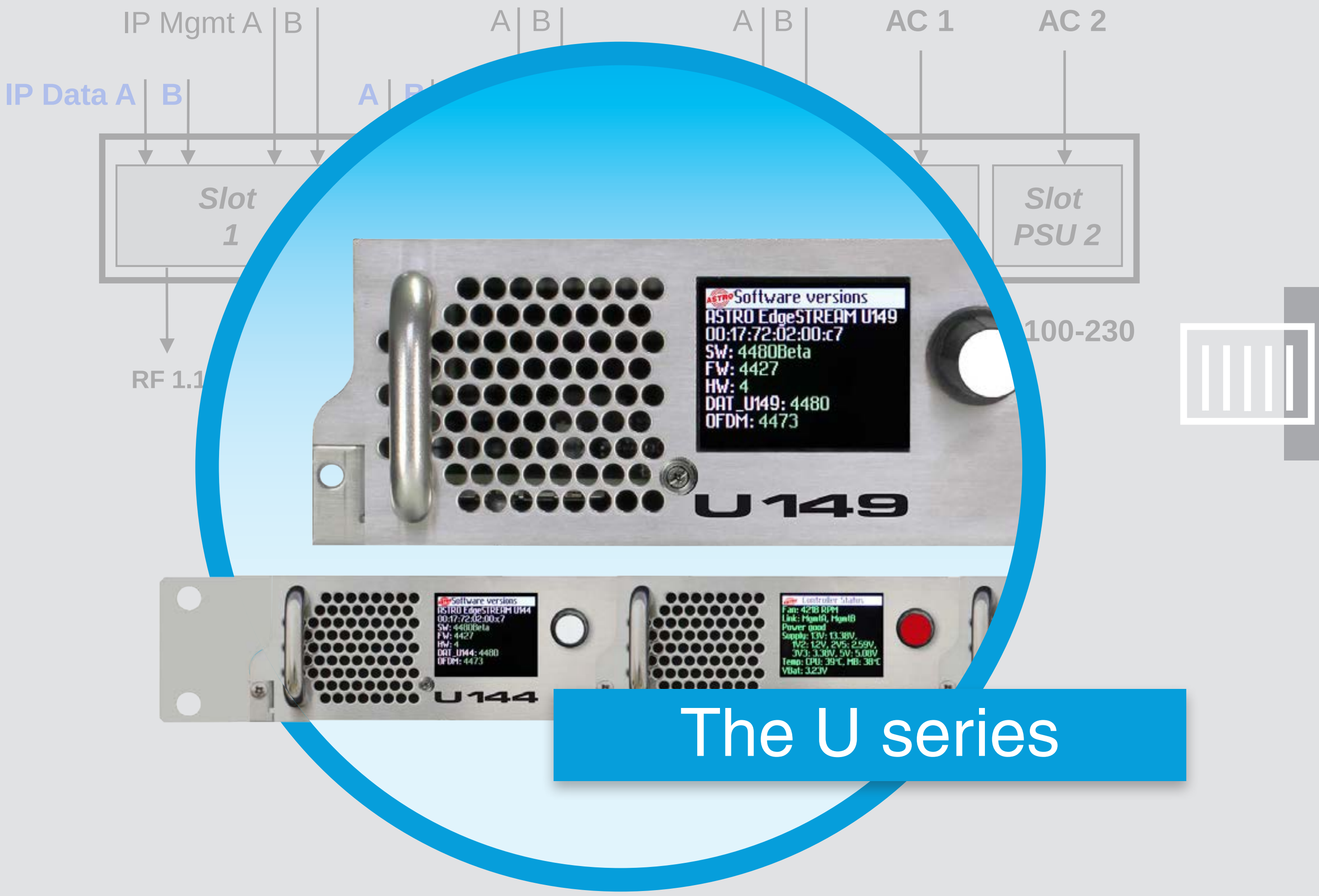
Modular IP head-end solutions for high density signal processing

ASTRO®

Going future today.



Made in Germany

Direct Digital by ASTRO

A flexible system with outstanding signal quality

The U series offers a complete, adaptive solution for IP signal processing with modular architecture. It features easy configuration and maintenance via webbrowser interface as well as a maximum of operating stability by utilizing redundant power supply and elaborate redundancy mechanisms.

Index

IP COFDM QAM FM PAL NTSC

- **19 Inch Base Units**
  To ensure maximum operating stability, the base units of the U 100 series can be equipped with redundant power supply. Each U 100 base unit can house up to three modules.
- **Management Controller**
  The U 100-C controller in conjunction with the web-browserbased configuration makes the management of your IP head-end via an IP address comfortable.
- **IP Streamers**
  You want to convert DVB-S2, DVB-C, DVB-T or DVB-T2 input signals into IP? The streamers of the U series offer up to 4 or 8 IP multicast groups, making it possible to generate up to 12 resp. 24 streams per rack unit.
- **Signal converters with integrated IP frontend**
  You need COFDM, PAL / NTSC, QAM or FM output si-gnals? The U series will offer the complete range. And every module has it‘s own IP frontend.
- **Descrambler**
  The U 194 module processes up to 4 transport streams (4 x IP > 4 x IP) and supports multi-service-descram-bling.
- **Gateways**
  The U 261 and U 262 modules convert up to 16 IP MPTS into 16 DVB ASI output streams resp. 16 DVB ASI output streams into 16 IP MPTS.

Direct Digital DD® by ASTRO

The Direct Digital® Technology developed by ASTRO al-lows for outstanding signal parameters independent from temperature and aging. Additional system ressources, ma-ximum flexibility in configuration as well as high-end video- and audioparameters set new benchmarks.

Modular IP head-end solutions

Where to find what?

Carrier Class Technology - the U series

The U series head-end components were designed and developed for professional applications in largest cable networks. All devices of this series are built in 19“ technology and some are equipped with redundant power supply units or can be updated with redundnat power supply optionally.

Carrier Class Edge Technology

The U 100 series is a modular designed IP head-end concept. The base unit can house upt to three modules that can optionally be operated with redundant power supply.. Hardware and software both offer all mechanisms, that contribute to ensure the best operational signal availability.

Gateways

The U 261 IP / ASI reception gateway converts up to 16 IP MPTS into 16 DVB ASI output streams. The U 262 ASI / IP transmission gateway can convert up to 16 DVB ASI signals into IP MPTS. These devices support RTP and FEC, a transport stream analyzer is optionally available.

Active and passive combining

For combining of head-end signals ASTRO offers active and passive components. The U 960 can be equipped with splitters according to customers needs, while the active U 901 (1 x 1 in 8) offers amplification designed for lowest intermodulation. The redundant power supply is achieved either via separate power supply units or by remote feeding via RF jack.

Active SAT distribution fields

The U 9xx SAT distribution field can be ordered in different variations. 1 x 1 in 16 or 2 x 1 in 8, in 75 Ω or 50 Ω implementaion – anything is possible. Furthermore these units can be integrated into the ASTRO bus system making it possible to do a remote configuration of attenuation and slope. It is as well possible to supervise the LNC current consumption.

Available modules

Type	Description	Page
Carrier Class Edge Technology		
U 100-230	Base unit for mounting up to 3 modules of the U 1xx series Input voltage 230 V AC in connection with the U 100-SNT power supply unit	14
U 100-48	Base unit for mounting up to 3 modules of the U 1xx series Input voltage - 48 V DC	14
U 100-C	Management-system for U 100 base units and signal converters	15
U 144	DVB-S2 to IP streamer 4-way converter, 4 standard DVB-S2 input signals via 4 input jacks into IP multicast groups with 4 CI slots	16
U 148	DVB-S2 in IP streamer 8-way converter, 8 standard DVB-S2 input signals via 4 input jacks into IP multicast groups	18
U 149 *NEW*	DVB-S2 in IP streamer 8-way converter, 8 standard DVB-S2 input signals via 4 input jacks into IP multicast groups; APSK support	18
U 164	DVB-C, DVB-T or DVB-T2 to IP streamer 4-way converter, 4 standard DVB-C, DVB-T or DVB-T2 input signals via 4 input jacks into IP multicast groups with 4 CI slots	20
U 168	DVB-C, DVB-T or DVB-T2 to IP streamer 8-way converter, 8 standard DVB-C, DVB-T or DVB-T2 input signals via 4 input jacks into IP multicast groups, FTA	22
U 116	IP to PAL converter with MPEG 4 support (H.264/AVC Level 4.1 HP), HD to SD downscaling, optional AC-3 4-way converter, 4 IP multicast groups to 4 standard PAL programmes	24
U 118 *NEW*	IP to PAL converter with MPEG 4 support (H.264/AVC Level 4.1 HP), HD to SD downscaling, optional AC-3 8-way converter, 8 IP multicast groups to 8 standard PAL programmes	24
U 124	IP to FM converter 16-way converter, 4 IP multicast groups to 2 x 8 standard FM programmes	26
U 125	IP to FM converter 40-way converter, 16 IP multicast groups to 2 x 20 standard FM programmes	26
U 158	IP itoQAM converter 8-way converter, 8 IP multicast groups to 8 standard QAM channels	28
U 160	IP itoDVB-C converter 24-way converter, 24 IP multicast groups to 2 DVB-C2 systems	30
U 174	IP to COFDM converter 4-way converter, 4 IP multicast groups to 4 standard COFDM channles	32
U 194	IP to IP descrambler 4-way descrambler, 4 transport streams, multi-service-descrambling, 4 CI slots	34
IP Gateways		
U 261	IP / ASI Gateway Conversion of up to 16 multicast groups into up to 16 DVB ASI outputs, 230 V input voltage	36
U 261 i	IP / ASI Gateway Conversion of up to 16 multicast groups into up to 16 DVB ASI outputs, 48 V input voltage	36
U 262	ASI / IP Gateway Conversion of up to 16 DVB ASI inputs into up to 16 multicast groups, 230 V input voltage	36
U 262 i	ASI / IP Gateway Conversion of up to 16 DVB ASI inputs into up to 16 multicast groups, 48 V input voltage	36
Active and passive combining		
U 901	Active combining network combining of up to 8 base units; trims installation version (VZN 8) available	40
U 960	Passive combining network distribution of input signals in the frequency range 5 to 1000 MHz	41
Professional SAT distribution		
U 911 - 946	Active SAT-distribution panels 2 SAT-inputs into 8 outputs at a time or 1 SAT-input into 16 outputs	42

Why choose the U 100 series?

Reasons to buy

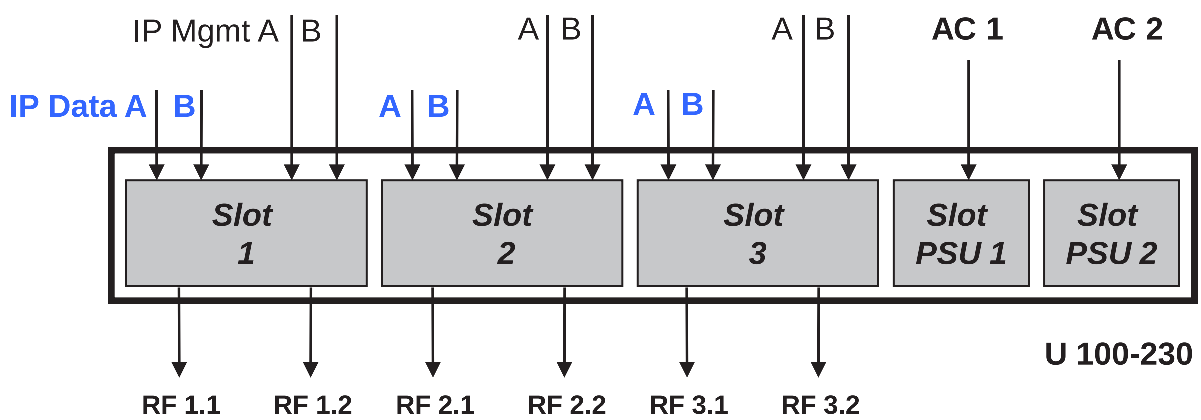
A modular built IP head-end concept for any demand

The U 100 Edge series has been developed on the basis of many years of experience gained from the operation of IP head-ends for processing CATV signals from IP data streams.

The series is based on a hardware model which is completely new from the ground up. The experience, gained in major IP content over IP projects, enabled ASTRO to consider operating conditions in large IP backbone networks.

Thus, in addition to outstanding transmission parameters, the U 100 series also offers sophisticated redundancy and replacement switching mechanisms to reach the greatest possible signal performance availability.

U 100 signal flow chart



Easy configuration / operation

- user friendly configuration via web browser - no proprietary software needed for managing the system
- consistant menu structure of configuration interface for each module
- LEDs indicate operation and errors on each module

Easy installation

- easy mounting of the base unit in 19 inch cabinets
- passive backplane enables a quick exchange of the signal converters
- all active components integrated into the signal converters
- wiring remains unaffected, even if different types of converters will be used

High end performance

- three plug-in modules per 19 inch heigth provide high signal density
- signal converters offer outstanding signal parameters by Direct Digital ®
- low power consumption per channel

Easy service handling

- HOT SWAP service
- compact design allows easy spare part handling
- Log file output via web interface
- Remote access to your U 100 head-end by ASTRO support team

Reliability

- redundant power supply
- short down-time in case of malfunction: every module has redundant network interfaces for network management and data connection
- effective redundancy switching options in case of link failure, source failure or device failure
- 2 data ports per signal converter
- IGMPv3, RTP and FEC without additional license fees

Full integration into the U family

The U 100 devices are part of the U-family - a complete range of hardware components (SAT-distribution, IP gateways, etc.) designed for professional applications in ultra large cable networks. For more information please have a look at the ASTRO main catalogue.

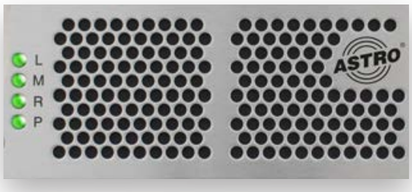
U 100 base unit

The U 100 base unit serves as the chassis for the various signal converters, providing space for three signal converters and two power supply units within a single rack unit. Each slot is equipped with a temperature-controlled fan and the replaceable rear panel offers two management and two data ports as well as the output of the CATV signals via two F sockets.

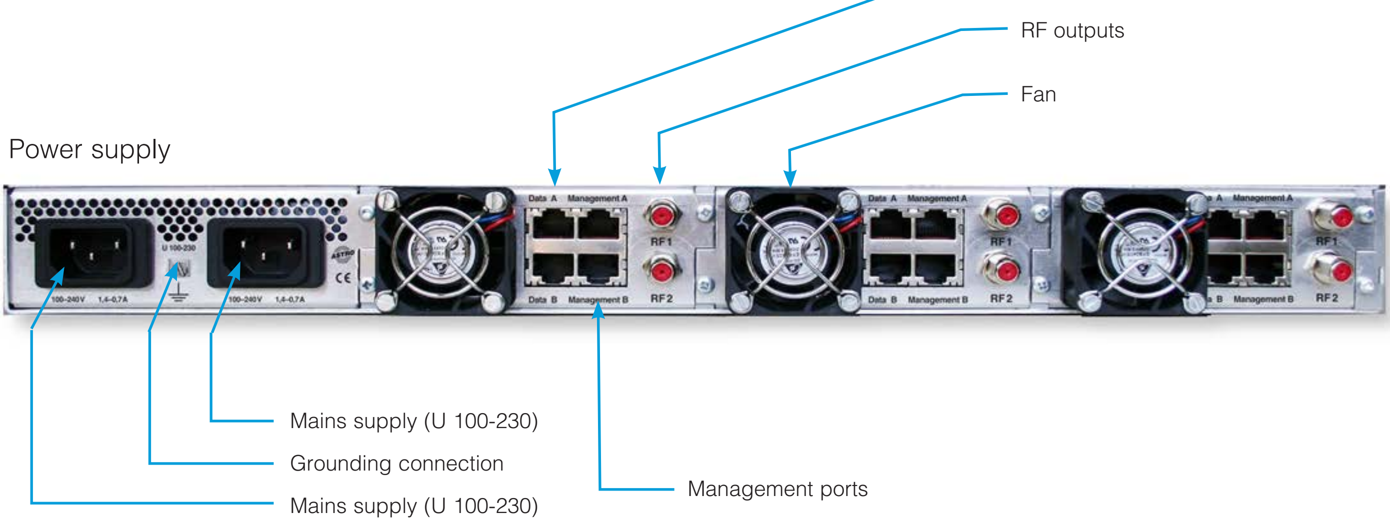
Order no.: 380 101 (for U 100-230)

Status display for slots

L = left
M = middle
R = right
P = power supply



Connectors on the rear side (U 100-230)



The U 100-SNT power supply unit

The U 100-SNT power supply is required to operate the U 100-230 base unit. Minimum one power supply is needed, while two U 100-SNT enable a redundant supply of the base unit and are recommended to avoid signal loss due to mains power failures.

Order no.: 380 102

Base unit for 48 V power supply

The U 100 base unit is also available for -48 V DC power supply. In this case the redundant power supply can be provided by a battery system or any other 48 V power supply unit and no further power supply units are needed inside the U 100-48 base unit.

Order no.: 380 100 (for U 100-48)

U 960 combining network

For distribution of input signals ASTRO offers a 19 inch rack device with individual mounting subject to customer request. It is available with 16 or 28 inputs and can be assembled with 2-way, 3-way, 4-way or 8-way splitter.

Order no.: 380 179 (16 inputs); 380 198 (28 inputs)

Modules of the U 100 series

The ASTRO IP head-end modules handle all output signals distributed in standard CATV networks: QAM, PAL, COFDM and FM. Based on the proven DirectDigital ® system, all the signal converters provide outstanding parameters. For generating IP signals, different types of IP streamers are available. These are equipped with DVB-S2 or DVB-C/T2 frontends and offer high signal density.

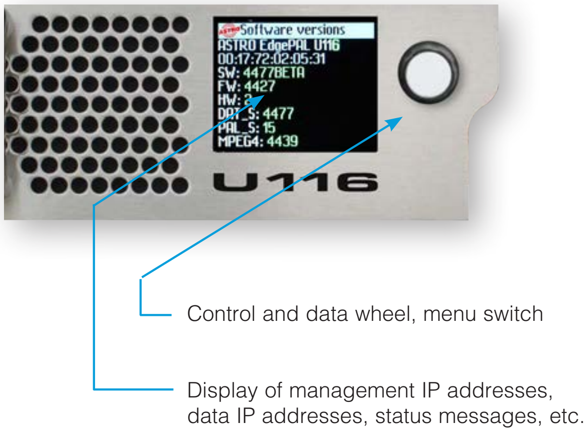
IP front end included

One special feature of the signal converters is the inclusion of the IP frontend in each slide-in module. Consequently, each module has its own independent IP receiver unit and operates separately from the other modules inside the base unit. In this way, it is possible to limit any failure of an IP frontend to only a single module, meaning that the effects of an error are far less serious compared to a system which has only a single IP interface shared by all the signal converters.

Configuration kept safe on SD card

System parameters are stored on SD card. If the signal converter must be replaced, the SD card plugged into the old module can now be inserted in the new module, allowing the previous configuration to be automatically migrated. Thanks to this feature, the spare equipment can be set in operation quickly on site without any need for service staff to reconfigure the system.

Easy front panel operation



Available module types

IP converters

- IP > COFDM
- IP > PAL
- IP > QAM
- IP > FM

> page 24

IP streamers

- DVB-S2 > IP
- DVB-C/T/T2 > IP

> page 16

Descrambler

4 x IP > 4 x IP

> page 34

Management controller

> page 15

Programming? - It‘s easy!

You can handle the configuration of your U 100 head-end comfortably via the web browser interface of your PC or Laptop - without installation of proprietary programming software. Just connect your computer to the network jack of the module you want to set up. Then type the IP address of the module into your browser to show up the web page needed for configuration. Aside from configuration purposes you can also easily handle a lot of different tasks concerning control and maintenance of many functions.

Menu items o

- Inventory report
- Configuration
- Log file
- Module settings
- Network / Rack
- Replace
- Schedule
- SNMP
- Time

Menu items of IP converters

- IP receivers
- RF output signals
- TS analyzer (optional)
- Licensing
- System log settings
- Active alarm table (overview of current errors)
- Statistics
- Network adjustments
- Test generator

Menu items o

- RF input signals
- IP transmitter
- TS analyzer (optional)
- Licensing
- System log settings
- Active alarm table
- Statistics
- Network adjustments
- Test generator

Configuration and maintenance

Everything under control

The structure of the web GUI is nearly the same for each module of the U 100 series. If you are experienced in using one module's programming interface you will easily operate the others as well. Only the modulator settings differ from each other. The IP settings are strictly seperated from modulator settings and also management tasks are located in seperate submenus. The clear arrangement of the menus enable the operator to configure all necessary parameters without hassle.

The U series is integrated to all relevant management systems.

f controller

Common menu items

- Log-In / -Out
- Status overview (of current adjustments)
- Overview of main settings
- Software update / Configuration files
- User administration

f streamers

(overview of current errors)

Menu items of descrambler

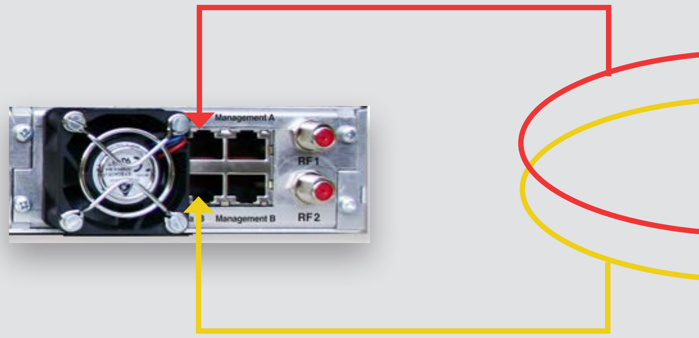
- IP receivers
- IP transmitters
- TS analyzer (optional)
- Licensing
- System log settings
- Active alarm table (overview of current errors)
- Statistics
- Network adjustments
- Test generator

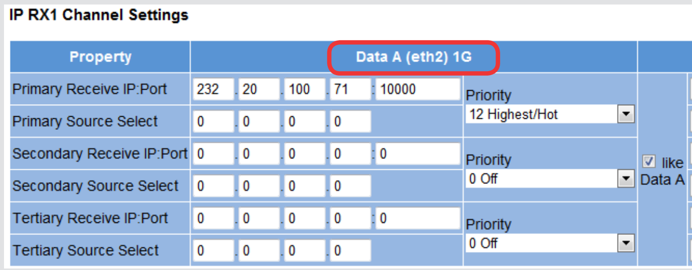
The U 100 redundancy concept

The U 100 series offers **all possible redundancy options** like link redundancy, source redundancy and device redundancy. Want maximum reliability? - Choose the U 100 series you get it!

Link redundancy

- Requirement for real link redundancy are **two independent data interfaces**.
- If one signal feed fails, the redundant data interface must take over the operation.
- ASTRO U 100 series devices offer fully redundant data interfaces, independently configurable.
- Switching between interfaces can be done manually or automatically with configurable priorities.
- The redundant signals can be configured in hot stand-by or cold stand-by.
- Thanks to the link redundancy concept every device and link in-between the master head-end and the regional haed-end is covered.
- In case of hot stand-by, the redundant link and source is monitored permanently to ensure an error-free operation after switching over.



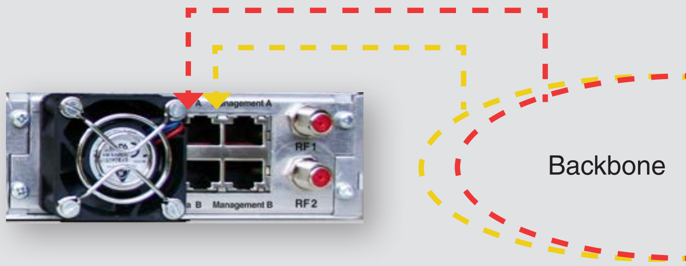


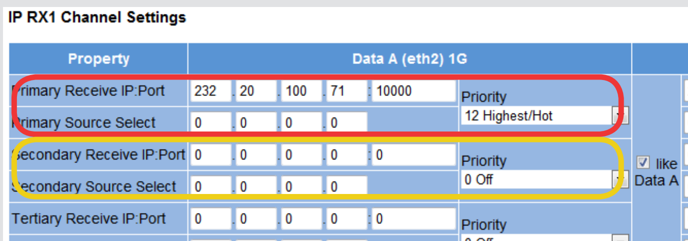
IP RX1 Channel Settings

Property	Data A (eth2) 1G						
Primary Receive IP:Port	232	20	100	71	10000	Priority	
Primary Source Select	0	0	0	0		12 Highest/Hot	
Secondary Receive IP:Port	0	0	0	0	0	Priority	like
Secondary Source Select	0	0	0	0		0 Off	Data A
Tertiary Receive IP:Port	0	0	0	0	0	Priority	
Tertiary Source Select	0	0	0	0		0 Off	

Source redundancy

- Requirement for source redundancy are **at least two independently configurable IP receivers per data interface.**
- If the primary signal source fails, the IP receiver must listen immediately to the secondary source.
- ASTRO U 100 series devices even offer **three (!) configurable IP receivers per data interface.**
- This enables the operator to have two sources feeding the backbone and one local source for emergencies.
- The redundant signal sources can be configured in hot stand-by or cold stand-by.
- In case of hot-stand-by, the redundant link and source is monitored permanently to ensure an error-free operation after switching over.





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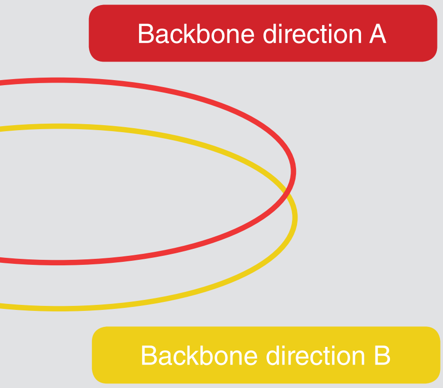
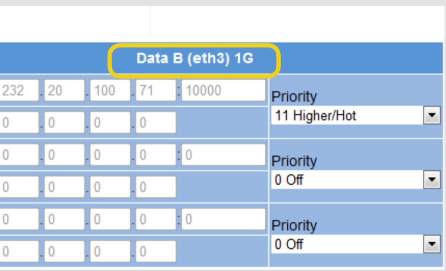
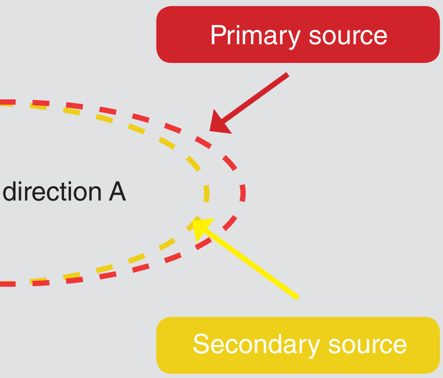
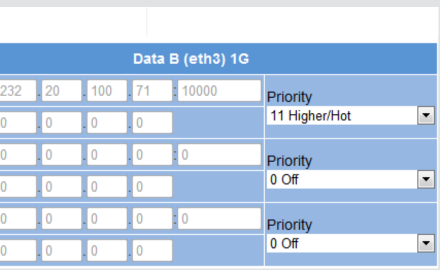
Primary Source Select	0	0	0	0		12 Highest/Hot	
Secondary Receive IP:Port	0	0	0	0	0	Priority	like
Secondary Source Select	0	0	0	0		0 Off	Data A
Tertiary Receive IP:Port	0	0	0	0	0	Priority	
Tertiary Source Select	0	0	0	0		0 Off	





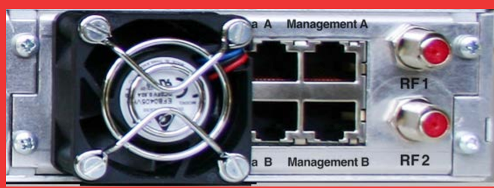




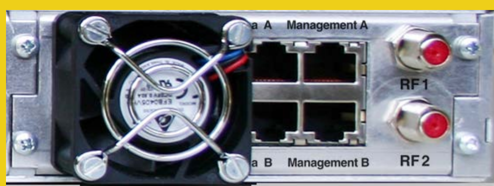
Device redundancy

- Requirement for device redundancy is **spare equipment inside the working head-end** and the U 100-C controller.
- This spare equipment must be connected to the same signal sources like the working equipment.
- A device is considered as spare equipment by the controller if the RF ports are switched off.
- The switching-over to the spare equipment can be made manually or automatically in case of certain events.

working U 100 module



redundant U 100 module



Replace

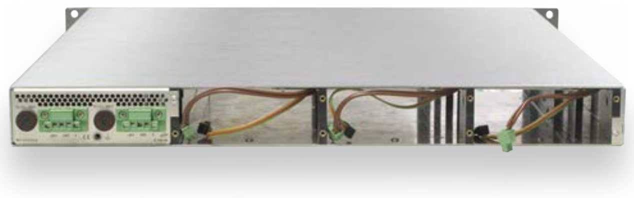
Base	Slot	Module	Status	Message	Monitoring	Replace Options
1	1	U174	ok	lock is logged in	ok	
1	2	U114	ok	lock is logged in	ok	Base 2 / Slot :
1	3	U100-C	warning	Supply13V: 0V,Supply1V2: 0V,Supply2V5: 0V,Supply3V3: 0V	warning status	
2	1	U124	ok	lock is logged in	ok	
2	2	U158	ok	lock is logged in	ok	
2	3	U114	off	lock is logged in	ok	

Base units

FOR APPLYING U 100 MODULES

Backside of U 100, 230 V version:

Backside of U 100, 48 V version:



- Power and signal supply for modules of the U 100 series
- Can carry up to 3 modules of the U 100 series
- Output signals are seperately led out via F-jacks
- Optional redundant power supply of the base unit
- Status indication for signal converters and power supply units
- Horizontal air flow allows compact installation

It is mandatory to use guide rails in the 19 inch rack. As these guide rails are different for each 19 inch rack supplier, they are not in the scope of delivery of U 100 base units.

TECHNICAL DATA

Type		U 100 - 48	U 100 - 230
Order number		380 100	380 101
EAN-Code		4026187611064	4026187611149
Common data			
Voltage supply	[V]	- 48 DC	110...240 ~ +/- 10% AC
Power consumption	[W]	depends on number of modules assembled	
Dimensions		19" / 1 HE	
Ambient temperature	[°C]	0...+45	

Management controller module

SYSTEM MANAGEMENT FOR U 100 SIGNAL PROCESSORS

U 100-C

- For comprehensive system management of the U 100 series signal converters
- Provides many functions for configuring and servicing the U 100 series
- User friendly configuration via web browser interface
- Monitored fan

The U 100-C is an overall management system for the U 100 series with many interesting features for network operators. It features a comfortable rack view of the complete system, time controlled updates and it can initiate automatic redundancy switching in case of malfunctions.

TECHNICAL DATA

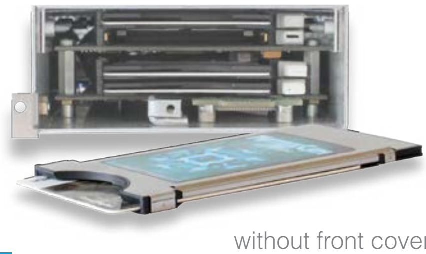
Type		U 100-C
Order number		380 103
EAN-Code		4026187131739
Network interfaces (passive routing to U 1xx)		
Protocol		IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNTP, IGMPv3
Common data		
Power consumption	[W]	27
Dimensions		19´´, 1 HE
Ambient temperature	[°C]	0...+45

Streamer modules

SIGNAL PROCESSING: DVB-S2 TO IP

4 x DVB-S2 to IP, up to 4 DVB-S2 transponders:

U 144



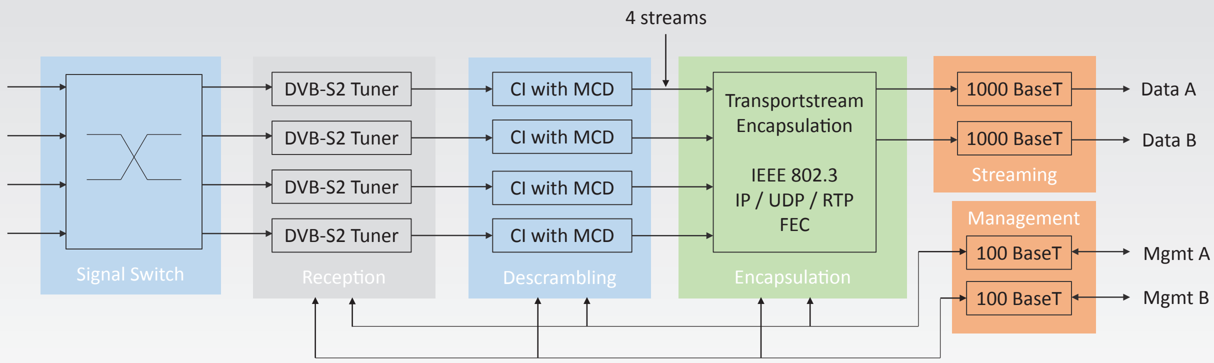
without front cover

Direct Digital DD by ASTRO

- Plug-in modules for U 100 base unit
- 4 physical signal input jacks
- for processing of 4 DVB-S2 signals into IP multicast groups (8 MPTS, 504 SPTS)
- up to 4 DVB-S2 transponders
- up to 12 streams per rack unit
- U 144: 4 CI slots
- Tuners with DiSEqC control
- monitored fan

BLOCK DIAGRAM

U 144:



TECHNICAL DATA

Type		U 144
Order number		380 144
EAN-Code		4026187170745
Number of DVB-S2 input signals		4
Number of DVB-S2 transponders		4
Number of IP output streams		8MPTS, 504 SPTS
Interfaces		
Management		2 x 100 Base-T Ethernet (RJ 45)
Data		2 x 1000 Base-T Ethernet (RJ 45)
Protocols		IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNTP, IGMPv3
Transportstream Encapsulation		
Protocols		UDP, UDP / RTP, 1-7 packets, FEC
Packet length	Bytes	188 / 204
DVB-S demodulator		
DVB-S modulation		QPSK; 8PSK
Input frequency range	[MHz]	950 - 2150
Input level	[dBµV]	40 - 80
SAT-IF input	[Ω]	75, F-jack
Reflection loss	[dB]	≥ 10
Input symbol rate	[MS/s]	max. 45,0 (depends on DVB-S2 Modulation)
DVB-S Roll-off-factors		0,20;0,25;0,35
DVB-S LDPC		1/2; 1/3; ¼; 2/3; 2/5; 3/5; 4/5; 5/6; 8/9; 9/10 (depends on DVB-S2 Modulation)
Viterbi decoding (according DVB standard)		1/2; 2/3; 3/4; 5/6; 7/8; automatically / manually
DiSEqC Control		☑
CI interfaces		
CI slots		4 x (front access)
Supported modules	excerpt (others on request)	Alphacrypt, Aston Conax, Dreamcrypt, Entavio CAM, GkWare BISS CAM, Homecast CAM, ICECrypt, Ideto Access, Kid CAM, Mascom Cryptoworks, Matrix CAM, Mediaguard Canal Digitaal, Nagravision, Oasis CAM, PCMCIA CAm, Premiere, Worldcam, TechniCam Beta2, Technicrypt, TPS, Reality CAM, SMiT, Universal CAM, Viaccess, Videoguard CAM
Connectors		4 x PCMCIA
RF inputs		
Connectors	Ω	75, 4 x F-jack
Common data		
when mounted in base unit U 100-48:		
Current consumption at 48 V	mA	680
Power consumption at 48 V	W	28 per module
Input voltage	V	- 48
when mounted in base unit U 100-230:		
Input voltage	VAC	110...240 ~ +/- 10% AC
Input power consumption	W / VA	1 power supply unit, 3 modules: 122,2 / 134,2; 2 power supply units, 3 modules: 140,2 / 157,5
Dimensions		1 HU, 19 inch
Ambient temperature	°C	0 ... +45

Streamer modules

SIGNAL PROCESSING: DVB-S2 TO IP

4 x DVB-S2 to IP, up to 8 DVB-S2 transponders, APSK support:

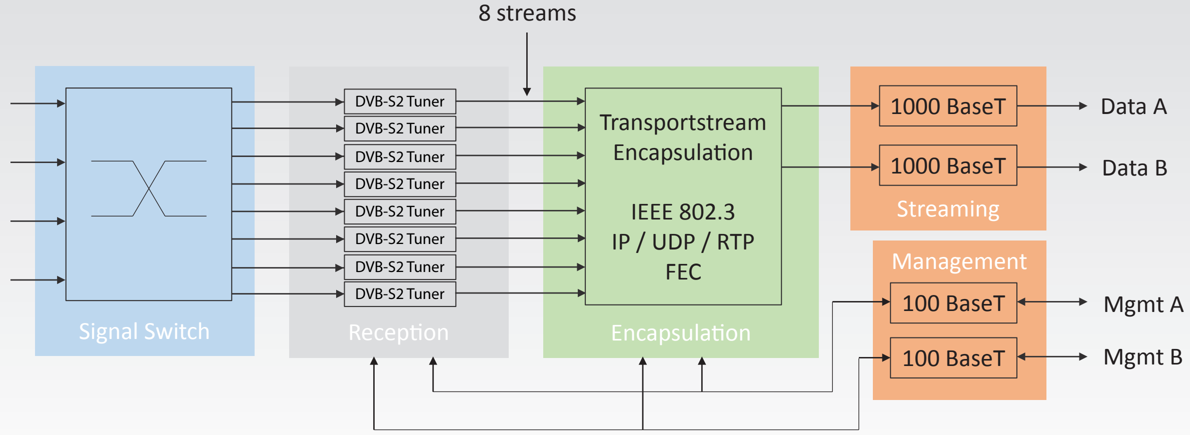
Direct Digital DD by ASTRO

4 x DVB-S2 to IP; up to 8 DVB-S2 transponders:

- Plug-in modules for U 100 base unit
- 4 physical signal input jacks
- for processing of 8 DVB-S2 signals into IP multicast groups (8 MPTS, 504 SPTS)
- up to 24 streams per rack unit
- only U 149: APSK support
- Tuners with DiSEqC control
- monitored fan

BLOCK DIAGRAM

U 148, U 149:



TECHNICAL DATA

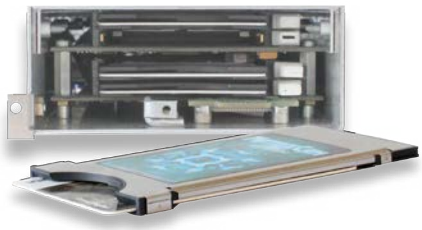
Type		U 148	U 149
Order number		380 148	380 149
EAN-Code		4026187170752	4026187191948
Number of DVB-S2 input signals		4	4
Number of DVB-S2 transponders		8	8
Number of IP output streams		8 MPTS, 504 SPTS	
Interfaces			
Management		2 x 100 Base-T Ethernet (RJ 45)	
Data		2 x 1000 Base-T Ethernet (RJ 45)	
Protocols		IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNTP, IGMPv3	
Transportstream Encapsulation			
Protocols		UDP, UDP / RTP, 1-7 packets, FEC	
Packet length	Bytes	188 / 204	
DVB-S demodulator			
DVB-S modulation		QPSK; 8PSK	QPSK; 8PSK; 16APSK; 32APSK
Input frequency range	[MHz]	950 - 2150	
Input level	[dBµV]	40 - 80	
SAT-IF input	[Ω]	75, F-jack	
Reflection loss	[dB]	≥ 10	
Input symbol rate	[MS/s]	max. 45,0 (depends on DVB-S2 Modulation)	
DVB-S Roll-off-factors		0,20;0,25;0,35	
DVB-S LDPC		1/2; 1/3; ¼; 2/3; 2/5; 3/5; 4/5; 5/6; 8/9; 9/10 (depends on DVB-S2 Modulation)	
Viterbi decoding (according DVB standard)		1/2; 2/3; 3/4; 5/6; 7/8; automatically / manually	
DiSEqC Control		☑	
RF inputs			
Connectors	Ω	75, 4 x F-jack	
Common data			
when mounted in base unit U 100-48:			
Current consumption at 48 V	mA	680	
Power consumption at 48 V	W	28 per module	
Input voltage	V	- 48	
when mounted in base unit U 100-230:			
Input voltage	VAC	110...240 ~ +/- 10% AC	
Input power consumption	W / VA	1 power supply unit, 3 modules: 122,2 / 134,2; 2 power supply units, 3 modules: 140,2 / 157,5	
Dimensions		1 HU, 19 inch	
Ambient temperature	°C	0 ... +45	

Streamer modules

SIGNAL PROCESSING: DVB-C / DVB-T / DVB-T2 TO IP

4 x DVB-C, DVB-T or DVB-T2 to IP:

U 164



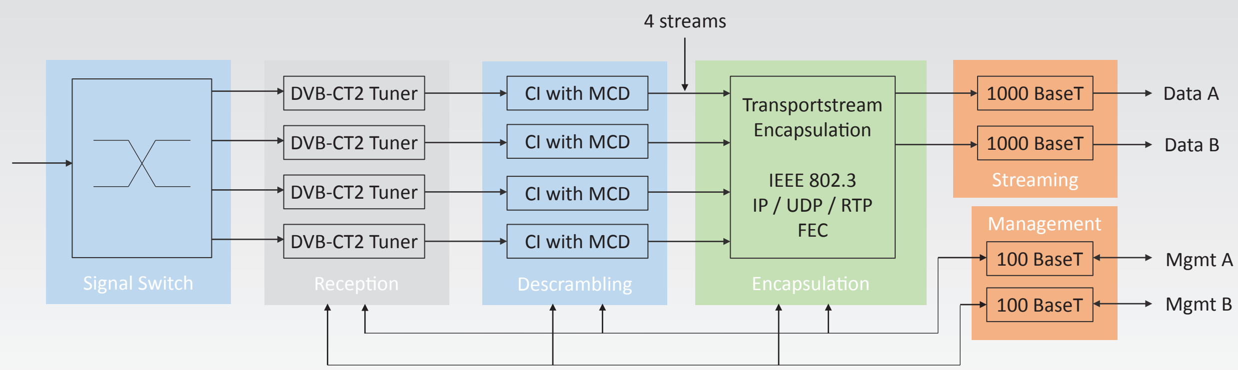
without front cover

- Plug-in modules for U 100 base unit
- 2 physical signal input jacks
- for processing of 4 DVB-CT2 signals into IP multicast groups (8 MPTS, 504 SPTS)
- up to 12 streams per rack unit
- 4 CI slots
- monitored fan

Direct Digital DD by ASTRO

BLOCK DIAGRAM

U 164:



HD TV

4 QUAD

CI

TECHNICAL DATA

Type		U 164
Order number		380 164
EAN-Code		4026187170769
Number of DVB-CT2 input signals		4
Number of DVB-CT2 tuners		8
Number of IP output streams		8MPTS, 504 SPTS
Interfaces		
Management		2 x 100 Base-T Ethernet (RJ 45)
Data		2 x 1000 Base-T Ethernet (RJ 45)
Protocols		IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNTP, IGMPv3
Transportstream Encapsulation		
Protocols		UDP, UDP / RTP, 1-7 packets, FEC
Packet length	Bytes	188 / 204
DVB-C demodulator		
Input data rate	[Mbaud]	0,5 - 7
Modulation modes (accord. DVB-standard)		QPSK, QAM16, QAM32, QAM64, QAM128, QAM256
DVB-T demodulator / DVB-T2 demodulator		
Modulation		DVB-T: 4-, 16-, 64-QAM — DVB-T2: 4-, 16-, 64-, 256-QAM
Guardinterval		DVB-T: 1/4; 1/8; 1/16; 1/32 — DVB-T2: 1/4; 5/32; 1/8; 5/64; 1/16; 1/32; 1/64; 1/128
FEC		DVB-T: 1/2; 2/3; 3/4; 5/6; 7/8 — DVB-T2: 1/2; 3/5; 2/3; 3/4; 4/5; 5/6
FFT-Mode		DVB-T: 2k, 8k — DVB-T2: 1k, 2k, 4k, 8k, 16k, 32k
Bandwidth	[MHz]	DVB-T: 6; 7; 8 — DVB-T2: 5; 6; 7; 8
Remote voltage supply		5V, typ. 100mA, switchable
CI interfaces		
CI slots		4 x (front access)
Supported modules	excerpt (others on request)	Alphacrypt, Aston Conax, Dreamcrypt, Entavio CAM, GkWare BISS CAM, Homecast CAM, ICECrypt, Ideto Access, Kid CAM, Mascom Cryptoworks, Matrix CAM, Mediaguard Canal Digitaal, Nagravision, Oasis CAM, PCMCIA CAm, Premiere, Worldcam, TechniCam Beta2, Technicrypt, TPS, Reality CAM, SMiT, Universal CAM, Viaccess, Videoguard CAM
Connectors		4 x PCMCIA
RF inputs		
Connectors	Ω	75, 4 x F-jack
Common data		
when mounted in base unit U 100-48:		
Current consumption at 48 V	mA	680
Power consumption at 48 V	W	28 per module
Input voltage	V	- 48
when mounted in base unit U 100-230:		
Input voltage	VAC	100 - 240 (50 / 60 Hz)
Input power consumption	W / VA	one power supply, three modules: 121,2 / 144; two power supplies, three modules: 144,1 / 158
Dimensions		1 HU, 19 inch

Streamer modules

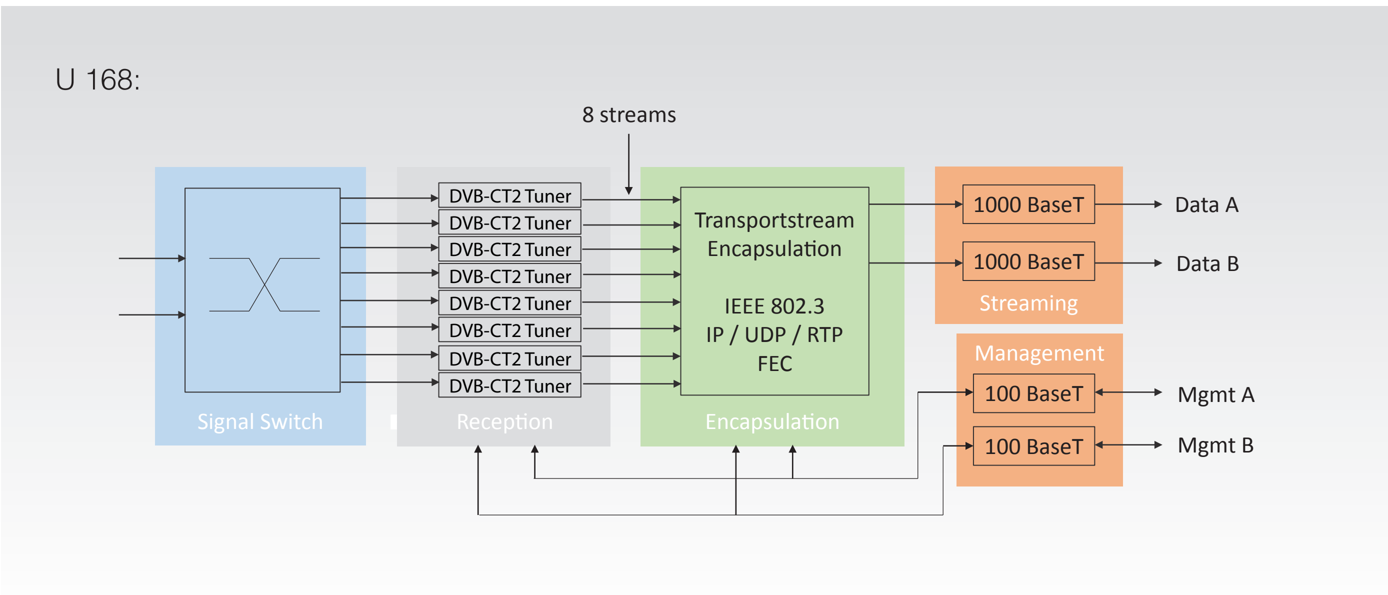
SIGNAL PROCESSING: DVB-C / DVB-T / DVB-T2 TO IP

8 x DVB-C, DVB-T or DVB-T2 to 8 x IP:

Direct Digital DD by ASTRO

- Plug-in modules for U 100 base unit
- 2 physical signal input jacks
- for processing of 8 DVB-CT2 signals into IP multicast groups (8 MPTS, 504 SPTS)
- up to 24 streams per rack unit
- monitored fan

BLOCK DIAGRAM



TECHNICAL DATA

Type		U 168	
Order number		380 168	
EAN-Code		4026187170776	
Number of DVB-CT2 input signals		4	
Number of DVB-CT2 tuners		8	
Number of IP output streams		8 MPTS, 504 SPTS	
Interfaces			
Management		2 x 100 Base-T Ethernet (RJ 45)	
Data		2 x 1000 Base-T Ethernet (RJ 45)	
Protocols		IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNTP, IGMPv3	
Transportstream Encapsulation			
Protocols		UDP, UDP / RTP, 1-7 packets, FEC	
Packet length	Bytes	188 / 204	
DVB-C demodulator			
Input data rate	[Mbaud]	0,5 - 7	
Modulation modes (accord. DVB-standard)		QPSK, QAM16, QAM32, QAM64, QAM128, QAM256	
DVB-T demodulator / DVB-T2 demodulator			
Modulation		DVB-T: 4-, 16-, 64-QAM	DVB-T2: 4-, 16-, 64-, 256-QAM
Guardinterval		DVB-T: 1/4; 1/8; 1/16; 1/32	DVB-T2: 1/4; 5/32; 1/8; 5/64; 1/16; 1/32; 1/64; 1/128
FEC		DVB-T: 1/2; 2/3; 3/4; 5/6; 7/8	DVB-T2: 1/2; 3/5; 2/3; 3/4; 4/5; 5/6
FFT-Mode		DVB-T: 2k, 8k	DVB-T2: 1k, 2k, 4k, 8k, 16k, 32k
Bandwidth	[MHz]	DVB-T: 6; 7; 8	DVB-T2: 5; 6; 7; 8
Remote voltage supply		5V, typ. 100mA, switchable	
RF inputs			
Connectors	Ω	75, 2 x F-jack	
Common data			
when mounted in base unit U 100-48:			
Current consumption at 48 V	mA	680	
Power consumption at 48 V	W	28 per module	
Input voltage	V	- 48	
when mounted in base unit U 100-230:			
Input voltage	VAC	100 - 240 (50 / 60 Hz)	
Input power consumption	W / VA	one power supply, three modules: 121,2 / 144; two power supplies, three modules: 144,1 / 158	
Dimensions		1 HU, 19 inch	
Ambient temperature	°C	0 ... +45	

Signal converters with IP front end

SIGNAL PROCESSING: IP TO PAL / NTSC

8 x IP to 8 x PAL / SECAM / NTSC with MPEG 4 support (H.264/AVC Level 4.1 HP):

NEW

U 118

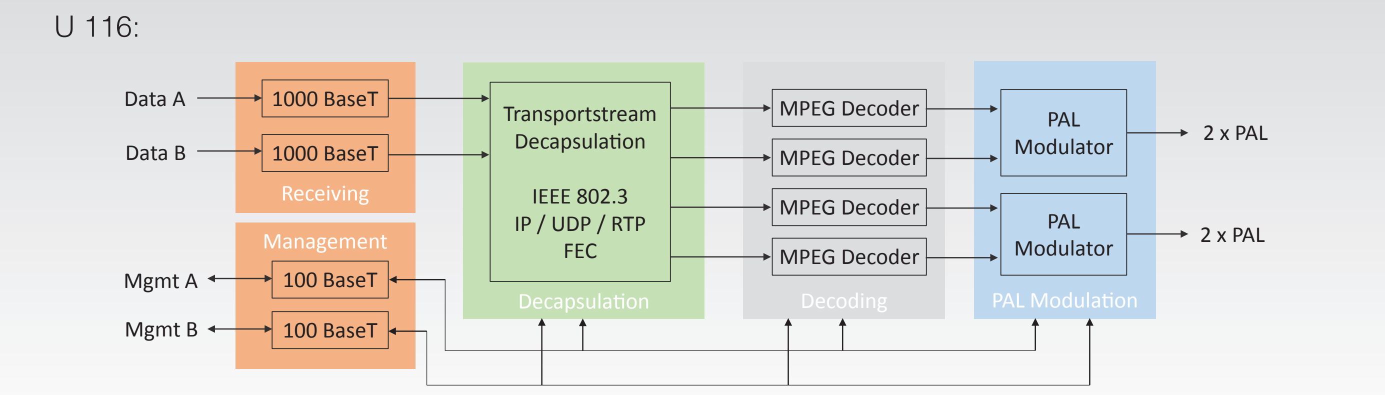
Direct Digital DD® by ASTRO

4 x IP to 4 x PAL / SECAM / NTSC with MPEG 4 support (H.264/AVC Level 4.1 HP):

U 116

- Plug-in module for U 100 base unit
- U 118: for processing of up to 8 IP multicast groups of a Gigabit Ethernet MPEG TS in 8 standard PAL programmes
- U 116: for processing of up to 4 IP multicast groups of a Gigabit Ethernet MPEG TS in 4 standard PAL programmes
- PAL programmes are 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 sigal quality even after combining
- user friendly configuration via web browser
- monitored fan

BLOCK DIAGRAM



U 118 with 8 IP inputs and 8 PAL output signals

TECHNICAL DATA

Type		U 116	U 118
Order number		380 117	380 122
EAN-Code		4026187141059	4026187191955
Maximum number of IP input signals		4	8
Maximum number of PAL output signals		4	8
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, SNTP, IGMPv3	
Transport stream editing			
TS Decapsulation		UDP, UDP / RTP, 1-7 packets, FEC	
Packet length	[Bytes]	188 / 204	
Decoding			
Video		H.264/AVC Level 4.1 HP, MPEG-2 MP@HL	
Audio		MPEG-1/2 Layer 1/2, (HE-)AAC, AC-3* / Dolby Digital (Plus) optional	
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	112
Return loss	[dB]	≥ 14	
Spurious frequency dist.	[dB]	≥ 60	
Stereo cross talk	[dB]	> 55	
Residual carrier accuracy	[%]	1	
TV standard		PAL B/G, D/K, M, N, SECAM, SECAM L, A2/NICAM, NTSC mono	
Video-signal to noise ratio	[dB]	typ. 65	typ. 63
Common data			
when mounted in base unit U 100-48:			
Current consumption at 48 V	mA	680	
Power consumption at 48 V	W	32 per module	43 per module
Input voltage	V	- 48	
when mounted in base unit U 100-230:			
Input voltage	VAC	100 - 240 (50 / 60 Hz)	
Input power consumption	W / VA	1 power supply unit, 3 modules: 122,2 / 134,2; 2 power supply units, 3 modules: 140,2 / 157,5	1 power supply unit, 3 modules: 168 / 181 2 power supply units, 3 modules: 188 / 205
Dimensions		1 HU, 19 inch	
Ambient temperature	°C	0 ... +45	

*) AC-3 only supported by U 116 (AC-3), order number: 380 118

Signal converters with IP front end

SIGNAL PROCESSING: IP TO FM

4 x IP to 2 x 20 FM programmes:

U 125

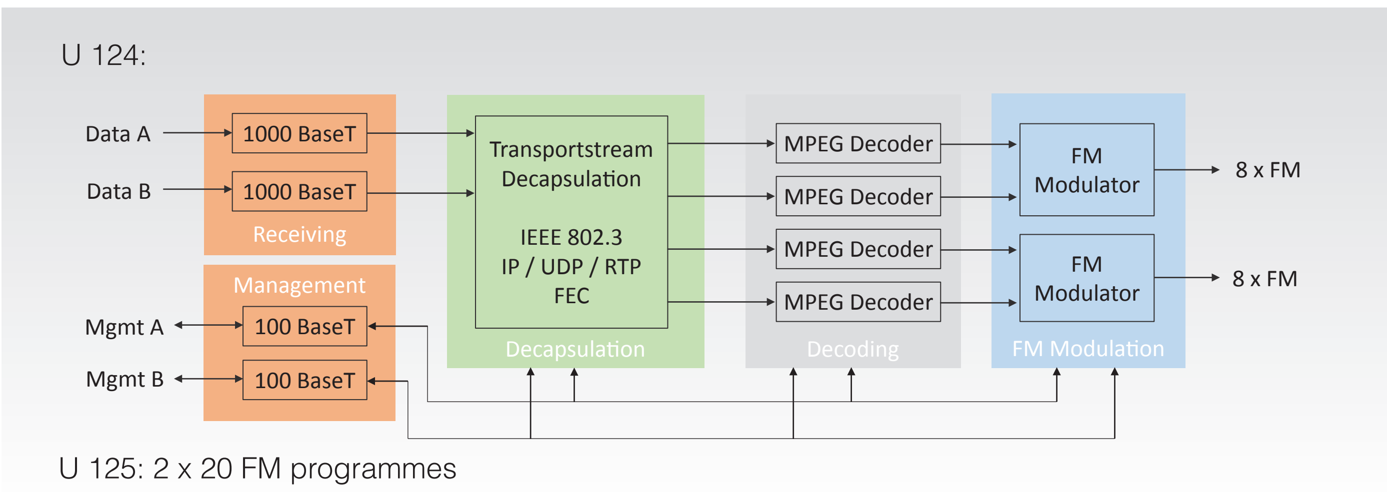
Direct Digital by ASTRO

4 x IP to 2 x 8 FM programmes:

U 124

- Plug-in module for U 100 base unit
- U 124: for processing of up to 4 IP multicast groups of a Gigabit Ethernet MPEG TS into 2 x 8 standard FM programmes
- U 125: for processing of up to 16 IP multi-cast groups of a Gigabit Ethernet MPEG TS into 2 x 20 standard FM programmes
- FM programmes are led through as two groups consisting of 8 programmes
- outstanding signal parameters by Direct Digital technology
- static and dynamic RDS are supported (radiotext, PTY, PS and CT)
- user friendly configuration via web browser
- monitored fan

BLOCK DIAGRAM



TECHNICAL DATA

Type		U 124	U 125
Order number		380 124	380 125
EAN-Code		4026187611118	4026187191337
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, SNTP, IGMPv3	IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNTP, IGMP, SSL, RADIUS
Transport stream editing			
Decapsulation		UDP, UDP / RTP, 1-7 packets, FEC	
Packet length	[Bytes]	transparent (188 oder 204 packets)	
Decoding			
Input signal		4 x MPEG-2 TS	16 x MPEG-2 TS
Audio		MPEG 1 Layer 2, Stereo	
FM modulator			
Connectors		2 x F-jack	
Output signal		2 x 8 FM stereo channels with RDS	2 x 20 FM stereo channels with RDS
Output frequency	[MHz]	87,5 - 108, digital modulated, 10 kHz steps	
static dynamic		TP / PI / PS 8 x 8 signs Pi / Radiotext / PTY / PS / CT / MS	
Output level	[dBµV]	114	
Intermodulation distance	[dBc]	> 60	60 @ 114 dbµV; 65 @ 112 dbµV
Return loss	[dB]	> 14	> 18
Signal to noise ratio	[dB]	> 64	> 65
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			
when mounted in base unit U 100-48:			
Current consumption at 48 V	mA	680	920
Power consumption at 48 V	W	25,5 per module	39 per module
Input voltage	V	- 48	- 48
when mounted in base unit U 100-230:			
Input voltage	VAC	110 - 240 (50 / 60 Hz)	
Input power consumption	W / VA	1 power supply unit, 3 modules: 102,2 / 114,2; 2 power supply units, 3 modules: 125,2 / 137,5	one power supply unit, three modules: 155,2 / 168; two power supply units, three modules: 175 / 192
Dimensions		1 HU, 19 inch	
Ambient temperature	°C	0 ... +45	

Signal converters with IP front end

SIGNAL PROCESSING: IP TO QAM

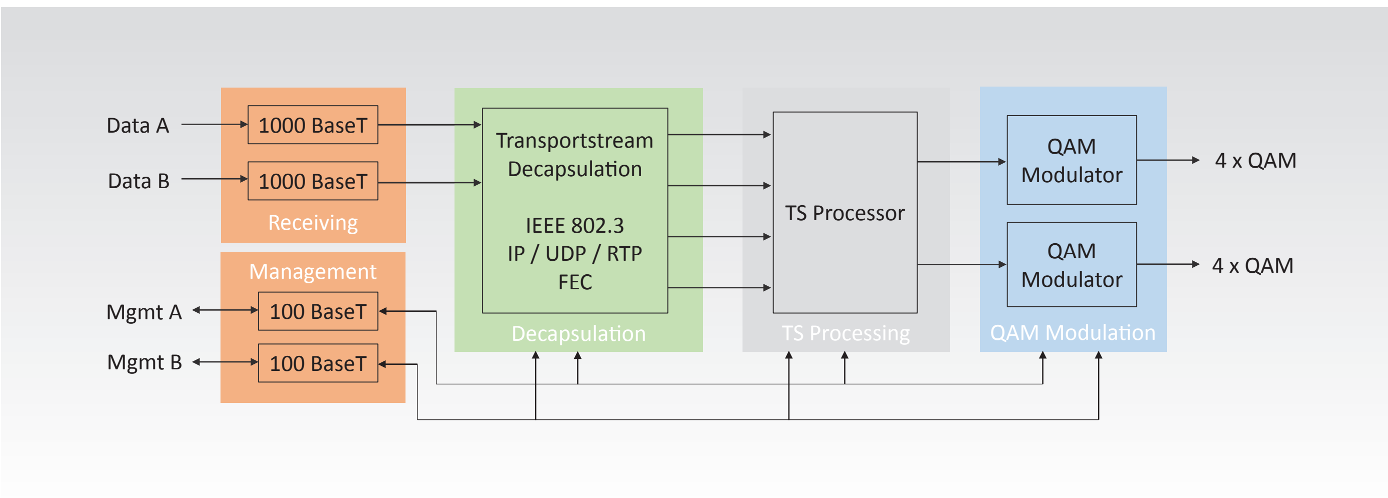
8 x IP to 8 x QAM:

U 158

Direct Digital DD by ASTRO

- Plug-in module for U 100 base unit
- for processing of up to 8 IP multicast groups of a Gigabit Ethernet MPEG TS in 8 standard QAM channels
- QAM channels programmes are led through as four adjacent channels
- outstanding signal parameters by Direct Digital technology
- NIT and LCN processing integrated
- optionally available output channel filters (U-KF) allow for maintaining the high sigal
- user friendly configuration via web browser
- monitored fan

BLOCK DIAGRAM



TECHNICAL DATA

Type		U 158
Order number		380 158
EAN-Code		4026187131852
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, SNTP, IGMPv3
Transport stream 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		according DVB standard
Spectrum shape (cos-roll-off)	[%]	15
FEC		Reed-Solomon (204, 188)
Data rate adjustment		☑
PCR-correction		☑
NIT-handling, PID-remapping		☑
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
HF 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		
when mounted in base unit U 100-48:		
Current consumption at 48 V	mA	680
Power consumption at 48 V	W	28 per module
Input voltage	V	- 48
when mounted in base unit U 100-230:		
Input voltage	VAC	100 - 240 (50 / 60 Hz)
Input power consumption	W / VA	1 power supply unit, 3 modules: 122,2 / 134,2; 2 power supply units, 3 modules: 140,2 / 157,5
Dimensions		1 HU, 19 inch
Ambient temperature	°C	0 ... +45

Signal converters with IP front end

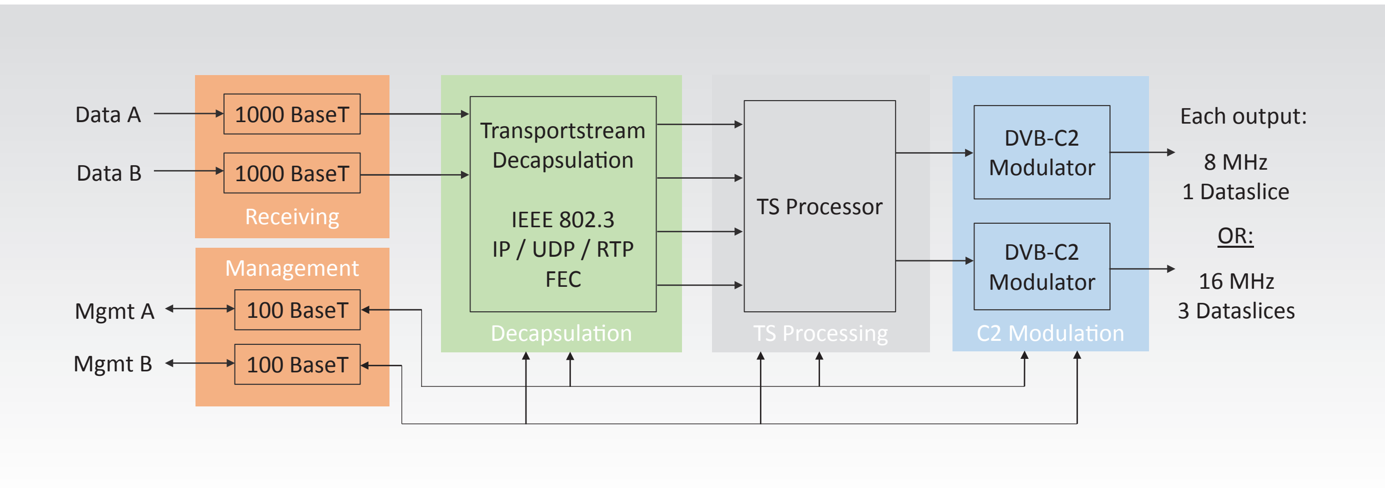
SIGNAL PROCESSING: IP TO DVB-C2

2 x IP to 2 x DVB-C2:

U 160

- Plug-in module for U 100 base unit
- for processing of up to 24 IP multicast groups of a Gigabit Ethernet MPEG TS into 2 DVB-C2 systems
- multiple transportstream
- multiplexing of data slices
- FEC: LDPC and BCH
- OFDM modulation
- broadband notch placing
- user friendly configuration via web browser
- monitored fan

BLOCK DIAGRAM



HD TV

2 TWIN

ASTRO

TECHNICAL DATA

Type		U 160
Order number		380 160
EAN-Code		4026187161088
Interfaces		
Management		2 x 100 Base-T Ethernet (RJ 45)
Data		2 x 1000 Base-T Ethernet (RJ 45)
Protocols		IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNTP, IGMPv3
Transportstream Encapsulation		
Protocols		UDP, UDP / RTP, 1-7 packets, FEC
Packet length	Bytes	188 / 204
DVB-C2 demodulator		
Input interface		Transportstream
Coding Modes		static
FEC		LDPC, BCH
Interleaving		Bit, time and frequency
Modulation		OFDM
Bandwidth	MHz	16
Guard interval		1/64 or 1/128
Modulation schemes		16 QAM to 4096 QAM
FEC Frame		64 800 bits or 16 200 bits
Data Slices		1-3
Physical Layer Pipes		Single PLP per Data Slice
Narrowband Notches		☑
Broadband Notches		☑
RF modulator		
Connectors	Ω	75, 2 x F-jack
Frequency range	MHz	47 - 862
RF output level	dBµV	114
Return loss	dB	> 14
Spurious frequency distance	dB	> 60
Common data		
when mounted in base unit U 100-48:		
Current consumption at 48 V	mA	680
Power consumption at 48 V	W	28 per module
Input voltage	V	- 48
when mounted in base unit U 100-230:		
Input voltage	VAC	100 - 240 (50 / 60 Hz)
Input power consumption	W / VA	1 power supply unit, 3 modules: 122,2 / 134,2; 2 power supply units, 3 modules: 140,2 / 157,5
Dimensions		1 HU, 19 inch
Ambient temperature	°C	0 ... +45

Signal converters with IP front end

SIGNAL PROCESSING: IP TO COFDM

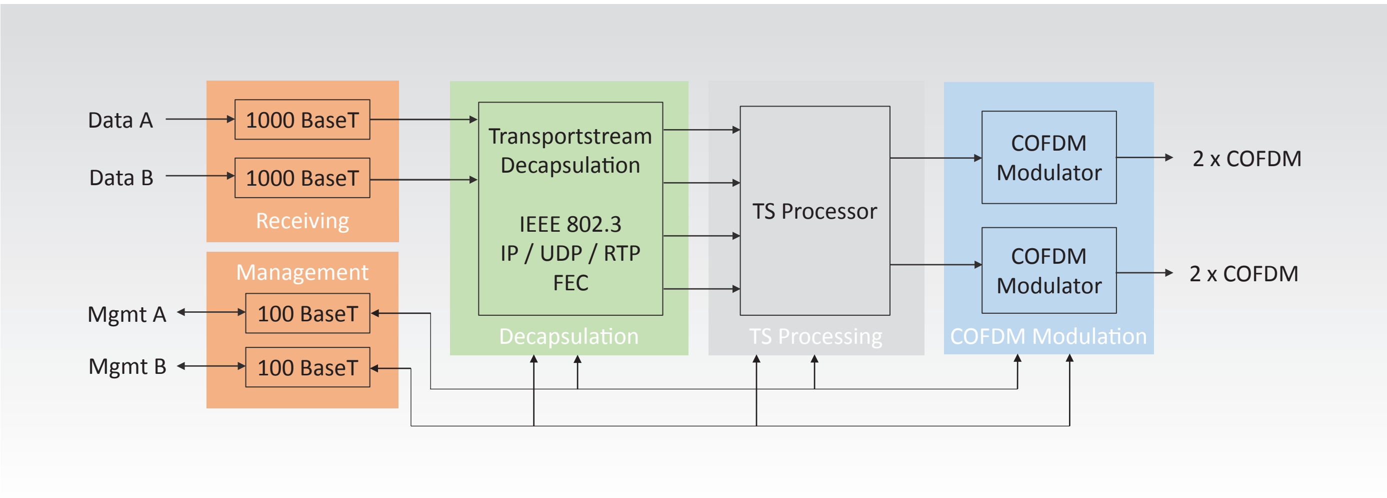
4 x IP to 4 x COFDM:

U 174

Direct Digital by ASTRO

- Plug-in module for U 100 base unit
- for processing of up to 4 IP multicast groups of a Gigabit Ethernet MPEG TS into 4 standard COFDM channels
- COFDM channels are led through as two adjacent channels
- outstanding signal parameters by Direct Digital technology (MER: ≥ 43 dB; shoulder attenuation: ≥ 56 dB)
- optionally available output channel filters (U-KF) allow for maintaining the high signal quality even after combining
- user friendly configuration via web browser
- monitored fan

BLOCK DIAGRAM



TECHNICAL DATA

Type		U 174
Order number		380 174
EAN-Code		4026187611026
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, SNTP, IGMPv3
Transportstream editing		
TS capsulation		UDP, UDP / RTP, 1-7 packets, FEC
Packet length	[Bytes]	188 / 204
COFDM modulator		
COFDM Mode		2k
Carrier modulation		QPSK, 16-, 64-QAM
Bandwidth	[MHz]	6, 7, 8
Maximum brutto data rate	[Mbit/s]	31,668
Signal processing		accord. DVB standard
Coding rates		1/2, 2/3, 3/4, 5/6, 7/8
Guard intervals		1/4, 1/8, 1/16, 1/32
Data rate adjustment		☑
PCR-correction (< 500 ns accord. DVB)		☑
NIT-Handling (static)		☑
PID Remapping		☑
PID Filtering		Drop oder Pass PID-Filter
MER (Equalizer)	[dB]	≥ 43
Shoulder attenuation	[dB]	> 56 (< 700 MHz); > 54 (≥ 700 MHz)
HF modulator		
Connectors	[Ω]	75, 2 x F-jack
Frequency range	[MHz]	47 - 862, digitaly modulated
Frequency deviation	[kHz]	< 10
Output level	[dBµV]	114
Intermodulation distance	[dB]	> 60
Return loss	[dB]	> 14
Spurious frequency distance	[dB]	> 60
Common data		
when mounted in base unit U 100-48:		
Current consumption at 48 V	mA	680
Power consumption at 48 V	W	28 per module
Input voltage	V	- 48
when mounted in base unit U 100-230:		
Input voltage	VAC	100 - 240 (50 / 60 Hz)
Input power consumption	W / VA	1 power supply unit, 3 modules: 122,2 / 134,2; 2 power supply units, 3 modules: 140,2 / 157,5
Dimensions		1 HU, 19 inch
Ambient temperature	°C	0 … +45

Descrambler

SIGNAL PROCESSING: IP TO IP

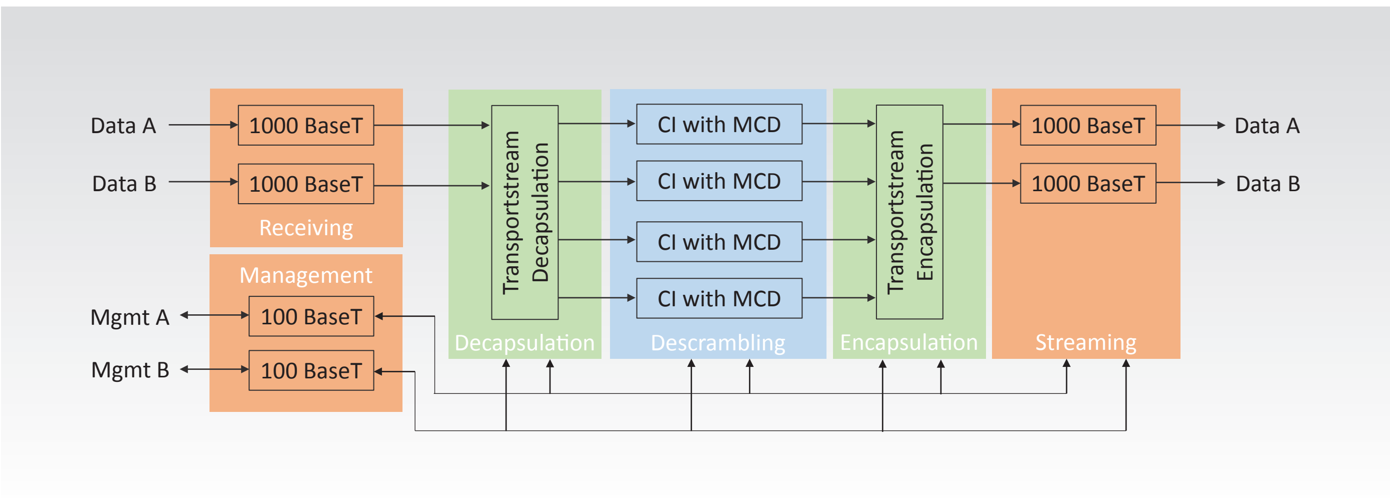
4 x IP to 4 x IP:

U 194

Direct Digital by ASTRO

- Plug-in module for U 100 base unit
- 4 CI-slots; independent / cascadable
- 4 transport streams
- Multi-Service-Descrambling
- decryption level: service based, PID based
- user friendly configuration via web browser
- monitored fan

BLOCK DIAGRAM



TECHNICAL DATA

Type		U 194
Order number		380 161
EAN-Code		4026187161095
Network data interfaces		
Interface type		100FD/1000Base-T Ethernet IEEE 802.3
Prrotocol		IP v4, ARP, UDP, RTP, ICMP, IGMPv2
Connector		2 x 8p8C "RJ-45" (redundant)
TS Receiver		4 x (unicast / multicast)
TS Transmitter		4 x (unicast / multicast)
CI interfaces		
CI slots		4 x (front access)
Supported modules	excerpt (others on request)	Alphacrypt, Aston Conax, Dreamcrypt, Entavio CAM, GkWare BISS CAM, Homecast CAM, ICECrypt, Ideto Access, Kid CAM, Mascom Cryptoworks, Matrix CAM, Mediaguard Canal Digitaal, Nagravision, Oasis CAM, PCMCIA CAm, Premiere, Worldcam, TechniCam Beta2, Technicrypt, TPS, Reality CAM, SMiT, Universal CAM, Viaccess, Videoguard CAM
Connectors		4 x PCMCIA
Transportstream		
TS encapsulation		UDP/IP, RTP/UDP/IP, FEC
TS type		MPTS
TS functionality		Receiver, decode, and transmit up to 4 MPTS via IP
Control and Management		
Interface type		100FD/1000Base-T Ethernet IEEE 802.3
Features		Element control via HTTP/Web-GUI, SNMP traps for integration with network management systems (NMS), software update via FTP or TFTP
Protocol		IP v4, ARP, UDP, TCP, ICMP, HTTP, SNMP v2c, FTP, TFTP, DNS, DHCP, SNTP
Connectors		2 x 8P8C "RJ-45" (redundant)
Common data		
when mounted in base unit U 100-48:		
Current consumption at 48 V	mA	605
Power consumption at 48 V	W	24,3 per module
Input voltage	V	- 48
when mounted in base unit U 100-230:		
Input voltage	VAC	100 - 240 (50 / 60 Hz)
Input power consumption	W / VA	1 power supply unit, 3 modules: 112,2 / 120,2; 2 power supply units, 3 modules: 120,2 / 132,5
Dimensions		1 HU, 19 inch
Ambient temperature	°C	0 ... +45

Gateways

The Video over IP solution

Maximum Flexibility in signal conversion

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 is achieved user friendly via a webbrowser interface.

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	◉ on ○ off	◉ on ○ off	◉ on ○ off	◉ on ○ 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.

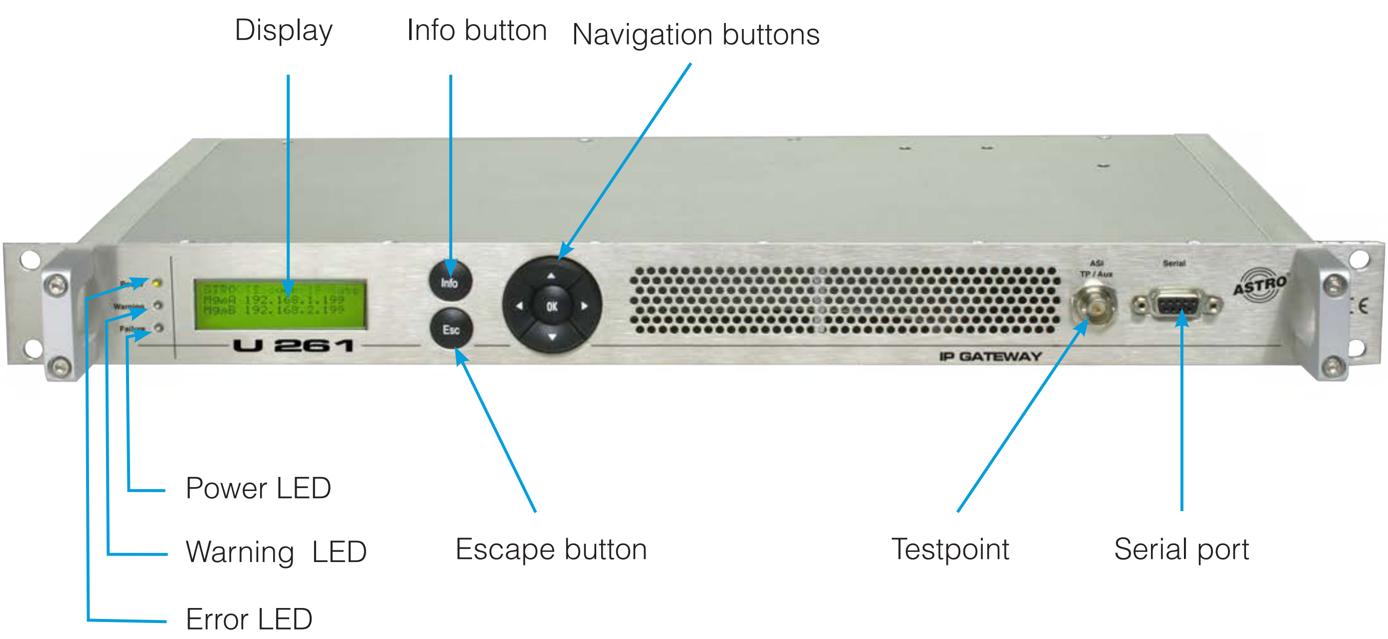
Thanks to a licensing of the transport streams and further optional features (for example transport stream analyzer) the distribution of investment costs can be tailored to the market's needs. Forward Error Correction (FEC) according to ProMPEG CoP and encapsulation of Ethernet frames with RTP are already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

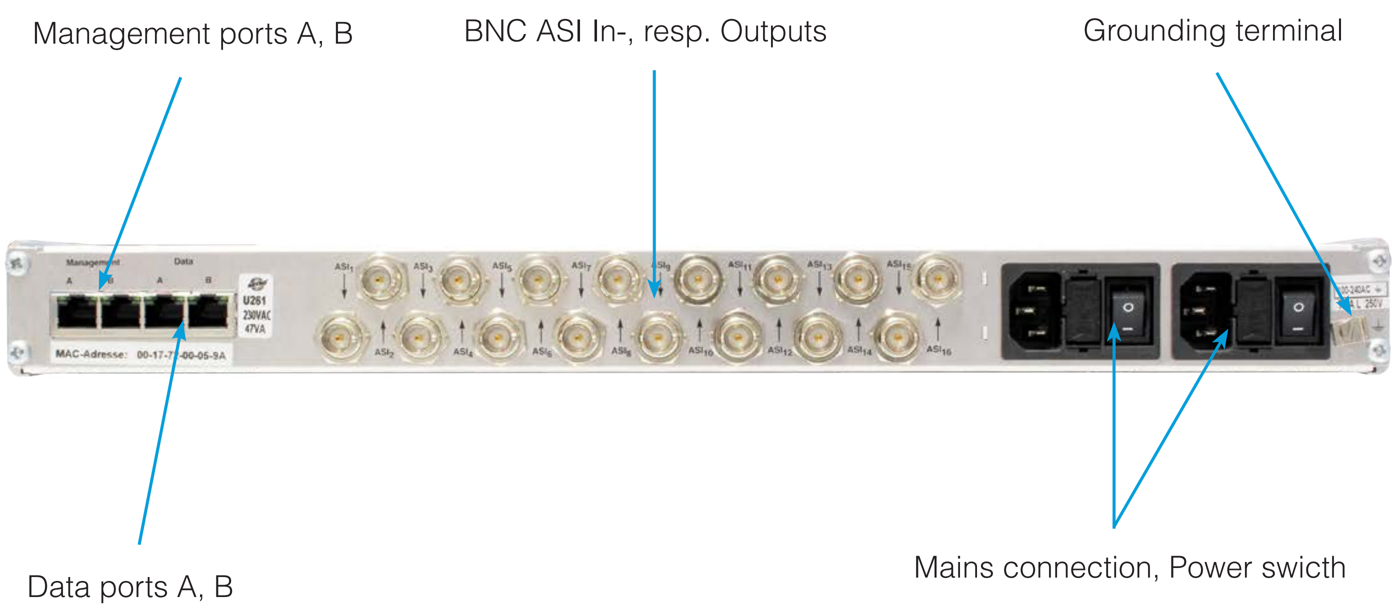
To achieve maximum reliability, the management as well as the data ports on the back of the device are implemented redundant.

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.

The interface at the front:



The backside:



Gateways

IP INTO ASI AND ASI INTO IP

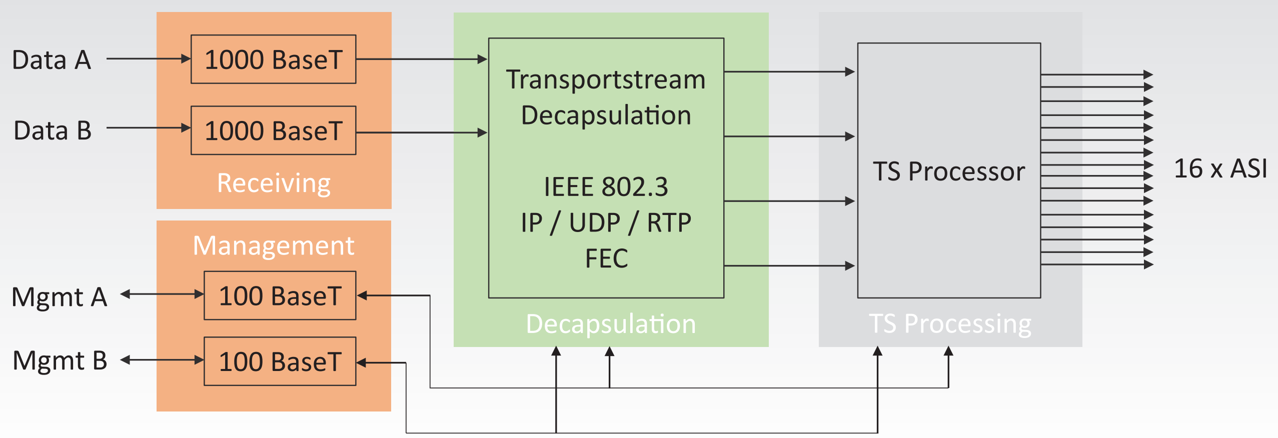
IP into ASI:

ASI into IP:

- 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

BLOCK DIAGRAM

U 261:



TECHNICAL DATA

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 outputs, 1 input		16 inputs, 1 output	
Connectors		BNC-jack			
Bitrate	[Mbit/s]	netto 210 max.			
Network interfaces					
Type of interface		1000 Base-T Ethernet			
Protocol		RTP, ARP, IPv4, UDP, IGMP, ICMP			
Connection		2 x RJ 45			
Absolute Bitrate	[Mbit/s]	950, max.			
Ethernet MTU-Length	[bytes]	1500, max.			
Transportstream editing					
TS capsulation		UDP, UDP+RTP, 1-7 packets, FEC			
Transportstream editing		transparent (188 oder 204 packets)			
Control and management					
Type		100 Base-T Ethernet			
Features		Element control via HTTP/WEB,			
Protocol		ARP, IPv4, TCP, HTTP, SNMP (error messages), UDP, ICMP, FTP, TFTP,DNS, SNTP			
Connectors		2 x RJ 45			
Common data					
Input voltage	[VDC]	100 - 240 V	- 48 V	100 - 240 V	- 48 V
Power consumption	[W]	22	17	22	17
Dimensions		1 HE / 19"			
Ambient temperature	[°C]	0…+50			

LICENSES FOR UPDATING 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 anaylzer for checking of MPEG-TS on PID-level

Active Combining

ACTIVE COMBINING NETWORK

19 inch version:

U 901

Trims-installation version:

VZN 8

- 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
- preemphase 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

TECHNICAL DATA

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 1 dB steps by attenuation pads (short)	
Preemphase	[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	
Housing		19", 1 HE	-
Ambient temperature	[°C]	0...+50	

Passive Combining

PASSIVE COMBINING NETWORK

U 960

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

TECHNICAL DATA

Type		U 960
Order number		380 195
EAN-Code		4026187680152
Impedance	[Ω]	75
Frequency range	[MHz]	5 - 1000
Screening	[dB]	> 100
Connectors	[dB]	F-Buchsen
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 splitterr		
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		
Housing		19", 1 HE
Ambient temperature	[°C]	0...+50

Active SAT distribution fields

FOR DISTRIBUTION OF SAT POLARISATIONS

U 911 - U 946

- 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 914	U 915
Order number		380 192	380 212	380 214	380 215
EAN-Code 4026187…		...651435	...002749	...651909	002763
Connectors	[Ω]	In- and outputs: F-jacks, 75			

Type		U 921	U 922	U 924	U 925
Order number		380 221	380 222	380 224	380 225
EAN-Code 4026187…		...735180	...002787	...735173	002800
Connectors	[Ω]	In- and outputs: SMA-connectors, 50			

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

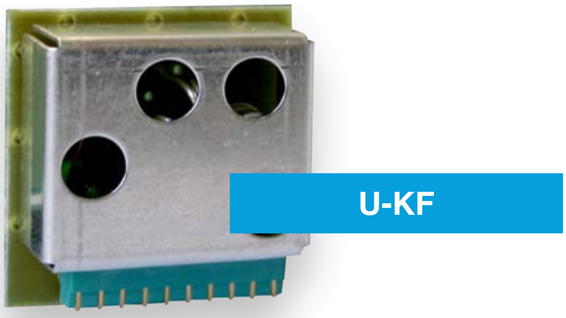
Type		U 941	U 942	U 944	U 945
Order number		380 241	380 242	380 244	380 245
EAN- Code 4026187…		...002886	...002893	...002916	...002923
Connectors	[Ω]	Inputs: F-jacks, 75 & Outputs: SMA-connectors, 50			

Common data					
Inputs / Outputs		2 x 1 in 8		1 x 1 in 16	
Num. of power suppl. 230 V / 28VA		2	1	2	1
Remote current	[ma]	350	350	350	350
LNB voltage	[V]	16	16	16	16
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 in nominal frequency range	 [dBss] [dBss]	 < 1 < 2			
Return loss Inputs / Outputs	[dB]	≥ 12 / ≥ 14			
Output isolation	[dB]	> 20			
Testpoints (1 per polarization) Value output isolation Return loss	 [dB] [dB]	 10 12			

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

Accessories

CHANNEL SELECTIVE FILTERS, MOUNTING CABINETS



- channel selective pluggable filter module for maintaining the outstanding output parameters even after interconnection

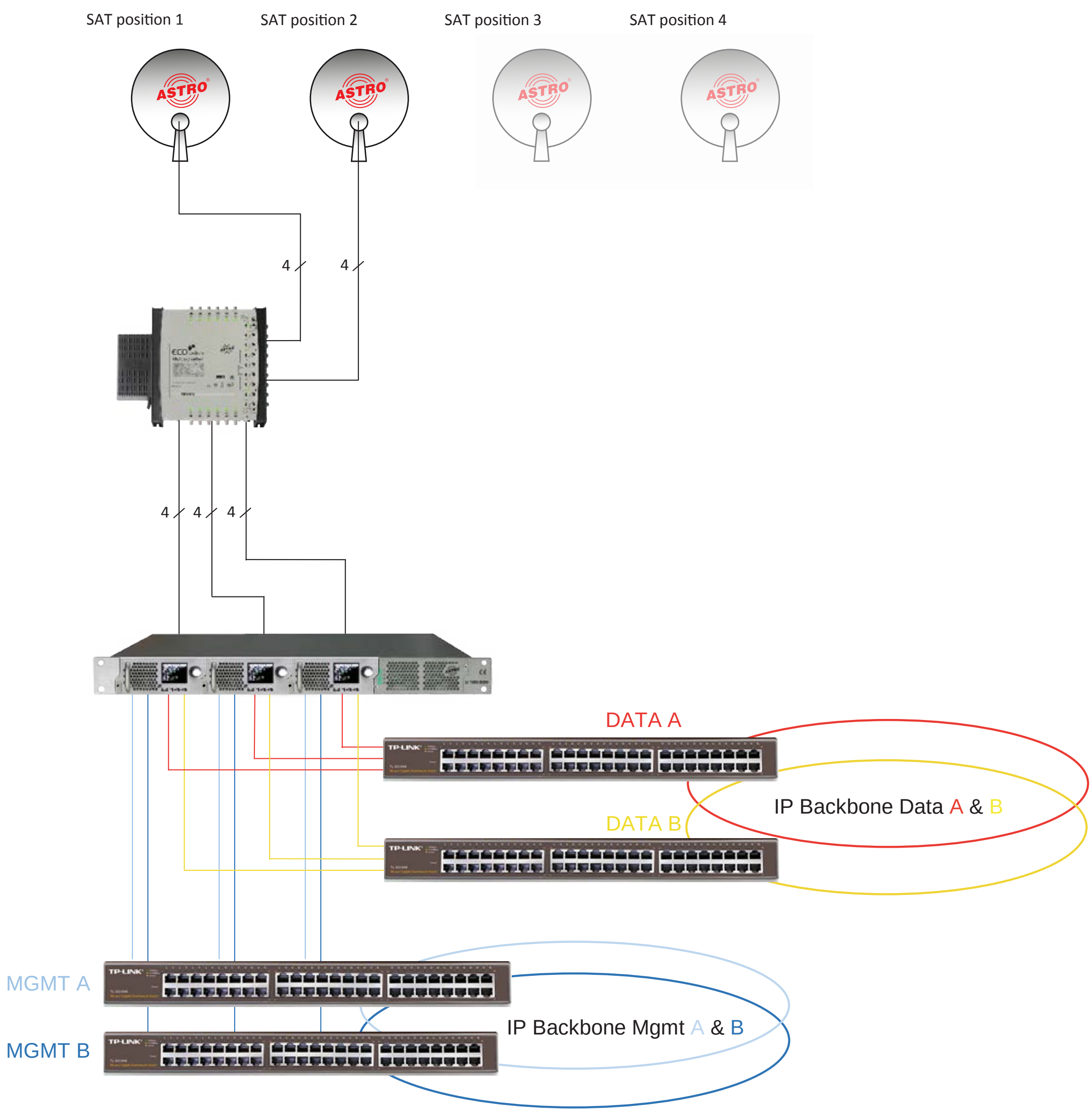
Order number: 380 ...
(Please order with indication of output channel.)
Channel range: 47 - 862 MHz

- 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

Order number: 189 931
EAN-Code: 4026187591731
Dimensions: (B x H x T): 600 x 2000 x 600 mm
2 doors; 42 RU

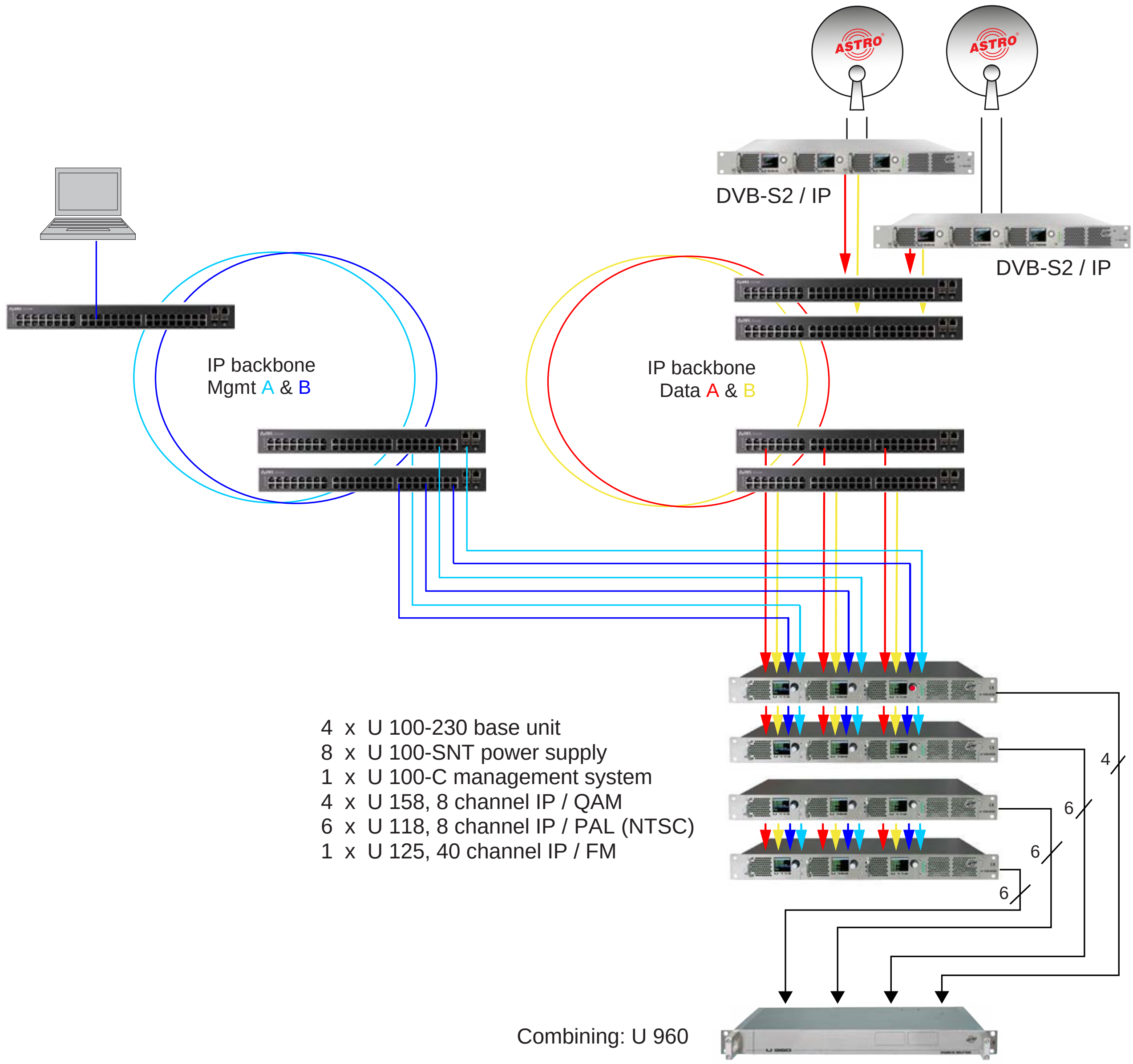
Application solutions

Streaming of DVB-S2 input signals to IP with Descrambling



- 12 x DVB-S2 to IP with multichannel decryption
- high signal density with 12 streams per RU
- support of UDP/RTP and FEC
- up to 4 satellite positions with 16 input multiswitch thanks to DiSEqC 2.0 support
- fully integrated to the ASTRO U 100-C management system

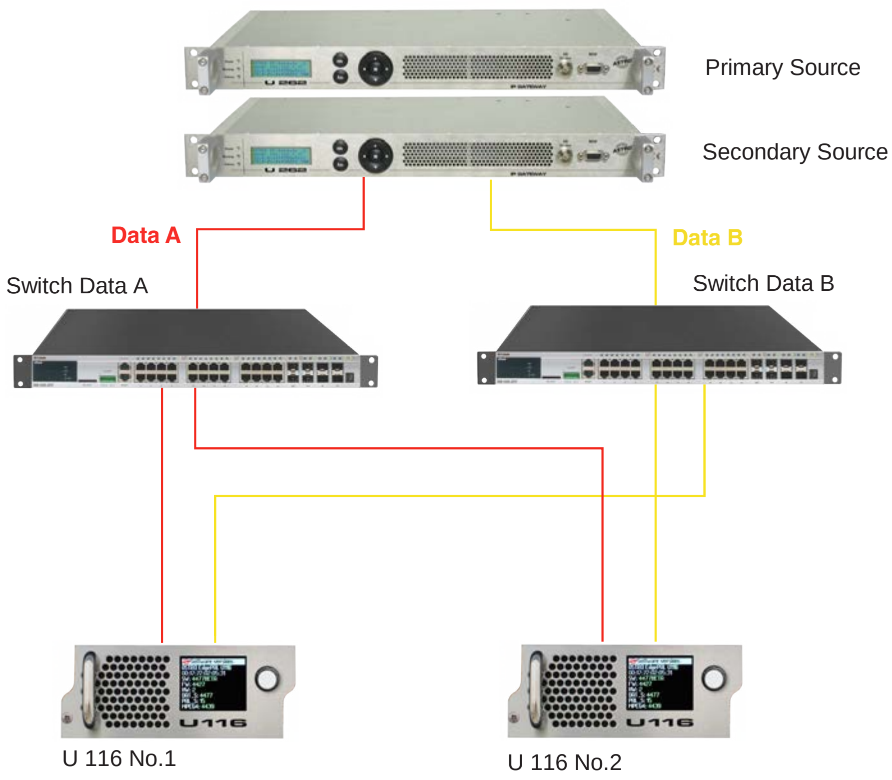
IP head-end: 32 x IP / QAM, 48 x IP / PAL, 40 x IP / FM with fully redundant network structure for management and data connections



- conversion of 32 QAM channels, 48 PAL, SECAM or NTSC channels and 40 FM stations out of IP multicast groups
- only 4 19 inch rack units required
- compatible to any other Video-over-IP equipment encapsulating MPEG-TS to IP, according applicable standards

Application solutions

Demonstration of Link and Source redundancy



Regular Operation:

IP RX Channel Settings

Channel	Enable	Interface	Prim. RX IP socket source	Sec. RX IP socket source	Ter. RX IP socket source	Encapsulation	TSID ONID	Alias
IP RX1	◉ on ○ off	Data A	232.20.100.71:10000 0.0.0.0	232.20.100.130:10000 0.0.0.0	0.0.0.0:0 0.0.0.0	RTP/UDP/IP Mult. PCR	1101 1	Das Erste, ARD
		Data B	232.21.100.71:10000 0.0.0.0	232.21.100.130:10000 0.0.0.0	0.0.0.0:0 0.0.0.0			

- Primary and Secondary Source are working
- IP Receiver “Data A” and “Primary Source” are working according the configured priorities

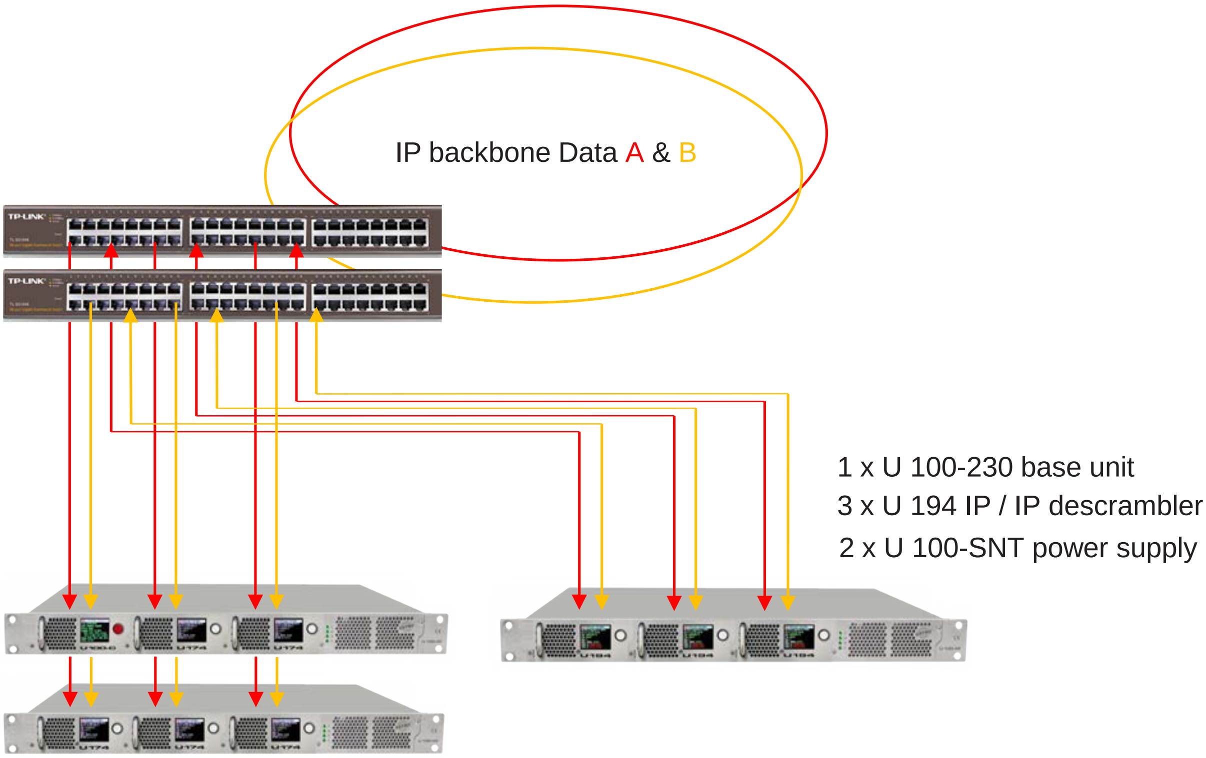
Operation with two failure events:

IP RX Channel Settings

Channel	Enable	Interface	Prim. RX IP socket source	Sec. RX IP socket source	Ter. RX IP socket source	Encapsulation	TSID ONID	Alias
IP RX1	◉ on ○ off	Data A	232.20.100.71:10000 0.0.0.0	232.20.100.130:10000 0.0.0.0	0.0.0.0:0 0.0.0.0	RTP/UDP/IP Mult. PCR	1101 1	Das Erste, ARD
		Data B	232.21.100.71:10000 0.0.0.0	232.21.100.130:10000 0.0.0.0	0.0.0.0:0 0.0.0.0			

- Primary Source failure and Switch Data A failure
- IP Receiver “Data B” and “Secondary Source is working

IP head-end: 20 x IP/COFDM, 12 x IP in / IP out Descrambling



2 x U 100-230 base unit
5 x U 174, 4 channel IP/COFDM
1 x U 100-C, management system
4 x U 100-SNT power supply

- descrambling of 12 streams per rack unit
- multiservice decrambling
- cascadable CI slots

Frequently asked questions

Signal converters

What is the output alignment in the different converters with CATV output?

There are different alignments of output signals depending on the type of modulator. The U 116 IP to PAL and U 174 IP to COFDM converters offer 4 output channels transmitted in 2 pairs via 2 F-female outputs. The difference between start and stop frequency in one pair of output channels can be 32 MHz, or with other words: 2 channels can be left unused between two output channels.

The U 118 IP to PAL and U 158 IP to QAM converter offer 8 output channels transmitted in 2 quartets via 2 F-female outputs. Those 4 channels per output have to be adjacent channels.

An independent processing of the output channels is possible with the U 124 IP to FM converter but via 2 F-female outputs.

Why are there so many IP interfaces for each signal converter?

The ASTRO U 100 series offers several physical interfaces to enable all possible redundancy mechanisms and to configure different receive paths. To reduce the impact of a lost input signal to a minimum, redundant data interfaces are mandatory. For different concepts of remote access it is also necessary to provide redundant management interfaces. These interfaces can be used, but they don't have to be used. The disadvantage of a slightly more time-consuming cabling effort can be neglected, compared to the benefit of high signal stability and different remote access options.

Is it possible to use different types of signal converters in one base unit?

Any type of U 100 series signal converter can be used in the U 100-230 or U 100-48 base unit. They can be operated in any mixture without limitations. The only thing to be considered is the type of backplane which is installed to the corresponding slot. The backplane is part of the delivery of any signal converter. Some are compatible to each other but some are not.

Combining / Channel filtering

Does ASTRO offer a solution for the combining of the RF outputs?

ASTRO offers two standard devices for passive combining, the U 960-32 and U 960-32-1. Both are made for the passive combining of up to 32 RF inputs. In addition the "-1" version is equipped with a two-way splitter for symmetric combining of two U 960 devices.

What is the field of application for the output channel filter?

Any modulator causes broadband noise, no matter how sophisticated the hard- and software is designed. Especially if a huge number of output channels shall be combined, this broadband noise accumulates at the combined output. To cut off this noise, the optional output channel filter can be installed to the signal converter. This leads to a significant improvement of the S/N at the combined output. The ASTRO modulators have one separate signal path to lead the signal via the channel output filter, this means that the modulator stays fully frequency agile.

Service handling / Software updates and extensions

Are the modules of the U 100 series “hot-swappable”?

The main focus of the development of the U 100 series is the operation of biggest CATV networks and one task for operating such networks is the quick and easy exchange of the modules. So as a matter of course, any module of the U 100 series including the power supply is hot swappable without any impact to the working modules in the U 100 base unit.

Are there any features with additional license costs?

All major features of the ASTRO U 100 series are included. Features like UDP/RTP and FEC at the IP receiving side are included as well as programmable time-sharing of output channels and information ticker for PAL programs. These are some examples. The only feature with additional costs is the transport stream analyzer.

How do updates work and what are the costs for updates?

In general, updates are available on the ASTRO firmware server. These updates can be downloaded to a local computer and then an update can be started. The update file might also be stored on the U 100-C management system and the firmware will be uploaded directly or time-controlled to the module. The third possibility is the download via FTP server directly to the module.

Standard firmware updates are free-of-charge. Those standard updates include bug fixes or general improvements of the firmware. If an operator asks for unique customized features ASTRO will make a special quotation.

Technology

What does „Direct Digital“ mean?

Direct Digital features the completely digital modulation of output signals. In addition the new technology on an FPGA basis leads to outstanding signal parameters, independent of temperature and aging. The modulator is realized as software solution with many positive effects. Changing the standard of an output signal is done by programming the module via Web GUI. No tuning of hardware is required.

Direct Digital DD by ASTRO

Why are RTP and FEC recommended?

RTP (Real-time Transport Protocol) is important to evaluate the quality of the link between signal source and receiver. Every transmitted Ethernet frame gets an increment number according RTP. As a result the receiver is able to recognize missing or reordered frames. Any packet loss is only recognized but not repaired. To fix the packet loss FEC (Forward Error Correction) is mandatory. The FEC assorts the arriving Ethernet frames to a matrix and calculates column and line sum. The size of the matrix can be determined in the web GUI and is decisive for the additional overhead of the FEC packets. The “weakest” FEC is able to correct up to 5 missing or corrupt frames in series and produces an overhead of 11% including RTP. RTP is mandatory to set-up an FEC, so both features belong together. In ASTRO IP receiving and transmitting devices RTP and FEC is included without additional license fees.

ASTRO - System provider for head-end components

As a system provider ASTRO produces and sells a complete range of reception and distribution installations for satellite, cable and IPTV. We are the perfect partner for handling the versatile challenges, multimedia communication involves. We offer individual solutions on highest technological level for the complex requirements in this future market.

With more than 65 years of experience in reception technology ASTRO is your competent partner for head-end HFC network layout.

ASTRO supports integrators with its own planning department that delivers software aided network designs. Installers can be sure to be provided with an optimized head-end system, suitable for the required application.

Quality „Made in Germany“

ASTRO head-end components are „Made in Germany“. Each device of the U series is developed and produced in Bensberg close to Cologne.

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