
GUT MMD 22	Modem-trunkline outlet	TV	FM	Modem	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				192
GUT MMD 7 SAT	Modem-SAT-stubline outlet	TV	FM	Modem / SAT		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			197

DC = direct voltage pass for receivers 14 and 18 Volt

*When splitters are used, installed outlets must not be manipulated!

End outlets are trunkline outlets with a 75 Ω termination resistor (GUR 75/750).

An end outlet must always be the last outlet in a trunkline or the only outlet.

There must be adequate isolation at every connector to avoid residual images or other distortion.



Quality features of GUT 1.. wall outlets

Flexible cover adapts to different cable types

Inner conductor screwed:
Any cable fixed savely (old or new, thick or thin)

Cord grip even for 4 mm wire cross section

Cross-head screws

Technical data imprinted

EAN-Code

Lots of space for placement of cable

Sophisticated mechanics for compliance of minimum bending radius

- **Every** outlet is checked and selected according to compliance of technical specifications
- Long F-Connektor for easy mounting of F-plugs
- Made in Germany

GUT103

Stubline wall outlet (MATV / CATV / SAT)



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- 3-jacks wall outlet for reception of terrestr., SAT-, radio-and TV-programmes up to 2400 MHz
- cable channel compatibility, return path capability
- easy, fast and secure connection, even with different internal conductor diameters

Type		GUT 103			
Order number		540 831			
EAN-code		4026187410988			
		Stubline outlet			
Frequency range					
	[MHz]	5 - 68	87,5 - 108	125 - 862	950 - 2400
Tap loss					
Jack RF		-	2 ± 1,5	-	-
Plug TV	[dB]	1 ± 1,5	-	2 ± 1,5	-
F jack SAT		-	-	-	2 ± 1,5
Return loss					
Input		> 10	> 9	> 5	> 5
Jack RF		-	> 8	-	-
Plug TV	[dB]	> 10	-	> 5	-
F jack SAT		-	-	-	> 5
Isolation					
RF - TV		> 30	> 17	> 20	-
TV - SAT	[dB]	> 4 bis 20 MHz	-	> 10	> 9
		> 10 ab 20 MHz	> 25	-	> 30
FM - SAT		-	-	-	> 30

maximum 500 mA LNB current via F jack

GUT300



Stubline wall outlet (MATV / CATV / SAT); for reception of terr., SAT-, radio and TV-programmes up to 2400 MHz, 3 outputs, with screw and claw fixing, mounting with 55 Ø wall boxes

Type		GUT 300				
Order number		540 301				
EAN-code		4026187440077				
		Stubline outlet				
Frequency range						
	[MHz]	40 - 70	87,5 - 108	174 - 862	950 - 2150	2150 - 2400
Tap loss						
FM		-	2 ± 1,5	-	-	-
TV	[dB]	1 ± 1,5	-	2 ± 1,5	-	-
SAT		-	-	-	2 ± 1,5	3 ± 2
Return loss						
Input		> 5	> 5	> 5	> 5	> 5
FM	[dB]	-	> 8	-	-	-
TV		> 5	-	> 8	-	-
SAT		-	-	-	> 5	> 5
Isolation						
FM-TV / TV-SAT / FM-SAT	[dB]	> 20 / > 6 / > 30				

GUT311



Trunkline wall outlet with DC Block (MATV / CATV / SAT); for reception of terr., SAT-, radio and TV-programmes up to 2400 MHz, 3 outputs, with screw and claw fixing, mounting with 55 Ø wall boxes

Type		GUT 311				
Order number		541 311				
EAN-code		4026187440091				
		Trunkline outlet				
Frequency range						
	[MHz]	40 - 70	87,5 - 108	174 - 862	950 - 2150	2150 - 2400
Through loss						
	[dB]	2 ± 1	2 ± 1	2 ± 1	2,5 ± 1,5	3,5 ± 2,5
Tap loss						
FM		-	11 ± 2	-	-	-
TV	[dB]	11 ± 1,5	-	12,5 ± 1,5	-	-
SAT		-	-	-	12 ± 2	12,5 ± 2,5
Return loss						
Input Output		> 5	> 5	> 5	> 5	> 5
FM	[dB]	-	> 8	-	-	-
TV		> 5	-	> 5	-	-
SAT		-	-	-	> 5	> 5
Isolation						
FM-TV / TV-SAT / FM-SAT	[dB]	> 20 / > 6 / > 30				



GUT312



Trunkline wall outlet with DC Block (MATV / CATV / SAT); for reception of terr., SAT-, radio and TV-programmes up to 2400 MHz, 3 outputs, with screw and claw fixing, mounting with 55 Ø wall boxes

Type		GUT 312					
Order number		541 312					
EAN-code		4026187440029					
		Trunkline outlet					
Frequency range							
	[MHz]	40 - 70	87,5 - 108	174 - 862	862 - 1750	1750 - 2400	
Through loss							
	[dB]	2 ± 1	2 ± 1	2 ± 1	3,5 ± 1,5	4 ± 2,5	
Tap loss							
FM		-	11 ± 2	-	-	-	
TV	[dB]	11 ± 1,5	-	12,5 ± 1,5	-	-	
SAT		-	-	-	12 ± 2	12,5 ± 2,5	
Return loss							
Input Output		> 5	> 5	> 5	> 5	> 5	
FM	[dB]	-	> 8	-	-	-	
TV		> 5	-	> 5	-	-	
SAT		-	-	-	> 5	> 5	
Isolation							
FM-TV / TV-SAT / FM-SAT	[dB]	> 20 / > 6 / > 30					

GUT400



Stubline wall outlet (MATV / CATV / SAT); for reception of terr., SAT-, radio and TV-programmes up to 2400 MHz, 4 outputs, with screw and claw fixing, mounting with 55 Ø wall boxes

Type		GUT 400					
Order number		540 400					
EAN-code		4026187440039					
		Stubline outlet					
Frequency range							
	[MHz]	40 - 70	87,5 - 108	174 - 862	950 - 2150	2150 - 2400	
Through loss							
	[dB]	2 ± 1	2 ± 1	2 ± 1	3,5 ± 1,5	4 ± 2,5	
Attenuation							
FM		-	1,5 ± 1	-	-	-	
TV	[dB]	1,5 ± 1	typ. 20	1,5 ± 1	typ. 10	-	
SAT1		typ. 10	10	typ. 10	2,6 ± 1,5	typ. 8	
SAT2		1 ± 0,5	1 ± 0,5	1 ± 0,5	1,5 ± 1	5 ± 2	
Return loss							
Input SAT1/2		> 6	> 6	> 6	> 4	> 4	
FM	[dB]	-	> 6	-	-	-	
TV		> 6	-	> 5	-	-	
SAT1/SAT2		- / > 10	- / > 10	- / > 10	> 4 / > 4	- / > 4	
Isolation							
Input SAT1/SAT2	[dB]	typ. 20 / typ. 25					

GUT121

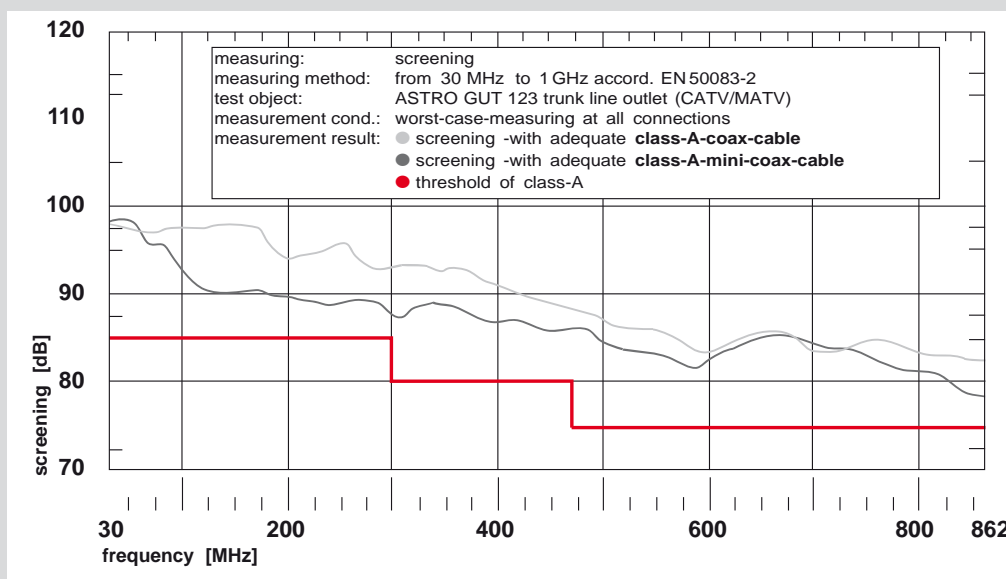
Stubline wall outlet (MATV / CATV / SAT)



KLASSE **A**
CLASS

- 2 jacks wall outlet for reception of terrestrial radio and TV-programmes
- stubline and trunkline outlets, frequency range 5 - 862 MHz
- easy, fast and secure connection even with different internal conductor diameters
- for standard coax- and minicoax-cable, improved reconnection technology
- outstanding electric parameters
- with screw- and claw-fixing, mounting with 55 Ø wall boxes

Screening



Type		GUT 121			
Order number		540 811			
EAN-code		4026187410834			
		Stubline outlet			
Frequency range					
	[MHz]	5 - 65	87,5 - 108	47 - 470	470 -862
Tap loss					
Jack RF Plug TV	[dB]	6 ± 0,5 2,4 ± 0,3	5,5 ± 0,5 2,4 ± 0,3	- 2,4 ± 0,5	- 2,2 ± 0,3
Return loss					
Input Jack RF Plug TV	[dB]	> 14 - > 14	> 14 > 14 > 14	> 10 - > 14	> 12 - > 14
Isolation					
RF - TV	[dB]	> 22	> 25	> 25	> 50



GUT123



Trunkline wall outlet (MATV / CATV); for reception of terr., radio and TV-programmes up to 862 MHz, 2 outputs and return path, with screw and claw fixing, mounting with 55 Ø wall boxes

Type		GUT 123			
Order number		541 231			
EAN-code		4026187410865			
		Trunkline outlet			
Frequency range					
	[MHz]	5 - 65	87,5 - 108	47 - 470	470 - 862
Tap loss					
Jack RF Plug TV	[dB]	- 9 ± 0,5	12,5 ± 0,5 9 ± 0,5	- 8,5 ± 1	- 8,5 ± 1
Through loss					
	[dB]	2,5 ± 0,2	2,5 ± 0,2	2,6 ± 0,2	2,8 ± 0,2
Return loss					
Trunk line input - output*		> 18	> 18	> 14	> 14
Jack RF	[dB]	-	> 14	-	-
Plug TV		> 14	> 14	> 12	> 12
Isolation					
Trunk line output - connectors		> 30	> 35	> 30	> 28
RF - TV	[dB]	> 22	> 25	> 25	> 50

* > 12 dB over the complete range, if subscriber connector is not terminated

GUT152



Trunkline wall outlet (MATV / CATV); for reception of terr., radio and TV-programmes up to 862 MHz, 2 outputs and return path, with screw and claw fixing, mounting with 55 Ø wall boxes

Type		GUT 152			
Order number		541 851			
EAN-code		4026187410896			
		Trunkline outlet			
Frequency range					
	[MHz]	5 - 65	87,5 - 108	47 - 470	470 - 862
Tap loss					
Jack RF Plug TV	[dB]	- 12,2 ± 0,5	15,5 ± 0,5 12,2 ± 0,5	- 12 ± 1	- 12,2 ± 1
Through loss					
	[dB]	0,8 ± 0,2	0,8 ± 0,2	0,9 ± 0,2	1,1 ± 0,2
Return loss					
Trunk line input - output		> 18	> 18	> 18	> 15
Jack RF	[dB]	-	> 14	-	-
Plug TV		> 14	> 14	> 12	> 12
Isolation					
Trunk line output - connectors		> 30	> 35	> 30	> 28
RF - TV	[dB]	> 22	> 25	> 25	> 50

GUT162



Trunkline wall outlet (MATV / CATV); for reception of terr., radio and TV-programmes up to 862 MHz, 2 outputs and return path, with screw and claw fixing, mounting with 55 Ø wall boxes

Type		GUT 162			
Order number		542 861			
EAN-code		4026187410926			
		Trunkline outlet			
Frequency range					
	[MHz]	5 - 65	87,5 - 108	47 - 470	470 - 862
Tap loss					
Jack RF Plug TV	[dB]	- 14,3 ± 0,5	17,5 ± 0,5 14,3 ± 0,5	- 14 ± 1	- 14 ± 1
Through loss					
	[dB]	0,6 ± 0,2	0,6 ± 0,2	0,7 ± 0,2	0,9 ± 0,2
Return loss					
Trunk line input - output Jack RF Plug TV	[dB]	> 18 - > 14	> 18 > 14 > 14	> 18 - > 12	> 15 - > 12
Isolation					
Trunk line output - connectors RF - TV	[dB]	> 30 > 22	> 35 > 25	> 30 > 25	> 28 > 50

GUT182



Trunkline wall outlet (MATV / CATV); for reception of terr., radio and TV-programmes up to 862 MHz, 2 outputs and return path, with screw and claw fixing, mounting with 55 Ø wall boxes

Type		GUT 182			
Order number		541 880			
EAN-code		4026187411374			
		Trunkline outlet			
Frequency range					
	[MHz]	5 - 65	87,5 - 108	47 - 470	470 - 862
Tap loss					
Jack RF Plug TV	[dB]	- 14,3 ± 0,5	21 ± 0,5 18 ± 0,5	- 18 ± 1	- 18 ± 1
Trough loss					
	[dB]	0,6 ± 0,2	0,6 ± 0,2	0,7 ± 0,2	0,9 ± 0,2
Return loss					
Trunk line input - output Jack RF Plug TV	[dB]	> 18 - > 14	> 18 > 14 > 14	> 18 - > 12	> 15 - > 12
Isolation					
Trunk line output - connectors RF - TV	[dB]	> 30 > 22	> 35 > 25	> 30 > 25	> 28 > 50



GUT MMD x, GUT MMD xF

Multimedia broadband and data outlets



KLASSE
A
CLASS

- very high isolation between data connection and TV/RF connection prevents disturbances in TV and radio reception by means of the cable modem
- WICLIC or F-connector jacks for cable modem prevent unwanted ingress caused by connecting a „second television“
- high beam strength via the radio jack by means of VHF band pass filter
- easy, fast and secure connection even with different internal conductor cross sections
- cable bend protection by chamfered housing
- solid die-cast housing



adequate wall boxes see page 224

Common data		GUT MMD...	
Isolation			
Modem to TV (5 - 45 MHz)	[dB]	≥ 80	
Modem to TV (45 - 65 MHz)	[dB]	≥ 70	
Modem to TV (5 - 65 MHz)	[dB]	≥ 40	
Common data			
Directivity	[dB]	≥ 30	
Screening		class A according EN 50083-2	
Intermodulation resistance		according EN 60728-4	

Type		GUT MMD 4 / MMD 4F		GUT MMD 10 / MMD 10F	
Order number		540 140 / 540 141		541 110 / 541 111	
EAN-code 4026187...		...411060 / ...411213		...411091 / ...411244	
		Modem stubline outlet		Modem endpoint outlet	
Tap loss					
TV	(109 * - 1.000 MHz)	[dB]	max. 4,3 ± 1	max. 10 ± 1	
Modem	(5 - 1.000 MHz)**	[dB]	max. 4,3 ± 1	max. 10 ± 1	
FM	(87,53 - 108 *** MHz)	[dB]	max. 8 ± 2	max. 13,5 ± 2	
Return loss					
Input	(5 - 1000 MHz)	[dB]	> 16 ****	> 16	

* additional attenuation max. 2 dB ** 87,5 - 108 MHz: + 2 dB *** additional attenuation max. 0,5 dB **** 87,5 - 125 MHz: according EN 60728-4

Type		GUT MMD 13 / MMD 13F	GUT MMD 15 / MMD 15F
Order number		541 130 / 541 131	541 115 / 541 151
EAN-code 4026187...		...411121 / ...411275	...411152 / 411305
Modem trunkline outlet			
Tap loss			
TV (109 * - 1.000 MHz)	[dB]	max. 12,8 ± 1	max. 15,3 ± 1
Modem (5 - 1.000 MHz) **	[dB]	max. 12,8 ± 1	max. 15 ± 1
FM (87,5 *** - 108 *** MHz)	[dB]	max. 16,5 ± 2	max. 18,5 ± 2
Trunk via net loss			
(5 - 1.000 MHz)	[dB]	max. 2 ± 0,3	max. 1,4 ± 0,3
Return loss			
Input (5 - 1000 MHz)	[dB]		≥ 16
Output (5 - 1000 MHz)	[dB]		≥ 16

* additional attenuation max. 2 dB ** 87,5 - 108 MHz: + 2 dB *** additional attenuation max. 0,5 dB

Type		GUT MMD 17 / MMD 17F	GUT MMD 19 / MMD 19F
Order number		541 170 / 541 171	541 190 / 541 191
EAN-code 4026187...		...411183 / ...411336	...411404 / ...411435
Modem trunkline outlet			
Tap loss			
TV (109 * - 1.000 MHz)	[dB]	max. 18 ± 1	max. 20,2 ± 1
Modem (5 - 1.000 MHz **)	[dB]	max. 18,5 ± 2	max. 21 ± 2
FM (87,53 - 108 *** MHz)	[dB]	max. 20,5 ± 2	max. 23 ± 2
Trunk via net loss			
(5 - 1.000 MHz)	[dB]	max. 1,1 ± 0,3	max. 1,1 ± 0,3
Return loss			
Input (5 - 1000 MHz)	[dB]		≥ 16
Output (5 - 1000 MHz)	[dB]		≥ 16

* additional attenuation max 2 dB ** 87,5 - 108 MHz: + 2 dB *** additional attenuation max. 0,5 dB

Type		GUT MMD 22 / MMD 22F
Order number		541 220 / 541 221
EAN-code		4026187411466 / 4026187411497
Modem trunkline outlet		
Tap loss		
TV (109 * - 1.000 MHz)	[dB]	max. 22,2 ± 1
Modem (5 - 1.000 MHz) **	[dB]	max. 22,2 ± 1
FM (87,5 - 108 *** MHz)	[dB]	max. 26 ± 2
Trunk via net loss		
(5 - 1.000 MHz)	[dB]	max. 0,9 ± 0,3
Return loss		
Input (5 - 1000 MHz)	[dB]	≥ 16
Output (5 - 1000 MHz)	[dB]	≥ 16

* additional attenuation max. 2 dB ** 87,5 - 108 MHz: + 2 dB *** additional attenuation max. 0,5 dB



GUT MMD 2 6S, MMD 2 12D, MMD 2 12E, MMD 2 14D

Multimedia broadband outlets



KLASSE
A
CLASS

- 2 separate data connectors for direct connection of an interactive set-top-box resp. PVR and cable modem
- broadband layout of TV and RF frequency ranges
- extremely high isolation between TV/RF and the data-ports for avoiding interference of the SAT-IF
- galvanic separation of the inner conductors of the TV-, RF- and data connectors to avoid ripple voltage and stray electric current
- screening according EN 50083-2 Class A
- cover plate (80 x 80 mm) included

Type		GUT MMD 2 6S		
Order number		540121		
EAN-Code		4026187131388		
		Stubline outlet		
Tap loss				
		5 - 65 MHz:	66 - 83 MHz:	84 - 1000 MHz:
Data 1	[dB]	10,5 ± 1		
Data 2	[dB]	10,5 ± 1		
RF	[dB]	50 typ.	-	6,5 ± 1
TV	[dB]	50 typ.	-	6,5 ± 1
Isolation				
		5 - 65 MHz:	84 - 862 MHz:	862 - 1000 MHz:
Data 1 to RF	[dB]	≥ 60	≥ 30	≥ 26
Data 1 to TV	[dB]	≥ 60	≥ 30	≥ 26
Data 1 to Data 2	[dB]	≥ 38*	≥ 32 (470 - 862 MHz: ≥ 26)	≥ 24
Data 2 to RF	[dB]	≥ 60	≥ 30	≥ 26
Data 2 to TV	[dB]	≥ 60	≥ 30	≥ 26
TV to RF	[dB]	-	≥ 20	≥ 20
Return loss				
		5 - 65 MHz:	66 - 83 MHz:	84 - 1000 MHz:
Data 1	[dB]	≥ 18 (-1,5 dB / Octave) F = 40 MHz		
Data 2	[dB]	≥ 18 (-1,5 dB / Octave) F = 40 MHz		
RF	[dB]	≥ 14 (-1,5 dB / Octave) (> 10 dB min.) F = 80 MHz		≥ 14 (-1,5 dB / Octave) (> 10 dB min.) F = 80 MHz
TV	[dB]	≥ 14 (-1,5 dB / Octave) (> 10 dB min.) F = 80 MHz		≥ 14 (-1,5 dB / Octave) (> 10 dB min.) F = 80 MHz

* between 5 and 15 MHz > 30 dB typ.

Type		GUT MMD 2 12D		
Order number		541121		
EAN-Code		4026187131395		
		Trunkline outlet		
Tap loss				
		5 - 65 MHz:	66 - 83 MHz:	84 - 1000 MHz:
Data 1	[dB]	12 ± 1		
Data 2	[dB]	12 ± 1		
RF	[dB]	55 typ.	-	12,5 ± 1
TV	[dB]	55 typ.	-	12,5 ± 1
Transmission loss 5 - 1000 MHz				
Data 1	[dB]	3,5 ± 0,8**		
Data 2	[dB]			
RF	[dB]			
TV	[dB]			
Isolation				
		5 - 65 MHz:	84 - 862 MHz:	862 - 1000 MHz:
Data 1 to RF	[dB]	≥ 60	≥ 45 (470 - 862 MHz: ≥ 36)	≥ 34
Data 1 to TV	[dB]	≥ 60	≥ 45 (470 - 862 MHz: ≥ 36)	≥ 34
Data 1 to Data 2	[dB]	≥ 36*	≥ 34 (470 - 862 MHz: ≥ 30)	≥ 22
Data 1 to Out	[dB]	≥ 35	≥ 32	≥ 30
Data 2 to RF	[dB]	≥ 60	≥ 45 (470 - 862 MHz: ≥ 36)	≥ 34
Data 2 to TV	[dB]	≥ 60	≥ 45 (470 - 862 MHz: ≥ 36)	≥ 34
Data 2 to Out	[dB]	≥ 36	≥ 40 (470 - 862 MHz: ≥ 36)	≥ 30
TV to RF	[dB]	-	-	≥ 20
TV to Out	[dB]	≥ 60	≥ 30 (470 - 862 MHz: ≥ 28)	≥ 24
RF to Out	[dB]	≥ 60	≥ 30 (470 - 862 MHz: ≥ 28)	≥ 24
Return loss				
		5 - 65 MHz:	66 - 83 MHz:	84 - 1000 MHz:
Data 1	[dB]	≥ 18 (-1,5 dB / Octave) F = 40 MHz		
Data 2	[dB]	≥ 18 (-1,5 dB / Octave) F = 40 MHz		
RF	[dB]	≥ 14 (-1,5 dB / Octave) (> 10 dB min.) F = 80 MHz		≥ 14 (-1,5 dB / Octave) (> 10 dB min.) F = 80 MHz
TV	[dB]	≥ 14 (-1,5 dB / Octave) (> 10 dB min.) F = 80 MHz		≥ 14 (-1,5 dB / Octave) (> 10 dB min.) F = 80 MHz

* between 5 and 15 MHz > 30 dB typ.

** between 862 and 1000 MHz 4,0 ± 0,8 dB



Type		GUT MMD 2 12E		
Order number		541122		
EAN-Code		4026187131401		
		Trunkline outlet		
Tap loss				
		5 - 65 MHz:	66 - 83 MHz:	84 - 1000 MHz:
Data 1	[dB]	12 ± 1		
Data 2	[dB]	12 ± 1		
RF	[dB]	55 typ.	-	12,5 ± 1
TV	[dB]	55 typ.	-	12,5 ± 1
Isolation				
Equals the data of GUT MMD 2 12D for Data 1 to RF / Data 1 to TV / Data1 to Data 2 / Data 2 to RF / Data 2 to TV and TV to RF				
Return loss				
Equals the data of GUT MMD 2 12D				

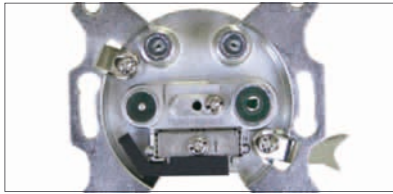
Type		GUT MMD 2 14D		
Order number		541121		
EAN-Code		4026187131395		
		Trunkline outlet		
Tap loss				
		5 - 65 MHz:	66 - 83 MHz:	84 - 1000 MHz:
Data 1	[dB]	14,5 ± 1		
Data 2	[dB]	14,5 ± 1		
RF	[dB]	55 typ.	-	12,5 ± 1
TV	[dB]	55 typ.	-	12,5 ± 1
Transmission loss 5 - 1000 MHz				
Data 1	[dB]	2,0 ± 0,8**		
Data 2	[dB]			
RF	[dB]			
TV	[dB]			
Isolation				
		5 - 65 MHz:	84 - 862 MHz:	862 - 1000 MHz:
Data 1 to RF	[dB]	≥ 60	≥ 45 (470 - 862 MHz: ≥ 36)	≥ 34
Data 1 to TV	[dB]	≥ 60	≥ 45 (470 - 862 MHz: ≥ 36)	≥ 34
Data 1 to Data 2	[dB]	≥ 36*	≥ 34 (470 - 862 MHz: ≥ 30)	≥ 22
Data 1 to Out	[dB]	≥ 35	≥ 32	≥ 30
Data 2 to RF	[dB]	≥ 60	≥ 45 (470 - 862 MHz: ≥ 36)	≥ 34
Data 2 to TV	[dB]	≥ 60	≥ 45 (470 - 862 MHz: ≥ 36)	≥ 34
Data 2 to Out	[dB]	≥ 32	≥ 30	
TV to RF	[dB]	-	-	≥ 20
TV to Out	[dB]	≥ 60	≥ 30 (470 - 862 MHz: ≥ 28)	≥ 24
RF to Out	[dB]	≥ 60	≥ 30 (470 - 862 MHz: ≥ 28)	≥ 24
Return loss				
		5 - 65 MHz:	66 - 83 MHz:	84 - 1000 MHz:
Data 1	[dB]	≥ 18 (-1,5 dB / Octave) F = 40 MHz		
Data 2	[dB]	≥ 18 (-1,5 dB / Octave) F = 40 MHz		
RF	[dB]	≥ 14 (-1,5 dB / Octave) (> 10 dB min.) F = 80 MHz		≥ 14 (-1,5 dB / Octave) (> 10 dB min.) F = 80 MHz
TV	[dB]	≥ 14 (-1,5 dB / Octave) (> 10 dB min.) F = 80 MHz		≥ 14 (-1,5 dB / Octave) (> 10 dB min.) F = 80 MHz

* between 5 and 15 MHz > 30 dB typ.

** between 862 and 1000 MHz 4,0 ± 0,8 dB

GUT MMD 7 SAT

SAT-, Multimedia- broadband- and data-outlet



KLASSE **A**
CLASS

- for use in SAT-IF installations, combined with multimedia installations
- separate SAT-connector (F-jack)
- separate data-connector (F-jack)
- extremely high isolation between TV/RF and the data-ports for avoiding interference of the SAT-IF
- galvanic separation of the inner conductors of the TV-, RF- and data connectors to avoid ripple voltage and stray electric current

Type		GUT MMD 7 SAT		
Order number		540 170		
EAN-Code		4026187120627		
Multimedia-Stubline outlet with SAT-connection				
Tap loss				
		5 - 65 MHz:	84 - 862 MHz:	950 - 2400 MHz:
Data	[dB]	7 ± 1		-
RF	[dB]	55	7,0 ± 1	-
TV	[dB]	55	7,0 ± 1	-
SAT	[dB]	55 typ.	30 typ.*	1,5 ± 1
Isolation				
	[MHz]	5 - 65 MHz:	470 - 862 MHz:	950 - 2400 MHz:
Data to RF	[dB]	≥ 70	≥ 25	-
Data to TV	[dB]	≥ 70	≥ 25	-
Data to SAT	[dB]	≥ 70	≥ 25**	≥ 20***
TV to RF	[dB]	-	≥ 20	-
TV to SAT	[dB]	≥ 70	≥ 25**	≥ 20***
RF to SAT	[dB]	≥ 70	≥ 25**	≥ 20***
Return loss				
		5 - 65 MHz:	84 - 862 MHz:	950 - 2400 MHz:
Data	[dB]	≥ 18 (-1,5 dB / Octave) F = 40 MHz		-
RF	[dB]	≥ 14 (-1,5 dB / Octave) F = 80 MHz		-
TV	[dB]	≥ 14 (-1,5 dB / Octave) F = 80 MHz		-
SAT	[dB]			> 10 (950 - 2400 MHz) linear sloping to 7,2 dB

* 830 - 862 MHz 15 dB typ. ** 830 - 862 MHz 20 dB typ. *** 950 - 1050 MHz 15 dB typ.



Splitters and taps of the HFT-series

Common data		HFT...
Screening		
30 - 300 MHz	[dB]	> 85
300 - 470 MHz	[dB]	> 80
470 - 862 MHz	[dB]	> 75
Common data		
Connectors	[dB]	F jack
Screening		class A according EN 50083-2
Impedance	[Ω]	75

HFT 2, HFT 3, HFT 4, HFT 6, HFT 8

Splitters and taps



A
 KLASSE CLASS

- top-quality distribution material for terrestrial frequencies up to 1000 MHz
- blocking capacitor at in- and outputs
- screening: class A

Type		HFT 2	HFT 3	HFT 4	HFT 6	HFT 8
Order number		408 020	408 030	408 040	408 060	408 080
EAN-code 4026187...		...310004	...310028	...310202	...310288	...310295
		splitter				
Frequency range	[MHz]	5...1000				
Transmission loss input-outputs						
5 - 20 MHz	[dB]	3,5 ± 0,5	5,3 ± 0,6	7,8 ± 0,8	9,2 ± 0,8	11,0 ± 0,8
20 - 40 MHz	[dB]	3,5 ± 0,5	5,3 ± 0,6	7,8 ± 0,8	9,2 ± 0,8	11,0 ± 0,8
300 - 862 MHz	[dB]	3,5 ± 0,5	6,0 ± 1	7,8 ± 1	9,2 ± 1	12,0 ± 0,5
40 - 300 MHz	[dB]	3,5 ± 0,5	5,3 ± 0,8	7,8 ± 0,8	9,2 ± 0,8	11,5 ± 0,2
Isolation output-output						
5 - 20 MHz	[dB]	18	14	16	14	20
20 - 40 MHz	[dB]	25	20	20	20	20
40 - 300 MHz	[dB]	25	24	20	20	20
300 - 862 MHz	[dB]	22	22	20	20	20
Return loss input						
5 - 20 MHz	[dB]	18	16	18	18	18
20 - 40 MHz	[dB]	20	20	20	14	20
40 - 300 MHz	[dB]	20*	24*	20*	20*	20*
300 - 862 MHz	[dB]	20*	22*	20*	20*	20*
Return loss output						
5 - 20 MHz	[dB]	16	14	18	14	18
20 - 40 MHz	[dB]	20	20	20	14	20
40 - 300 MHz	[dB]	20*	24*	20*	20*	20*
300 - 862 MHz	[dB]	20*	22*	20*	20*	20*

* at 40 MHz - 1,5 dB/Oct.

HFT 106, HFT 108, HFT 111, HFT 116, HFT 120

1-waytaps



KLASSE **A**
CLASS

- top-quality distribution material for terrestrial frequencies up to 1000 MHz
- blocking capacitor at in- and outputs
- screening: class A

Type		HFT 106	HFT 108	HFT 111	HFT 116	HFT 120
Order number		408 160	408 100	408 110	408 120	408 130
EAN-code 4026187...		...310325	...310042	...310066	...310080	...310103
		1-way taps				
Frequency range	[MHz]	5...1000				
Tap loss input-stub						
5 - 862 MHz	[dB]	6,5 ± 1,5	8,5 ± 1,5	12,5 ± 1,5	16 ± 1,5	20 ± 1,5
Transmission loss input-output						
5 - 470 MHz	[dB]	1,5 ± 0,5	1,5 ± 1,5	0,75 ± 0,5	0,6 ± 0,4	0,6 ± 0,4
470 - 862 MHz	[dB]	2,0 ± 0,8	1,8 ± 1	1,2 ± 0,8	0,8 ± 0,5	0,8 ± 0,5
Isolation stub-output						
5 - 40 MHz	[dB]	20	28	35	35	40
40 - 470 MHz	[dB]	25	25	30	33	35
470 - 862 MHz	[dB]	25	20	25	28	30
Return loss input						
5 - 40 MHz	[dB]	16	18	20	20	20
40 - 300 MHz	[dB]	20*	20*	20*	20*	20*
300 - 862 MHz	[dB]	20*	20*	20*	20*	20*
Return loss output						
5 - 40 MHz	[dB]	20	20	20	20	20
40 - 470 MHz	[dB]	20*	20*	20*	20*	20*
470 - 862 MHz	[dB]	20*	20*	20*	20*	20*

* at 40 MHz - 1,5 dB/oct.



HFT 208, HFT 212, HFT 216, HFT 220

2-waytaps



KLASSE
A
CLASS

- top-quality distribution material for terrestrial frequencies up to 1000 MHz
- blocking capacitor at in- and outputs
- screening: class A

Type		HFT 208	HFT 212	HFT 216	HFT 220
Order number		408 200	408 210	408 220	408 230
EAN-code 4026187...		...310127	...310141	...310165	...310189
		2-way tap			
Frequency range	[MHz]	5...1000			
Tap loss input-stub					
5 - 862 MHz	[dB]	8,5 ± 1,5	12,5 ± 1,5	16 ± 1,5	20 ± 1,5
Transmission loss input-output					
5 - 862 MHz	[dB]	3 ± 1	1,4 ± 0,8	1,2 ± 0,6	1,2 ± 0,6
470 - 862 MHz	[dB]	3,8 ± 1	2 ± 1	2 ± 0,8	1,8 ± 0,8
Isolation stub-output					
5 - 40 MHz	[dB]	20	25	30	32
470 - 862 MHz	[dB]	18	20	20	22
Isolation stub-stub					
5 - 40 MHz	[dB]	28	40	40	40
470 - 862 MHz	[dB]	25	36	36	36
Return loss input					
5 - 20 MHz	[dB]	18	18	18	18
470 - 862 MHz	[dB]	20*	20*	20*	20*
Return loss output					
5 - 20 MHz	[dB]	18	18	18	18
470 - 862 MHz	[dB]	20*	20*	20*	20*
Return loss stub					
5 - 20 MHz	[dB]	18	18	18	20
470 - 862 MHz	[dB]	20*	20*	20*	20*

HFT 416, HFT 618, HFT 820

4- / 6- / 8-way taps asymmetrical



KLASSE
A
CLASS

- top-quality distribution material for terrestrial frequencies up to 1000 MHz
- blocking capacitor at in- and outputs
- screening: class A

Type		HFT 416	HFT 618	HFT 820
Order number		408 400	408 600	408 800
EAN-code 4026187...		...310226	...310233	...310240
		4-way tap	6-way tap	8-way tap
Frequency range	[MHz]	5...1000		
Transmission loss input-output				
5 - 470 MHz	[dB]	4,5 ± 1	6,8 ± 0,8	8,8 ± 0,6
470 - 862 MHz	[dB]	4,8 ± 1	7,5 ± 1	9,5 ± 0,8
Isolation stub output				
5 - 40 MHz	[dB]	25	25	25
40 - 470 MHz	[dB]	22	22	22
470 - 862 MHz	[dB]	20	20	20
Isolation stub-stub				
5 - 470 MHz	[dB]	40	40	40
470 - 862 MHz	[dB]	36	36	36
Return loss input				
5 - 20 MHz	[dB]	14	14	14
20 - 862 MHz	[dB]	20*	20*	20*
Return loss output				
5 - 20 MHz	[dB]	16	16	16
20 - 862 MHz	[dB]	20*	20*	20*
Return loss stub				
5 - 20 MHz	[dB]	16	16	16
20 - 862 MHz	[dB]	20*	20*	20*
Tap value				
Output 1, 5 - 862 MHz	[dB]	13 ± 1,5	13 ± 1,5	13 ± 1,5
Output 2, 5 - 862 MHz	[dB]	13,5 ± 1,5	13,5 ± 1,5	13,5 ± 1,5
Output 3, 5 - 862 MHz	[dB]	15 ± 1,5	15 ± 1,5	15 ± 1,5
Output 4, 5 - 862 MHz	[dB]	15,5 ± 1,5	15,5 ± 1,5	15,5 ± 1,5
Output 5, 5 - 862 MHz	[dB]	-	17,5 ± 1,5	17,5 ± 1,5
Output 6, 5 - 862 MHz	[dB]	-	18 ± 1,5	18 ± 1,5
Output 7, 5 - 862 MHz	[dB]	-	-	20 ± 1,5
Output 8, 5 - 862 MHz	[dB]	-	-	20,5 ± 1,5



HFT 411, HFT 616, HFT 818

Symmetrical taps



KLASSE
A
CLASS

- top-quality distribution material for terrestrial frequencies up to 1000 MHz
- blocking capacitor at in- and outputs
- suitable for return path and UHF
- EN 50083-1, EN 50083-2 (screening: class A)
- unused tap-outputs in return path networks have to be terminated with termination resistor (FUR 75 order number: 610770)

Type		HFT 411	HFT 616	HFT 818
Order number		408 411	408 616	408 818
EAN-code 4026187...		...310424	...310448	...310462
		4-way tap	6-way tap	8-way tap
Frequency range	[MHz]	5...1000		
Tap value	[dB]	11 / 12	16	18
Transmission loss input-output				
5 - 40 MHz	[dB]	-	5,7	7,8
40 - 470 MHz	[dB]	-	5,7	7,2
470 - 862 MHz	[dB]	-	5,7	8
862 - 1000 MHz	[dB]	-	6	8
Isolation output-output				
5 - 40 MHz	[dB]	≥ 36	≥ 36	≥ 36
40 - 470 MHz	[dB]	≥ 38	≥ 40	≥ 40
470 - 862 MHz	[dB]	≥ 32	≥ 36	≥ 36
862 - 1000 MHz	[dB]	≥ 30	≥ 32	≥ 32
Directivity				
5 - 40 MHz	[dB]	-	≥ 26	≥ 26
470 - 470 MHz	[dB]	-	≥ 30	≥ 30
470 - 1000 MHz	[dB]	-	≥ 26	≥ 26
Return loss				
5 - 40 MHz	[dB]	≥ 18	≥ 16	16
40 - 1000 MHz	[dB]	≥ 20*	≥ 20*	≥ 20*

* at 40 MHz -1,5 dB / octave

Splitters and taps of the HFT G-series

Common Data		HFT...G
Connectors	[dB]	Standard F-jacks
Screening	[dB]	≥ 110 (Class A acc. EN 50083-2)
Impedance	[Ω]	75

HFT 2 G, HFT 3 G, HFT 4 G, HFT 6 G, HFT 8 G Splitters



KLASSE
A
CLASS

- top-quality distribution material for terrestrial frequencies up to 1000 MHz
- blocking capacitor at in- and outputs
- screening: class A
- 360° gold plated inner conductor connectors
- flattened ends of F-jacks for best contact

Type		HFT 2 G	HFT 3 G	HFT 4 G	HFT 6 G	HFT 8 G
Order number		408 021	408 031	408 041	408 061	408 081
EAN-code 4026187...		...110819	...110826	...111212	...111229	...111236
		2-way splitter	3-way splitter	4-way splitter	6-way splitter	8-way splitter
Frequency range	[MHz]	5...1000				
Transmission loss input / output						
5 - 40 MHz	[dB]	3,5 ± 0,3	5,5 ± 0,3	6,9 ± 0,3	9,0 ± 0,5	10,5 ± 0,5
40 - 470 MHz	[dB]	3,5 ± 0,3	5,3 ± 0,3	6,9 ± 0,3	9,0 ± 0,5	10,5 ± 0,5
470 - 862 MHz	[dB]	3,5 ± 0,5	5,5 ± 0,6	6,9 ± 0,6	9,0 ± 0,6	10,5 ± 0,6
862 - 1000 MHz	[dB]	3,5 ± 0,8	5,5 ± 1	6,9 ± 1	9,0 ± 1	10,5 ± 1
Isolation output / output						
5 - 15 MHz	[dB typ.]	> 40	> 30	> 40	> 30	> 36
15 - 40 MHz	[dB typ.]	> 40	> 36	> 40	> 35	> 40
40 - 470 MHz	[dB typ.]	> 38	> 34	> 36	> 32	> 34
470 - 862 MHz	[dB typ.]	> 35	> 32	> 35	> 30	> 30
862 - 1000 MHz	[dB typ.]	> 30	> 28	> 30	> 28	> 26
Return loss input / output						
5 - 40 MHz	[dB]	> 25 / > 28	> 25 / > 23	> 25 / > 28	> 25 / > 25	> 23 / > 22
40 - 1000 MHz	[dB]	> 25 / > 30	> 25 / > 25	> 25 / > 30	> 25 / > 25	> 23 / > 25
1000 - 1750 MHz	[dB]	> 28 / > 28	> 25 / > 25	> 25 / > 26	> 25 / > 24	> 23 / > 23
1750 - 2050 MHz	[dB]	> 25 / > 25	> 22 / > 25	> 25 / > 23	> 22 / > 22	> 23 / > 22
2050 - 2400 MHz	[dB]	> 22 / > 22	> 20 / > 22	> 22 / > 22	> 22 / > 22	> 22 / > 22



HFT 106 G, 108 G, 110 G, 112 G, 116 G, 120 G

1-waytaps


KLASSE A
CLASS

- top-quality distribution material for terrestrial frequencies up to 1000 MHz
- blocking capacitor at in- and outputs
- screening: class A
- 360° gold plated inner conductor connectors
- flattened ends of F-jacks for best contact

Type		HFT 106 G	HFT 108 G	HFT 110 G	HFT 112 G	HFT 120 G
Order number		408 161	408 101	408 111	408 112	408 131
EAN-code 4026187...		...111243	...111250	...111267	...111274	...111281
		1-way tap				
Frequency range	[MHz]	5...1000				
Transmission loss input / output						
5 - 15 MHz	[dB]	2,2 ± 0,4	2 ± 0,4	1,3 ± 0,4	0,8 ± 0,4	0,6 ± 0,3
15 - 40 MHz	[dB]	2,2 ± 0,4	2 ± 0,4	1,3 ± 0,4	0,8 ± 0,4	0,6 ± 0,3
40 - 470 MHz	[dB]	2,2 ± 0,4	2 ± 0,4	1,3 ± 0,4	0,8 ± 0,4	0,6 ± 0,3
470 - 862 MHz	[dB]	2,2 ± 0,6	2 ± 0,6	1,3 ± 0,6	0,8 ± 0,6	0,6 ± 0,5
862 - 1000 MHz	[dB]	2,2 ± 0,8	2 ± 0,8	1,3 ± 0,8	0,8 ± 0,8	0,6 ± 0,5
Tap loss input / stub						
5 - 15 MHz	[dB]	6,5 ± 0,5	8,5 ± 0,5	10,5 ± 0,5	12,5 ± 0,5	20 ± 0,5
15 - 40 MHz	[dB]	6,5 ± 0,5	8,5 ± 0,5	10,5 ± 0,5	12,5 ± 0,5	20 ± 0,5
40 - 470 MHz	[dB]	6,5 ± 0,5	8,5 ± 0,5	10,5 ± 0,5	12,5 ± 0,5	20 ± 0,5
470 - 862 MHz	[dB]	6,5 ± 0,8	8,5 ± 0,8	10,5 ± 0,8	12,5 ± 0,8	20 ± 0,8
862 - 1000 MHz	[dB]	6,5 ± 1	8,5 ± 1	10,5 ± 1	12,5 ± 1	20 ± 1
Return loss input / output / stub						
5 - 15 MHz	[dB typ.]	> 23 / > 22 / > 22	> 23 / > 22 / > 25	> 25 / > 22 / > 22	> 25 / > 22 / > 22	> 25 / > 22 / > 25
15 - 40 MHz	[dB typ.]	> 23 / > 22 / > 25	> 25 / > 22 / > 25	> 25 / > 22 / > 25	> 25 / > 22 / > 22	> 25 / > 22 / > 25
40 - 470 MHz	[dB typ.]	> 23 / > 22 / > 25	> 23 / > 22 / > 25	> 23 / > 22 / > 25	> 23 / > 22 / > 22	> 23 / > 22 / > 22
470 - 862 MHz	[dB typ.]	> 22 / > 20 / > 20	> 22 / > 20 / > 22	> 22 / > 20 / > 22	> 22 / > 20 / > 20	> 22 / > 20 / > 20
862 - 1000 MHz	[dB typ.]	> 22 / > 20 / > 20	> 22 / > 20 / > 22	> 22 / > 20 / > 22	> 22 / > 20 / > 20	> 22 / > 20 / > 20
Directivity output / stub						
5 - 15 MHz	[dB typ.]	> 35	> 35	> 35	> 40	> 42
15 - 40 MHz	[dB typ.]	> 35	> 35	> 35	> 40	> 42
40 - 470 MHz	[dB typ.]	> 30	> 30	> 30	> 32	> 38
470 - 862 MHz	[dB typ.]	> 28	> 28	> 28	> 30	> 32
862 - 1000 MHz	[dB typ.]	> 26	> 26	> 26	> 28	> 30

HFT 208 G, HFT 212 G, HFT 216 G, HFT 220 G

2-waytaps



KLASSE
A
CLASS

- top-quality distribution material for terrestrial frequencies up to 1000 MHz
- blocking capacitor at in- and outputs
- screening: class A
- 360° gold plated inner conductor connectors
- flattened ends of F-jacks for best contact

Type		HFT 208 G	HFT 212 G	HFT 216 G	HFT 220 G
Order number		408 201	408 101	408 111	408 112
EAN-code 4026187...		...111298	...111304	...120269	...120269
		1-way tap			
Frequency range	[MHz]	5...1000			
Transmission loss input / output					
5 - 15 MHz	[dB]	3,9 ± 0,5	1,5 ± 0,5	1,2 ± 0,3	0,9 ± 0,3
15 - 40 MHz	[dB]	3,9 ± 0,5	1,5 ± 0,5	1,2 ± 0,3	0,9 ± 0,3
40 - 470 MHz	[dB]	3,9 ± 0,5	1,5 ± 0,5	1,2 ± 0,3	0,9 ± 0,3
470 - 862 MHz	[dB]	3,9 ± 0,6	1,5 ± 0,6	1,2 ± 0,6	0,9 ± 0,6
862 - 1000 MHz	[dB]	3,9 ± 1	1,5 ± 1	1,2 ± 0,8	0,9 ± 0,8
Tap loss input / stub					
5 - 15 MHz	[dB]	8,5 ± 0,5	12,5 ± 0,5	16 ± 0,5	20 ± 0,5
15 - 40 MHz	[dB]	8,5 ± 0,5	12,5 ± 0,5	16 ± 0,5	20 ± 0,5
40 - 470 MHz	[dB]	8,5 ± 0,5	12,5 ± 0,5	16 ± 0,5	20 ± 0,5
470 - 862 MHz	[dB]	8,5 ± 0,8	12,5 ± 0,8	16 ± 0,8	20 ± 0,8
862 - 1000 MHz	[dB]	8,5 ± 1	12,5 ± 1	16 ± 1	20 ± 1
Return loss input / output / stub					
5 - 15 MHz	[dB typ.]	> 23 / > 20 / > 20	> 23 / > 22 / > 22	> 23 / > 22 / > 25	> 23 / > 22 / > 25
15 - 40 MHz	[dB typ.]	> 23 / > 21 / > 22	> 23 / > 22 / > 25	> 23 / > 22 / > 25	> 23 / > 22 / > 25
40 - 470 MHz	[dB typ.]	> 23 / > 21 / > 22	> 23 / > 22 / > 25	> 23 / > 22 / > 25	> 23 / > 22 / > 25
470 - 862 MHz	[dB typ.]	> 22 / > 20 / > 20	> 22 / > 20 / > 22	> 22 / > 20 / > 22	> 22 / > 20 / > 20
862 - 1000 MHz	[dB typ.]	> 22 / > 20 / > 20	> 22 / > 20 / > 22	> 22 / > 20 / > 20	> 22 / > 20 / > 22
Directivity output / stub					
5 - 15 MHz	[dB typ.]	> 26	> 30	> 38	> 40
5 - 40 MHz	[dB typ.]	> 26	> 30	> 38	> 40
40 - 470 MHz	[dB typ.]	> 24	> 28	> 36	> 36
470 - 862 MHz	[dB typ.]	> 23	> 26	> 30	> 32
862 - 1000 MHz	[dB typ.]	> 22	> 24	> 28	> 30
Isolation stub / stub					
5 - 15 MHz	[dB typ.]	> 32	> 42	> 50	> 50
5 - 40 MHz	[dB typ.]	> 32	> 42	> 50	> 50
40 - 470 MHz	[dB typ.]	> 28	> 36	> 38	> 40
470 - 862 MHz	[dB typ.]	> 28	> 36	> 38	> 40
862 - 1000 MHz	[dB typ.]	> 28	> 35	> 36	> 40



HFT 416 G, HFT 618 G, HFT 820 G

4- / 6- / 8-way taps



KLASSE
A
CLASS

- top-quality distribution material for terrestrial frequencies up to 1000 MHz
- blocking capacitor at in- and outputs
- screening: class A
- 360° gold plated inner conductor connectors
- flattened ends of F-jacks for best contact

Type		HFT 416 G	HFT 618 G	HFT 820 G
Order number		408 401	408 601	408 810
EAN-code 4026187...		...120283	...120290	...120306
		4-way tap	6-way tap	8-way tap
Frequency range	[MHz]	5...1000		
Transmission loss input / output				
5 - 470 MHz	[dB]	3,5 ± 0,5	5,2 ± 0,5	7,0 ± 0,5
470 - 1000 MHz	[dB]	3,0 ± 1	5,2 ± 1	7,0 ± 1
Isolation stub / stub				
5 - 40 MHz	[dB typ.]	> 42	> 42	> 42
40 - 470 MHz	[dB typ.]	> 40	> 40	> 40
470 - 862 MHz	[dB typ.]	> 34	> 35	> 35
862 - 1000 MHz	[dB typ.]	> 33	> 34	> 34
Directivity output / stub				
5 - 40 MHz	[dB typ.]	> 32	> 35	> 33
40 - 470 MHz	[dB typ.]	> 30	> 30	> 30
470 - 862 MHz	[dB typ.]	> 25	> 28	> 28
862 - 1000 MHz	[dB typ.]	> 24	> 26	> 26
Return loss input / output / stub				
5 - 40 MHz	[dB typ.]	> 22 / > 22 / > 22	> 22 / > 22 / > 22	> 22 / > 22 / > 22
40 - 470 MHz	[dB typ.]	> 22 / > 22 / > 22	> 22 / > 20 / > 22	> 22 / > 20 / > 22
470 - 862 MHz	[dB typ.]	> 20 / > 20 / > 20	> 20 / > 20 / > 20	> 20 / > 20 / > 20
862 - 1000 MHz	[dB typ.]	> 20 / > 20 / > 20	> 20 / > 20 / > 20	> 20 / > 20 / > 20
Tap value 5 - 1000 MHz				
Output 1	[dB]	12,5 ± 1	12,5 ± 1	12,5 ± 1
Output 2	[dB]	13,5 ± 1	13,5 ± 1	13,5 ± 1
Output 3	[dB]	14,5 ± 1	14,5 ± 1	14,5 ± 1
Output 4	[dB]	15,5 ± 1	15,5 ± 1	15,5 ± 1
Output 5	[dB]		16,5 ± 1	16,5 ± 1
Output 6	[dB]		17,5 ± 1	17,5 ± 1
Output 7	[dB]			18,5 ± 1
Output 8	[dB]			19,5 ± 1

HFD 2, HFD 3, HFD 4, HFD 8

2- / 3- / 4- / 8-way SAT splitters



KLASSE **A**
CLASS

- top-quality distribution material for terrestrial frequencies up to 2400 MHz
- for use in CATV and SAT-IF-systems
- EN 50083-1, EN 50083-2 (screening: class A)
- HFD 2 with power pass to all ports
- HFD 3 - HFD 8 with power pass to one port, 24 V / 0,5 A max.

Type		HFD 2	HFD 3	HFD 4	HFD 8
Order number		414 200	414 300	414 400	414 800
EAN-code 4026187...		...320003	...320126	...320027	...320140
		2-way splitter	3-way splitter	4-way splitter	8-way splitter
Frequency range	[MHz]	5...2400			
Through loss					
5 - 40 MHz	[dB]	4	8	11	13,5 ± 2,5
40 - 1000 MHz	[dB]	5	8	10	13,5 ± 1,5
1000 - 1750 MHz	[dB]	5,5	10	10,5	14 ± 2,0
1750 - 2050 MHz	[dB]	6	10,5	11,5	16 ± 2,0
2050 - 2400 MHz	[dB]	8	12	13,5	17 ± 2,0
Isolation loss					
5 - 40 MHz	[dB]	10	13	13	11
40 - 1000 MHz	[dB]	20	21	21	18
1000 - 1750 MHz	[dB]	20	17	17	16
1750 - 2050 MHz	[dB]	15	15	15	14
2050 - 2400 MHz	[dB]	10	10	10	14
Return loss inputs-outputs					
5 - 40 MHz	[dB]	10 / 9	8 / 6	7 / 7	10
40 - 1000 MHz	[dB]	12 / 10	12 / 10	12 / 10	12
1000 - 1750 MHz	[dB]	10 / 8	10 / 8	10 / 10	8
1750 - 2050 MHz	[dB]	10 / 8	10 / 8	10 / 8	8
2050 - 2400 MHz	[dB]	7 / 7	7 / 5	7 / 7	8



HFD 111, HFD 212

SATtaps



KLASSE
A
CLASS

- top-quality distribution material for terrestrial frequencies up to 2400 MHz
- for use in CATV and SAT-IF-systems
- EN 50083-1, EN 50083-2 (screening: class A)
- HFD 111-HFD 212 with power pass to one port, 24 V / 1 A max.

Type		HFD 111			HFD 212			
Order number		414 140			414 150			
EAN-code		4026187320089			4026187320102			
		1-way tap			2-way tap			
Frequency range	[MHz]	5...2400						
Distribution loss								
5 - 40 MHz	[dB]	10,5			10,5			
40 - 1000 MHz	[dB]	10,5			11			
1000 - 2050 MHz	[dB]	12			11,5			
2050 - 2400 MHz	[dB]	13,5			13			
Through loss								
5 - 40 MHz	[dB]	2,5			3,5			
40 - 1000 MHz	[dB]	1,5			2,5			
1000 - 2050 MHz	[dB]	3,0			4,5			
2050 - 2400 MHz	[dB]	4,0			5,5			
Isolation loss								
		stub / trunk			stub / trunk		stub / trunk	
5 - 40 MHz	[dB]	10,5			17		15	
40 - 1000 MHz	[dB]	10,5			25		30	
1000 - 2050 MHz	[dB]	12			20		25	
2050 - 2400 MHz	[dB]	13,5			15		20	
Return loss								
		input	output	stub	input	output	output	stub
5 - 40 MHz	[dB]	11	13	5	8	13	10	5
40 - 1000 MHz	[dB]	14	12	14	14	12	14	13
1000 - 2050 MHz	[dB]	14	10	14	15	10	15	12
2050 - 2400 MHz	[dB]	8	10	10	8	10	10	10

Terrestrial technology



Antennas

DVB-T aerials for reception of digital terrestrial TV- and radio programmes

Aerials for reception of analogue terrestrial TV- and radio programmes

Page 210



Antenna-diplexers and amplifiers

For mast and indoor mounting to combine antenna-cables
FM amplifiers

Page 212



ADI 3, ADO 3

Active digital antennas



- for digital terrestrial TV- and radio-programmes according to DVB-T standard
- remote supply 5 V via receiver or power supply diplexer SSW 11



see „SSW 11“ on page 214

Type		ADI 3	ADO 3
Order number		300 911	300 903
EAN-Code		4026187002138	4026187002152
		Indoor	Outdoor
Frequency range	[MHz]	174 - 862, Channel 5 - 69	
Gain		3 - 14	10 - 17
Connectors		IEC-jack	

UX48

UHF (FIV-V) channel-group antenna



- FM (LMKU / BII) stereo directional antennas

Type		UX 48
Order number		012 521
EAN-Code		4026187120968
Frequency range	[MHz]	UHF 470 - 862, channel 21 - 69
Elements		48
Gain	[dB(i)]	11 - 16
Forward backward ratio	[dB]	> 29
Angle of beam	[°]	54 - 26
Length	[cm]	110
Connectors		F-jacks

RUF 22, UK 3 N, UK 5

FM (LMKU / BII) stereo directional antennas



- for terrestrial analogue radio-programmes

Type		RUF 22	UK 3 N	UK 5
Order number		000 220	002 300	002 500
EAN-code		4026187120351	4026187121143	4026187000677
Frequency range	[MHz]	FM 87,5 - 108		
Elements		1	3	5
Gain	[dB]	0	4,5 - 5,5	6 - 8
Front-to-back-ratio	[dB]	-	10 - 15	14 - 18
Beam width	[°]	ring dipole	hor. 70, vert. 110	hor. 65 - 72, vert. 195
Wind load	[N]	29		93
Length	[cm]	Ø 49	117,5	181
Connectors		screw clamps, coaxial		



AZX 13, ADX 32, HMW 13

Antennadi plexers



- AZX, ADX: outdoor diplexers for mast mounting, waterproof plastic case

Type		AZX 13	ADX 32	HMW 13
Order number		108 130	120 320	112 130
EAN-code		4026187510107	4026187510008	4026187510169
1. Input				
Frequency range	[MHz]	47 - 230 (B I - III)	47 - 68 (B I)	-452 (B I - III / SC)
Through loss	[dB]	0,5	0,5	0,5 - 1,5
2. Input				
Frequency range	[MHz]	470 - 862 (B VI - V)	174 - 230 (B III)	(B IV - V)
Through loss	[dB]	1,5	0,5	0,5 - 1,5
3. Input				
Frequency range	[MHz]	-	470 - 862 (B VI - V)	-
Through loss	[dB]	-	1,5	-
Common data				
Connectors		screw clamps, coaxial		F jack

AC-UKW

FM amplifier

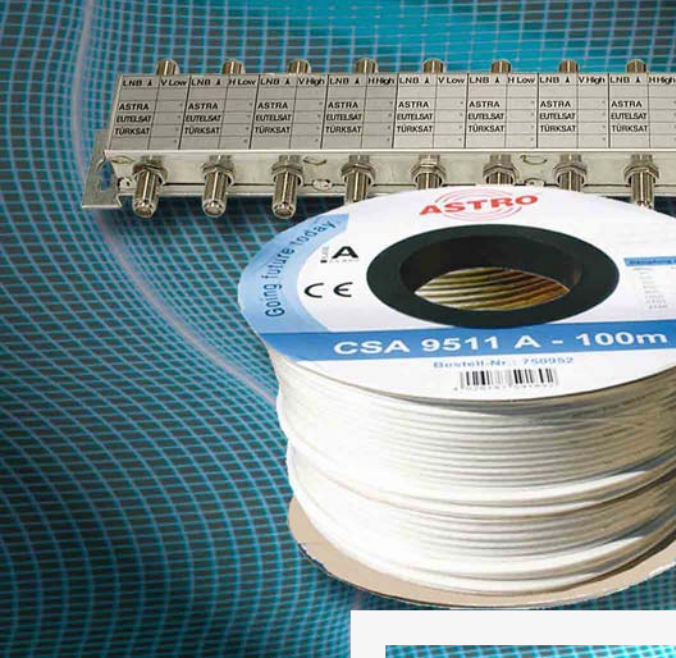


KLASSE
A
CLASS

- for use in small-sized or middle-sized installations

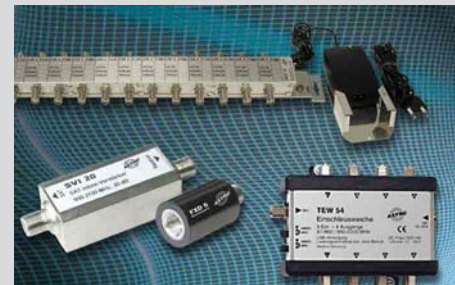
Type	AC-UKW		
Order number			262 021
EAN-Code			4026187170080
Gain			
B II	(UKW / FM)	[dB]	18 ± 1
Maximum output level			
66 dB KMA2, EN 50083-5		[dBμV]	112 (60 dB KMA)
Common data			
Level control		[dB]	0-10
Noise figure		[dB]	4
Supply voltage		[V~ / Hz]	100 - 240, 50, 1,8 VA
Connectors		[Ω]	F-jacks, 75
Dimensions (W x H x D)		[mm]	120 x 160 x 60

Accessories



Accessories for SAT-
and CATV-installation

Page 214



Connectors / Cables /
Tools

Page 217



Mounting material

Page 226



SSW22



SAT-bandpass filter

Type		SSW 22
Order number		310 100
EAN-Code		4026187770242
Frequency range	[MHz]	5 - 2150
Transmission loss	[dB]	1 - 2 typ.
LNB supply voltage	[V~]	A 14 / B 18, 24 max. 500 mA
Connectors	[Ω]	Inputs and Outputs, F-jacks, 75

SSW11



Power supply diplexer for remote powering of active DVB-T antennas

Type		SSW 11
Order number		350 121
EAN-code		4026187770754
Frequency range	[MHz]	47 - 862
Through loss	[dB]	1 - 2 typ.
Output voltage	[V~]	5 (50 mA)
Connectors	[Ω]	Inputs and Outputs, IEC jack, 75

TEW54



terrestrial filter for quatro-switch-LNB; for isolation of a terrestrial antenna installation; terrestrial input active / passive switchable to SAT-signals; connection of 4 subscribers, power supply via receiver

Type		TEW 54
Order number		330 480
EAN-Code		4026187790158
Frequency range	[MHz]	5 - 2200
Transmission loss	[dB]	14 (terr. passive) 6 (terr. active / SAT)
LNB current	[mA]	DC-Pass/max. 5001
Isolation (horizontal / vertical)	[dB]	> 25
Power consumption	[mA]	< 60 / 12...18 V
Connectors	[Ω]	5 In- and 4 Outputs, F-jacks, 75

SEW110



filter for combining SAT-signals and terrestrial programmes of an antenna installation to 1 down lead

Type		SEW 110
Order number		340 110
EAN-Code		4026187790066
Frequency range	[MHz]	47 - 862 / 950 - 2150
Tap loss	[dB]	14 (terr. passive) 6 (terr. active / SAT)
Transmission loss	[dB]	1,5 typ.
Isolation	[dB]	20
Connectors	[Ω]	In- and Outputs, F-jacks, 75

SQS122



DiSEqC 2.1 position switch

Type		SQS 122
Order number		320 142
EAN-Code		4026187770778
Frequency range	[MHz]	5 - 2200
Tap loss	[dB]	1
LNB current	[mA]	max. 500 / 12...18 V DC, DC-Pass
Current demand	[mA]	35
Switch mode	[dB]	Uncommitted Switch1, DiSEqC A/B, Tone Burst, Option Bit
Connectors	[Ω]	In- and Outputs, F-jacks, 75

SES12



power supply earthing bars; for up to 12 LNBs, LNB inputs short-circuit-proof, outputs DC decoupled, power supply with power LED

Type		SES 12
Order number		310 090
EAN-code		4026187630263
Frequency range	[MHz]	950 - 2200
Isolation	[dB]	> 30
Through loss	[dB]	≤ 1
Return loss	[dB]	> 12
Connectors	[Ω]	12 Inputs-Outputs, F jack, 75
Remote current per input	[mA]	450
Remote supply	[V / A]	19, max. 3



SVP20



overvoltage protection; for protection of devices, mechanically compatible for multiswitches of the AMS / SAM-series

Type		SVI 20
Order number		340 200
EAN-code		4026187790165
Frequency range	[MHz]	950 - 2150
Gain	[dB]	12...20
Power supply	[V]	11 - 20 (5 mA)
DC-power pass	[mA]	max. 500
Connectors	[Ω]	Inputs-Outputs, F jack, F plug, 75

SVI20



SAT inline amplifier

Type		SVI 20
Order number		340 200
EAN-code		4026187790165
Frequency range	[MHz]	950 - 2150
Gain	[dB]	12...20
Power supply	[V]	11 - 20 (5 mA)
DC-power pass	[mA]	max. 500
Connectors	[Ω]	Inputs-Outputs, F jack, F plug, 75

SER12



SAT-equalizer

Type		SER 12
Order number		340 120
EAN-Code		4026187790189
Frequency range	[MHz]	900 - 2100
Transmission loss	[dB]	3
Range of equalization	[dB]	0...12
Voltage supply	[V]	11 - 20 (50 mA)
DC-admission	[mA]	max. 500
Connectors	[Ω]	In- and Outputs, F-jack, F-plug, 75

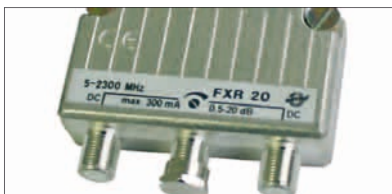
HP 85 N



Highpass filter; blocks the frequency range 5 - 65 MHz

Type		HP 85 N
Order number		119 085
EAN-Code		4026187570170
Frequency range	[MHz]	85 - 862 (transmission) 5 - 65 (blocked)
Transmission loss < 85 MHz	[dB]	max. 1,5
Inhibiting depth < 65 MHz	[dB]	> 50
Return loss > 85 MHz	[V]	≥ 18, -1,5 dB / octave, > 14 dB
Connectors	[Ω]	In- and Outputs, F-jacks, F-plug, 75

FXR20



Attenuator

Type		FXR 20
Order number		521 361
EAN-Code		4026187190828
Frequency range	[MHz]	5 - 2300
Attenuation	[dB]	0,5 - 20
DC-admission	[mA]	max. 300
Connectors	[Ω]	In- and Output, F-jack, 75

FDS 04, FDS 07, FDS 11



F-connectors: to be screwed onto coaxial cable

Type		FDS 04	FDS 07	FDS 11
Order number		620 240	620 270	620 110
EAN-code		4026187590291	4026187590314	4026187591083
for cable Ø	[mm]	3,6 - 4,0	6,6 - 7,0	10,0 - 10,3



FCS07



F-criimp-plug: to be crimped onto coaxial cable by means of a crimp-gripper

Type		FCS 07
Order number		620 070
EAN-code		4026187590253
for cable Ø	[mm]	6,6 - 7,0

FKS 03, FKS 06, FKS 16, FKS 16 P



F-compression-plugs: to be pressed onto coaxial cable by means of a compression-gripper; FKS 16 and FKS 16 P: for SAT-cable CSA 9516 (FKS 16 P: professional version)

Type		FKS 03	FKS 06
Order number		620 230	620 281
EAN-code		4026187592080	4026187591809
for cable Ø	[mm]	CSA 9539 (Midi-coax)	6,6 - 7,0

Type		FKS 16	FKS 16 P
Order number		620 160	620 161
EAN-Code		4026187111144	4026187170530
for cable Ø	[mm]	10,1 (CSA 9516 SAT-coax)	

FWA 07, FBB 180



angled adapter: F-plug and F-jack
double jack: F-jack 180° rotated

Typ		FWA 07	FBB 180
Bestellnummer		620 080	620 081
EAN-code		4026187590376	4026187591496

FSS 07, FSS 07Q



F-double-plugs:

FSS 07: two F-female plugs with screwing

FSS 07 Q: two F-female plugs to be plugged on Quick-connectors for connection of cascable multiswitch

Type	FSS 07	FSS 07 Q
Order number	620 340	620 350
EAN-code	4026187590338	4026187591229

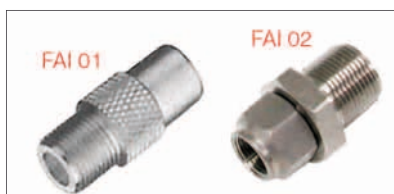
FBB 07, FBB 07 prof



F-double-jacks: F-jack on both sides

Type	FBB 07	FBB 07 prof
Order number	620 330	620 331
EAN-code	4026187590215	4026187591854

FAI 01, FAI 02



Adapter, F-connector to IEC:

FAI 01: IEC-plug to F-jack

FAI 02: F-plug to IEC-jack

Type	FAI 01	FAI 02
Order number	620 060	620 061
EAN-code	4026187590192	4026187591649

FUR 75, FUR 75 DC



F-plug-termination resistor 75 Ω

FUR 75 DC with DC-block

Type	FUR 75	FUR 75 DC
Order number	610 770	610 771
EAN-Code	4026187590352	4026187591151



225



foldable F-sealing grommet:
for water proof sealing of F-plugs

Type		225
Order number		722 250
EAN-code		4026187590864

IKB 06, IKS 06



IEC-compression-jacks, IEC -compression-connectors;
IEC-connectors to be pressed on to coaxial cable by means of a compression-gripper, for use with cables CSA 9511A HF, CSA 9511A

Type	IKB 06	IKS 06
Order number	620 261	620 260
EAN-code	4026187592042	4026187592066

ISV 120, ISV 130



IEC-plugs for connection to coax-cable
(CSA..., 3,6 - 8,0 mm)

Type	ISV 120	ISV 130
Order number	620 541	620 551
EAN-Code	4026187591403	4026187591441
Version	straight plug	angled plug

ISM 120, ISM 130

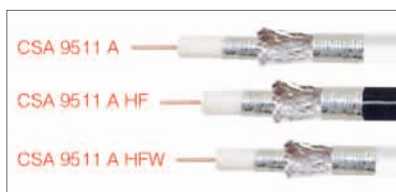


IEC-jack for connection to coax-cable
(CSA..., 3,6 - 8,0 mm)

Type	ISM 120	ISM 130
Order number	620 521	620 531
EAN-Code	4026187591427	4026187591465
Version	straight jack	angled jack

CSA 9511 A, CSA 9511 AHF

House installation cable for terrestrial TV, cable-TV and satellite



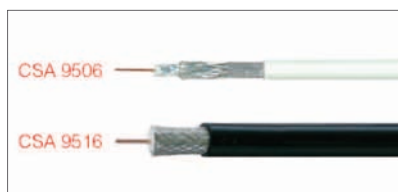
KLASSE
A
CLASS

- suitable for analogue and digital signals as well as HDTV
- screening factor and transfer impedance in the whole frequency range according class A or better (EN 50117)
- 3-way screening / length marks
- PE cable, gas-foamed dielectric for low attenuation values
- very good return loss values in the satellite frequency range
- excellent price-performance ratio
- suitable ASTRO plugs: FDS 07, FCS 07, FKS 06, IKB 06, IKB 06 and IKS 06 (for CSA 9511A / CSA 9511A HF)
- CSA 9511 AHF and CSA 9511 A HFW: halogen-free cables are flame retardant and can be installed in modern buildings with big gatherings, like train stations, airports, museums, congress halls and department stores

Type		CSA 9511 A	CSA 9511 A HF	CSA 9511 A HFW
Order number		750 952 (100 m) 750 955 (250 m) 750 953 (500 m)	750 956 (100 m)	750 958 (500 m)
EAN-Code		4026187591892 (100 m) 4026187591908 (250 m) 4026187591915 (500 m)	4026187110680 (100 m)	4026187111168 (500 m)
Inner conductor CU blank / massive	[Ø mm]	1,13	1,13	1,13
Isolation PEE gas foamed	[Ø mm]	4,8	2,72	4,8
Jacket / PVC	[Ø mm]	6,9	6,9	6,8
Minimal bending radius	[mm]	35	35	35
Impedance	[Ω]	75,0 ± 3,0	75,0 ± 3,0	75,0 ± 3,0
Attenuation @ 20°C				
55 MHz	[dB / 100 m]	4,2	4,2	4,1
230 MHz		8,0	8,0	8,4
300 MHz		9,8	9,8	10,0
500 MHz		12,1	12,1	13,1
860 MHz		17,0	17,0	17,1
1000 MHz		19,3	19,3	18,1
1800 MHz		26,3	26,3	25,2
2150 MHz		29,7	29,7	28,3
2400 MHz		-	-	-
Screening factor, coupling resistance				
5 - 30 MHz	[dB]	< 2 mΩ / m	< 2 mΩ / m	< 5 mΩ / m
30 - 1000 MHz		> 108	> 108	> 110
1000 - 2400 MHz		> 98	> 98	> 100

CSA 9506, CSA 9516

House installation cable for terrestrial TV, cable-TV and satellite



KLASSE
A
CLASS

CSA 9506:

- Midi-coax-cable, Ø 4,5 mm
- 3-way screening

CSA 9516:

- suitable for analogue and digital signals as well as HDTV
- screening factor and transfer impedance in the whole frequency range according class A or better (EN 50117)
- very good return loss values in the satellite frequency range
- available on 500 m cable reel
- suitable ASTRO-plugs FKS 16, FKS 16 P

Type		CSA 9506	CSA 9516
Order number		750 948 (250 m)	750 985 (500 m)
EAN-Code		4026187111113	4026187111106
Inner conductor			
CU blank / massive	[Ø mm]	0,6	1,65
Isolation Cell PE	[Ø mm]	2,8	7,2
External conductor			
Netting		aluminium	tin-plated copper
Coating	[Ø mm]	4,5 (white) PVC	10,1 (black) PE
Minimal bending radius	[mm]	30	60
Impedance	[Ω]	75,0 ± 3,0	75,0 ± 3,0
Attenuation @ 20°C			
100 MHz	[dB / 100 m]	11,5	3,7
200 MHz		15,5	5,1
500 MHz		24,5	9,0
950 MHz		34,5	13,6
1350 MHz		41,5	16,8
2150 MHz		53,5	22,5
Screening factor coupling resistance			
30 - 1000 MHz	[MHz / dB]	> 110	> 100
1000 - 2050 MHz		> 100	> 90
Ohmic resistance @ 20 °C			
	[Ω / km]	-	maximum 9 / maximum 12

KRZ 05, KRZ 05 prof



Compression-gripper: gripper for easy connection of compression-plugs to coaxial cable with 6,6- 7,0 mm Ø

Type	KRZ 05	KRZ 05 prof
Order number	718 360	718361
EAN-Code	4026187591847	4026187131470
applicable plug type	FKS 03, FKS 06, IKS 06, IKB 06	FKS 16, FKS 16P

KRA03



Cablestripper: tool for easily strip coaxial cable 4,5 - 6,5 mm Ø

Type	KRA 03
Order number	718 350
EAN-code	4026187591786
for	FDS 04, FDS 07, FCS 07, FKS 06

FDK06



Turning knob: tool for easily positioning F-plugs on coax-cable before crimping or fixing compression plugs

Type	FDK 06
Order number	718 371
EAN-code	4026187591885
for	FDS 04, FDS 07, FCS 07, FKS 06

KR-SET, KR-SET prof



KR-SET: 1 x KRA 03 professional cablestripper, 100 x FKS 06 compression-plugs, 1 x KRZ 05 compression-gripper, 1 x tool box made of impact-resist. and shockproof polyprop.; KR-SET prof: 1 x KRA 03 professional cablestripper, 100 x FKS 06 compression-plugs, 1 x KRZ 05 professional compression-gripper, 1 x tool box made of impact-resist. and shockproof polyprop.

Type	KR-SET	KR-SET prof
Order number	718 000	718 001
EAN-Code	4026187591878	4026187002374



GUS...,GU Z...



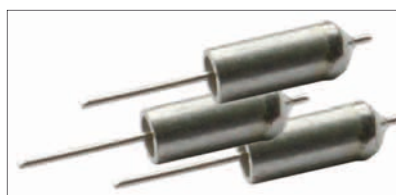
surface mounting frames, cover plates

Type	GUS 40	GUS 400
Order number	610 500	610 501
EAN-code	4026187440008	4026187411633
Function	mounting frames	mounting frames
Colour	electro white	pure white

Type	GUZ 40	GUZ 45	GUZ 44
Order number	610 400	610 450	610 440
EAN-code	4026187440138	4026187440213	4026187440053
Function	2-jacks cover	3-jacks cover	4-jacks cover
Colour	electro white		

Type	GUZ 400	GUZ 450
Order number	610 402	610 451
EAN-code	4026187440237	4026187440251
Function	2-jacks cover	3-jacks cover
Colour	pure white	

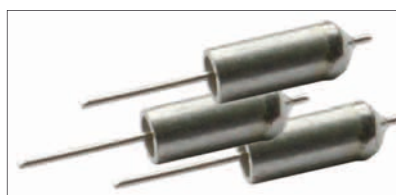
GUR 75 DC



Termination resistor for SAT trunkline outlets; including DC block

Type	GUR 75 DC
Order number	610 762
EAN-Code	4026187110741

GUR750



Termination resistor for the GUT 1..-series

Type	GUR 750
Order number	610 760
EAN-code	4026187390921

AKB..., AKF..., AKQ...



Receiver-connection cable

Type		AKB 15	AKB 30	AKB 50
Order number		601 010	601 030	601 050
EAN-code		4026187000219	4026187000226	4026187000233
Length	[cm]	150	300	500
Connectors	[Ω]	IEC-jack, IEC-angled plug, 75		

Type		AKF 155	AKB 305	AKB 505
Order number		601 020	601 040	601 060
EAN-code		4026187000240	4026187000257	4026187000264
Length	[cm]	150	300	500
Connectors	[Ω]	F-plug on both sides, 75		

Type		AKQ 15	AKQ 30	AKQ 50
Order number		601 210	601 230	601 250
EAN-Code		4026187000271	4026187000288	4026187000295
Length	[cm]	150	300	500
Connectors	[Ω]	F-quick angled plug on both sides, 75		

Scart150



SCARTcable

Type		Scart 150
Order number		350 150
EAN-code		4026187591571
Length	[cm]	150

HDMI 200, HDMI 500, HDMI 1000



HDMI cable; gold plated connectors

Type		HDMI 200	HDMI 500	HDMI 1000
Order number		350 153	350 154	350 155
EAN-Code		4026187120658	4026187120665	4026187120672
Length	[m]	2	5	10



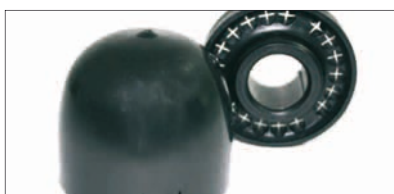
MST48/60



Mounting set for masts 48 / 60 including:
 1 x 231 Z tile, 1 x ESF 05 earth terminal,
 1 x 244 mast bracket, 1 x 246 mast bracket,
 1 x 229 gasket, 1 x 1016 mast retainer, 1 x MHD 48/60
 mast cap, 2 x HS 70 wood screws

Type		MST 48 / 60
Order number		710 700
EAN-Code		4026187002367
For mast Ø	[mm]	48 / 60

MHD48/60



2 parts with cablebushing in the mast for up to 18
 cables, cables are inserted via mast top (for weather
 proof sealing of masts)

Type		MHD 48 / 60
Order number		370 480
EAN-Code		4026187002282
For mast Ø	[mm]	48 / 60

250, 251, 252, 260, 276



Mast caps; material: PVC-plastics

Type		250	251	252	260	276
Order number		710 500	710 510	710 520	710 610	710 760
EAN-Code 4026187...		...001292	...001315	...001339	...001353	...001377
For mast Ø	[mm]	bis 43	32 - 60	48	60	76

ESF 02, ESF 05, ESF 09



Earth terminal for connection of 2 / 5 / 9 coax-cables
 and 1 earth connection, compliant to VDE-injunction,
 for broadband and SAT-distribution installations

Type		ESF 02	ESF 05	ESF 09
Order number		4026187720 020	4026187720 050	4026187720 071
EAN-Code		4026187630294	630256	630249
Connectors	[Ω]	2 F-jacks, 75	5 F-jacks, 75	9 F-jacks, 75
Return loss	[dB]	> 25		

5030



Earth terminal for connection of maximum 5 coax-cables and 1 earth connection, compliant to VDE-injunction, for antenna-amplification-installations

Type		5030
Order number		720 300
EAN-Code		4026187001803

LGH30

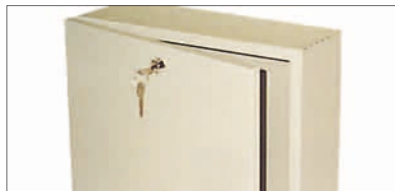


Outdoor housing made of light grey PVC, cover with quick lock (22 x 17 x 8 cm), for devices that are not intended for outdoor installation; for mast or wall mounting, 8 cable bushings, protected against dampness by rubber buckler

Type		LGH 30
Order number		189 300
EAN-Code		4026187590727

LGH 3040, 4060, 8060, 8080, 80120

Mounting cabinet for antenna- and broadband-installations



- Cabinet made of 1,2 mm metal plate in PURAL-coating 7032; open rear side with distance- and mounting-frame
- eight pre-purges that can be tweaked out if required for cable feed
- ventilation grills for good ventilation
- uniform locking safety lock
- delivered with particle board for mounting

Type		LGH 3040	LGH 4060
Order number		189 340	189 460
EAN-Code		4026187591281	4026187591298
Dimensions (W x H x D)	[mm]	300 x 400 x 150 mm; 1 door	400 x 600 x 190 mm; 2 door

Type		LGH 8060	LGH 8080	LGH 80120
Order number		189 700	189 800	189 900
EAN-Code		590734	590741	590758
Dimensions (W x H x D)	[mm]	600 x 800 x 250 mm; 1 door	800 x 800 x 260 mm; 1 door	1200 x 800 x 290 mm; 2 door



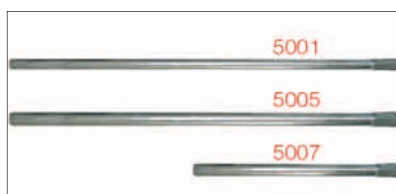
5050, 5060, 5076



mast duct; hot zinc dipped steel; durable design with cap

Type		5050	5060	5076
Order number		700 150	700 160	700 170
EAN-Code		4026187001865	4026187001872	4026187001889
Mast Ø	[mm]	60	60	76
Length	[m]	2	2,9	2,25
Wall thickness	[mm]	2	2,5	2,6
Maximum bending moment	[Nm]	1565	2350	3640

5001, 5005, 5007



antenna mast; hot zinc dipped steel, slip-on; with anti-twist protection

Type		5001	5005	5007
Order number		700 010	700 050	700 070
EAN-Code		4026187001513	4026187001575	4026187001599
Mast Ø	[mm]	48,25	42,25	48,25
Length	[m]	2	2	1
Wall thickness	[mm]	2	2	2
Maximum bending moment	[Nm]	1375	1375	1375

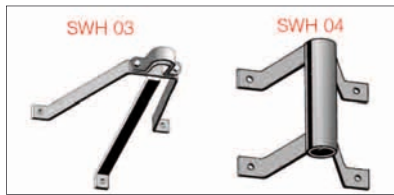
SR 48/200, SR 48/300



antenna mast; hot zinc dipped steel; durable design with cap

Type		SR 48/200	SR 48/300
Order number		700 141	700 181
EAN-Code		4026187591984	4026187591991
Mast Ø	[mm]	48	48
Length	[m]	2	3
Wall thickness	[mm]	2	2
Maximum bending moment	[Nm]	800	800

SWH 03, SWH 04



wall holder for wall mounting of parabolic-antennas;
hot zinc dipped steel

Type		SWH 03	SWH 04
Order number		702 130	702 140
EAN-Code		4026187000127	4026187000134
Fixing duct Ø	[mm]	60 / 76	50
Wall distance	[mm]	450	270
Mounting plain	[mm]	710 x 670	390 x 350
Afforded quantity		2	-

SWH 25, SWH 40, SWH 55



wall holder for wall mounting of parabolic-antennas;
hot zinc dipped steel; durable design with cap

Type		SWH 25	SWH 40	SWH 55
Order number		702 250	702 350	702 550
EAN-Code		4026187591953	4026187591960	4026187591977
Fixing duct Ø	[mm]	48	48	48
Wall distance	[mm]	250	400	550
Mounting plain	[mm]	155 x 155	165 x 165	200 x 200

1004, 1005, 1006



wall braces for wall mounting of mast ducts; steel
5 mm; hot zinc dipped; scope of delivery: 1 pair

Type		1004	1005	1006
Order number		710 040	710 051	710 060
EAN-Code 4026187...		...002213	...002220	...001391
Fixing duct Ø	[mm]	bis 60	bis 60	bis 48
Wall distance	[mm]	300	480	300



SDH...

Chevronholder



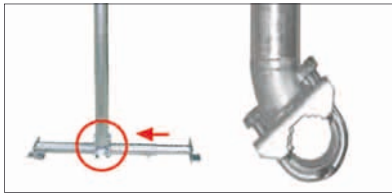
- patent applied for holder for parabolic-antennas; made of hot zinc dipped steel; including mast cap; 6 wood screws (10 x 100)
- adjustable width
- no roof bushing
- mounting at any place on the roof
- easy mounting (completely done outside)
- calculable cost of material
- for parabolic-antennas up to 100 cm Ø, plus FM-antenna (only SDH 130...)
- suitable chevron distance 30...120 cm; flexibly extendable

Type		SDH 85 XS	SDH 130 XS
Order number		370 082	370 133
EAN-Code		4026187592134	4026187592110
Duct Ø	[mm]	48	48
Length	[m]	0,9	1,3
Suitable for chevron distance	[mm]	380 - 600	380 - 600
Base frame	[mm]	390 - 600 x 148 x 40	390 - 600 x 148 x 40
Weight	[kg]	ca. 6,0	ca. 7,4

Type		SDH 85	SDH 130
Order number		370 081	370 131
EAN-Code		4026187591373	4026187591380
Duct Ø	[mm]	48	48
Length	[m]	0,85	1,3
Suitable for chevron distance	[mm]	500 - 900	500 - 900
Base frame	[mm]	580 - 980 x 148 x 40	580 - 980 x 148 x 40
Weight	[kg]	ca. 5,4	ca. 6,5

Type		SDH 85 XL	SDH 130 XL
Order number		370 083	370 134
EAN-Code		4026187592141	4026187592127
Duct Ø	[mm]	48	48
Length	[m]	0,9	1,3
Suitable for chevron distance	[mm]	900 - 1200	900 - 1200
Base frame	[mm]	900 - 1280 x 148 x 40	900 - 1280 x 148 x 40
Weight	[kg]	ca. 6,8	ca. 8,0

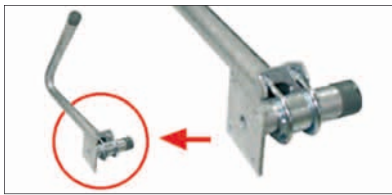
SDH 130 BS



Roof overhang holder; hot zinc dipped steel

Type		SDH 130 BS
Order number		370132
EAN-Code		4026187592103
Duct Ø	[mm]	48
Length	[m]	1,3
Suitable for chevron distance	[mm]	550 - 950
Base frame	[mm]	390 - 600 x 148 x 40
Weight	[kg]	ca. 7,6

SUH55



Roof overhang holder; hot zinc dipped steel

Type		SUH 55
Order number		370 055
EAN-Code		4026187592158
Duct Ø	[mm]	48
Length	[m]	0,55
Suitable for chevron distance	[mm]	-
Base frame	[mm]	465 x 545 x 455
Weight	[kg]	ca. 3,6

SDH mounting set



including:
 mast cap MHD 48/60 and 6 wood screws 10 x 100;
 plumb tile 231, bonding sleeve 229 N
 suitable for SDH... chevron holders

Type		SDH mounting set
Order number		370 080
EAN-Code		4026187000080



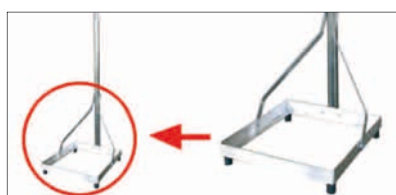
SDF030



tripod with perpendicular mast lug, hot zinc dipped steel

Type		SDF 030
Order number		702 030
EAN-Code		4026187590789
Duct Ø	[mm]	76
Length	[m]	1,2

STH50



terrace stand, balcony base; frame for inserting a concrete slab, made of aluminium

Type		STH 50
Order number		370 052
EAN-Code		4026187591922
Duct Ø	[mm]	50
Length of mast	[m]	1
Base plate	[cm]	50 x 50
Frame angle	[mm]	400 x 400 x 3

241, 242, 243, 244, 246, 247



mast brackets; 244, 246, 247 with earthing clamp, made of hot zinc dipped steel

Type		241	242	243	244	246	247
Order number		710 410	710 420	710 430	710 440	710 460	710 470
EAN-Code 4026187...		...001179	...001193	...001216	...001230	...001254	...001278
For mast Ø	[mm]	42,25	42,25	42,25	48,25	60	76
Version		straight	left	right	straight	straight	straight

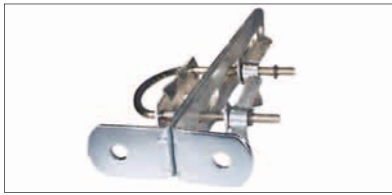
1007



mast holder for masts up to 50 mm Ø, 100 mm wall distance; made of hot zinc dipped steel

Type		1007
Order number		710 070
EAN-Code		4026187001414

1009



mast mounting for masts up to 55 mm Ø, adjustable up to 70 mm wall distance; made of hot zinc dipped steel

Type		1009
Order number		710 090
EAN-Code		4026187001438

1016, 1018



mast floor holder with bushing clamp for earthing connection; made of hot zinc dipped steel

Type		1016	1018
Order number		710 162	710 181
EAN-Code		4026187002237	4026187002244
For mast Ø	[mm]	max. 60	max. 89

1020



double duct clamp; scope of delivery: 1 pair; made of hot zinc dipped steel

Type		1020
Order number		710 120
EAN-Code		0022514026187
For mast Ø	[mm]	max. 60
Length of threaded rods	[mm]	1

220 K, 221 K, 222 K



tile for mast bushing through tiled roofs; made of plastic; sealing grommet included

Type		220 K	221 K	222 K
Order number	black brownish red	722 200 722 100	722 210 -	722 220 -
EAN-Code	black brownish red	4026187000868 4026187000028	4026187000882 -	4026187000929 -
Type of tyle		Frankfurter	Frankfurter Doppel-S	Hohlziegel
For mast Ø	[mm]	32 - 50	32 - 50	32 - 50
Base plate	[mm]	420 x 330	420 x 330	390 x 240



231, 231 Z, 235 Z, 236



Metal tile for mast bushing through tiled roofs; made of zinc, resp. Plumb; tile 236 is splittable

Type		231 Z	235 Z	231	236
Order number		722 311	722 351	722310	722 360
EAN-Code		4026187002206	4026187002275	4026187002206	4026187110581
Material		Zinc	Zinc	Zinc	Plumb
For mast Ø	[mm]	max. 60	max. 80	max. 60	max. 80
Base plate	[mm]	420 x 330	420 x 330	420 x 330	390 x 240

232K



Grooved tile for mast bushing through tiled roofs; made of plastic, black; sealing grommet included

Type		232 K
Order number		722 320
EAN-Code		4026187000004
Type of tyle		grooved tyle
For mast Ø	[mm]	32 - 50
Base plate	[mm]	400 x 230

226, 228



Sealing grommet for sealing of masts and tiles; made of PVC, black

Type		226	228
Order number		722 260	722 280
EAN-Code		4026187000967	4026187000998
For mast Ø	[mm]	max. 60	32 - 50

227, 229 N



Bonding sleeve for sealing of masts and tiles; made of rubber, black; self vulcanizing when pressed

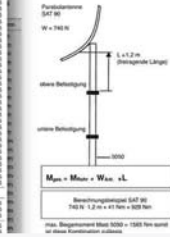
Type		227	229 N
Order number		722 270	722 292
EAN-Code		4026187000554	4026187
For mast Ø	[mm]	60 - 76	max. 60

Die Bestimmungen für Antennen-Anlagen (DIN EN 50303 Teil 1) enthalten Anforderungen an die Montage von Antennen-Anlagen.

Die Statikberechnung ist ein wichtiger Punkt, der einzuhalten ist. Die Werte für Windlastangaben sind für einen Staudruck von 100 Pa angegeben. Sie haben bei einer Montagehöhe von 20 m über Grund Geltung. Bei einer Montagehöhe von mehr als 20 m über Grund (z. B. 8-stöckiges Haus) ist mit einem Staudruck von 150 Pa zu rechnen. Dazu muss die Windlastberechnung mit dem Faktor 1,5 multipliziert werden. Es ist außerdem darauf zu achten, dass die Berechnungswerte dem Wert von 1000 Nm nicht überschritten werden dürfen. Dies ist durch einen Statiker der Aufbau zu prüfen und anzugeben.

Es sich aus der Addition der Antennen und Taggerne multipliziert mit

folgende Staudrucke (siehe Tabelle):



Kanäle und Frequenzen nach CCIR-Norm

Bereich	Kanal	Kanalfrequenz MHz	Bandbreite kHz	U-Ton kHz	Bereich	Kanal	Kanalfrequenz MHz	Bandbreite kHz	U-Ton kHz	
Standard B + G	Europe	(+ H, L, K, L bis B (VVO))				V	900-410	807,25	812,25	100
Untere Sondenkanälebereich EGB	S 1	114-118	118,25	117,75	10	825-835	832,25	837,25	100	
	S 2	118-122	119,25	118,75	11	835-845	842,25	847,25	100	
	S 3	122-126	123,25	122,75	12	845-855	852,25	857,25	100	
	S 4	126-130	127,25	126,75	13	855-865	862,25	867,25	100	
	S 5	130-134	131,25	130,75	14	865-875	872,25	877,25	100	
	S 6	134-138	135,25	134,75	15	875-885	882,25	887,25	100	
	S 7	138-142	139,25	138,75	16	885-895	892,25	897,25	100	
	S 8	142-146	143,25	142,75	17	895-905	902,25	907,25	100	
	S 9	146-150	147,25	146,75	18	905-915	912,25	917,25	100	
	S 10	150-154	151,25	150,75	19	915-925	922,25	927,25	100	
Obere Sondenkanälebereich GGB	G 11	230-234	231,25	230,75	20	925-935	932,25	937,25	100	
	G 12	234-238	235,25	234,75	21	935-945	942,25	947,25	100	
	G 13	238-242	239,25	238,75	22	945-955	952,25	957,25	100	
	G 14	242-246	243,25	242,75	23	955-965	962,25	967,25	100	
	G 15	246-250	247,25	246,75	24	965-975	972,25	977,25	100	
	G 16	250-254	251,25	250,75	25	975-985	982,25	987,25	100	
	G 17	254-258	255,25	254,75	26	985-995	992,25	997,25	100	
	G 18	258-262	259,25	258,75	27	995-1005	1002,25	1007,25	100	
	G 19	262-266	263,25	262,75	28	1005-1015	1012,25	1017,25	100	
	G 20	266-270	267,25	266,75	29	1015-1025	1022,25	1027,25	100	
Ersatzfrequenzen Kanälebereich GGB	E 21	300-310	305,25	304,75	30	1025-1035	1032,25	1037,25	100	
	E 22	310-320	315,25	314,75	31	1035-1045	1042,25	1047,25	100	
	E 23	320-330	325,25	324,75	32	1045-1055	1052,25	1057,25	100	

Common information

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EMC-limits

For **active** devices the following values for maximum acceptable **spurious radiation** are valid according to DIN EN 50083-2/A1:

30 - 1000 MHz	20 dBpW (39 dB μ V/75 Ω)
1000 - 2500 MHz	43 dBpW (62 dB μ V/75 Ω)

For **passive** devices the following values limits for **screening** are valid according to DIN EN 50083-2/A1:

Frequency range (MHz)	Screening (dB)	
	Class A	Class B
30 - 300	85	75
300 - 470	80	75
470 - 1000	75	65
1000 - 3000	55	55

Level limits

Level limits at the receiving port

Range	minimum	maximum
FM	40 dB μ V mono / 50 dB μ V stereo	70 dB μ V
F I	60 dB μ V	80 dB μ V
F III	60 dB μ V	80 dB μ V
F IV/V	60 dB μ V	80 dB μ V
SAT-IF	60 dB μ V	77 dB μ V

Channels and frequencies

Range	Channel	Channel limits MHz	Picture carrier MHz	Sound ¹⁾ carrier MHz	
Standard B + G	Europe	(+ H, I, K, L for B IV / V) ²⁾			
I	2	47– 54	48,25	53,75	
	3	54– 61	55,25	60,75	
	4	61– 68	62,25	67,75	
Lower scope of special channels	S 2	111–118	112,25	117,75	
	S 3	118–125	119,25	124,75	
	S 4	125–132	126,25	131,75	
	S 5	132–139	133,25	138,75	
	S 6	139–146	140,25	145,75	
	S 7	146–153	147,25	152,75	
	S 8	153–160	154,25	159,75	
	S 9	160–167	161,25	166,75	
	S 10	167–174	168,25	173,75	
	III	5	174–181	175,25	180,75
6		181–188	182,25	187,75	
7		188–195	189,25	194,75	
8		195–202	196,25	201,75	
9		202–209	203,25	208,75	
10		209–216	210,25	215,75	
11		216–223	217,25	222,75	
12		223–230	224,25	229,75	
Upper scope of special channels		S 11	230–237	231,25	236,75
		S 12	237–244	238,25	243,75
		S 13	244–251	245,25	250,75
		S 14	251–258	252,25	257,75
	S 15	258–265	259,25	264,75	
	S 16	265–272	266,25	271,75	
	S 17	272–279	273,25	278,75	
	S 18	279–286	280,25	285,75	
	S 19	286–293	287,25	292,75	
	S 20	293–300	294,25	299,75	
Expanded scope of special channels	S 21	302–310	303,25	308,75	
	S 22	310–318	311,25	316,75	
	S 23	318–326	319,25	324,75	
	S 24	326–334	327,25	332,75	
	S 25	334–342	335,25	340,75	
	S 26	342–350	343,25	348,75	
	S 27	350–358	351,25	356,75	
	S 28	358–366	359,25	364,75	
	S 29	366–374	367,25	372,75	
	S 30	374–382	375,25	380,75	
	S 31	382–390	383,25	388,75	
	S 32	390–398	391,25	396,75	
	S 33	398–406	399,25	404,75	
	S 34	406–414	407,25	412,75	
	S 35	414–422	415,25	420,75	
	S 36	422–430	423,25	428,75	
	S 37	430–438	431,25	436,75	
	S 38	438–446	439,25	444,75	
IV	21	470–478	471,25	476,75	
	22	478–486	479,25	484,75	
	23	486–494	487,25	492,75	
	24	494–502	495,25	500,75	
	25	502–510	503,25	508,75	
	26	510–518	511,25	516,75	
	27	518–526	519,25	524,75	
	28	526–534	527,25	532,75	
	29	534–542	535,25	540,75	
	30	542–550	543,25	548,75	
	31	550–558	551,25	556,75	
	32	558–566	559,25	564,75	
	33	566–574	567,25	572,75	
	34	574–582	575,25	580,75	
	35	582–590	583,25	588,75	
	36	590–598	591,25	596,75	
	37	598–606	599,25	604,75	

Range	Channel	Channel limits MHz	Picture carrier MHz	Sound ¹⁾ carrier MHz	
V	38	606–614	607,25	612,75	
	39	614–622	615,25	620,75	
	40	622–630	623,25	628,75	
	41	630–638	631,25	636,75	
	42	638–646	639,25	644,75	
	43	646–654	647,25	652,75	
	44	654–662	655,25	660,75	
	45	662–670	663,25	668,75	
	46	670–678	671,25	676,75	
	47	678–686	679,25	684,75	
	48	686–694	687,25	692,75	
	49	694–702	695,25	700,75	
	50	702–710	703,25	708,75	
	51	710–718	711,25	716,75	
	52	718–726	719,25	724,75	
	53	726–734	727,25	732,75	
	54	734–742	735,25	740,75	
	55	742–750	743,25	748,75	
	56	750–758	751,25	756,75	
	57	758–766	759,25	764,75	
	58	766–774	767,25	772,75	
	59	774–782	775,25	780,75	
	60	782–790	783,25	788,75	
	61	790–798	791,25	796,75	
	62	798–806	799,25	804,75	
	63	806–814	807,25	812,75	
	64	814–822	815,25	820,75	
	65	822–830	823,25	828,75	
	66	830–838	831,25	836,75	
	67	838–846	839,25	844,75	
	68	846–854	847,25	852,75	
	69	854–862	855,25	860,75	
	Standard D		OIRT		
	B I	R I	48,5– 56,5	49,75	56,25
		R II	58– 66	59,25	65,75
		R III	76– 84	77,25	83,75
	(B II)	R IV	84– 92	85,25	91,75
		R V	92–100	93,25	99,75
	Special channels	s1	110–118	111,25	117,75
s2		118–126	119,25	125,75	
s3		126–134	127,25	133,75	
s4		134–142	135,25	141,75	
s5		142–150	143,25	149,75	
s6		150–158	151,25	157,25	
s7		158–166	159,25	165,75	
s8		166–174	167,25	173,75	
(B III)	R VI	174–182	175,27	181,75	
	R VII	182–190	183,25	189,75	
	R VIII	190–198	191,25	197,75	
	R IX	198–206	199,25	205,75	
	R X	206–214	207,25	213,75	
	R XI	214–222	215,25	221,75	
	R XII	222–230	223,25	229,75	
Special channels	s9	230–238	231,25	237,75	
	s38	462–470	463,25	469,75	

¹⁾ Sound carrier = Picture carrier + 5, 742 MHz

²⁾ Variant sound carrier

Standard I:

Sound carrier = Picture carrier + 6 MHz

Standard K, L:

Sound carrier = Picture carrier + 6,5 MHz



Wind load calculations

The advices for antenna-installations (VDE 0855 part 1) imply requirements at the mounting of antenna-installations.

The calculations for stand pipes are an important factor that must be considered. Values for wind load data are indicated for a back pressure of 800 Pa. They are valid for a mounting position 20 m above the ground. When the mounting position is more than 20 m above the ground (e. g. a house with 8 floors) the considered back pressure must be 1100 Pa. Furthermore the wind load value must be multiplied by the factor 1,4. You must note that the maximum side load at the upper mounting point must not exceed 1650 Nm, resp. the maximum acceptable value for the pipe (DIN/VDE 0855).

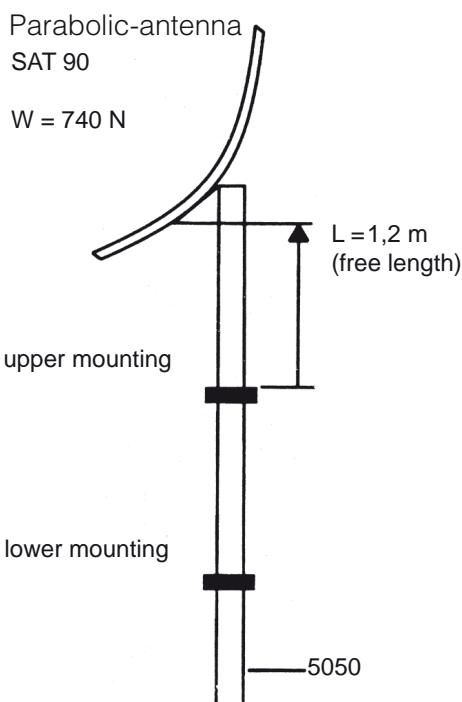
When the side load is higher, the installation must be checked by a stress analyst and a statics confirmation must be written.

The maximum side load is due to the addition:

1. of the wind load values of the mounted antennas and support shafts multiplied with their mounting heights each and
2. the wind load of the free length of the stand pipe (see table).

Wind load of masts:

Free length L (m)	ASTRO-Type	
	5050 5060	5076
	Ø 60 mm	Ø 76 mm
0,50	7 Nm	9 Nm
0,60	10 Nm	13 Nm
0,70	14 Nm	18 Nm
0,80	18 Nm	23 Nm
0,90	23 Nm	30 Nm
1,00	29 Nm	36 Nm
1,10	35 Nm	44 Nm
1,20	41 Nm	53 Nm
1,30	49 Nm	62 Nm
1,40	56 Nm	72 Nm
1,50	65 Nm	82 Nm
1,60	74 Nm	93 Nm
1,70	83 Nm	105 Nm
1,80	93 Nm	118 Nm
1,90	104 Nm	132 Nm
2,00	115 Nm	146 Nm
2,10	127 Nm	161 Nm
2,20	139 Nm	177 Nm
2,30	153 Nm	193 Nm
2,40	166 Nm	210 Nm
2,50	180 Nm	228 Nm
2,60	195 Nm	247 Nm
2,70	210 Nm	266 Nm
2,80	226 Nm	286 Nm
2,90	242 Nm	307 Nm
3,00	259 Nm	328 Nm



$$M_{comp.} = M_{Pipe} + W_{Ant.} \cdot L$$

Worked sample SAT 90
 $740 \text{ N} \cdot 1,2 \text{ m} + 41 \text{ Nm} = 929 \text{ Nm}$

maximum permitted side load for mast
 type 5050 (see below) = 1565 Nm;
 this combination is permitted

maximum permitted side load for masts	Type 5001 u. 5007	= 1375 Nm
	Type 5050	= 1565 Nm
	Type 5060	= 2350 Nm
	Typ 5076	= 3640 Nm

Product labeling



By the **CE** mark of conformity **ASTRO** approves the conformity of products with the standards DIN EN 50083-1 and A1, DIN EN 50083-2 and A1 and DIN EN 60065 where applicable. The labelling can be found in the catalogue, on the product – if possible -, on the package and in user manuals and application notes.



Products are labelled with the Class A label, when they comply with the demanding screening requests of Class A in the amendment of DIN EN 50083-2. The labelling can be found in the catalogue, on the product – if possible -, on the package and in user manuals and application notes.

For active devices the Class A label also documents the compliance with the amendment A1. The labelling can be found in the catalogue and on the package.

The Class A label is a for ZVEI registered trademark[®].



In the past active and passive products had to be labelled with the BZT-mark and licensed at the BZT. Since the introduction of the mandatory CE-labelling a BZT-license is no longer required. Therefore ASTRO abstains for the BZT-licensing of new products which is replaced by the EG-accepted CE-labelling.

Technical product data

Technical changes, changed design and errors are excepted.

Terms of delivery and payment

You can find detailed informations concerning delivery and payment in the internet: „www.astro-kom.de/en/company/agb/“.



Glossary

Astra

Satellite system operated by the Société Européenne des Satellites (Luxembourg). The Astra family (1A-G) comprises 7 satellites in the orbit position 19.2° East for the transmission of radio and television channels. Foreign and virtually all German-speaking programs can be received with a Sat antenna, which must have a diameter of 60 cm.

Bandwidth

Colloquial term for data (transmission) rate, indicating the volume of data which can be transmitted in 1 second on a link.

BAT/Bouquet

Bouquet Association Table. Presentation of a group of different TV stations for bundling into a multiplex, or into an offering for the TV user.

Broadcast

Broadcast means the simultaneous transmission of content to any given, unlimited number of receivers.

CA

Conditional Access System. Controls subscriber access to specific programs, service offerings, etc., e.g. Irdeto, Viaccess, Nagra, Cryptoworks, Conax.

CA Module

Conditional Access Module. A module which is inserted into the receiver to enable decoding of encrypted signals with an activated additional card.

C-Band

Frequency 3.7GHz – 4.2 GHz.

Common Interface

CI. Interface of the receiving device for a CA module.

Conditional Access

Access to an offering which is linked to a condition (e.g. a subscription). Due to content encryption, only authorized users have access to the program content.

Data Transmission Rate

Volume of data which can be transmitted on a link within a specific period of time, normally specified in bits per second (bit/s). The data rate determines the image quality of digital TV programs. Data rates of 5 to 6 Mbit/s correspond to the image quality delivered by analog TV.

Decoder

Electronic device which reconstructs presentable images from video material stored in data-reduced form.

Digital Compression

Mathematical algorithms are used and irrelevant image information is filtered out in order to reduce the data volume of digital signals.

DISEqC

Digital Satellite Equipment Control. A method used to control the switchover between different satellites, e.g. Astra and Eutelsat. Can also be used to control multiple subscriber systems.

Dolby Digital, AC-3

Multi-channel audio format which transmits six discrete channels. Frequently abbreviated to DD.

DVB

Digital Video Broadcasting. Transmission standard for digital televisions via cable, satellite or terrestrial systems.

EPG

The Electronic Program Guide is a combined user interface and program guide for set-top boxes. Various functions can be activated via remote control using a number of buttons. It also provides background information on all programs for the current day and the following day.

Eutelsat

This European satellite operator owns an entire fleet of satellites in space. They transmit numerous foreign programs. The Hotbird satellites which are important for Germany are located at 13° East.

FEC

Forward Error Correction. Redundancy information is added to digital signals. The aim is to identify and correct typical faults which occur on the transmission link.

Footprint

The geographical area into which the satellite transmits. Within this footprint, the satellite can be received without problems, provided the specified size of the satellite dish is observed.

Free-To-Air (FTA)

Digital receiver without a Conditional Access Module for the reception of free radio and television programs.

Free TV

Television programs which can be received by the viewer with no monthly charge, under private or public law (but with GEZ [Central License Fee Collection Office] fee).

HDTV

High Definition Television. TV with a resolution up to five times greater than that of conventional TV (SDTV), with a widescreen aspect ratio of 16:9. This enables reproduction of video with significantly greater detail, increased sharpness and brighter colors. The European system operates using 1,080 lines x 1,920 pixels, while the American/Japanese system operates using 720 lines x 1,280 pixels.

LNB

Low Noise Block Converter. The LNB is the receiver head at the focal point of a parabolic antenna. It amplifies and converts the satellite signals, which can then be further processed by the satellite receiver.

MPEG

Motion Picture Experts Group. MPEG-1 (data rate 1.5 Mbit/s) MPEG-2 (data rate 100 Mbit/s) and MPEG-4. Compresses the audio and video signals into digital quality above the level of analog television. The improved MPEG-4 standard enables processing of the increased data volume of HDTV signals. The conventional digital television signal (SDTV) is and for the time being remains compressed in the MPEG-2 standard.

OSD

OSD stands for On-Screen Display. This refers to additional information on the screen (e.g. programming data, settings menus).

PVR

Personal Video Recording. Hard-disk-based video recorder with storage capacity and additional service functions such as EPG, deferred television, skipping of commercial breaks. Point-to-point transmission of data to a specific recipient.

QAM and QPSK

Quadrature Phase Shift Keying is a modulation method for digital television programs received via satellite. Cable networks have different requirements for the transmission of digital signals. A different modulation method, quadrature amplitude modulation, is required for this purpose. In QAM, digital signals are presented by a combination of four phases and four amplitudes. The data are mapped in the resulting matrix.

Receiver

A receiver receives a digital TV transmission, further processes and amplifies the signal, and can control a display screen.

RF Modulator

The RF modulator of the satellite receiver converts audio and video signals into an antenna signal. This enables the connection of older television sets with no Scart connection facility via the normal antenna cable and the antenna input on the television set.

RS-232C Interface

The operating system of a receiver can be updated by the service engineer via the RS-232C interface, with no need to open the device. A null modem cable and the corresponding software are required for this purpose. Station listings can also be transmitted via the data interface.

SDTV

Standard Definition Television. Conventional television with low image resolution according to the PAL or NTSC standards.

Set-Top Box

A receiving device for digital TV.

Simulcast

Parallel transmission of a transmitter, in both analog and digital form.

Simulcrypt

Transmission of a signal with several different types of encryption simultaneously.

Smartcard

The card, which looks like a phonecard or cash card, contains a chip which provides the CA module with the owner's identification, along with information on available programs.

Transponder

A combined transmitter and responder. Electronic device which receives and automatically forwards a signal. TV satellites receive a signal and then broadcast it within a large transmission area.

Triple Play

Term for the offering of telephony, Internet and TV via a single "path". Telephony or cable companies offer this via their infrastructure.

USB

Stands for "Universal Serial Bus", a standard for connecting ancillary devices such as a mouse, keyboard or scanner to the PC.

Universal LNB

Receiving unit on the satellite antenna which receives both the 11 GHz range and the 12 GHz range, which is used for digital transmissions. The universal LNB is required to operate the d-box. Switchover is performed via the 22kHz signal.

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