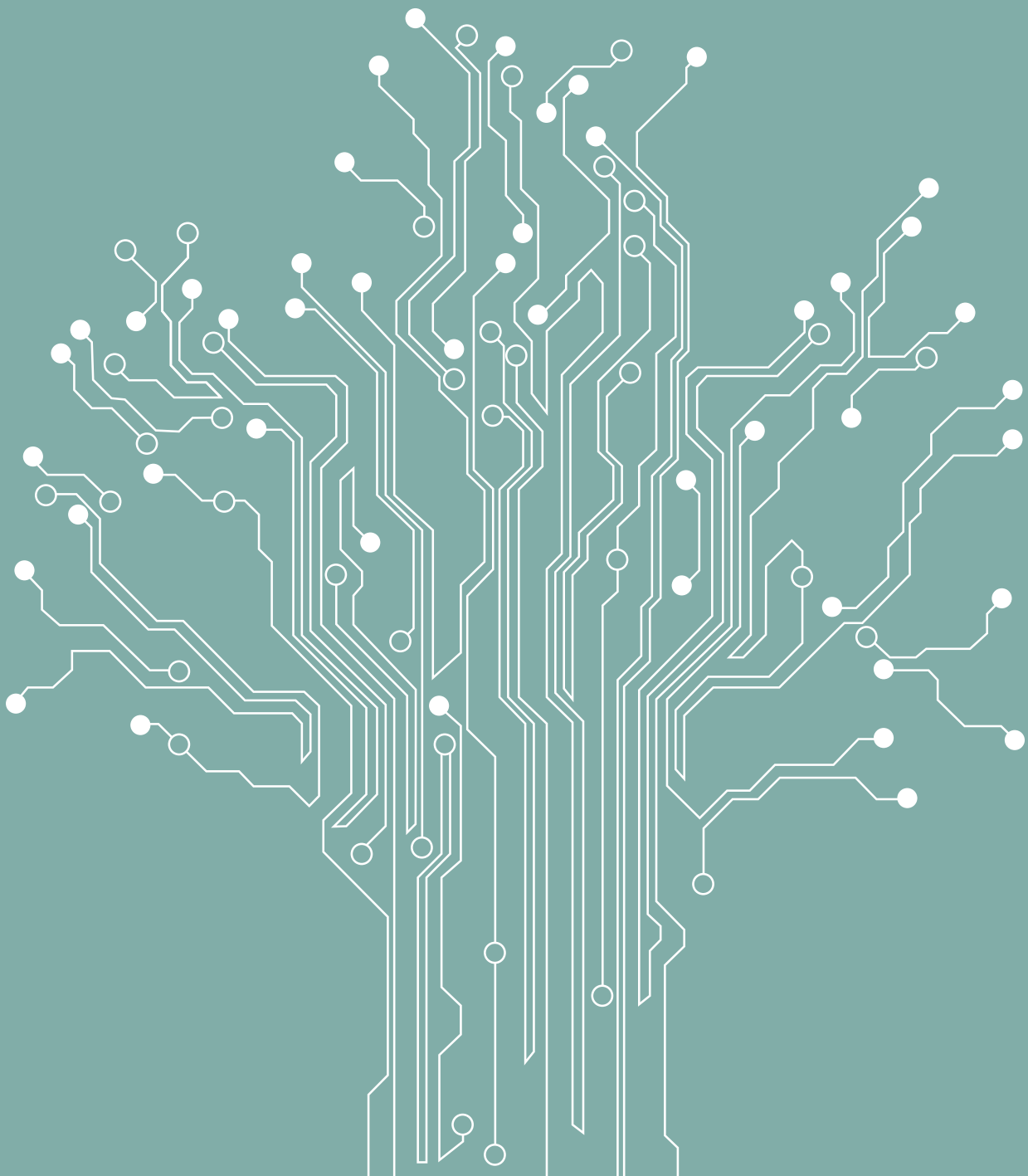
IKUSI
velatia



PROFESSIONAL SOLUTIONS FOR YOUR BUSINESS

MULTIMEDIA CATALOGUE 2013

This catalogue describes the IKUSI products for reception, processing and distribution of terrestrial, satellite and cable signals in individual and collective installations.

IKUSI, in order to provide its customers with products embodying the latest technological advances, reserves the right to make revisions in current production models. New specifications affected by such changes may not appear in this catalogue.

IKUSI is a multinational supplier of integrated solutions in the fields of Electronics and Information and Communication Technologies.

It offers services and solutions in the areas of security, infrastructure and infrastructure maintenance, information / entertainment and communications management, as well as operations for Airports, Traffic Systems and Railways and the Business Management and Health Sectors.

It also offers solutions for remote control systems and designs and manufactures technologies for the processing, reception and distribution of image and sound signals, for TV Operators and professional distributors (electric and electronic storage and installations).

The IKUSI brand was created in 1967, although its origins date back to 1949, when its founder Ángel Iglesias began his entrepreneurial career, finally culminating in IKUSI as it stands today. The company now has a workforce of more than 900 highly-qualified professionals and clients in more than 80 countries, with 5% of its turnover reinvested in R&D&I. Apart from Spain, IKUSI is present in another 9 countries, with especially notable operations in Mexico, where its two subsidiaries, Ikusi México and Micronet, together account for almost a third of all the Group's employees and offer solutions mainly in the sectors of transportation, airports, security and integrated telecommunications. 73% of its annual revenue is generated internationally.

2010 marked an important milestone for IKUSI, as this was the year that it became part of velatia, an industrial group with extensive experience in electric and electronic equipment and goods, which in recent years began to diversify into telecommunications, IT and security. Currently, velatia employs more than 3,000 workers and operates in 18 countries.

IKUSI'S mission is to offer client oriented, innovative solutions to international markets, with the aim of creating stable and growing value, based on mutual and enduring trust with clients and with the people that comprise the organisation, with the suppliers and with society.

The IKUSI brand is not just synonymous with technology and innovation; the trust that it inspires in its clients constitutes one of its greatest assets. Behind this philosophy is a Company that puts its clients at the centre of its business activities, by applying the latest technologies tailored to the individual needs of each client.











From Television to Multimedia

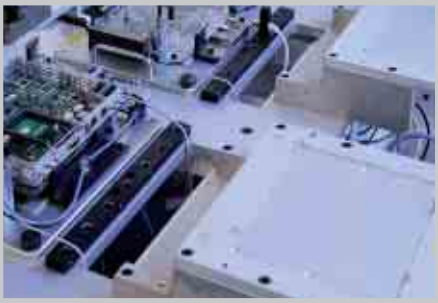
More than 60 years of experience as pioneers in the development of electronic equipment for the reception, processing and distribution of television signals.

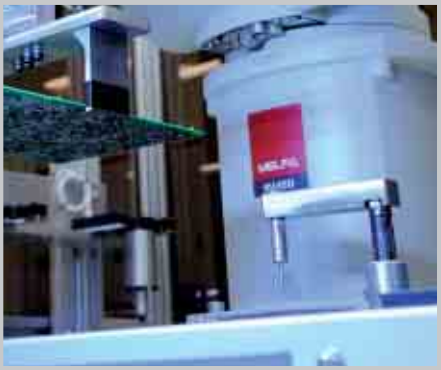
Ikusi has been present in the world of television since the very start of the sector back in the 1950's.
Since then, Ikusi has always pursued the same ideal: Excellence as a goal for everything that we do. It is in our DNA.

However, in the more than 60 years, the sector, television and Ikusi have undergone a huge transformation. A road travelled that we want to view with sufficient perspective and which invites us to change the name of this catalogue. For decades the chosen name was Television Catalogue. A name that we are now replacing with Multimedia Catalogue, in our understanding that this new name better reflects the present time and the importance of Ikusi as a pioneer in the development and manufacture of advanced equipment for the most select customers.

This vocation is deployed in different areas. Ikusi has designed and manufactured electronic equipment for the processing of image and audio signals, combining various technologies, to offer the optimum solution to the professional telecommunications integrator. Our Multimedia area also includes the TV Operators business. Ikusi offers these customer ad hoc solutions for complex applications, such as the integration of embedded decryption systems, in which the versatility and reliability of the equipment is an essential condition. For that reason, Ikusi is the trademark of prestige for the main TV operators in Europe.

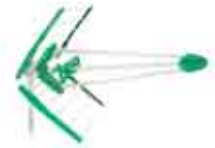
We hope that this Multimedia Catalogue 2013 will help you to consult and design the best solution for your Television installations. We believe that our products, our advice, our after-sales service and our Commercial network are the best value proposition to allow you to achieve excellence in your professional activity. In that respect, we share the same DNA.





Reception

Terrestrial



Satellite

Supports

Mast-Head Preamplifiers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Headends

Broadband Amplifiers




Single channel Headends


Modulators


ClassA headends





ClassA accessories





Distribution

Extension amplifiers



Apartment amplifiers


Multiswitches



Coaxial Cables and Connectors


UTP cables

Passive distribution elements


Wall outlets

Accessories

Instrumentation

Signal analyzers

Others solutions

Optical fibre

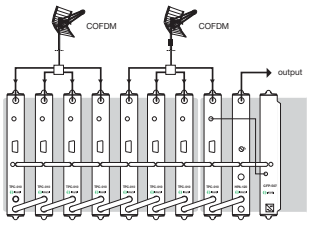
TV Transmitter - Gap Filler

User's equipment

Annex

Level/Voltage conversion table

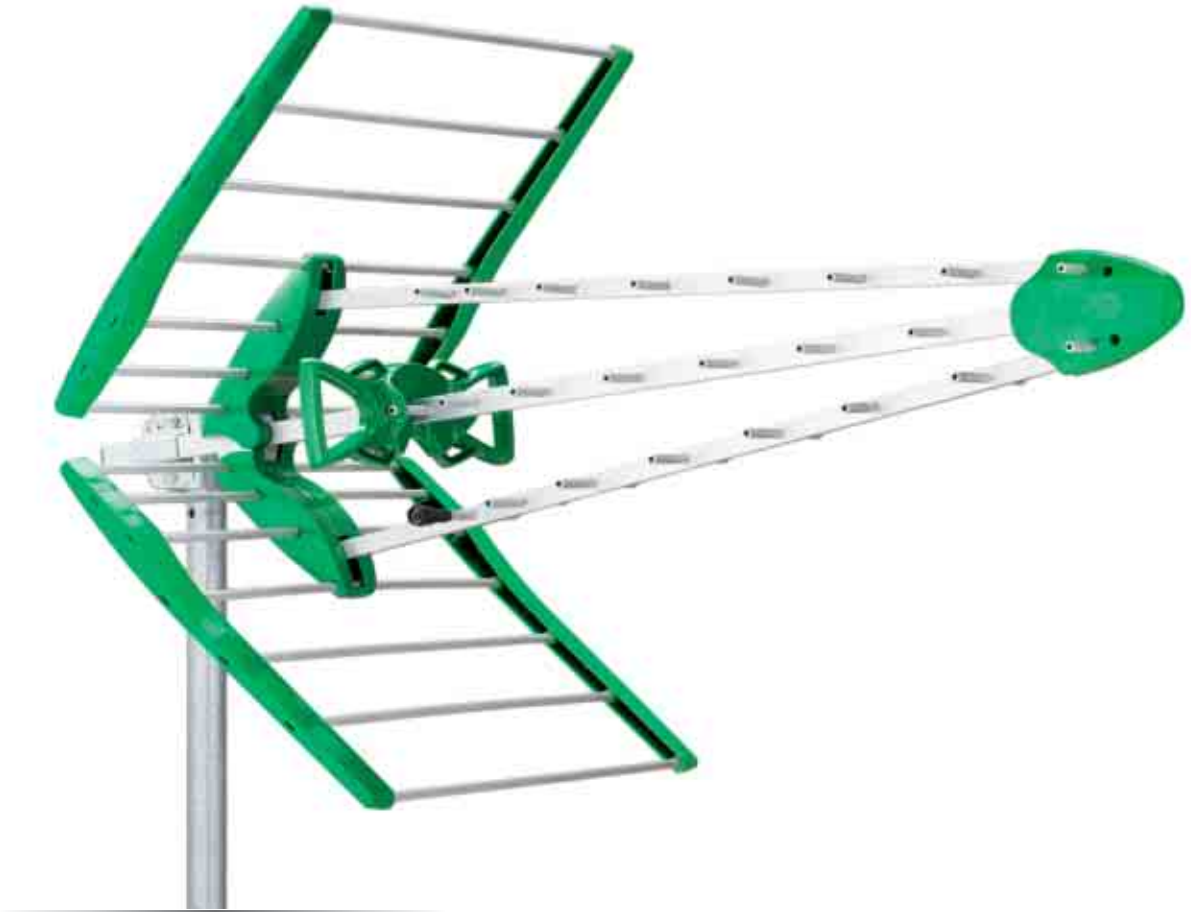
dBµV	0	1	2	3	4	5	6	7	8	9
0	1.0 µV	1.1 µV	1.2 µV	1.4 µV	1.6 µV	1.8 µV	2.0 µV	2.2 µV	2.5 µV	2.8 µV
10	3.2 µV	3.5 µV	4.0 µV	4.5 µV	5.0 µV	5.6 µV	6.3 µV	7.1 µV	7.9 µV	8.9 µV
20	10.0 µV	11.2 µV	12.6 µV	14.1 µV	15.8 µV	17.8 µV	20.0 µV	22.4 µV	25.1 µV	28.2 µV
30	31.6 µV	35.5 µV	39.8 µV	44.7 µV	50.1 µV	56.2 µV	63.1 µV	70.8 µV	79.4 µV	89.1 µV
40	100 µV	112 µV	126 µV	141 µV	158 µV	178 µV	200 µV	224 µV	251 µV	282 µV
50	316 µV	355 µV	398 µV	447 µV	501 µV	562 µV	631 µV	708 µV	794 µV	891 µV
60	1.0 mV	1.1 mV	1.3 mV	1.4 mV	1.6 mV	1.8 mV	2.0 mV	2.2 mV	2.5 mV	2.8 mV
70	3.2 mV	3.5 mV	4.0 mV	4.5 mV	5.0 mV	5.6 mV	6.3 mV	7.1 mV	7.9 mV	8.9 mV
80	10.0 mV	11.2 mV	12.6 mV	14.1 mV	15.8 mV	17.8 mV	20.0 mV	22.4 mV	25.1 mV	28.2 mV
90	31.6 mV	35.5 mV	39.8 mV	44.7 mV	50.1 mV	56.2 mV	63.1 mV	70.8 mV	79.4 mV	89.1 mV
100	100 mV	112 mV	126 mV	141 mV	158 mV	178 mV	200 mV	224 mV	251 mV	282 mV
110	316 mV	355 mV	398 mV	447 mV	501 mV	562 mV	631 mV	708 mV	794 mV	891 mV
120	1.0 V	1.1 V	1.3 V	1.4 V	1.6 V	1.8 V	2.0 V	2.2 V	2.5 V	2.8 V



Reception

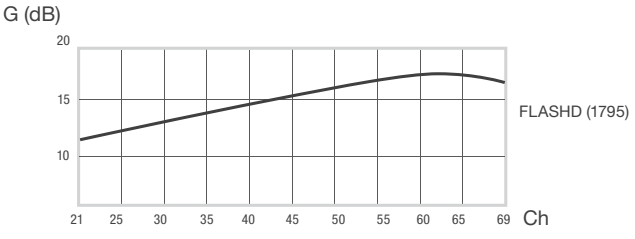
FLASHD

FLASHD | LTE | COMPACT | NANO



MODEL			FLASHD (HDT518V)		
REF.			1795		
Channels			21 - 69 (470-862 MHz)		
Gain		dB	17.5		
Front-to-Back ratio		dB	≥20		
Beamwidth	90° dihedral mode 120° dihedral mode	H / V H / V	470 MHz 55°/65° 55°/55°	670 MHz 40°/50° 40°/40°	860 MHz 25°/30° 25°/23°
Windload		N	130 Km/h : 105 150 Km/h : 150		
Length		cm	105		
Packed weight		kg	3		
Quantity boxed			1		

Gain Graphs



MAST BRACKET I-FIX Patented by Ikusi

The instant open antenna with automatic mast bracket

support detail >

- The TV FLASHD antenna, supplied completely assembled.
- The antenna is unfolded by simply pressing a button.
- Automatic bracket, **fastening with one hand.**
- Convergent triple-boom with 23 directors.
- Active or passive compact dipole. Dihedral reflector, all elements made of aluminium.
- Clamping system for masts of ø 25 to 50 mm. Variable clamp tilt ±40°. Horizontal or vertical polarization.
- Cable connection: F type connector. 1 screw-on plug and 1 rubber protection cap are supplied.
- Polystyrene connecting-box with weatherproofing IP55 grade. The box is easily detachable for an easier coaxial cable connection. Impedance: 75 Ω.

Fully assembled

Without tools

PATENTED

Compact dipole

PATENTED

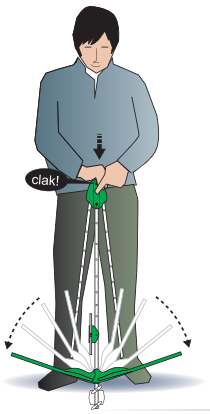
New automatic bracket

17.5 dB

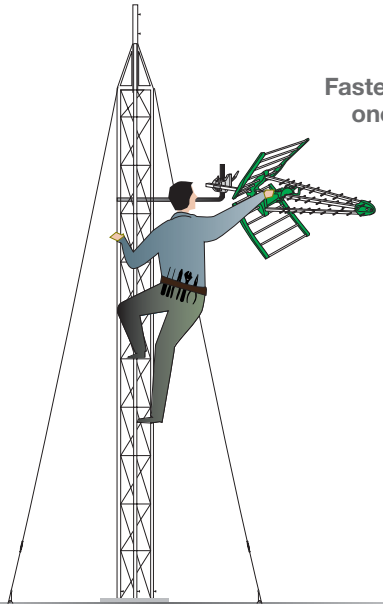
Gain 17.5 dB

100% recyclable

Unfolded by simply pressing a button!



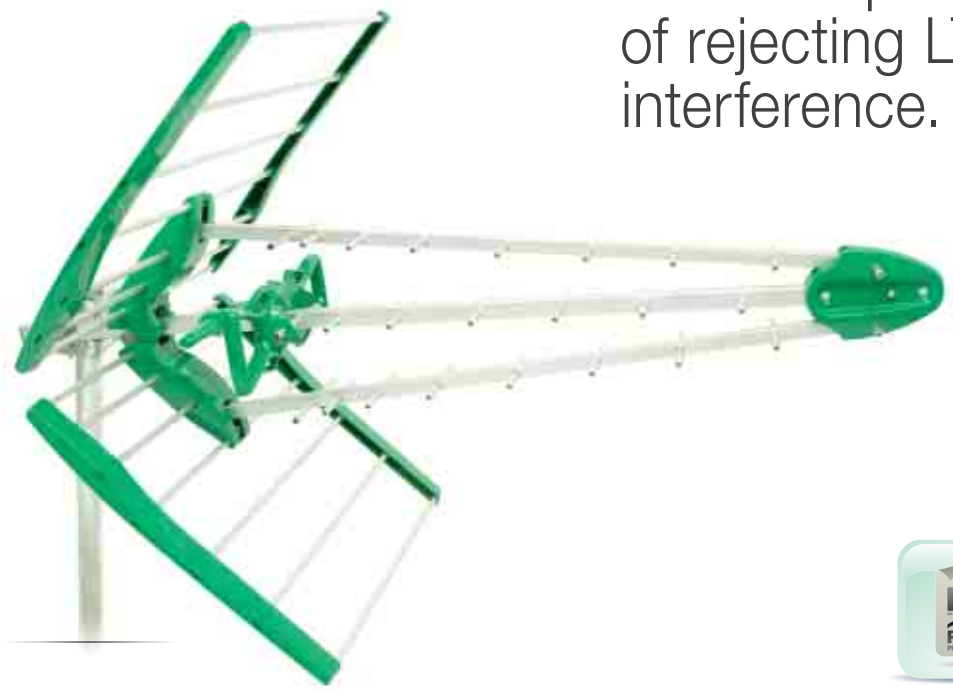
Fastening with one hand!



FLASHD

FLASHD | LTE | COMPACT | NANO

Antennas adapted to the new TV spectrum, capable of rejecting LTE band interference.



Rejection of LTE frequencies

Rotation system to adjust polarity

Instant opening with the touch of a button

Full assembled

New automatic bracket

Compact dipole

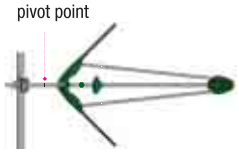
No tools required

100% recyclable

- The key feature of the new Flashd LTE antennas is that they provide a strong rejection of LTE while maintaining current gains, very often without the need to incorporate a filter.
- Designed to help avoid the saturation of active equipment by LTE signals, rejecting frequencies above 790 MHz.
- Two antenna models:

  FLASHD LTE c60. The antenna frequency response is cut off at channel 60.

  FLASHD LTE c58. The antenna frequency response is cut off at channel 58.
- Equipped with a mechanism for rotating on their own axis to facilitate the change in polarity.
- Supplied fully assembled.
- Unfold with a simple press of a button.
- Installed with one hand by means of automatic clamping.
- Convergent triple-boom, with 26 directors.
- Passive compact dipole. Dihedral reflector, all aluminium parts.
- Fixed to masts of 025 to 50 mm. Adjustable tilt angle ±40°.
- ABS enclosure with IP55 protection rating. Easy disassembly for fast coaxial cable connection.

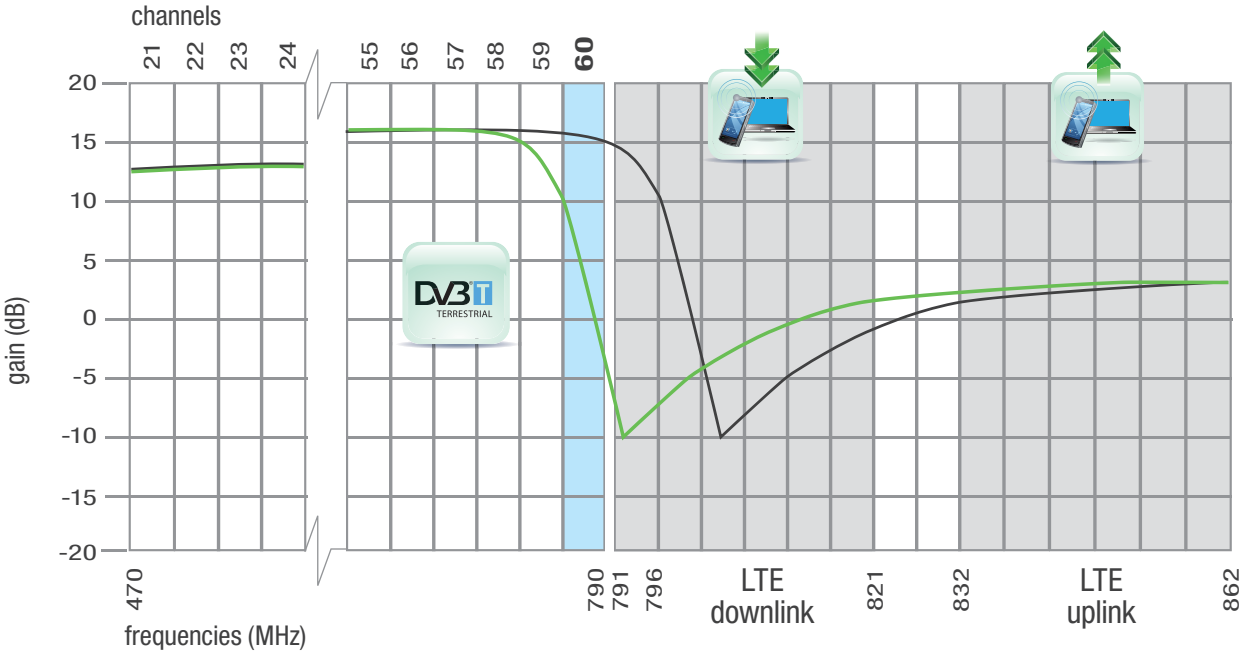


MODEL (green color)		FLASHD LTE c60 (HDT618V)	FLASHD LTE c58 (HDT818V)
REF.		1808	1810
MODEL (gray color)		FLASHD LTE c60 (HDT618V)	FLASHD LTE c58 (HDT818V)
REF.		1807	1809
Channels		21 - 60 (470-790 MHz)	21 - 58 (470-774 MHz)
Nominal gain	dB	17	
Front-to-Back ratio	dB	≥20	
Beamwidth	H / V H / V	40º / 50º (470 MHz) 55º / 65º (670 MHz)	
Windload	N	130 Km/h : 105 150 Km/h : 150	
Length	cm	105	
Packed weight	kg	3	
Quantity boxed		1	

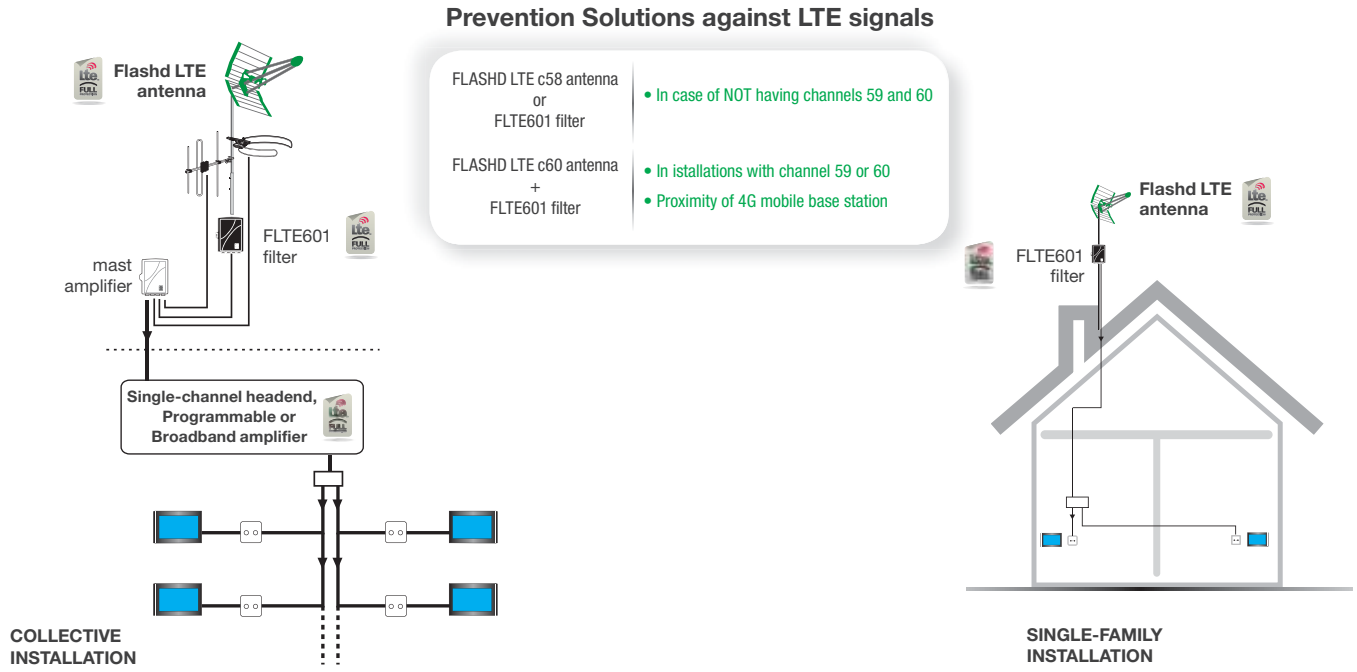
1 screw-on plug and 1 rubber protection cap are supplied.

FLASHD LTE gain diagrams

FLASHD LTE c60 antenna gain diagram.
FLASHD LTE c58 antenna gain diagram.



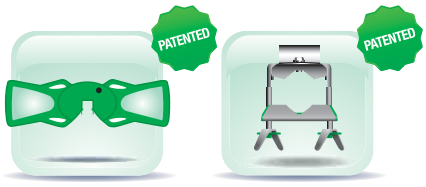
Installation example



FLASHD

FLASHD | LTE | **COMPACT** | NANO

MODEL		FLASHD COMPACT (HDT513V)
REF.		1803
Channels		21 - 69 (470-862 MHz)
Gain	dB	13
Front-to-Back ratio	dB	≥ 16
Beamwidth	H V	60º 80º
Windload	N	130 Km/h : 18 150 Km/h : 23
Length	cm	80
Packed weight (10u)	kg	8
Quantity boxed		10

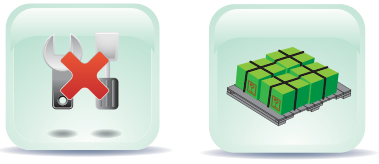


Compact dipole

Robust and functional clamping

Gain 13 dB

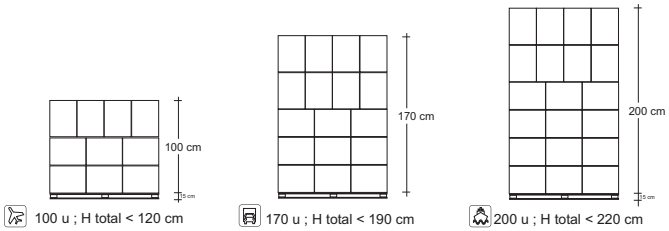
100% recyclable



Easy assembly without tools

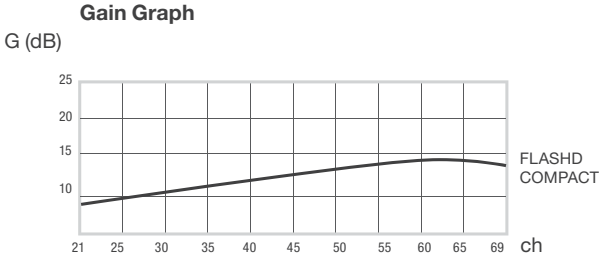
Versatility in the pallet

- UHF reception antenna. Dihedral reflector, compact dipole and 7 directors.
- For vertical and horizontal polarization, allowing variation of elevation angle.
- Easy assembly without tools.
- Minimum volume transport packaging.
- Clamping system for masts Ø 25 to 50 mm.
- Cable connection: F type connector. 1 screw-on plug and 1 rubber protection cap are supplied.
- The box is easily detachable for an easier coaxial cable connection.



Versatility in the pallet from 30cm to the desired height, in increments of 10cm

Gain Graph



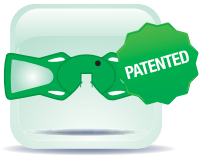
FLASHD

FLASHD | LTE | COMPACT | NANO

MODEL		FLASHD NANO (HDT511V)
REF.		1800
Channels		21 - 69 (470-862 MHz)
Gain	dB	12
Front-to-Back ratio	dB	≥16
Beamwidth	H V	60° 80°
Windload	N	130 Km/h : 15 150 Km/h : 20
Dimensions	cm	50 x 30
Packed weight	kg	0.825
Quantity boxed		5

- The smallest antenna range FLASHD for reception of TV signals in the UHF band, formed by a dihedral reflector made up of four aluminium tubes and a dipole (the same as the one in the FLASHD antenna).
- For vertical and horizontal polarization, allowing variation of elevation angle.
- Minimum packaging volume for transport and easy assembly without tools.

Without tools



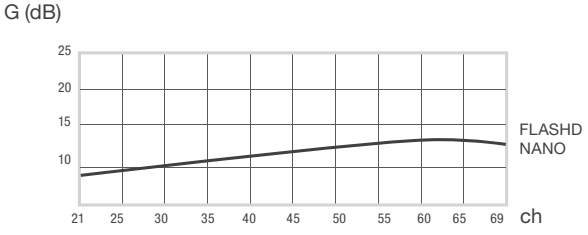
Compact dipole

Robust and functional clamping

Gain 12 dB

100% recyclable

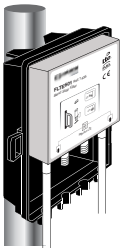
Gain Graph



LTE band-stop filter

FLTE601

One professional filter with two cut-off at channel 59 or 60

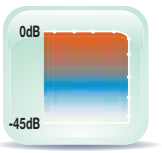


pass filter up to channel 59

pass filter up to channel 60

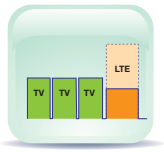
Rejection LTE frequencies

2 Cut-off channels on the same filter



Maximum attenuation to LTE frequencies

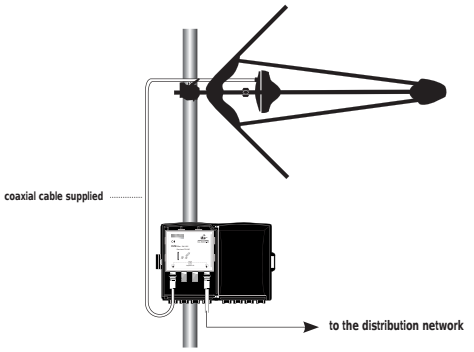
Supplied with connectorised cable



High selectivity and minimal losses on high TV channels

- High-rejection helicoid filter designed with a new concept.
- One single filter with two stop frequencies on channel 59 or 60, depending on the radio spectrum, the FLTE601 can be configured as a pass filter up to channel 59 or channel 60. A built-in key makes it easy to do.
- Designed for most installations, comparable with the top-range filters on the market, capable of providing maximum protection to TV installations, preventing damaging LTE down-links.
- In cases in which the TV installation is very close to the LTE base stations and channel 60 is available, it may be necessary to combine the LTE Flashd Antenna + FLTE601 filter.
- Minimal losses on the highest TV channel and rejection of more than 45 dB to the LTE frequencies.
- Equipped with a connectorized coaxial cable coupling on both ends, making the connection easier for the installer, with the subsequent time savings.
- Housed in weatherproof box with an IP55 protection level.

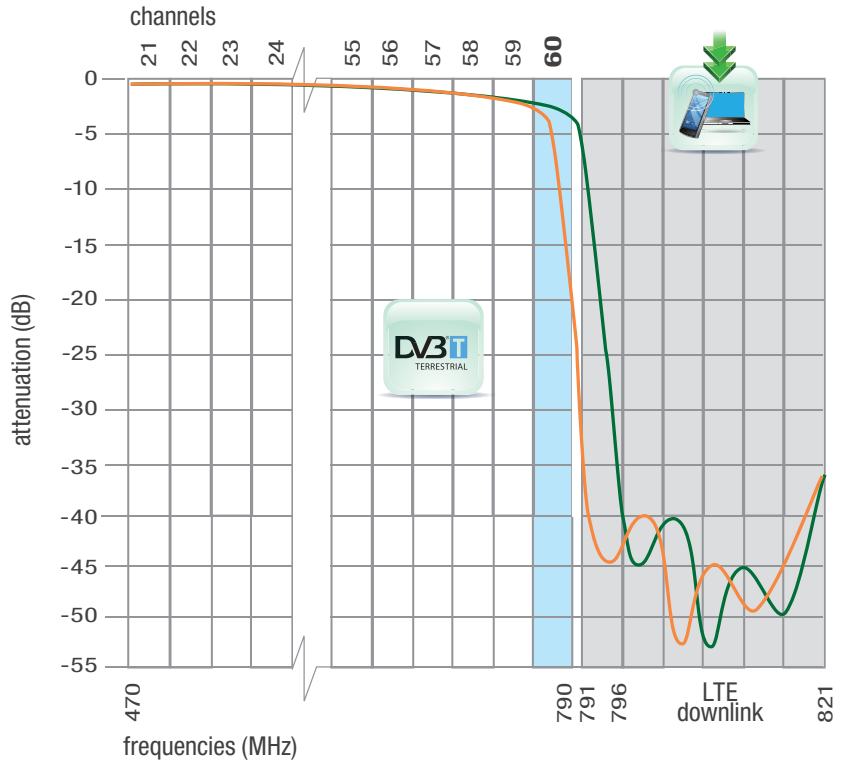
MODEL		FLTE601	
REF.		1435	
Two cut-off options		channel 59	channel 60
Pass band frequencies	MHz	0 ... 782	0 ... 790
Attenuation LTE frequencies	dB	see graph on next page	
Insertion losses	dB		
Dimensions	mm	96 x 125 x 46	



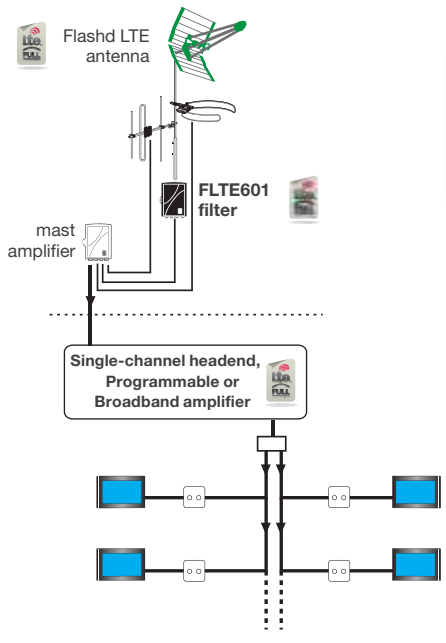
NEW

Filter attenuation graph

FLTE601 with cut-off at channel 60
FLTE601 with cut-off at channel 59



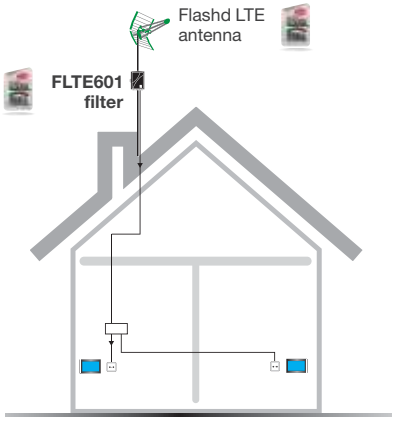
Installation example



COLLECTIVE INSTALLATION

Prevention Solutions against LTE signals

FLASHD LTE c58 antenna or FLTE601 filter	• In case of NOT having channels 59 and 60
FLASHD LTE c60 antenna + FLTE601 filter	• In istallations with channel 59 or 60 • Proximity of 4G mobile base station



SINGLE-FAMILY INSTALLATION

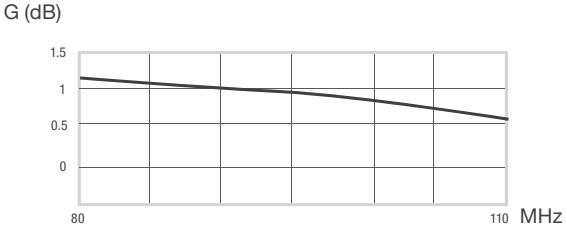
Radio

IKS1/FM DAB-300

MODEL		IKS-1E/FM
REF.		1725
Frequency range	MHz	87.5 - 108
Gain	dB	1
Front-to-Back ratio	dB	0
Windload (for velocities 130/150 km/h)	N	28/38
Quantity boxed		5

- Radio antenna - VHF band.
- Elements and support square-bars made of aluminium.
- Pre-assembled. Clamping system for masts of Ø25 to 50 mm.
- Terminal clamp connection. Impedance: 75Ω.

Gain Graph

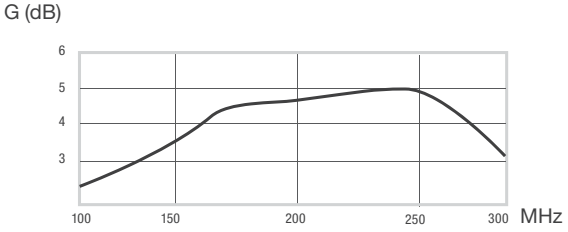


IKS1/FM DAB-300

MODEL		DAB-030
REF.		1730
Frequency range	MHz	174 - 240
Gain	dB	5
Front-to-Back ratio	dB	10
Windload (for velocities 130/150 km/h)	N	15/20
Quantity boxed		5

- Antenna for reception of digital radio DAB.
- Type Yagi (3 elements).
- Terminal clamp connection.

Gain Graph



Satellite Dishes-offset type

RPA ANTENNA | RPA SUPPORT | LNB

- Dish made of powder-coated steel, LNB arm made of aluminium, LNB holder made of polypropylene and fibre glass,Az-El holder made of galvanized steel, with 2 U-bolts and 2 mast clamps.
- Precision mechanical construction.
- Supplied in individual box or industrial packings of 30 units.

RPA-080

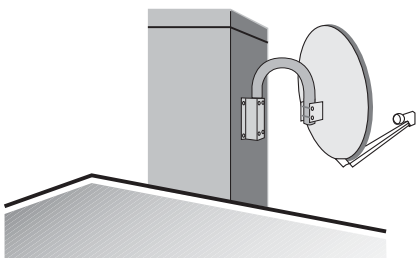
MODEL			RPA-060	RPA-080	RPA-080T
REF.			3065	3067	3068
Diameter / Colour		cm	60 / light grey	80 / light grey	
Gain	10.75 GHz	dBi	34.7	36.8	
	11.75 GHz		35.2	37.8	
	12.75 GHz		36.1	38.5	
Offset angle		°	25	25	
Beamwidth (at 12.75 GHz)		°	< 3.1	< 2.2	
Cross-polar discrimination		dB	> 27	> 27	
Pointing range	Elevation	°	15 - 48	10 - 56	
	Azimut	°	0 - 360	0 - 360	
LNB bracket diameter		mm	23 / 40	23 / 40	
Dish dimension (external)		mm	574 x 644	745 x 845	
Mast clamp diameter		mm	32 - 60	32 - 76	
Windload (130/150 km/h)		N	320 / 435	520 / 710	
Quantity boxed			1	1	30

RPA ANTENNA | RPA SUPPORT | LNB

SPA-240

SCF-085

MODEL	REF.	DESCRIPTION
SCF-085	**1067**	Ground-fixing. "Column" type. Heigh: 90cm. For antennas RPA-080 and RPA-100. Pipe of Ø50 mm and quadrangular base of 200x200 mm, all made of zinced steel.
SPA-240	**3071**	Wall-fixing. "U" type. Width of the arm: 24cm. For antennas RPA-060 and RPA-080. Pipe of Ø40mm made of galvanized steel.



SPA-240 for Wall-fixing "U" type

Satellite Dishes-offset type

RPA ANTENNA | RPA SUPPORT | LNB

MODEL		UEU-121K
REF.		1113
Type		UNIVERSAL
Input frequency	GHz	10.70 - 12.75
Output frequency	MHz	950 - 2150
Phase noise at 10 kHz	dBc/Hz	-85
Gain	dB	58 (±2)
Noise figure (typ.)	dB	0.2
IF outputs *		1 (VL or VH or HL or HH)
Control tone		22 kHz for high band 11.70 a 12.75 GHz
Max consumption	mA	90
Operating voltage	VDC	vert.: 11 - 14 hor.: 16 - 20

MODEL		UEU-221K
REF.		3083
Type		TWIN UNIVERSAL
Input frequency	GHz	10.70 - 12.75
Output frequency	MHz	950 - 2150
Phase noise at 10 kHz	dBc/Hz	-85
Gain	dB	58 (±2)
Noise figure (typ.)	dB	0.2
IF outputs *		2 (VL or VH or HL or HH)
Control tone		22 kHz for high band 11.70 a 12.75 GHz
Max consumption	mA	190
Operating voltage	VDC	vert.: 11 - 14 hor.: 16 - 20

MODEL		UEU-124K
REF.		1114
Type		QUATTRO
Input frequency	GHz	10.70 - 12.75
Output frequency	MHz	950 - 2150
Phase noise at 10 kHz	dBc/Hz	-85
Gain	dB	58 (±2)
Noise figure (typ.)	dB	0.2
IF outputs *		4 (VL) (VH) (HL) (HH)
Control tone		—
Max consumption	mA	190
Operating voltage	VDC	9 - 20

* VL (Vertical, Low) : Vertical Polarization, Low band 950-1950 MHz
VH (Vertical, High) : Vertical Polarization, High band 1100-2150 MHz
HL (Horizontal, Low) : Horizontal polarization, Low band 950-1950 MHz
HH (Horizontal, High) : Horizontal polarization, High band 1100-2150 MHz

- Use with offset antennas. F connector.
- Input frequency: 10.70 - 12.75 GHz.
- 3 types: Universal, Twin Universal and Quattro.

Supports and accessories

SUPPORTS | MASTS | TOWERS

1888

1887

1886

1911

1890

REF	DESCRIPTION
1888	KMV-100. Wind set (steelwire 25 m, Rigging screw, Wirelock). For Ø30 to 35 mm masts.
1887	BMA-200. Single angle pipe with 4 screws plate and polythene cap.
1890	APR-350. Universal mast bracket.

REF	DESCRIPTION
1911	GMA-400. Wall-screwing clamp, length 40 cm for Ø≤45 mm masts.
1889	GMA-200. Wall-screwing clamp, length 20 cm for Ø≤45 mm masts.
1886	GME-200. Wall support bracket for Ø ≤45 mm masts.

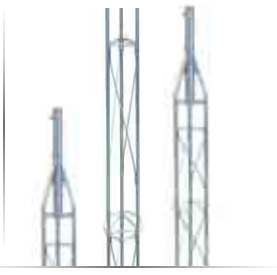
SUPPORTS | MASTS | TOWERS

REF	DESCRIPTION
1941	Plug-in mast 3 meters , 40 mm Ø, thickness 2 mm.
1880	Plug-in mast 2.5 meters , 35 mm Ø, thickness 1.5 mm.
1881	Plug-in mast 1.5 meters , 35 mm Ø, thickness 1.5 mm.

SUPPORTS | MASTS | TOWERS

1876

1950



REF	DESCRIPTION
1942	Trestle-power or upper section, 2.5m. Top end adapted for housing the point mast.
1944	Trestle-power or upper section, 1.5m. Top end adapted for housing the point mast.
1943	Lower section, 2.5 m. To be coupled to an upper section or to be used as intermediate section. Resulting trestle-tower requires rope-bracing.
1950	BTA-225. Screwed, triangular fixed base, side 225 mm. Three bolts for securing the trestle-tower.
1876	Hooked, triangular fixed base, side 225 mm. Three bolts for securing the trestle-tower.
1948	Steel wire Ø3 mm for rope-bracing use (100 m).

Shielded multiband amplifiers

SBA | MBS | MB | MMS | MMU

MODEL		SBA-100	SBA-120	SBA-210	SBA-202	SBA-290	SBA-220	SBA-353
REF.		3398	3390	3399	3385	1213	3394	1218
RF inputs		1	1	2	2	2	2	3
Frequency range		UHF	UHF	BI/DAB/BIII - UHF	VHF - UHF	UHF - SAT	FM - UHF	BI/DAB/BIII - UHF - UHF
Nominal gain	dB	UHF: 40	UHF: 35	BI/FM/BIII: 30 UHF: 40	BI/DAB/BIII: -1 UHF: 25	UHF: 35 SAT:-2	FM: 22 UHF: 40	BI/DAB/BIII: 30 UHF1: 35 UHF2: 35
Gain adjustment	dB	0 - 15	0 - 15	0 - 15	0 - 15	0 - 15	0 - 15	0 - 15
Noise figure	dB	≤ 2	≤ 3	BI/FM/BIII: ≤ 3.5 UHF: ≤ 2	VHF: ≤ 1 UHF: ≤ 3	≤ 3	FM: ≤ 5 UHF: ≤ 2	BI/DAB/BIII: ≤ 3 UHF: ≤ 5
Output level (DIN-B, -60dB)	dBµV	105	114 [1]	105	106	105	105	103
Rejection to BI (FM)	dB	—	—	≥ 25	—	—	—	≥ 30
Input isolation	dB	—	—	≥ 26	> 26	—	≥ 26	≥ 18
Operation voltage	VDC	+24	+24	+24	+24	+12 to +24 [2]	+24	+24
Consumption	mA	30	50	30	40	50 (12V) , 70 (24V)	30	80
Dimensions	mm	96 x 125 x 46	96 x 125 x 46	96x 125 x 46	96 x 125 x 46	96 x 125 x 46	96 x 125 x 46	150 x 112 x 68

[1] The high signal capacity of the SBA-120 is reinforced with two built-in notch filters for selective attenuation of 1 or 2 very strong channels. Adjustment range extends to GSM 900 mobile telephony frequencies. To facilitate the adjustment of the notch-filters, the SBA-120 has a -20dB test port.

		Notch-filter 1	Notch-filter 2
Adjustable frequency	MHz	470 ... 770	760 ... 960
Notch depth	dB	5 (470 MHz) “ “ 18 (770 MHz)	8 (760 MHz) “ “ 18 (860 MHz) “ “ 25 (960 MHz)

[2] Line powering via down-lead coax cable:
a) From a 'Satellite Receiver + APB-912 Power Supply' assembly. Passing of voltage/tone to SAT input port.
b) In the case of not using the SAT input, from an APB-912 or APB-624 power supply.

SAT connection	Operating voltage
YES	12V ... 18V
NO	12V ... 24V

- Very high UHF gain. Sat-IF coupling in the SBA-290 model.
- Interstage variable attenuators. Optimum design for very low operative noise figure.
- GSM frequency rejection filter.
- Internal injection-moulded zinc alloy housing with F type ports.
- External HIPS (high-impact polystyrene) box, with fixing plastic clamp for 20-50 mm diameter masts. IP55 weatherproofing grade.
- Protection against lightning.

Application example:
Pág. 126

Shielded multiband amplifiers

SBA | MBS | MB | MMS | MMU

MODEL		MBS-200
REF.		3397
RF inputs		2
Frequency range		VHF - UHF
Nominal gain	dB	VHF: -1 UHF: 30
Gain adjustment	dB	0 - 15
Noise figure	dB	≤ 4
Output level (DIN-B, -60dB)	dBµV	106
Rejection to BII (FM)	dB	—
Input isolation	dB	≥ 26
Operating voltage	VDC	+24
Consumption	mA	40
Current passage (with ON/OFF switch)		Yes (UHF)
Dimensions	mm	96 x 125 x 46

MODEL		MBS-300
REF.		3396
RF inputs		3
Frequency range		BI/DAB/BIII - UHF - UHF
Nominal gain	dB	BI/DAB/BIII: 30 UHF1: 26 UHF2: 26
Gain adjustment	dB	0 - 15
Noise figure	dB	BI/DAB/BIII: ≤ 5 UHF: ≤ 9
Output level (DIN-B, -60dB)	dBµV	106
Rejection to BII (FM)	dB	≥ 25
Input isolation	dB	≥ 18
Operating voltage	VDC	+24
Consumption	mA	40
Current passage (with ON/OFF switch)		Yes (UHF)
Dimensions	mm	96 x 125 x 46

- Variable input attenuators and DC feed-through switches.
- Internal zinc alloy housing with integral F type ports.
- External uv stabilised ABS box with fixing plastic clamp for 20-50mm diameter masts.
- Protection against lightning.

Multiband amplifiers

SBA | MBS | MB | MMS | MMU

MODEL		MB-01	MB-222	MB-322	MB-255
REF.		2180	2185	3407	2186
RF inputs		1	2	2	2
Frequency range		BI/DAB/BIII/UHF	BI/DAB/BIII UHF	FM UHF	UHF UHF
Nominal gain	dB	26	BI/DAB/BIII: 32 UHF: 32	FM: 32 UHF: 32	UHF1: 26 UHF2: 26
Gain adjustment	dB	—	0 - 15	0 - 15	0 - 15
Noise figure	dB	≤ 3	≤ 3	≤ 3	≤ 7
Output level (DIN-B, -60dB)	dBµV	106	106	106	106
Rejection to BI (FM)	dB	≥ 30	≥ 30	—	—
Input isolation	dB	—	≥ 26	≥ 26	≥ 18
Operating voltage	VDC	+24	+24	+24	+24
Consumption	mA	45	45	45	45
Current passage (with ON/OFF switch)		Yes	Yes (UHF)	Yes (UHF)	Yes (UHF)
Dimensions	mm	109 x 84 x 57	96 x 125 x 46	96x 125 x 46	96 x 125 x 46

- Variable input attenuators and DC feed-through switches.
- Polystyrene box with fixing plastic clamp for 20-50 mm diameter masts.
- Protection against lightning. Terminal-clamp connection.

Selective amplifier

MMS

MODEL		MMS-UHF
REF.		1429
Bandwidth		1 UHF channel
Nominal gain	dB	21
Selectivity	dB	>20 (±12 MHz) >30 (±20 MHz)
Noise figure	dB	5
Output level	dBµV	105 (analog) [1] 100 (digital) [2]
Operating voltage	VDC	+24
Consumption	mA	20
Current passage		Yes
Dimensions	mm	96 x 125 x 46

[1] DIN-K, -54 dB
[2] EN 50083-3, -35 dB

2 input band multiplexer

MMU

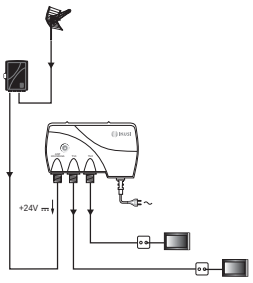
MODEL		MMU
REF.		1270
RF inputs		2
Frequency range		40-862 MHz 40-862 MHz
Insertion loss	dB	VHF: 3.5 UHF: 5
Input isolation	dB	≥ 18
Current passage		Yes
Dimensions	mm	109 x 84 x 57

- Amplification of 1 UHf channel.
- Polystyrene box with fixing plastic clamp for 20-50 mm diameter masts.
- Protection against lightning.
- Terminal-clamp connection.

Power Supply +24 VDC

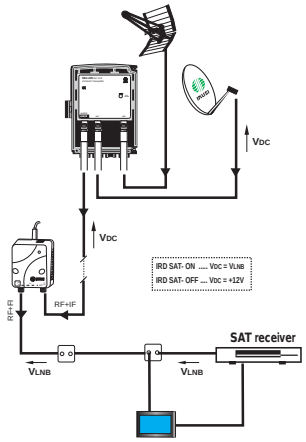
APB

MODEL		APB-124
REF.		3432
Regulation type		switch mode
Mains voltage (50 Hz)	VAC	230-240
Output voltage	VDC	+24 (±5%)
Max output current	mA	100
Frequency range	MHz	40 - 862
Number de RF outputs		2
RF insertion loss	dB	≤ 4
Max consumption	W	3,5
Dimensions	mm	90 x 58 x 22



Power Supply +12 VDC

MODEL		APB-912
REF.		3433
Regulation type		linear
Mains voltage (50 Hz)	VAC	230-240
Output voltage	VDC	+12 (±5%)
Max output current	mA	200
Frequency range	MHz	45 - 2300
Number de RF outputs		1
RF insertion loss	dB	≤ 1.5
Max consumption	W	5.5
Dimensions	mm	65 x 90 x 45



- Two models for two regulation technologies.
- 1 «RF input + DC output» port - 1 or 2 «RF output» ports.
- Electrical safety protection level: Class II.
- External plastic box. Wall fixing by 2 screws supplied.
- APB 912: Designed to be used with mast-head preamplifiers featuring Sat-IF coupling, such as the IKUSI's SBA-290 model. When the user's SAT receiver is OFF or stand-by, the APB-912 power supply operates normally, providing +12 Vdc voltage for the mast-head preamplifier (and also, attention, for the attached LNB).
  When the SAT receiver is switched ON, the APB-912 comes automatically to stand-by and let pass the voltage/tone signals coming from the receiver, so that the LNB as well the SBA-290 preamplifier are powered by the SAT receiver.

Amplifier + Power supply kits

JSBA

MODEL	REF	CONTENTS
JSBA100	**1208**	Amplifier SBA-100 + Power supply APB-124
JSBA210	**1210**	Amplifier SBA-210 + Power supply APB-124

Headends

Terrestrial and Satellite headend amplifier

NBS-800

- High-power broadband amplifiers, for terrestrial and satellite signals in small installations.
- Four models:
  NBS-801 (1 broadband input ; 1 output),
  NBS-804 (4 inputs BI/FM-BIII/DAB-2xUHF ; 1 output)
  NBS-824 (4 inputs BI/FM-BIII/DAB-UHF1-UHF2 ; 1 output)
  NBS-895 (5 inputs BI/FM-BIII/DAB-2xUHF-IF SAT ; 1 output)
- Interstage input attenuators.
- Powered by switching power supply, in removable box.
- By inserting a bridge, you can select the cutoff frequency low-pass filter in the upper UHF, switchable between 862 MHz and 790 MHz.
- Power passing to input.
- Zamak housing with protective cover for adjustment potentiometers.
- F Connectors. Wall fixing and indoor mounting. Grounding terminal.
- Compatible with UNICABLE ™

MODEL		NBS-801	NBS-804	NBS-824	NBS-895
REF.		3531	3532	3533	3534
Inputs		1	4 BI/FM-BIII/DAB-2xUHF	4 BI/FM-BIII/DAB-UHF1-UHF2	5 BI/FM-BIII/DAB-2xUHF-IF SAT
Frequency range	MHz	45-862 / 45-790 *	BI/FM: 45-112 BIII/DAB: 174-240 2xUHF: 470-862 / 470-790 *	BI/FM: 45-112 BIII/DAB: 174-240 UHF1: 470-606 ** UHF2: 606-862 ** 606-790 *	BI/FM: 45-112 BIII/DAB: 174-240 2xUHF: 470-862 / 470-790 * IF SAT: 950-2150
Gain	dB	42	BI/FM: 42 BIII/DAB: 42 2xUHF: 45	BI/FM: 42 BIII/DAB: 42 UHF1: 45 UHF2: 45	BI/FM: 42 BIII/DAB: 42 2xUHF: 45 IF SAT: 40
Gain adjustment	dB	0 - 18	0 - 18	0 - 18	0 - 18
Slope control range	dB	0 - 12	—	—	IF-SAT : 0 / 6
Response flatness	dB	±2	BI/FM: ±2 BIII/DAB: ±2 2xUHF: ±1.5	BI/FM: ±2 BIII/DAB: ±2 UHF1: ±1.5 UHF2: ±1.5	BI/FM: ±2 BIII/DAB: ±2 2xUHF: ±1.5 IF SAT: ±2
Outputs		1	1	1	1
Output test	dB	-30	-30	-30	-30
Output level	dBµV	TV: 118 (DIN-45004B IMD -60 dB)	TV: 118 (DIN-45004B IMD -60 dB)	TV: 118 (DIN-45004B IMD -60 dB)	TV: 118 IF-SAT: 120 (EN 50083-3 IMD -35 dB)
Noise figure	dB	6	BI/FM: 7 BIII/DAB: 7 2xUHF: 8	BI/FM: 7 BIII/DAB: 7 UHF1: 8 UHF2: 8	BI/FM: 7 BIII/DAB: 7 2xUHF: 8 IF SAT: 9
Input/output return loss	dB	10	10	10	TV: 10 FI SAT: 6
Voltage/current preamplif. mast		12-24V / 100mA	UHF2: 12-24 V / 100 mA	UHF1,2: 12-24V / 100mA	UHF2: 12-24 V / 100 mA IF SAT: 13-18V / 100 mA LNB: 0/22 kHz
Mains supply voltage	VAC	240 (+10% -15%)	240 (+10% -15%)	240 (+10% -15%)	240 (+10% -15%)
Consumption	W	11	11	11	16
Dimensions	mm	230 x 145 x 43			

* Switchable frequency range by inserting a plug-in bridge supplied.
** Other crossover channels on request.

Application example:
Pág. 127

Terrestrial and Satellite headend amplifier

NBS-600

- Mid-power broadband amplifiers, for terrestrial and satellite signals in small installations.
- Two models :
  NBS-604 (4 inputs BI/FM-BIII/DAB-2xUHF ; 1 output),
  NBS-695 (5 inputs BI/FM-BIII/DAB-2xUHF-IF SAT ; 1 output)
- Interstage input attenuators.
- Powered by switching power supply, in removable box.
- By inserting a bridge, you can select the cutoff frequency low-pass filter in the upper UHF, switchable between 862 MHz and 790 MHz.
- Power passing to input.
- Zamak housing with protective cover for adjustment potentiometers.
- F Connectors. Wall fixing and indoor mounting. Grounding terminal.
- Compatible with UNICABLE ™

MODEL		NBS-604	NBS-695
REF.		3529	3530
Inputs		4 BI/FM-BIII/DAB-2xUHF	5 BI/FM-BIII/DAB-2xUHF-IF SAT
Frequency range	MHz	BI/FM: 45-112 BIII/DAB: 174-240 2xUHF: 470-862 / 470-790 *	BI/FM: 45-112 BIII/DAB: 174-240 2xUHF: 470-862 / 470-790 * IF SAT: 950-2150
Gain	dB	BI/FM: 36 BIII/DAB: 36 2xUHF: 39	BI/FM: 36 BIII/DAB: 36 2xUHF: 39 IF SAT: 34
Gain adjustment	dB	0 - 18	0 - 18
Slope control range	dB	—	IF SAT : 0 / 6
Response flatness	dB	BI/FM: ±2 BIII/DAB: ±2 2xUHF: ±1.5	BI/FM: ±2 BIII/DAB: ±2 2xUHF: ±1.5 IF SAT: ±2
Outputs		1	1
Output test	dB	-30	-30
Output level	dBµV	TV: 112 (DIN-45004B IMD -60 dB)	TV: 112 IF SAT: 114 (EN 50083-3 IMD -35 dB)
Noise figure	dB	BI/FM: 7 BIII/DAB: 7 2xUHF: 8	BI/FM: 7 BIII/DAB: 7 2xUHF: 8 IF SAT: 9
Input/output return loss	dB	10	TV: 10 FI-SAT: 6
Voltage/current preamplif. mast		UHF2: 12-24 V / 100 mA	UHF2: 12-24 V / 100 mA IF SAT: 13-18V / 100 mA LNB: 0/22 kHz
Mains supply voltage	VAC	240 (+10% -15%)	240 (+10% -15%)
Consumption	W	8	11
Dimensions	mm	230 x 145 x 45	

* Switchable frequency range by inserting a plug-in bridge supplied.

Power supply
Spare Parts
Pág. 114

Terrestrial amplification Headend

NBS-200

- Low-power broadband amplifiers, for terrestrial signals in small installations.
- Three models :

  NBS-201 (1 input VHF/UHF ; 1 output),

  NBS-204 (4 inputs BI-FM-BIII/DAB-UHF ; 1 output),

  NBS-241 (1 input VHF/UHF ; 5 outputs)
- Input attenuators.
- By inserting a bridge, you can select the cutoff frequency low-pass filter in the upper UHF, switchable between 862 MHz and 790 MHz.
- Zamak chassis housed in plastic box.
- F Connectors. Wall fixing and indoor mounting.

MODEL		NBS-204	NBS-201	NBS-241
REF.		3516	3517	3518
Inputs		4 BI-FM-BIII/DAB-UHF	1 VHF/UHF	1 VHF/UHF
Frequency range	MHz	BI: 45-68 FM: 88-108 BIII/DAB: 174-240 UHF: 470-862/790*	45 - 862/790 *	45 - 862/790 *
Gain	dB	BI: 31 FM: 31 BIII/DAB: 31 UHF: 31	31	21
Gain adjustment	dB	BI-FM-BIII/DAB: 0 - 18 UHF: 0 - 15	0 - 15	0 - 15
Slope control range	dB	—	0 - 10/20	0 - 10/20
Response flatness	dB	BI-FM-BIII/DAB: ±2 UHF: ±2	±2	±2
Outputs		1	1	5
Output test	dB	-30	-30	—
Outut level (DIN-45004B IMD -60 dB)	dBµV	106	106	96
Noise figure	dB	BI-FM-BIII/DAB: 4,5 UHF: 5	5	5
Input/output return loss	dB	10	10	10
Mains supply voltage	VAC	240 (+10% -15%)	240 (+10% -15%)	240 (+10% -15%)
Consumption	W	3	3	3
Dimensions	mm	155 x 80 x 40	155 x 80 x 40	155 x 80 x 40

* Switchable frequency range by inserting a plug-in bridge supplied.

Terr and Sat amplification micro-headends

CBM

MODEL		CBM-175	CBM-113
REF.		3547	3543
RF inputs		5	3
Frequency range		IF - UHF - UHF DAB/BIII - BI/FM	UHF - VHF Ext (45-862 MHz)
Nominal gain	dB	IF: 27-32 UHF: 29 UHF: 29 DAB/BIII: 30 BI/FM: 29	UHF: 31 VHF: 30 Ext: 17-20
Attenuation adjustment on the inputs	dB	IF: 0-18 UHFs: 0-15 VHFs: 0-18	UHF: 0-15 VHF: 0-18 Ext: 0-10
Noise figure	dB	IF, UHF: ≤ 9 rest: ≤ 7	≤ 7 (except Ext)
Input return loss	dB	IF: ≥ 6 rest: ≥ 10	
IF signal output level	dBµV	106 IMD3 -35 dB (EN 50083-3)	
Terrestrial signal output level	dBµV	106 IMD3 -60 dB (DIN 45004B)	
Mains voltage (50/60 Hz)	VAC	100 - 240	
Voltage/Current for preamplifier		+24 VDC / 60 mA	
Consumption	W	4	
Dimensions	mm	120 x 85 x 50	

- Designed for single-family homes (chalets, villas). Also for small-size collective installation, in cases of only-terrestrial reception.
- Complete range to meet all terrestrial and satellite configuration requirements. Available models with 45-862 MHz "extension" input for combining video/audio modulated sources (surveillance cameras, for example).
- Current passing the preamplifier is made by inserting a bridge supplied.
- Adjustment potentiometers on the inputs. Small plastic box. F type connection. Indoor mounting. Wall fixing.

Sat-IF Combiner/Amplifier

AFI-840

MODEL		AFI-840
REF.		1164
IF Sat band	MHz	950 - 2150
Response flatness	dB	± 1,5
Gain	dB	34 - 40 (6 dB fixed slope)
Continuous gain adjustment	dB	0 - 18
Output level (-35 dB IMD3, EN 50083-3)	dBµV	120
Input/output return loss	dB	≥ 6
Noise figure	dB	< 8
TV band	MHz	5 - 862
TV coupling loss	dB	≤ 1,5
Output test (TV+IF)	dB	-30 ±1.5
Mains voltage (50/60 Hz)	VAC	100 - 240
Consumption	W	6
Insertable voltage/tone to Sat-IF input port		+13 VDC / +18 VDC 0 / 22 kHz
Max LNB power current	mA	200 (at +13 VDC & at +18 VDC)
Dimensions	mm	120 x 85 x 50

- 1 Satellite 950-2150 MHz input port, with adjustable gain and pre-emphasized response to compensate for cable losses.
- 1 Terrestrial coupling 5-862 MHz input port; 1 Combined Satellite+Terrestrial output port; 1 output test port.
- Mains powered 50/60 Hz. Electrical safety protection level: Class II. Mains lead and plug included.
- Line powering of LNB. Generation of voltage/tone for selection of H/V polarisation and high/low frequency sub-band by the small plug-in bridges provided.
- Small plastic box, with protective cover. Internal zinc alloy chassis. F type connection.
- Indoor mounting. Wall- fixing.

Terr & Sat programmable multichannel amplifier

ONE-SAT

- Self-installation function.
- All settings are automatically memorised.
- Reprogrammable as many times as required. Programmed without the need for external control.
- 10 tuneable UHF filters with the variable band width of 1 to 5 channels.
- Terrestrial inputs (BI-FM, BIII-DAB, UHF and EXT) and satellite input with low noise figure.
- Two types of configurable output:

  Configuration: 1 OUTPUT (high Power)
  TV (123 dBµV) + SAT1 (116 dBµV)

  Configuration: 2 OUTPUTS
  TV (118 dBµV) + SAT1 (116 dBµV)
  TV (118 dBµV) + SAT2

- Allows the user to block the use of channels 61 to 69.
- Equalisation and automatic gain control.
- Internal configuration cloning with transferral to another equipment.
- Equipment locking by security code.
- Silent and extra slim.

MODEL			ONESAT (AFP-292)							
REF.			2844							
Inputs			1 BI/FM	1 DAB/BIII	1 EXT (VHF/UHF)	3 UHF 3	3 UHF 2	3 UHF1	1 FI-SAT1	1 FI-SAT2 (passive)
Frequency range		MHz	47 - 108	174 - 240	47 - 240 / 470 - 862	470 - 862 (*)			950-2150	
Input configuration Number of programmable UHF filters per input			—			0 1 3 3 1	0 0 0 5 7	10 9 7 2 2	—	
Gain	config TV2 & TV1	dB	30	35	35	35/55 switchable			40	-1,5
	config TV1		35	40	40	40/60 switchable			40	
Gain adjustment		dB	25	20		30			20	
Noise figure		dB	< 6						< 9	
Optimum input margin		dBµV	60-85	60-80		50-100			68-88	
Return losses		dB	> 10							
Selectivity (±10MHz of channels ends)		dB	—			10			—	
Uncoupling between inputs		dB	—			> 20			—	
Output level	config TV2 & TV1	dBµV	113	113	VHF: 113 UHF: 118	118			116	
	config TV1		118	118	VHF: 113 UHF: 123	123			116	
Output level adjustment		dB	20							
AGC tolerance		dB	—			± 1			—	
Switchable preamplifier voltage		V	—			off-12-24			off-13-18	
Maximum preamplifier current		mA	—			100			300	
Preamplifier tones		kHz	—						0-22	
Slope adjustment		dB	—						0-9	
Test output		dB	-30							
Mains voltage		VAC	230 - 240							
Consumption			25 W / 0.25 A							
Operating temperature		ºC	-5 ... +50							
Dimensions		mm	300 x 250 x 40							

(*) with LTE Protection

Terrestrial programmable multichannel amplifier

ONE-118

- Self-installation function.
- All settings are automatically memorised.
- Reprogrammable as many times as required. Programmed without the need for external control.
- 10 tuneable UHF filters with the variable band width of 1 to 5 channels.
- Terrestrial inputs (BI-FM, BIII-DAB, UHF and EXT) and satellite input with low noise figure.
- Allows the user to block the use of channels 61 to 69.
- Equalisation and automatic gain control.
- Internal configuration cloning with transferral to another equipment.
- Equipment locking by security code.
- Silent and extra slim.

MODEL		ONE118 (AFP-201)				
REF.		2845				
Inputs		1 BI/FM	1 DAB/BIII	3 UHF 3	 UHF 2	 UHF1
Frequency range	MHz	47 - 108	174 - 240	470 - 862 (*)		
Input configuration Number of programmable UHF filters per input		—		0 1 3 3 1	0 0 0 5 7	10 9 7 2 2
Gain	dB	30	40	55		
Gain adjustment	dB	25	20	30		
Noise figure	dB	< 6	< 6	< 6	< 6	< 6
Optimum input margin	dBµV	60-85	60-80	50-100		
Return losses	dB	> 10	> 10	> 10	> 10	> 10
Selectivity (±10MHz of channels ends)	dB	—		10		
Uncoupling between inputs	dB	—		> 20		
Output level	dBµV	118	118	118		
Output level adjustment	dB	20	20	20	20	20
AGC tolerance	dB	—		± 1		
Switchable preamplifier voltage	V	—		off-12-24		
Maximum preamplifier current	mA	—		100		
Test output	dB	-30				
Mains voltage	VAC	230 - 240				
Consumption		25 W / 0.25 A				
Operating temperature	ºC	-5 ... +50				
Dimensions	mm	300 x 250 x 40				

(*) with LTE Protection


Application example:
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Power supply
Spare Parts
Pág. 114

SZB - Amplification equipment

Single-channels

MODEL		SZB-129	SZB-128	SZB-168	SZB-139	SZB-148*
REF.		2294	2293	3160	3152	2246
Bandwidth		FM	FM	DAB	1 channel BIII [1]	1 channel UHF [2]
Gain [3,4]	dB	57	30	53	56	52
Noise figure	dB	4	7.5	8	7	9
Output level EN 50083-3, -35dB	dBµV	(2x) 113 IMD -50dB			(2x) 121	
Z output return loss	dB	≥ 6				
Consumption	mA	100	80	100		
Dimensions	mm	190 x 38 x 87				

* SZB-148 high selectivity. Amplification of one analog or digital UHF channel, either non-adjacente or adjacent.
Each amplifier is packed with 1 Z bridge Ref. 2247
1 Also 1 channel S3 to S18.
2 Also 1 channel S19 to S38.
3 Adjustable -20 dB (-30 dB in SZB-148). Inerstage attenuator in all models —maintenance of low noise figure—.
4 Substract 3.5 dB if Z input demultiplexing is used.

Particular ordering instruction: Specify the TV channel for single-channel amplifiers.

- **Ready for digital dividend.**
- TV single-channel amplifiers, Z input de-multiplexing and Z output multiplexing. Adjacent channel operation allowed in UHF band.
- FM Radio and DAB Amplifiers.
- Output voltage +24 VDC is automatically connected to the RF modules through a connecting bar at the base-plate.
- It is advisable to place the amplifiers on the base-plate following an increasing order of number of channel (frequency). The RF output of the headend will be taken from the last one of the modules ordered in this way.
- Toolless mounting.

Application example:
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SZB - Amplification equipment

Multichannel

MODEL		SZB-180		
REF.		2248		
Bandwidth		2 UHF channels	3 UHF channels	4 UHF channels
Gain [1]	dB	60		
Noise figure	dB	5		
Output level EN 50083-3, -35dB	dBµV	(2x) 118	(2x) 116	(2x) 115
Z output return loss	dB	≥ 6		
Consumption	mA	100		
Dimensions	mm	190 x 38 x 87		

1 Adjustable -20 dB . Interstage attenuator —maintenance of low noise figure—.
The free output ports need to be terminated using a 75Ω terminator.

- TV multichannel amplifier.
  Especially created for amplification of combined analog and digital channels. Z input de-multiplexing and Z output multiplexing. Adjacent channel operation allowed in UHF band.
- Output voltage +24 VDC is automatically connected to the RF modules through a connecting bar at the base-plate.
- Toolless mounting.

Modulators

SZB-400

MODEL		SZB-430	SZB-440
REF.		2238	2239
Selectable TV channel located between:		146 - 470	470 - 890
Selectable TV system (DSB)		B, G, D, K, I, L, M, N	
Audio mode		Mono	
Output level	dBµV	65 to 75	
Adjustable carrier level ratio	dB	10 to 18	
Video input level	Vpp	0.7 ... 1.4	
Adjustable video modulation depth	%	75 to 85	
Audio input level	Vpp	0.4 ... 4	
Audio input inpedance	Ω	600	
Adjustable audio modulation depth	%	10 to 80 (L system)	
Weighted S/N ratio	dB	> 60	
Spurious in band	dBc	< -60	
Broadband noise (ΔB = 5 MHz)	dBc	< -60	
Output loop-through loss	dB	≤ 0.8	
Consumption at +24 VDC	mA	110	
Video connector		(1x) female F	
Audio connector		(1x) female RCA	
RF output connector (TV channel)		(2x) female F	
Programming-unit connector		USB type	

Each module is packed with:
- 1 plug-bridge Ref. 2247, for output concentration line between modules.
- 1 RCA plug, for audio input connection.

- Double Side Band. Mono Audio.
- Microprocessor controlled. Access to adjustments and programming can be easily achieved through the SPI-300 programming-unit.
- Designed to deliver a very low broadband noise floor so several SZB-400's can be simply combined together through the two directional RF output ports provided, then fed into a broadband amplifier as the final driver. Only 1 channel gap required.
- One single channel RF output from each modulator, or one multichannel RF output by installing the concentration line. The free output ports need to be terminated using a 75Ω terminator. F female video connector; RCA female audio connector.

Sat-IF Combiner/Amplifier

SZB-190

MODEL		SZB-190
REF.		1346
Sat-IF Band	MHz	950 - 2150
Gain (7 dB fixed slope)	dB	33 (950 MHz) 40 (2150 MHz)
Gain adjustment	dB	18
Output level (IMD -35dB, EN 50083-3)	dBµV	120
Noise figure	dB	< 8
Terrestrial band	MHz	5 - 862
Terrestrial coupling loss	dB	< 1
Operating voltage	VDC	+ 24
Consumption	mA	120
Insertable voltage/tone to Sat-IF input port		+13 / +18 VDC 0 / 22 kHz
Max LNB power current	mA	350 (at +18 VDC) / 250 (at +13 VDC)

- 1 Satellite input 950-2150 MHz with adjustable gain and sloped response to compensate for cable loss; 1 terrestrial coupling input 5-862 MHz; 1 satellite+terrestrial output.
- Automatic power connection, either via contact terminal (SZB application) or via terrestrial coupling input port (MZB applications).
- LNB coax line powering. The SZB-190 generates the required voltage/tone signals for the selection of H/V polarisation and high/low frequency sub-band.

The SZB-190 may be used with anuniversal 1 output LNB. Power andvoltage/tone signals for polarity/bandselection are provided by the modulefrom its IF-Sat input port.Using a small screwdriver, place properlyeach microswitch 1 to 6 as indicated inthe table below :

Voltage / Tone	Microswitch					
	1	2	3	4	5	6
+13 VDC / 0 kHz	○	○	●	●	○	○
+13 VDC / 22 kHz	○	○	●	●	●	●
+18 VDC / 0 kHz	●	●	○	○	○	○
+18 VDC / 22 kHz	●	●	○	○	●	●

Power supply

SZB-212

MODEL		SZB-212
REF.		2228
Regulation type		switch mode
Mains supply voltage (50/60 Hz)	Vac	185 - 264
Output voltage	Vdc	+24 (±5%)
Max output current	A	2

- Electrical safety protection level: Class II. Mains lead with bipolar plug.
- Output voltage is additionally available from two auxiliar jacks, for connection to one or two power inserters (mast-head amplifier remote powering). Banana jumper supplied.

ACCESSORIES	HEADENDS	MODEL	REF.	DESCRIPTION
BASE PLATE	SZB	BAS-919	2225	Base plate with power connecting bar. Capacity: 1p. supply+8 RF modules SZB; or 9 RF modules.
	MZ6	BAS-959	1602	Base plate. Capacity: 1 amplifier/power supply+6 filters MZB/MZ6, or 9 filters.
HOUSING	SZB / MZ6	COF-809	2224	Housing for 1 BAS-919. Dimensions: 420 x 346 x 180 mm.
		COF-818	2226	Housing for 2 BAS-919. Dimensions: 798 x 346 x 180 mm.
BRIDGE	SZB	PZB-453	2247	Z plug bridge, F connectors. Length: 45.3 mm.
	MZ6	PZB-465	1579	Z plug bridge, F connectors. Length: 46.5 mm.

TV single-channel amplifiers

MZ6

Single-channels

Multichannel

MODEL		MZ6-129	MZ6-168	MZ6-148 *
REF.		1597	1590	1592
Bandwidth		FM	DAB (195-223 MHz)	1 channel UHF
Gain	dB	13	15	12
Gain adjustment	dB	-23	-30	-23
Noise figure	dB	6	7	11
Consumption	mA	25	30	25
Dimensions	mm	140 x 42 x 73		

* High-selectivity. It can be used for adjacent channels
Each amplifier is packed with 1 Z bridge Ref. 1579

MODEL		MZ6-180		
REF.		1586		
Bandwidth		2 UHF channels	3 UHF channels	4 UHF channels
Gain	dB	12		
Gain adjustment	dB	-23		
Noise figure	dB	7		
Consumption	mA	25		
Dimensions	mm	140 x 42 x 73		

- Single-channel and multichannel active Filter Modules. Adjacent channel operation allowed in UHF band. Also FM Radio and DAB active filters.
- F connection. Simply to place, without any tool, onto wall-fixing base-plates. Z input demultiplexing and Z output multiplexing.
- Wideband RF power amplification and DC powering functions on two separate modules (MZR-123 and MZR-700). The filters' Z concentration line is used as RF signal source for the power amplifier and as +24 VDC power voltage connecting way.
- Easy incorporation —to a new or existing «MZ6» headend— of the SZB-190 Sat IF Combiner/Amplifier.

MZ6

Amplifier

MODEL		MZR-123
REF.		1608
Funtion		**Amplifier**
No of RF inputs Frequency range		2 45-862 MHz
Gain	dB	(2x) 38
Output attenuator	dB	(2x) 0 - 25
Output level	dBµV	123
Output test	dB	-30 ±1
Consumption for +24V	mA	200

Power supply

MODEL		MZR-700
REF.		1607
Regulation type		Switch mode
Mains supply voltage (50/60 Hz)	VAC	230 - 240
Output [1]		+24V (700mA) (for the amplifier modules of the MZB headend) +24V/+12V (80mA) (for mast-head preamplifiers)

1 Two +24V output ports at the lower side, for the amplifier modules, and other two +24V/+12V (switchable) ones at the upper side, for mast-head preamplifiers. All of them behave as Z line end, and, as that, they are loaded internally with 75Ω.
The module is packed with 1 AC/DC blocker (BCF-060, Ref. 2379).

Available for:

NEW

AV-COFDM Stand Alone modulators

MAC-HOME | MAC-401 | MAW-200

MODEL		MAC-HOME
Ref.		4488
Input		CVBS, S-VIDEO, YPbPr, RGB
Video input level (CBVS)	Vpp	0.7 ... 1.4
Video coding		PAL/NTSC/SECAM/B&W
Audio input		1x mono/stereo
Audio input level (analogue)	Vpp	0.5 ... 2.5
Compression		
Video		MPEG2 MP@ML, H.264/MPEG-4 AVC MP L4.1
Video resolution		720x576, 25 fps (PAL), 720x480, 30 fps (NTSC)
Video Bit Rate	Mbits/s	3 - 10
Audio		MPEG1 Layer II
Bitrate audio	Kbits/s	96, 128, 160, 192, 224, 256, 320, 384
DVB Processing		
Insertion of tables		PAT, PMT, SDT, NIT
Configuration		Channel Name, SID, LCN, NID, Network Name, Provider Name, TSID, ONID, NIT MODE, LCN Private Descriptor
Output		DVB-T according to ETSI EN 300 744
Bandwidth	MHz	6/7/8
Carriers		2K (UK) / 8K (FR)
MER	dB	≥ 35
Central frequency	MHz	474 - 858
Output level	dBµV	≥ 80
Output attenuation	dB	≤ 1.5
Level adjustment	dB	-25
Frquency stability	ppm	≤ ±30
Noise figure (ΔB=8MHz)	dBc	≤ -45
Loopthrough		Yes
General		
Power supply	VAC	230 - 240
Consumption	W	8.1
Dimensions (without connectors)	mm	210 x 114 x 32
Weight	kg	1
Video input connectors		1 RCA (CVBS) ; 1 MINI DIN (S-VIDEO) , Y Pb Pr, RGB (adapter cable not included)
Audio input connectors		2 RCA (L and R)
Local interface		LCD + Joystick
Firmware update		Yes

- Domestic modulator that allows audio and video signal input in TV distributions.
- Maximum compression quality MPEG-2 & H.264/MPEG-4 AVC.
- C-VBS and Stereo Audio input connectors.
- S-VIDEO and Component Video (Y Pb Pr, RGB) input connector for maximum image quality.
- Easy configuration and programming through the button and the LCD display.
- RF DVB-T output, compatible with DTT in UHF band.
- LCN support and DVB processing.
- Replaceable power supply.
- This device is used to play back videos through the USB port.

Power supply Spare Parts
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AV-COFDM Stand Alone modulators

MAC-HOME | MAC-401 | MAW-200

MODEL		MAC-401
Ref.		4485
Input		4x CVBS
Video input level (CBVS)	Vpp	0.7 ... 1.4
Video coding		PAL/NTSC/SECAM
Audio input		4x mono/stereo
Audio input level	Vpp	0.5 ... 4.0
Compression		
Video		MPEG2 MP@ML
Video resolution		720x576, 25 fps (PAL), 720x480, 30 fps (NTSC)
Video Bit Rate	Mbits/s	3 - 10
Audio		MPEG1 Layer II
Audio Bit Rate	Kbits/s	96, 128, 160, 192, 224, 256, 320, 384
DVB processing		
Insertion of tables		PAT, PMT, SDT, NIT
Configuration		Channel Name, SID, LCN, NID, Network Name, Provider Name, TSID, ONID, NIT MODE, LCN Private Descriptor
Output		DVB-T according to ETSI EN 300 744
Bandwidth	MHz	6/7/8
Carriers		2K (UK) / 8K (FR)
MER	dB	38 (typ.)
Central frequency	MHz	51 - 858
Output level	dBµV	≥ 80
Output attenuation	dB	1
Level adjustment	dB	-15
Frquency stability	ppm	≤ ±30
Noise figure (ΔB=8MHz)	dBc	≤ -70
Loopthrough		Yes

General		
Power supply	VAC	230 - 240
Consumption		0.45 A / 30 W
Dimensions (without connectors)	mm	300 x 250 x 44
Weight	kg	2.5
LAN connector		RJ-45
Remote control		Ethernet 10BaseT 10/100 Mbits/seg
Local interface		LCD + Joystick
Remote interfaz / Update		Web / Ethernet

- The MAC 401 model is an AV analogue TV signal to COFDM digital TV signal standalone modulator unit. Suitable for individual residential installations, it is an ideal solution for the distribution of analogue video signals with COFDM digital TV modulation in a single standalone unit.
- AV1 to AV4 are also serially digitalised, coded in MPEG2 and modulated in COFDM. The COFDM base band signal is modulated on an RF carrier that can be adjusted at the output to the VHF and UHF bands.
- RF COFDM DVB-T output
- Excellent modulation quality MER: 38dB
- Processing and insertion of PSI/SI tables
- LCN support (Logical Channel Number)
- Remote control and firmware updates via web/Ethernet
- User interface with LCD display and control button for basic configuration.
- All settings are automatically memorised.
- Reprogrammable as many times as required.
- Firmware updated via Ethernet connection with web browser.
- Replaceable power supply.

Application example:
Pág. 128

Power supply Spare Parts
Pág. 114

Home DSB TV stand alone modulator

MAC-HOME | MAC-401 | MAW-200

MODEL		MAW-200
REF.		3029
Output TV channel frequency	MHz	45 - 84 174 - 300 470 - 862
Selectable TV system		B, G, H, D, K, I, L, M, N
Output channel spectrum		Double Side Band
Audio operation mode		Mono
RF coupling frequencies	MHz	47 - 2150 (TV+IF)
Fine tuning of video carrier frequency	MHz	±2,5 (steps of 0.25 MHz)
Adjustable output level	dBµV	65 - 85
Switchable carrier level ratio	dB	12±3 / 16±3
Video input level	Vpp	0.9 ... 1.1
Video modulation depth	%	81 (typ.)
Audio input level	mV	150 ... 775
Weighted S/N ratio	dB	> 55
Mains voltage	VAC	230 - 240
Consumption	W	3
Dimensions	mm	120 x 82 x 34

- Appropriate use with TV satellite receivers, VCR's and video cameras.
- Direct video/audio modulation. Multistandard. Mono sound. DSB (Double Side-Band) TV output channel.
- Agile selection of channel. Possibility of shifting the standard video carrier frequency up to ±2.5 MHz.
- Possible connection of stereo sound sources. L and R signals are sumed by the modulator itself.
- Built-in test pattern generator.
- Two buttons and one 2-digit LED display for selection and programming of operating parameters.
- Panel potentiometers for audio modulation and RF output level settings.
- Input port for RF coupling of antenna/SMATV signal.
- External plastic box. Indoor mounting. Wall fixing by two screws. AC power inditcator.
- Insertable mains lead.

Range and General Features

Wall fixing ClassA Headend

Rack mountable ClassA Headend

ClassA is a complete range of functional modules for processing of analogue and digital terrestrial, satellite, cable and baseband signals. It also includes optical transmitters and receivers and IP streamers. All modules have identical format and simply to place on a wall-fixing baseplate or n a 6RU rack-frame. All connection and control ports are located on the front panel.

The range includes the following types of modules:

COFDM output
TPC : Terrestrial/Cable TV channel processors
STC : DVB-S/S2 to DVB-T transmodulator with Common interface
TGT : DVB-T to DVB-T Regenerator
MTI : DVB-S/S2 to DVB-T transmodulator (IKUSUP bus connector)

IP output
TNS : DVB-T to IP streamer with Common interface
SNS : DVB-S/S2 to IP streamer with Common interface
BNS : A/V to IP streamer with Common interface

AM output
TRF : DVB-T receiver Free To Air
SRF : DVB-S receiver Free To Air
SRC : DVB-S receiver with Common interface
MCP : TV modulator Vestigial Side Band
THC : DVB-T receiver multicrypt with analog signal output
SHC : DVB-S/S2 receiver multicrypt with analog signal output
TBA : FM and DAB Radio amplifier

QAM output
TDI : DVB-T to DVB-C transmodulator
MDI : DVB-S/S2 to DVB-C tansmodulator

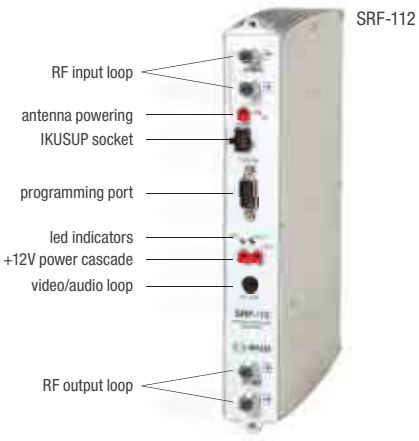
QPSK output
SPC : IF-IF converter

Accessories
AMX : 4 way 47-862 MHz active combiner
HMS : Headend Control unit
CFP : Power supply
HPA : 47-862 MHz and 950-2150 MHz amplifier
SPI : Programming unit

Optical fibre
FTD : Optical transmitter
FTR : Optical transmitter — return path
FSP : Optical splitter
FRD : Optical receiver
FRR : Optical receiver — return path

AGILITY AND ADJACENT CHANNELS
ClassA modules feature frequency agility handled by a high-performance PLL heterodyne double conversion. The broadband noise floor generated is exceptionally low, so multiple modules can be installed in the headend with very little deterioration of the CNR. The use of SAW filters provides, on the other hand, a true vestigial sideband response that enables frequency planning using adjacent channels.
These characteristics mean the installations are highly flexible and the maintenance problems are simplified.

VIDEO/AUDIO LOOP AND BISS OPERATION
ClassA receivers have an external video/audio loop that is switchable under control software. So, these receivers can be used in scrambling systems (vHOTEL from IKUSI, for example).
The receivers can also operate in BISS systems (Basic Interoperable Scrambling Systems).



Application example:
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COFDM channel processor

TPC STC/STF MTI TGT

MODEL		TPC-110	TPC-010	
REF.		3843	3842	3651
Type of application channel		Digital	Digital	Analog
Remote Programming Function		Yes	No	No
TV System / Standard		DVB-T ,, DVB-C		B/G, D/K, I, L
Frequency band of input TV channel	MHz	45 - 862		
Selectable output channel located between:	MHz	45 - 862		
Frequency selection steps	MHz	0.500		0.250
Input level (CAG 40 dB ; manual adjustment for L-system channels)	dBµV	40 - 80		50 - 90
Selectable tuning offset	kHz	(±) 125 / 250 / 375 / 500		
Noise figure	dB	< 9 (input level <70 dBµV)		
Bandwidth of SAW filtering (at -3 dB)	MHz	6.875 (for 7 MHz channels) 7.850 (for 8 MHz channels)		
Selectivity for 7 MHz channels	dB	> 9 (fc ± 3.75 MHz) > 70 (fc ± 4.75 MHz)		
Selectivity for 8 MHz channels	dB	> 18 (fc ± 4.75 MHz) > 70 (fc ± 5.25 MHz)		
Image rejection	dB	> 70		
Adjustable output level	dBµV	55 to 70		65 to 80
Output loop-through loss	dB	1.1 (typ) ,, 1.4 (max)		
Group delay	ns	< ±40		
Spurious in band	dBc	< -58		
Phase noise of output channel (@ 1kHz)	dBc/Hz	< -92 (processor) < -80 (converter)		
Broadband noise (ΔB=5 MHz)	dBc	< -75		
Supply voltage	VDC	+12		
Consumption	mA	590	540	
Operating temperature	ºC	0 ... +45		
Input RF connector type		(1x) female F		
Output RF connector type		(2x) female F		
DC connector type		"banana" socket		
Programming interface		RS-232 / DB-9		
IKUSUP bus connector		(2x) 4 pin socket	—	
Dimensions	mm	230 x 195 x 32		

Each module is packed with:
- 1 F plug bridge, 64 mm length, for input tap line and output coupling line.
- 1 DC plug bridge, 53 length, for connection of +12 VDC voltage.

Application example:
Pág. 123

TPC HEADEND

- Double heterodyne conversion in the 45-862 MHz frequency range. IF SAW filtering.
- Agile Processing module, usable either as channel converters (output channel is different to input channel) or as channel processor (output channel is the same as input channel). Adjacent channel operation at input and output.
- A TPC headend includes:

- As many TPC processing modules as channels to be converted or processed.
- One HPA amplifier that amplifies the sum of the combined output TV channels from the proecessors.
- One or more CFP power supplies.
- One or more rack-frames or wall fixing base plates. The base plates can be joined horizontally.
- Usually, housing units for the base plates.
- If the headend is voluminous, one or more AMX-400 combiners.

The TPC headends provide a TV multichannel signal whose level is appropriate to feed the distribution network. An extension input at the HPA amplifier allows easy coupling of the wideband 47-862 MHz signal provided by another existing headend.

FUNCTIONAL DESCRIPTION OF THE TPC PROCESSORS

In a TPC module can be distinguished three main sections:

- "Input Channel - IF" conversion. Includes a delayed AGC circuitry that operates in the 50-90 dBmV (analog) or 40-80 dBmV (digital) input level ranges.
- IF filtering. A double SAW filter is used, what provides very high selectivity (>70 dB at ±5.25 MHz from the centre for 8MHz-wide channels).
- "IF - Output Channel" conversion. The output level can be adjusted between 65 and 80 dBmV.

The TPC-110 which can be programmed remotely witch a the HMS control unit installed.

Main features:

- Input frequency. Is the central frequency for digital channel.
- Tuning Offset. Applicable when a strong adjacent channel interferes with the channel being processed.
- AGC on/off. The automatic gain control must be switched off for system L channels.
- Manual Gain Control, only if the AGC function has been disabled.
- IF Bandwidth. Two options: 7 or 8 MHz.
- Output Frequency. Same indications stated above for input frequency.
- RF output level. 15 dB adjustable.

The output signal has very low phase noise and very clean wideband spectrum. On the other hand, a very low broadband noise floor (< -75 dBc) allow the use of multiple processors in a headend with very little deterioration of the CNR.

Simple cabling of TPC headends

The TPC modules feature two directionally coupled input and output ports. Antenna or cable network signal can therefore be directly fed into the input port of the first module, which in turn passes it through the coupler to the next and so forth. On the output side, the same procedure is repeated wich forms the channel coupling. The sum of the combined channels is turn connected in the same way to the drive amplifier _the HPA module or an external wideband amplifier_ which then feeds the distribution network. For power connection, each module has two DC banana sockets that allow to built a +12 VDC cascade. A third banana socket is available to connect the power for an optional mast-head preamplifier.

COFDM Output (web programming)

DVB-S/S2 ▸ DVB-T

TPC STC MTI TGT

MODEL		STC-200
REF.		**4466**
Reception		DVB-S (QPSK) DVB-S2 (QPSK/8PSK)
Standard		EN 300 421 DVB-S EN 302 307 DVB-S2
Number of inputs		2
Input mode		Loop or two independent inputs
Input frequency	MHz	950-2150
Symbol rate	MS/s	2-45
Input level	dBm	DVB-S: -65 .. -25, DVB-S2: -70 .. -25
DiSEqC		Yes
TS processing		
PSI/SI tables regeneration		PAT, PMT, SDT, CAT, NIT, EIT, TDT, TOT, BAT
LCN insertion		Yes
PCR restamping		Yes
PID, SID and TS ID remapping		Yes
Common Interface slot		Yes
Output		DVB-T (COFDM)
Standard		EN 300 744 DVB-T
Output frequency	MHz	47 ... 862
Output level	dBmV	65 ... 80
MER	dB	> 38 (Tip.)
Spurious in band	dBc	< -50
Broadband noise (5 MHz)	dBc	< -75
Output COFDM modulation schemes		QPSK ; 16QAM ; 64QAM
COFDM output guard interval		1/4 ; 1/8 ; 1/16 ; 1/32
General		
Power voltage	VDC	+12
Interface		Web
Consumption	A	1.3 (with CAM)
IKUNET bus connector		2x RJ45
Dimensions	mm	230 x 195 x 32

The module is packed with:
- 2 F plug bridges, 64 mm length, for input tap line and output coupling line.
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.

Application example:
Pág. 123

STC HEADEND

- Digital transmodulation (QPSK/8PSK to COFDM) with Transport Stream Processing. The QPSK or 8PSK channels located in the Sat-IF frequency band (950-2150 MHz) are transformed to COFDM channels located in the 47-862 MHz band. The STC-200 has Common Interface (EN 50221) for discretionary de-encrypting of TV programmes.
- A STC headend includes:
  - As many STC Receiving Module as de-encrypted TV programmes to be distributed. At STC module, one CAM (Conditional Access Module) containing the Operator's Smart Card must fit the front panel slot.
  - One HPA Amplifier that amplifies the sum of the combined output QAM channels from the transmodulators.
  - One or more CFP Power Supplies.
  - One or more Rack-Frames or wall-fixing Base-Plates. The base-plates can be joined horizontally.
  - Usually, housing units for the base-plates.
  - If the headend is large, one or more AMX-400 combiners.

The STC headend provide a COFDM multichannel signal whose level appropriate to feed the distribution network. An extension input at the HPA amplifier allows easy coupling of the wideband 47-862 MHz signal provided by another existing headend.

FUNCTIONAL DESCRIPTION OF THE STC-200 TRANSMODULATOR

In a STC module can be distinguished the main sections:

- tunes a QPSK/8PSK digital channel in the 950-2150 MHz band,
- demodulates the signal being received,
- processes the transport stream (with programme de-encrypting in the STC-200, if this one has a “CAM + Operator Card” couple is installed), and
- re-modulates it in COFDM format on an RF channel that is selectable within the 47-862 MHz frequency range.

Main features:

- Central DVB-S/S2 Input Frequency (1 MHz steps)
- Input Symbol Rate (0.001 MS/s steps)
- Central COFDM Output Frequency (1 kHz steps)
- Output Channel Bandwidth (6, 7 or 8 MHz)
- Output Operation Mode (2K or 8K)
- Output COFDM modulation schemes (QPSK/8PSK ; 16QAM ; 64QAM)
- Code rate (1/2, 2/3, 3/4, 5/6 or 7/8)
- COFDM output guard interval (1/4, 1/8, 1/16 or 1/32)
- RF Output Level
- In-depth interleaving (only on DVB-H; with 2K and 4K modes)
- Discretionary de-encrypting of one or more Services
- Optional Blockade of Services, PIDs and Conditional Accesses, with Regeneration of Tables
- NIT Adaptation

Simple cabling of STC headend

The STC transmodulator feature two directionally coupled input and output ports. Sat-IF signal can therefore be directly fed into the input port of the first module, which in turn passes in through the coupler to the next and so forth. On the output side, the same procedure is repeated which forms the channel coupling. The sum of the combined channels is turn connected in the same way to the drive amplifier_ the HPA module or an external wideband amplifier_ which then feeds the distribution network. For power connection, each module has two DC banana sockets that allow to build a +12 VDC cascade. A third banana socket is available to connect the power for the attached LNB.

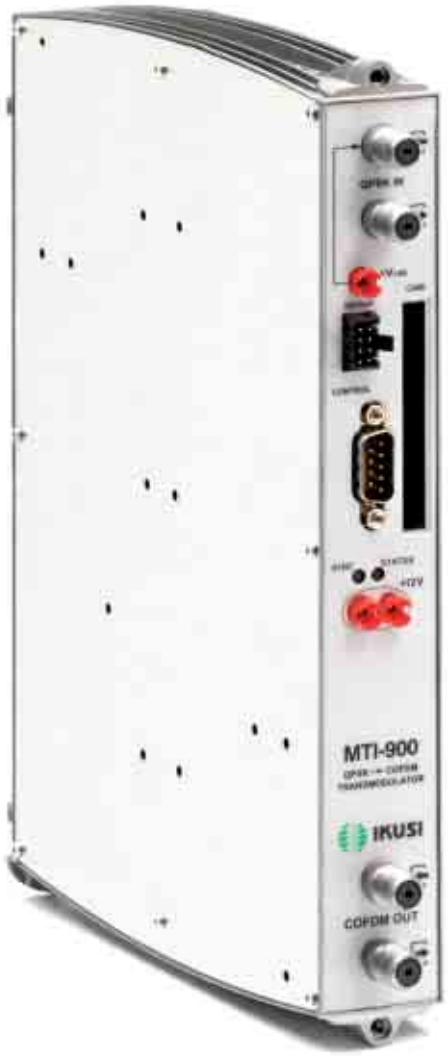
Local programming is carried out either with the SPI-300 unit, which is connected to each module individually. In order to perform NIT adaptation, the IKUNET bus must be installed. The last module at the right end of the IKUNET cascade carries out the control function.

Remote programming may by carried out only if the HMS control unit is installed in the headend.

COFDM Output

DVB-S/S2 ▸ DVB-T

TPC STC MTI TGT



MODEL			MTI-900	MTI-800
REF.			4098	4099
Reception			DVB-S (QPSK) DVB-S2 (QPSK/8PSK)	
Transport Stream (TS) processing			Yes	
Common interface slot (EN 50221)			Yes	NO
Number of encrypted programmes being supported			Variable (depends on the CAM)	—
QPSK/8PSK Input section	Standard		EN 300 421	
	Input frequency	MHz	950 - 2150	
	Input level	dBm	-65 ... -25 (DVB-S) -70 ... -25 (DVB-S2)	
	Input loop-through gain	dB	0 (±1)	
	AFC pull-in range	MHz	±5	
	Input Symbol rate	MS/s	2 ... 45 (DVB-S) 10 ... 30 (DVB-S2)	
COFDM Re-modulation section	Data processing		EN 300 744	
	Output operation modes		2K ,, 4K (DVB-H) ,, 8K	
	Constellation		QPSK ,, 16QAM ,, 64QAM	
	Code rate		1/2 ,, 2/3 ,, 3/4 ,, 5/6 ,, 7/8	
	Guard interval		1/4 ,, 1/8 ,, 1/16 ,, 1/32	
	MER (Modulation Error Ratio)	dB	> 38 (typ.)	
COFDM Output section	Selectable output channel located between:	MHz	47 - 862	
	Bandwidth	MHz	5 (DVB-H) ,, 6 ,, 7 ,, 8	
	Adjustable output level	dBµV	65 to 80	
	Frequency stability	ppm	≤ ±30	
	Output loop-through loss	dB	1.1	
	Spurious in band	dBc	< -50	
	Broadband noise (ΔB=5 MHz)	dBc	< -75	
General	Supply voltage	VDC	+12	
	Consumption	mA	730 (without CAM) 870 (with CAM)	730
	Operating temperature	˚C	0 ... +45	
	Input RF connector type		(2x) female F	
	Output RF connector type		(2x) female F	
	DC connector type		banana socket	
	CAM entrance		1 slot (EN 50221)	—
	Programming interface		RS-232 / DB-9	
	IKUSUP bus connector		(2x) 4 pin socket	
	Dimensions	mm	230 x 195 x 32	

The module is packed with:
- 2 F plug bridges, 64 mm length, for input tap line and output coupling line.
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.

Application example:
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MTI HEADEND

- Digital transmodulation (QPSK/8PSK to COFDM) with Transport Stream Processing. The QPSK or 8PSK channels located in the Sat-IF frequency band (950-2150 MHz) are transformed to COFDM channels located in the 47-862 MHz band. Range includes two transmodulators: MTI-900 and MTI-800. The MTI-900 has Common Interface (EN 50221) for discretionary de-encrypting of TV programmes.
- A MTI headend includes:
  - As many MTI tansmodulators as COFDM channels to be distributed. At MTI-900 module, one CAM (Conditional Access Module) containing the Operator's Smart Card must fit the front panel slot.
  - One HPA that amplifies the sum of the output COFDM channels from the transmodulators.
  - One or more CFP Power Supplies.
  - One or more Rack-Frames or wall-fixing Base-Plates. The base-plates can be joined horizontally.
  - Usually, housing units for the base-plates.
  - If the headend is large, one or more AMX-400 combiners.

The MTI headends provide a COFDM multichannel signal whose level is appropriate to feed the distribution network. An extension input at the HPA amplifier allows easy coupling of the wideband 47-862 MHz signal provided by another existing headend. You can use your TV DTT (Digital Terrestrial Television) for programs receiving satellite channels treated at the station MTI.

FUNCTIONAL DESCRIPTION OF THE MTI TRANSMODULATORS

An MTI transmodulator carries out the complete channel processing from the input to the output:

- tunes a QPSK/8PSK digital channel of the 950-2150 MHz band, demodulates the signal being received,
- processes the transport stream (with programme de-encrypting in the MTI-900, if this one has a “CAM + Operator Card” couple is installed), and
- re-modulates it in COFDM format on an RF channel that is selectable within the 47-862 MHz frequency range.

Main features:

- Central xPSK Input Frequency (1 MHz steps)
- Input Symbol Rate (0.001 MS/s steps)
- Central COFDM Output Frequency (1 kHz steps)
- Output Channel Bandwidth (6, 7 or 8 MHz; also 5 MHz on DVB-H)
- Output Operation Mode (2K or 8K; also 4K on DVB-H)
- RF Output Level
- FFT Window (Fast Fourier Transform), to reduce interference on adjacent channel
- In-depth interleaving (only on DVB-H; with 2K and 4K modes)
- Discretionary de-encrypting of one or more Services (only for MTI-900)
- Optional Blockade of Services, PIDs and Conditional Accesses, with Regeneration of Tables
- NIT Adaptation

Simple cabling of MTI headends

The MTI transmodulators feature two directionally coupled input and output ports. Sat-IF signal can therefore be directly fed into the input port of the first module, which in turn passes in through the coupler to the next and so forth. On the output side, the same procedure is repeated which forms the channel coupling. The sum of the combined channels is turn connected in the same way to the drive amplifier_ the HPA module or an external wideband amplifier_ which then feeds the distribution network. For power connection, each module has two DC banana sockets that allow to build a +12 VDC cascade. A third banana socket is available to connect the power for the attached LNB.

Local programming is carried out either with the SPI-300 unit, which is connected to each module individually. In order to perform NIT adaptation, the IKUSUP bus must be installed. The last module at the right end of the IKUSUP cascade carries out the control function.

Remote programming may by carried out only if the HMS control unit is installed in the headend.

FUNCTIONS OF THE TS PROCESSING

- Bit Rate adaptation with PCR restamping
- Adaptation of NIT table

  Adaptation to the particular adjustments of the headend is automatic. Name and identifier of the new network can be edited.
- Service and CA blockade
  Blockade is at service level and at conditional access level.

  Automatic regeneration of PAT, SDT and CAT tables.
- TS monitoring
  Usage level of the Transport Stream — percentage of null packets— is presented along the programming process.
- LCN insertion.
- TS_ID, SID, ONID and NID edition.

COFDM Output

DVB-T ▸ DVB-T

TPC STC MTI TGT

MODEL			TGT-100
REF.			4026
Remote mode			Yes
Transport Stream (TS) processing			Yes
Input section (COFDM)	Standard		EN 300 744
	Input frequency band	MHz	174 - 230 and 470 - 862
	Bandwidth	MHz	7 ,, 8
	Mode (automatic detection)		2K ,, 8K
	Constellation		QPSK ,, 16QAM ,, 64QAM
	Hierarchy		High Priority ,, Low Priority
	Input level (contellation: 64QAM/code rate: 2/3)	dBµV	35 ... 100
	Input loop-trhough gain	dB	0.5 (±1)
	Guard interval (automatic detection)		1/4 ,, 1/8 ,, 1/16 ,, 1/32
COFDM Re-modula-tion section	Data processing		2K ,, 4K (DVB-H) ,, 8K
	Constellation		QPSK ,, 16QAM ,, 64QAM
	Code rate		1/2 ,, 2/3 ,, 3/4 ,, 5/6 ,, 7/8
	Guard interval (automatic detection)		1/4 ,, 1/8 ,, 1/16 ,, 1/32
	In-depth interleaving (only on DVB-H)		Applicable (on 2K and 4K modes)
	MER	dB	> 38 (typ.)
Output section (COFDM)	Selectable output channel located between:	MHz	47 - 862
	Bandwidth	MHz	5 (DVB-H) ,, 6 ,, 7 ,, 8
	Adjustable output level	dBµV	65 to 80
	Frequency stability	ppm	≤ ±30
	Output loop-through loss	dB	1.1
	Spurious in band	dBc	< -50
	Broadband noise (ΔB=8MHz)	dBc	< -75
General	Supply voltage	VDC	+12
	Consumption	mA	670
	Operating temperature	ºC	0 ... +45
	Input RF connector type		(2x) female F
	Output RF connector type		(2x) female F
	DC connector type		"banana" socket
	Programming interface		RS-232 / DB-9
	IKUSUP bus connector		(2x) 4 pin socket
	Dimensions	mm	230 x 195 x 32

The module is packed with:
- 2 F plug bridges, 64 mm length, for input tap line and output coupling line.
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.

Application example:
Pág. 123

TGT HEADEND

- The TGT is a COFDM to COFDM Transport Stream Regenerator/Processor. The product is designed to correct and rebuild a poor quality COFDM signal back to Quasi Transmission Standard. The product also allows the user to change various parameters of the regenerated COFDM stream at the output.
- A TGT headend includes:
  - As many TGT Regenerators as COFDM channels being received.
  - One or more AMX-400 combiners if the headend being assembled is extensive.
  - One HPA Amplifier to launch the combined output COFDM channels from the regenerators.
  - One or more CFP Power Supplies.
  - One or more Rack Frames or wall mounting Base Plates. The base plates can be joined horizontally.
  - Housing units for the base plates if required.
  - If the headend is large, one or more AMX-400 combiners.

  The TGT headends deliver a multichannel COFDM signal with sufficient power to drive a distribution network.
  An extension input at the HPA amplifier allows easy coupling of the wideband 47-862 MHz signal provided by other existing headend equipment.

FUNCTIONAL DESCRIPTION OF THE TGT REGENERATORS

A TGT module carries out the complete COFDM stream regeneration plus full processing from input to output:

- tunes a COFDM digital channel in the range between 174-230 MHz or 470-862 MHz bands,
- demodulates the received signal,
- corrects errors within the actual COFDM data stream,
- processes the transport stream, and
- re-modulates an errorless data stream into an RF COFDM channel anywhere between 47-862 MHz.

Main features:

- Central Input Frequency (125 kHz steps)
- Bandwidth (7 or 8 MHz)
- Hierarchy Level (high or low priority)
- Central COFDM Output Frequency (1 kHz steps)
- Output Channel Bandwidth (6, 7 or 8 MHz; & 5 MHz for DVB-H)
- Output Operation Mode (2K or 8K; & 4K for DVB-H)
- Output Constellation (QPSK, 16QAM or 64QAM)
- Output Code Rate (1/2, 2/3, 3/4, 5/6 or 7/8)
- Output Guard Interval (1/4, 1/8, 1/16 or 1/32)
- RF Output Level
- FFT Window (Fast Fourier Transform), to reduce interference on adjacent channel
- In-depth Interleaving (only for DVB-H; with 2K and 4K modes)
- Optional Blockade of Services, PIDs and Conditional Accesses, with Regeneration of Tables
- NIT Regeneration (Adaptation)

FUNCTIONS OF THE TS PROCESSING

- Bit Rate adaptation with PCR restamping
- Adaptation of NIT table

  Adaptation to the particular adjustments of the headend is automatic. Name and identifier of the new network can be edited.
- Service and CA blockade
  Blockade is at service level and at conditional access level.

  Automatic regeneration of PAT, SDT and CAT tables.
- TS monitoring
  Usage level of the Transport Stream — percentage of null packets— is presented along the programming process.
- LCN insertion.
- TS_ID, SID, ONID and NID edition.

IP Output

TNS SNS BNS STB

Streaming Modules for ClassA Headends

The IP Streamers from IKUSI are gateways designed to broadcast in multicast on an IP network the services issued from DVB reception (satellite, terrestrial, cable), or DVB professional equipment, or local audio/video sources. The IP streams can be viewed using the IPR set-top box or a software video player.

The streamers have IKUSI ClassA mechanical format. As such, they are fixed on the BAS-700 baseplates or in the SMR-601 rack frame, and they are +12 VDC powered from a CFP module.

Range includes the following models:

— TNS-101. Free-to-air or MultiCrypt DVB-T reception. Common Interface.

— SNS-102. Free-to-air or MultiCrypt DVB-S/S2 reception. Common Interface.

— BNS-200. Streaming of baseband audio/video signals. Double.

Main feature

- DVB to IP streamers:
  Output: up to 8 simultaneous IP-encapsulated services, or 28 only-Radio programmes, with individual multicast addresses.
- A/V to IP streamer:
  Output: 1 or 2 IP-encapsulated TV broadcasts with individual multicast addresses.
- Filtering of information contained in the MPEG-2 tables.
- UDP and RTP transmission protocols.
- Web interface for module configuration.
- Alarm information SNMP agent.
- SAP and SDP protocols to facilitate automatic programme selection in the set-top box and to provide programme information to external servers.

Advanced features

- PID filtering
- PSI/SI parsing
- ECM and EMM transparent passthrough
- Regeneration of PAT and PMT tables
- Passthrough or blockade of CAT, NIT, SDT, EIT and TDT tables
- QoS marking configurable
- TTL configurable

Configuration of streamers is carried out through a web brower runnig on a PC provided with Ethernet adapter.

Abbreviations

ASI : Asynchronous Serial Interface. Serial transmission method for MPEG-2 streams.
CAT : Conditional Access Table
CVBS : Chroma Video Blanking Synchro
ECM : Entitlement Control Messages
EIT : Event Information Table
EMM : Entitlement Management Messages
IPTV : Internet Protocol Television
MPTS : Multiple Program Transport Stream
NIT : Network Information Table
PAT : Program Association Table
PID : Packet IDentifier
PMT : Program Map Table
PSI : Program Specific Information
QoS : Quality of Service
RTP : Real-Time Transport Protocol
SAP : Service Advertisement Protocol
SDP : Session Description Protocol
SDT : Service Description Table
SI : Service Information
SPTS : Single Program Transport Stream
TDT : Time and Date Table
TTL : Time to Live
UDP : User Datagram Protocol

IP Output

DVB-T ▸ IP

TNS SNS BNS STB

MODEL			TNS-101
REF.			5114
Reception			DVB-T FTA or MultiCript (Common Interface - EN50221)
Maximum number of de-encrypted services			Variable (CAM depending)
SNMP Support - traps			Yes
Input section (COFDM)	Frequency range	MHz	174 - 230 and 470 - 862
	Frequency step	kHz	125
	Input level	dBm	35 ... 100
	Input loop-through gain	dB	0.5 (±1)
Output section (IP)	Standard		IEEE 802.3 10/100 Base T
	Bit rate	Mbps	up to 100
	Transmission protocols		UDP / RTP
	No. of simultaneous streams		up to 8
	Multicast		Yes
Connectivity	RF input (loop-through)		(2x) female F
	DC connection		banana socket
	CAM entrance		slot
	Configuration		RS 232 / DB-9
	Ethernet output		RJ-45
General	Supply voltage	VDC	+12
	Consumption	mA	550 (CAM included)
	LEDs indicator		ON - STATUS - LINK - ACT
	Operating temperature	˚C	0 ... +45
	Dimensions	mm	230 x 195 x 32

The module is packed with:
- 1 F plug bridges, 64 mm length, for input tap line and output coupling line.
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.

TNS HEADEND

A TNS headend for DVB-T to IP streaming includes:

- As many TNS-101 Streamers as there are DVB-T channels whose programmes you want to broadcast on the IP network. The TNS-101 features Common Interface to be utilized when the DVB-T channel includes one or more encrypted programmes that one want to de-encrypt; a CAM (Conditional Acces Module) containing an Operator's Smart Card must fit the front panel slot. CAM modules are not supplied by IKUSI.
- One or more CFP Power Supplies.
- One or more Rack-frames or Baseplates. The baseplates can be joi ned horizontally.
- Usually, one housing unit.

The TNS modules have two directionally coupled input ports that facilitate simple connection of the incoming COFDM-modulated signal using the plug bridges supplied. For power connection each module has two DC banana sockets that allow to build the +12 VDC cascade from the power supply module. A third banana socket is available to connect the power for an optional mast-head preamplifier.

Application example:
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IP Output

DVB-S/S2 ▸ IP

TNS SNS BNS STB

MODEL			SNS-102
REF.			5113
Reception			DVB-S/S2 FTA or MultiCrypt (Common Interface - EN50221)
Number of encrypted programmes being supported			Variable (CAM depending)
SNMP Support - traps			Yes
DiSEqC equipped (vers. 1.08)			Yes
Input Section (QPSK/8PSK)	Frequency range	MHz	950 - 2150
	Output level	dBm	-65 ... -25
	Input loop-through gain	dB	0 (±1)
	Input symbol rate	MS/s	2 ... 45
Output Section (IP)	Standard		IEEE 802.3 10/100 Base T
	Bit rate	Mbps	up to 100
	Transmission protocols		UDP / RTP
	No. of simultaneous streams		up to 8
	Multicast		Yes
Connectivity	RF input (loop-through)		(2x) female F
	DC connection		banana socket
	CAM entrance		slot
	Configuration		RS 232 / DB-9
	Ethernet output		RJ-45
General	Supply voltage	VDC	+12
	Consumption	mA	790 (CAM included)
	Max DiSEqC current	mA	300
	Indicator leds		ON - STATUS - LINK - ACT
	Operating temperature	˚C	0 ... +45
	Dimensions	mm	230 x 195 x 32

The module is packed with:
- 1 F plug bridges, 64 mm length, for input tap line and output coupling line.
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.

SNS HEADEND

An SNS headend for DVB-S/S2 to IP streaming includes:

- As many SNS streamers as there are DVB-S/S2 transponders whose programmes one want to broadcast on the IP network. The SNS-102 must be utilized when the transponder transmits one or more encrypted programmes that one want to de-encrypt; a CAM (Conditional Acces Module) containing an Operator's Smart Card must fit the front panel slot. CAM modules are not supplied by IKUSI.
- One or more CFP Power Supplies.
- One or more Rack-frames or Baseplates. The baseplates can be joined horizontally.
- Usually, one housing unit.

The SNS streamers have two directionally coupled input ports that facilitate simple connection of the incoming Sat-IF signal using the plug bridges supplied. Besides this, the headends with SNS-102 models are able to use Sat-IF multiswitches, what allows to change at any time the Sat-IF signal fed into each streamer without recabling the headend.

Application example:
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IP Output

A/V ▸ IP

TNS SNS BNS STB

MODEL			BNS-200
REF.			5105
Inputs			(2x) Video (CVBS - PAL , SECAM , NTSC) (2x) Audio (ANALOGUE - Mono , ST/Dual)
SNMP support - traps			Yes
Input Section (V/A)	Video input level	Vpp	(2x) 0.7 ... 1.4
	Video input impedance	Ω	(2x) 75
	Max video resolution		PAL/SECAM: 720x576 NTSC: 720X480
	Audio input level	Vpp	(2x) 0.5 ... 4.0
	Audio input impedance	Ω	(2x) >600
MPEG Coding	Video coding		MPGE-2 MP&ML ,, MPEG-4 ASP
	Audio coding		MPEG-1 Layer II
Output Section (IP)	Standard		IEEE 802.3 10/100 Base T
	Bit rate	Mbps	up to 100
	Transmission protocols		UDP / RTP
	No. of simultaneous streams		2
	Multicast		Yes
Connectivity	Video connection		(2x) female RCA
	Audio connection		(4x) female RCA
	DC connection		banana socket
	Configuration		RS 232 / DB-9
	Ethernet output		RJ-45
General	Supply voltage	VDC	+12
	Consumption	mA	640
	Indicator LEDs		ON - STATUS - LINK - ACT
	Operating temperature	˚C	0 ... +45
	Dimensions	mm	230 x 195 x 32

The module is packed with:
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.

BNS HEADEND

A BNS headend for V/A to IP streaming includes:

- One BNS-200 streamer per two local video/audio sources.
- One or more CFP Power Supplies.
- One or more Rack-frames or base plates. The base plates can be joined horizontally.
- Usually, one housing unit.

The A/V input connections of the BNS module (two RCA connectors for video signals and four of the same type for audio L and R signals) are disposed at the top of the front panel. For power connection the module has two DC banana sockets for performing a +12 VDC cascade.

Application example:
Pág. 124

HD Set Top Box

TNS SNS RNS BNS STB

MODEL	IPR-112EU
REF.	5125

Interface

HDMI output for high definition,
RCA composite (CVBS) video/audio output,
S/PDIF audio via optical fiber,
RJ-45 for WAN/LAN, 10/100baseT, auto sensing x 2,
USB2.0 connector x 2
RJ-12 with RS-232
IR receiver / extension
IR out

Video output

NTSC/PAL/SECAM, TV resolution: 720x480/576 pixels
480i/480p/576i/576p/720p/1080i output formats

Video decoding

HD/SD H.264/AVC Main and High Profile to Level 4.1 (HD),Level 3.1 (SD)
Advanced profile level 3 VC-1
Simple/Main Profile VC-1
HD/SD MPEG-2 Main Profile at Main and High levels
MPEG still image decode
AVS1-P2 Jizhun profile @ level 6
MPEG4 P2 SP/ASP L5 SD Progressive/Interlaced

Audio output

S/PDIF optical or electrical
Analog stereo

Audio decoding

AAC LC, AAC HE 5.1
MPEG I Layer 1,2
WMA, WMA pro

General

Power: AC 100~240V / 50~60Hz
Dimensions: 169.4mm (W) x 149.6mm (D) x 29.2mm (H)

Software: Browser

Middleware
OSD with VCR trick mode (Play, Pause, FFW, RW, Stop)
EPG (Electronic Program Guide)*

Copy Protection
DRM and Macrovision

Stream Protocol
UDP, RTP and RTSP

Network Protocol
IPv4, HTTP, DNS Client, DHCP Client, NTP, TFTP Client, Telnet Server, ICMP (Ping / Trace Route)

Multicast Protocol: IGMP v2, v 3

Description

The IPR-112EU is a next generation IP-based set-top-box which can support IPTV, video-on-demand (VoD), near VoD, Internet, and over-the-top (OTT) video applications in both HD (high-definition) and SD (standard-definition) formats. It supports most popular HD/SD decoding schemes, including simultaneous HD/SD decoding with PIP (picture-in-picture) function. With advanced and legacy interfaces supported, it can be used as a multimedia hub for a modern digital home networking environment.
IPR-112EU is powered by state-of-the-art SoC and embedded Linux to support most advanced services via an IP network. These advanced applications allow Telcos, Cable operators and Internet service providers to leverage their invested DSL, HFC (cable modem) and FTTP infrastructure.
As forms alliances with industrial partners including chipset manufacturers and software vendors, we can provide customized solutions that enable our clients to satisfy customer needs.

Main features

- 400-MHz Dual-Core/fast 1000-DMIPS MIPS processor
- Supports HD/SD simultaneous decoding with PIP function
- High-performance 2D-effects graphic engine
- Supports high definition video quality via HDMI 1.3
- 480i/480p/576i/576p/720p/1080i output formats
- Digital noise and contour reduction (DNR/DCR)
- Dual USB 2.0 host controller with host transceiver
- Supports SD MPEG-4 P2, AVS1-P2 decoding
- Macrovision® 7.1 support
- Software upgradeable via HTTP

IF-IF Converter

SPC

MODEL			SPC-030
REF.			3844
Number of SAt-IF channels converted			3
Input mode			Configurable: a) Loop-through b) Two independent inputs: port up : 2-channel input port down : 1-channel input
Input section	Inuput frequency	MHz	950 - 2150
	Input level	dBµV	-60 ... -20
	Input symbol rate	dB	6 ... 45
	Max level difference between input signals		25
	Noise figure		< 10
	Input loop-through gain		0 (±2)
(COFDM) Output section	Output frequency band	MHz	950 - 2150
	Output response flatness	MHz	< 3
	Adjustable output level	dBµV	-38 a -23
	Phase noise	ppm	DVB-S2 compatible
	Output loop-through loss	dB	1 (typ.) ,, 1.8 (max)
	Spurious in band	dBc	< -35
General	Supply voltage	VDC	+12
	Consumption	mA	210
	Operating temperature	ºC	0 ... +45
	Input RF connector type		(2x) female F
	Output RF connector type		(2x) female F
	DC connector		banana socket
	Programming interface		RS-232 / DB-9
	Dimensions	mm	230 x 195 x 32

The module is packed with:
- 2 F plug bridges, 64 mm length, for input tap line and output coupling line.
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.

SPC HEADEND

- Frequency conversion of Sat-IF channels coming from different satellites or polarizations in order to establish a new frequency plan where all the converted channels are transmitted on a single cable.
- Use with digital channels.
- An SPC headend includes:

- Single and/or triple SPC Converters, as required.
- One HPA-920 Sat-IF Combiner/Amplifier.
- One or more CFP Power Supplies.
- One or more Rack-frames or Base-plates. The base-plates can be joined horizontally.
- Usually, housing units for the base-plates.
- If the headend being assembled is extensive, one or more AMX-400 combiners.

Main features:
- Central Input Frequencies (1 MHz increments)
- Symbol Rates (6 to 45 MS/s, 1 MS/s increments)
- Central Output Frequencies (1 MHz increments)
- Input Configuration (loop-through or 2 independent inputs)

AM Output

DVB-T ▸ AM

TRF | SRF | SRC | MCP | THC | TBA

MODEL			TRF-011	TRF-112
REF.			4085	4420
Output TV-channel spectrum			VSB (Vestigial Side Band)	
Remote mode			NO	Yes
Output channel TV system			B / G / D / K / I / L	B / G
Output channel audio system			Mono	A2
Output channel colour system			PAL , SECAM , NTSC	
Selectable output channel located between:		MHz	45 - 862	
Input section (COFDM)	Input frequency band	MHz	174 - 230 and 470 - 862	
	Bandwidth	MHz	7 ,, 8	
	Mode (automatic detection)		2K ,, 8K	
	Constellation (automatic detection)		QPSK ,, 16QAM ,, 64QAM	
	Hierarchy		High Priority ,, Low Priority	
	Input level (constellation 64QAM and code rate 2/3)	dBµV	35 ... 100	
	Input loop-trough gain	dB	0.5 (±1)	
	Guard interval (automatic detection)		1/4 ,, 1/8 ,, 1/16 ,, 1/32	
MPEG-2 Decoding section	Video decoding		Main Profile @ Main level	
	Audio decoding		Layer II	
	Teletext - Subtitles insertion		Yes	
	Image Format Conversion		16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-box	
External Video/audio loop	Video and L/R audio output levels	Vpp	—	1,0 (video) 0...2,0 (audio)
	Video and L/R audio input levels	Vpp	—	0,9...1,1 (video) 0,5...1,0 (audio)
Video & audio Re-modulation section	Adjustable video modulation depth	%	80 to 90	
	Adjustable audio peak deviation	kHz	±10 to ±50	
	Adjustable audio modulation depth	%	10 to 80 (system L)	
Output section (TV Channel)	Adjustable output level	dBµV	65 to 80	
	Output loop-through loss	dB	1.1 (typ) ,, 1.4 (max)	
	Adjustable carrier level ratio	dB	12 / 16 (Mono ; A2: Audio1) 20 (A2: Audio2)	
	Group delay precorrection		—	Yes
	Weighted SNR	dB	> 60	
	Spurious in band	dBc	< -58	< -60
	Broadband noise (ΔB=5 MHz)	dBc	< -75	
General	Supply voltage	VDC	+12	
	Consumption	mA	590	640
	Operating temperature	ºC	0 ... +45	
	Input RF connector type		(2x) female F	
	Output RF connector type		(2x) female F	
	DC connector type		banana socket	
	Programmating interface		RS-232 / DB-9	
	Video/audio loop connector type		—	mini-DIN (6 way)
	IKUSUP bus connector		—	(2x) 4 pin socket
	Dimensions	mm	230 x 195 x 32	

The module is packed with:
- 2 F plug bridges, 64 mm length, for input tap line and output coupling line.
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.

Application example:
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TRF HEADEND

- Terrestrial TV reception, standard DVB-T / MPEG-2 (EN 300 744).
- Digital to analogue transmodulation process (COFDM - AM) that presents the clear TV programmes transmitted in COFDM terrestrial TV channels on conventional VHF/UHF channels (VBS vestigial side band; any TV system and colour system).
- A TRF headend includes:
  - As many TRF receiving modules as free-to-air TV programmes to be distributed.
  - One HPA amplifier that amplifies the sum of the combined output TV channels from the receivers.
  - One or more CFP power supply.
  - One or more rack-frames or wall fixing base plates. The base plates can be joined horizontally.
  - Usually, one housing unit
  - If the headend is voluminous, one or more AMX-400 combiners.

The TRF headends provide a TV multichannel signal whose level is appropriate to feed the distribution network. With a TRF installed in the headend, the end user does not require a Set Top Box or any additional devices to view the clear digital TV programs being distributed. An extension input at the HPA amplifier allows easy coupling of the wideband 47-862 MHz signal provided by another existing headend.

FUNCTIONAL DESCRIPTION OF THE TRF RECEIVERS

A TRF receiving module carries out the complete channel processing from the input to the output:

- tunes a COFDM digital channel within the BIII or UHF bands,
- selects a TV programme from the multiplex being received, and
- directs it to a conventional TV channel which is selectable throughout the 45-862 MHz band..

Range includes different models for VSB output channel spectrums; for B/G, D/K, I, or L TV systems; and for mono sound, or A2 or Nicam stereo/dual sounds.

Mains features:

- Central Input Frequency (125 kHz increments).
- Bandwidth (7 or 8 MHz).
- Hierarchy Level (high or low priority).
- TV Programme and Audio Service.
- Parameters of the output TV channel (video carrier frequency, TV system, colour system, video modulation depth, audio modulation index, carrier level ratio, output level).
- Image Format. Possible conversions are 16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box.

Simple cabling of TRF headends

The TRF receiving modules features two directionally coupled input and output ports. Antenna signal can therefore be directly fed into the input port of the first module, which in turn passes in through the coupler to the next and so forth. On the output side, the same procedure is repeated which forms the channel couplign. The sum of the combined channels is turn connected in the same way to the drive amplifier _the HPA module or an external wideband amplifier_ which then feeds the distribution network.
For power connection, each module has two DC banana sockets that allow to build a +12 VDC cascade. A third banana socket is available to connect the power for an optional mast-head pramplifier.
An external video/audio loop, which is switched under control software, is available on model TRF-112.
Local programming is carried out either with the SPI-300 unit, which is connected to each module individually. Remote programming may by carried out only if the HMS control unit is installed in the headend.

AM Output

DVB-S ▸ AM

TRF | SRF | SRC | MCP | THC | TBA

MODEL			SRF-011	SRF-112
REF.			4084	4062
Output TV-channel spectrum			VSB (Vestigial Side Band)	
Remote mode			NO	Yes
Output channel TV system			B / G / D / K / I / L	B / G
Output channel audio system			Mono (1)	A2
Output channel colour system			PAL , SECAM , NTSC	
Selectable output channel located between:		MHz	45 - 862	
Input section (QPSK)	Input frequency band	MHz	950 - 2150	
	Input level	dBm	-65 ... -25	
	Input loop-through gain	dB	0 (±1)	
	AFC pull-in range	MHz	±5	
	Input symbol rate	MS/s	2 ... 45	
MPEG-2 decoding section	Video decoding		Main Profile @ Main level	
	Audio decoding		Layer II	
	Teletex - Subtitles insertion		Yes	
	Image Format Conversion		16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-box	
External video/audio loop	Video and L/R audio output levels	Vpp	—	1.0 (video) 0...2.0 (audio)
	Video and L/R audio input levels	Vpp	—	0.9...1.1 (video) 0.5...1.0 (audio)
V/A re-modulation section	Adjustable video modulation depth	%	80 to 90	
	Adjustable audio peak deviation	kHz	±10 to ±50	
Output section (TV channel)	Adjustable output level	dBµV	65 to 80	
	Output loop-through loss	dB	1.1	
	Adjustable carrier level ratio	dB	12 / 16 (Mono ; A2: Audio1) 20 (A2: Audio2)	
	Group delay precorrection		—	Yes
	Weighted SNR	dB	> 60	
	Spurious in band	dBc	< -58	< -60
	Broadband noise (ΔB=5 MHz)	dBc	< -75	
General	Supply voltage	VDC	+12	
	Consumption	mA	540	590
	Operating temperature	ºC	0 ... +45	
	Input RF connector type		(2x) female F	
	Output RF connector type		(2x) female F	
	DC connector type		banana socket	
	Programming interface		RS-232 / DB-9	
	Video/Audio loop connector type		—	mini-DIN (6 way)
	IKUSUP bus connector		—	(2x) 4 pin socket
	Dimensions	mm	230 x 195 x 32	

(1) When selecting a stereo audio service, the output channel sound carrier is modulated with the "L+R" sum. If the audio service selected is dual, the carrier can be modulated with any of the "audio 1", "audio 2" or "audio 1 + audio 2" signals.

The module is packed with:
- 2 F plug bridges, 64 mm length, for input tap line and output coupling line.
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.

Application example:
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SRF HEADEND

- Terrestrial TV reception, standard DVB-S / MPEG-2 (EN 300 421).
- Digital-to-Analogue Transmodulation Process (QPSK - AM) that presents the clear TV programmes transmitted in QPSK Sat-TV channels on conventional VHF/UHF channels (VSB vestigial side band; any TV system and Colour system).
- An SRF headend includes:
  - As many SRF receiving modules as free-to-air TV programmes to be distributed.
  - One HPA amplifier that amplifies the sum of the combined output TV channels from the receivers.
  - One or more CFP power supply.
  - One or more rack-frames or wall fixing base plates. The base plates can be joined horizontally.
  - Usually, one housing unit.
  - If the headend is voluminous, one or more AMX-400 combiners.

The SRF headends provide a TV multichannel signal whose level is appropriate to feed the distribution network. With a SRF installed in the headend, the end user does not require a Set Top Box or any additional devices to view the clear digital TV programs being distributed. An extension input at the HPA amplifier allows easy coupling of the wideband 47-862 MHz signal provided by another existing headend.

UNCTIONAL DESCRIPTION OF THE SRF RECEIVERS

A SRF receiving module carries out the complete channel processing from the input to the output:

- tunes a QPSK Sat-IF digital channel in the 950-2150 MHz band,
- selects a TV programme from the multiplex received, and
- directs it to a conventional TV channel which is selectable throughout the 45-862 MHz band.

Range includes different models for VSB output channel spectrums; for B/G, D/K, I, L or M/N TV system; and for mono or A2 stereo/dual sounds.

Main features:

- Central input frequency (1 MHz increments).
- Input symbol rate (pasos de 0,001 MS/s increments).
- TV programme and Audio service. (Or a Radio programme. Image will be black).
- Parameters of the output TV channel (video carrier frequency, TV system, colour system, video modulation depth, audio modulation index, carrier level ratio, output level).
- Image Format. Possible conversions are 16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box.

Present a very low broadband noise floor (< -75 dBc) that permit to use multiple modules in the headend with little deterioration of the CNR.

Simple cabling of SRF headends

The SRF receiving modules feature two directionally coupled input and output ports. Sat-IF signal can therefore be directly fed into the input port of the first module, which in turn passes it through the coupler to the next and so forth. On the output side, the same procedure is repeated which forms the channel coupling. The sum of the combined channels is turn connected in the same way to the drive amplifier _the HPA module or an external wideband amplifier_ which then feeds the distribution network.
For power connection, each module has two DC banana sockets that allow to build a +12 VDC cascade. A third banana socket is available to connect the power for the attached LNB.
An external video/audio loop, which is switched under control sortware, is available on model SRF-112.
Local programming is carried out either with the SPI-300 unit, which is connected to each module individually. Remote programming may by carried out only if the HMS control unit is installed in the headend.

AM Output

DVB-S ▸ AM

TRF | SRF | SRC | MCP | THC | TBA

MODEL			SRC-111
REF.			4096
Output TV-channel spectrum			VSB (Vestigial Side Band)
Remote mode			Yes
Output channel TV system			B / G
Audio operation mode			Mono (1)
Output channel colour system			PAL , SECAM , NTSC
Selectable output channel located between:		MHz	45 - 862
Input section (QPSK)	Inpt frequency	MHz	950 - 2150
	Input level	dBm	-65 ... -25
	Input loop-through gain	dB	0 (±1)
	AFC pull-in range	MHz	±5
	Input symbol rate	MS/s	2 ... 45
MPEG-2 decoding	Video decoding		Main Profile @ Main level
	Audio decoding		Layer II
	Teletext - subtitles insertion		Yes
	Image format conversion		16:9 a 4:3 Pan&Scan and 16:9 a 4:3 Letter-box
External V/A loop	Video and L/R audio output levels	Vpp	1.0 (video) 0 ... 2.0 (audio)
	Video and L/R audio input levels	Vpp	0.9 ... 1.1 (video) 0.5 ... 1.0 (audio)
V & A re-modulation section	Adjustable video modulation depth	%	80 to 90
	Adjustable audio peak deviation	kHz	±10 to ±50
Output section (TV channel)	Adjustable output level	dBµV	65 to 80
	Output loop-through loss	dB	1.1
	Adjustable carrier level ratio	dB	12 / 16
	Group delay precorrection		Yes
	Weighted SNR	dB	> 60
	Spurious in band	dBc	< -60
	Broadband noise (ΔB=5 MHz)	dBc	< -75
General	Supply voltage	VDC	+12
	Max consumption (CAM included)	mA	680
	Operating temperature	ºC	0 ... +45
	Input RF connector type		(2x) female F
	Output RF connector type		(2x) female F
	DC connector type		banana socket
	CAM entrance		Slot
	Programming interface		RS-232 / DB-9
	Video/audio loop connector type		mini-DIN (6-way)
	IKUSUP bus connector		(2x) 4-pin socket
	Dimensions	mm	230 x 195 x 32

(1) When selecting a stereo audio service, the output channel sound carrier is modulated with the "L+R" sum. If the audio service selected is dual, the carrier can be modulated with any of the "audio 1", "audio 2" or "audio 1 + audio 2" signals.

The module is packed with:
- 2 F plug bridges, 64 mm length, for input tap line and output coupling line.
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.

Application example:
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SRC HEADEND

- Reception of encrypted Sat-TV programs. Standard DVB-S / MPEG-2 (EN 300 421).
- Receiving Modules with Common Interface (EN 50221). The encrypted TV programmes transmitted on QPSK channels are de-encrypted and presented on conventional VHF/UHF channels (any TV system or Colour system).
- An SRC headend includes:
  - As many SRC Receiving Modules as de-encrypted TV programmes to be distributed. At each module, one CAM (Conditional Access Module) containing the Operator's Smart Card must fit the front panel slot.
  - One HPA Amplifier that amplifies the sum of the receivers' output TV channels. One or more CFP Power Supplies.
  - One or more Rack-Frames or wall-fixing Base-Plates. The base-plates can be joined horizontally.
  - Usually, housing units for the base-plates.
  - If the headend is large, one or more AMX-400 combiners.

The SRC headends provide a TV multichannel signal whose level is appropriate to feed the distribution network. With an SRC installed in the headend, the end user does not require a Set Top Box or any additional devices to view the de-encrypted digital TV programs being distributed. An extension input at the HPA amplifier allows easy coupling of the wideband 47-862 MHz signal provided by another existing headend.

FUCNTIONAL DESCRIPTION OF SRC RECEIVERS

An SRC receiving module with CAM+Operator's smart card inserted, carries out a complete channel processing from the input to the input:

- tunes a QPSK Sat-IF digital channel in the 950-2150 MHz band,
- selects an encrypted TV programme from the multiplex being received, and
- de-encryptes and presents it on a conventional TV channel that is selectable throughout the 45-862 MHz.

Main features:

- Central input frequency (1 MHz increments).
- Input symbol rate (pasos de 0,001 MS/s increments).
- TV programme and Audio service. (Or a Radio programme. Image will be black).
- Parameters of the output TV channel (video carrier frequency, TV system, colour system, video modulation depth, audio modulation index, carrier level ratio, output level).
- Image Format. Possible conversions are 16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box.

Present a very low broadband noise floor (< -75 dBc) that permit to use multiple modules in the headend with little deterioration of the CNR.

Simple cabling of SRC headends

The SRC receiving modules feature two directionally coupled input and output ports. Sat-IF signal can therefore be directly fed into the input port of the first module, which in turn passes it through the coupler to the next and so forth. On the output side, the same procedure is repeated which forms the channel coupling. The sum of the combined channels is turn connected in the same way to the drive amplifier _the HPA module or an external wideband amplifier_ which then feeds the distribution network.
For power connection, each module has two DC banana sockets that allow to build a +12 VDC cascade. A third banana socket is available to connect the power for the attached LNB.
An external video/audio loop, which is switched under control sortware, is available on model SRC-111.
Local programming is carried out either with the SPI-300 unit, which is connected to each module individually. Remote programming may by carried out only if the HMS control unit is installed in the headend.

AM Output

A/V ▸ AM

TRF SRF SRC MCP THC TBA

MODEL			MCP-411	MCP-412
REF.			3826	3829
TV system			B/G	
Audio system			Mono	A2
Input			(1x) Video (1x) Audio	
Selectable output channel located between:		MHz	45 - 862	
Adjustable output level		dBµV	70 to 80	
Intercarrier frequency	Audio 1	MHz	5.5	
	Audio 2		—	5,742
Adjustable carrier level ratio		dB	12 / 16	12/16 (1ª audio carrier) 20 (2ª audio carrier)
Video input level		Vpp	0.7 ... 1.4	
Video input impedance		Ω	75	
Adjustable video modulation depth		%	80 to 90	
Audio input level		Vpp	0.5 ... 4.0	
Impedancia entrada audio		Ω	> 600	
Adjustable audio peak deviation		kHz	±40 to ±50	
Audio pre-emphasis		µs	50	
Weighted SNR		dB	> 60	
Group delay precorrection			Yes	
Differential gain		%	< 3	
Differentian phase		º	< 2	
K-factor (2T pulse)		%	< 2	
Spurious in band		dBc	< -60	
Broadband noise (ΔB=5 MHz)		dBc	< -77	
Output loop-through loss		dB	0.7 (typ) , 1.2 (max)	
Supply voltage		VDC	+12	
Consumption		mA	370	460
Video connector type			(1x) female RCA	
Audio connector type			(2x) female RCA	
Output RF connector type			(2x) female F	
DC connector type			banana socket	
Programming interface			RS-232 / DB-9	
Dimensions		mm	230 x 195 x 32	

MCP-400 HEADEND

- Vestigial Side Band TV Modulators. Mono and A2 or Nicam Stereo/ Dual Sounds. TV Systems: B/G, D/K, I, L.
- Range includes single (MCP-4xx) and twin (MCP-8xx) modulators. The twin ones integrate two modulators in one module.
- IF modulation and SAW filtering for maximum harmonic reduction and true VSB response. Adjacent channel operation.
- Frequency agility. Any selectable TV channel within the 45-862 MHz band. PLL frequency synthesized.
- Built-in test pattern generator.

Each module is packed with:
- 1 or 2 F plug bridge, 64 mm length, for output coupling line.
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.
(RCA plugs for video and audio input connections are not supplied)

Application example:
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AM Output

A/V ▸ AM

TRF SRF SRC MCP THC TBA

MODEL			MCP-801	MCP-811	MCP-812
REF.			3849	3851	3848
TV system			B/G/D/K/I/L	B / G	
Audio system			Mono		A2
Input			(2x) Video ,, (2x) Audio		
Selectable output channel located between:		MHz	TV Bil channel each one of the two channels is selectable berween: 45 - 862		
Adjustable output level		dBµV	68 to 78		
Intercarrier frequency	Audio 1	MHz	5.5		
	Audio 2		—		5.742
Adjustable carrier level ratio		dB	12 / 16		12 / 16 (audio 1) 20 (audio 2)
Video input level		Vpp	0.7 ... 1.4		
Video input impedance		Ω	75		
Adjustable video modulation depth		%	80 to 90		
Audio input level		Vpp	0.5 ... 4.0		
Impedancia entrada audio		Ω	> 600		
Adjustable audio peak deviation		kHz	±40 to ±50		
Audio pre-emphasis		µs	50		
Weighted SNR		dB	> 59		
Differential gain		%	< 3		
Differentian phase		º	< 3		
K-factor (2T pulse)		%	< 3	< 2.5	
Spurious in band		dBc	< -57		
Broadband noise (ΔB=5 MHz)		dBc	< -73		
Output loop-through loss		dB	0.7 (typ) ,, 1.2 (max)		
Supply voltage		VDC	+12		
Consumption		mA	460		560
Video connector type			(2x) female RCA		
Audio connector type			(4x) female RCA		
Output RF connector type			(2x) female F		
DC connector type			banana socket		
Programming interface			RS-232 / DB-9		
Dimensions		mm	230 x 195 x 32		

Each module is packed with:
- 1 or 2 F plug bridge, 64 mm length, for output coupling line.
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.
(RCA plugs for video and audio input connections are not supplied)

MCP-800 HEADEND

- In twin modulators, the two generated TV channels are combined internally to make up one bi-channel output signal.
- An MCP headend includes:
  - Single MCP-4xx and/or twin MCP-8xx Modulators.
  - One HPA amplifier that amplifies the sum of the combined output TV channels.
  - One or more CFP Power Supplies.
  - One or more Rack-Frames or wall-fixing Base-Plates. The base-plates can be joined horizontally.
  - Usually, housing units for the base-plates.
  - For large headends, one or more AMX-400 combiners.
- The MCP assembly provides a TV multichannel signal whose level is appropriate to feed the distribution network. An extension input at the HPA amplifier allows easy coupling of the wideband 47-862 MHz signal provided by an existing reception headend.

AM Output

DVB-T ▸ AM

TRF | SRF | SRC | MCP | THC/THF | TBA

MODEL			THC-111	THF-011
REF.			4487	4489
Input section (COFDM)	Input frequency band	MHz	174 - 230 and 470 - 862	
	Bandwidth	MHz	7 / 8	
	Input level	dBµV	35 ... 100	
	Input loop-trough attenuation	dB	0.5 (±1)	
	Guard interval (automatic detection)		1/4 ,, 1/8 ,, 1/16 ,, 1/32	
Digital processing section	DVB Processing		EN 300 74	
	Video decoding		MPEG-4 AVC /H.264 HP@L4 MPEG-2 MP@HL (ISO/IEC 13818-2)	
	Image Format Conversion		16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-box	
	Audio decoding		MPEG-1 Layer I/II MPEG-2 Layer II	
	Firmware upgrade by user		Yes, RS-232 or IKUSUP configuration interface	
	Teletext - Subtitles insertion		Yes	
Base band analogical processing	Output video level (75Ω)	Vpp	1	
	Input video level	Vpp	0.9 ... 1.1 (with over modulation alarm)	
Conditional Access	Common Interface		CENELEC EN50221	—
RF Output section (TV Channel)	Frequency band	MHz	45 - 862	
	Step	kHz	250	
	Adjustable output level	dBµV	65 to 80	
	Output loop-through loss	dB	1.2 (typ) ,, 1.8 (max)	
	Output channel TV system		B / G / D / K / K' / I / L	
	Output channel colour system		PAL, SECAM, NTSC	
	Output channel audio system		Mono	
	Weighted SNR	dB	> 60	
	Spurious in band	dBc	< -59	
	Broadband noise (ΔB=5 MHz)	dBc	< -75	
General	Supply voltage	VDC	+12	
	Consumption	A	0.9 without CAM	
	Operating temperature	ºC	0 ... +45	
	Input RF connector type		(2x) female F	
	Output RF connector type		(2x) female F	
	DC connector type		banana socket	
	Programmating interface		RS-232 / DB-9	
	V/A loop connector type		mini-DIN (6-way)	
	IKUSUP bus connector		(2x) 4-pin socket	
	Dimensions	mm	230 x 195 x 32	

- Receives a digital TV signal modulated with COFDM, using MPEG2 or MPEG4 compression format, takes one channel from the input TS and outputs the selected channel in analogical format, modulated in a lateral vestigial RF carrier. The TV formats managed by the modules can be SD (Standard Definition) or HD (High Definition).
- Prepared to receive pay TV channels (THC only).
- The input signal can be free or encrypted by a conditional access system. The module THC opens encrypted channel using a Conditional Access Module (CAM).
- The module can be remotely controlled through the included IKUSUP bus, when connected to an HMS headend controller.

Application example:
Pág. 124

FM & DAB Radio Amplifier

TRF SRF SRC MCP THC **TBA**

MODEL		TBA-120
REF.		4277
Inputs		2 FM (87.5 - 108 MHz) DAB (195 - 223 MHz)
Response flatness	dB	± 1
Nominal FM gain	dB	10
Nominal DAB gain	dB	2
Variable FM attenuator	dB	0 - 40
Variable DAB attenuator	dB	0 - 20
Noise figure	dB	< 8
FM output level (-50dB IMD3, 2 carriers)	dBµV	80
DAB output level (-50dB IMD3, 2 carriers)	dBµV	80
Output loop-through loss	dB	1.5
Supply voltage	VDC	+12
Consumption	mA	175
Operating temperature	ºC	-10 ... +55
Input RF connector type		(2x) female F
Output RF loop connector		(2x) female F
DC connector type		banana socket
Dimensions	mm	230 x 195 x 32

The module is packed with:
- 1 F plug bridges, 64 mm length, for input tap line and output coupling line.
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.

TBA-120 HEADEND

- Insertion of FM and DAB radios in ClassA headends.
- FM and DAB separate amplification paths with gain adjustment by front panel attenuators. The FM attenuation is shared in two sections —behaviour-delayed input and interstage—, for maintenance of low noise figure.
- Output loop-through.
- Two "banana" sockets for +12 VDC power cascade.

QAM Output

DVB-T ▸ DVB-C

TDI MDI

MODEL			TDI-900
REF.			4021
Remote mode			Yes
Transport Stream (TS) processing			Yes
(COFDM) Input section	Standard		EN 300 744
	Input frequency	MHz	174 - 230 and 470 - 862
	Bandwidth	MHz	7 ,, 8
	Mode (automatic detection)		2K ,, 8K
	Constellation (automatic detection)		QPSK ,, 16QAM ,, 64QAM
	Hierarchy		High Priority ,, Low Priority
	Input level	dBµV	35 ... 100
	Input loop-through gain	dB	0.5 (±1)
	Guard interval (automatic detection)		1/4 ,, 1/8 ,, 1/16 ,, 1/32
QAM Re-modulation section	Data processing		EN 300 429
	Selectable Modulation Scheme of output signal		16QAM ,, 32QAM ,, 64QAM ,, 128QAM ,, 256QAM
	MER (Modulation Error Ratio)	dB	> 40 (typ.)
	Output symbol rate	MS/s	1 ... 8
	Selectable Roll-Off factor	%	12 ,, 13 ,, 15
(QAM) RF output section	Selectable output channel located between:	MHz	47 - 862
	Adjustable output level	dBµV	65 to 80
	Output loop-through loss	dB	1.1
	Spurious in band	dBc	< -55
	Broadband noise (ΔB=5 MHz)	dBc	< -75
General	Supply voltage	VDC	+12
	Consumption	mA	650
	Operating temperature	ºC	0 ... +45
	Input RF connector type		(2x) female F
	Output RF connector type		(2x) female F
	DC connector type		banana socket
	Programming Interface		RS-232 / DB-9
	IKUSUP bus connector		(2x) 4-pin socket
	Dimensions	mm	230 x 195 x 32

The module is packed with:
- 2 F plug bridges, 64 mm length, for input tap line and output coupling line.
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.

TDI HEADEND

- Digital Transmodulation (COFDM to QAM) with Transport Stream Processing. The COFDM channels located in the 174-230 MHz or 470-862 MHz bands are transformed to QAM channels (16 to 256 symbols) located in the 47-862 MHz band. NIT table can be adapted to the new network created.
- A TDI headend includes:

- As many TDI Transmodulators as QAM channels to be distributed.
- One HPA Amplifier that amplifies the sum of the combined output QAM channels from the transmodulators.
- One or more CFP Power Supplies.
- One or more Rack-Frames or wall-fixing Base-Plates. The base-plates can be joined horizontally.
- Usually, housing units for the base-plates.
- If the headend is large, one or more AMX-400 combiners.

The TDI headends provide a QAM multichannel signal whose level is appropriate to feed the distribution network. An extension input at the HPA amplifier allows easy coupling of the wideband 47-862 MHz signal provided by another existing headend. The user requires a DVB-C Receiver to convert the QAM signals into the appropriate signals that can be accepted by a conventional TV set, and to control access to encrypted TV programmes.

FUNCTIONAL DESCRIPTION OF THE TDI MODULATORS

A TDI transmodulator carries out the complete channel processing from the input to the output:
- tunes a COFDM digital channel,
- demodulates the signal being received,
- processes the transport stream, and
- re-modulates it in QAM format (16, 32, 64, 128 or 256 symbols) on an RF channel that is selectable within the 45-862 MHz frequency range.

Application example:
Pág. 123

QAM Output

DVB-S/S2 ▸ DVB-C

TDI MDI

MODEL			MDI-910
REF.			4020
Reception			DVB-S2 DVB-S
Transport Stream processing			Yes
Common Interface (EN 50221)			Yes
(QPSK/8PSK) Input section	Standard		EN 302 307
	Input frequency band	MHz	950 - 2150
	Input level	dBm	-70 ... -25 (DVB-S2) -65 ... -25 (DVB-S)
	Input loop-through gain	dB	0 (±1)
	AFC pull-in range	MHz	±5
	Input symbol rate	MS/s	10 ... 30 (DVB-S2) 2 ... 45 (DVB-S)
(QAM) Re-modulation section	Data processing		EN 300 744
	Selectable modulation scheme		16QAM ,, 32QAM ,, 64QAM ,, 128QAM ,, 256QAM
	MER (Modulation Error Ratio)	dB	> 40 (typ.)
	Output symbol ratio	MS/s	1 ... 8
	Selectable Roll-Off factor	%	12 ,, 13 ,, 15
(QAM) Output section	Selectable output channel located between:	MHz	47 - 862
	Bandwidth	MHz	5 (DVB-H) ,, 6 ,, 7 ,, 8
	Adjustable output level	dBµV	65 to 80
	Output loop-through loss	dB	1.1
	Spurious in band	dBc	< -55
	Broadband noise (ΔB=5 MHz)	dBc	< -75
General	Supply voltage	VDC	+12
	Consumption	mA	710 (without CAM) 850 (with CAM)
	Operating temperature	˚C	0 ... +45
	Input RF connector type		(2x) female F
	Output RF connector type		(2x) female F
	DC connector type		banana socket
	CAM entrance		slot
	Programming Interface		RS-232 / DB-9
	IKUSUP bus connector		(2x) 4-pin socket
	Dimensions	mm	230 x 195 x 32

The module is packed with:
- 2 F plug bridges, 64 mm length, for input tap line and output coupling line.
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.

MDI HEADEND

- Digital Transmodulation (QPSK/8PSK to QAM). The QPSK or 8PSK channels located in the Sat-IF frequency band (950-2150 MHz) are transformed to QAM channels (16 to 256 symbols) located in the 45-862 MHz band.
- A MDI headend includes:

- As many MDI Transmodulators as QAM channels to be distributed.
- One HPA Amplifier that amplifies the sum of the combined output QAM channels from the transmodulators.
- One or more CFP Power Supplies.
- One or more Rack-Frames or wall-fixing Base-Plates. The base-plates can be joined horizontally.
- Usually, housing units for the base-plates.
- If the headend is large, one or more AMX-400 combiners.

The MDI headend provide a QAM multichannel signal whose level is appropriate to feed the distribution network. An extension input at the HPA amplifier allows easy coupling of the wideband 47-862 MHz signal provided by another existing headend. The user requires a DVB-C Receiver to convert the QAM signals into the appropriate signals that can be accepted by a conventional TV set, and to control access to encrypted TV programmes.

FUNCTIONAL DESCRIPTION OF THE MDI MODULATORS

A MDI transmodulator carries out the complete channel processing from the input to the output:
- tunes a Sat-IF digital channel,
- demodulates the signal being received,
- processes the transport stream, and
- re-modulates it in QAM format (16, 32, 64, 128 or 256 symbols) on an RF channel that is selectable within the 45-862 MHz frequency range.

Application example:
Pág. 123

Active Combiner

AMX

MODEL		AMX-400
REF.		4433
No. of inputs	MHz	4
Frequency range	dB	45 -862
Response flatness	dB	±1.5
Gain	dB	7
IMD for 4x6 channels, 72 dBµV input level	dB	-75
Output variable attenuator	dB	0 - 10
Input and output return loss	dB	≥ 10
Output test	dB	-20 ±1
Supply voltage	VDC	+12
Consumption	mA	470
RF and test connectors		Female F
DC connectors		banana socket
Dimensions	mm	230 x 195 x 32

- Application in large ClassA headends where the modules (processors, receivers, transmodulators, modulators, regenerators) are mounted in several deck-arranged rack-frames or baseplates. The AMX-400 is a 4-input combiner that has been designed to combine up to 24 channels (6 channels per input). The system is expandable, so that it is possible to combine up to 96 channels by using 4 AMX-400 and one final passive combiner (or another AMX at IMD decrease's expense). The sum of the combined signals is connected to the HPA launch amplifier.

Power Supplies

CFP

NEW

MODEL		CFP-900	CFP-700	CFP-507	CFP-500	CFP-702 [1]
REF.		4492	4401	4439	4429	4447
Regulation type		switch mode				
Mains supply voltage (50/60 Hz)	VAC	100 - 240	100 - 240	100 - 240	230 - 240	110 - 240
Outputs		+12V (9A) ClassA modules +24V (60mA) for mast preamplifiers +18V (300mA) for LNB +18V / 22kHz (300mA) for LNB +13V (300mA) for LNB +13V / 22kHz (300mA) for LNB	+12V (5A) ClassA modules +24V (60mA) for mast preamplifiers +18V (300mA) for LNB +18V / 22kHz (300mA) for LNB +13V (300mA) for LNB +13V / 22kHz (300mA) for LNB	+12V (7A) for ClassA and LNB +24V (60mA) for mast preamplifiers	+12V (5,3A) for ClassA and LNB +24V (60mA) for mast preamplifiers	+12 (5A) for streamers +24 (60mA) for mast preamplifiers +18V (300mA) +18V / 22kHz (300mA) +13V (300mA) +13V / 22kHz (300mA)
Max total current for +24, +18 and +13V	mA	700	700	—		700
Efficiency	%	75				
Operating temperature	°C	-10 ... +55				
Mains lead		NO *	NO *	NO *	Yes (bipolar plug)	NO *
Dimensions	mm	230 x 195 x 48				

[1] The CFP-702 module is a power supply with SNMP Monitoring.
* Mains lead not including. The module has a 3 pin european standard inlet, so the mains lead to be used must have a mating CEE 22 socket.

Headend Control Unit

HMS

MODEL	HMS-120
REF.	4435

SOFTWARE
Operation software embedded
Web server
Internal GSM/GPRS modem
HTTP and support for SNMP v2
Access password
Multi-language support (english, spanish, french)

MONITORING/PROGRAMMING
Monitoring/Programming of headend through a web browser
Identification of the headend and dates of interventions
Reading of the RF level outgoing from each signal module
Reading of the RF levels of the multichannel signal outgoing from the headend
Equalization of the RF multichannel signal outgoing from the headend
Scheduling of parameter settings, OSD messages and firmware updates
Statisticians
Automatic alarm advertisements via SMS
Configuration of the HMS module through a PC

READING OF MODULES' RF OUTPUT LEVELS
Frequency range : 45-862 MHz
Range of levels : 55-90 dBµV
Accuracy of the reading : ±1.5 dBµV

GSM/GPRS MODEM
Frequency range:
GSM900 → Tx: 880-915MHz ,, Rx: 925-960MHz
GSM1800 → Tx: 1710-1785MHz ,, Rx: 1805-1880MHz
Threshold: < -102 dBm
RF output power : 2W (GSM900) , 1W (GSM1800)
Frontal slot for SIM card
Antenna — 7cm height, 50 Ω impedance

READING OF LEVEL OF MULTICHANNEL SIGNAL TAPPED FROM HEADEND RF OUTPUT
Frequency range : 45-862 MHz
Range of levels : 55-90 dBµV
Accuracy of the reading : ±1.5 dBµV

PUERTO ETHERNET DE COMUNICACIÓN
Estándar : IEEE 802.3 10/100 BaseT
Velocidad : hasta 100 Mbps
Protocolo de transmisión : TCP/IP

'TERMINAL' PORT
Electrical interface : V28/RS-232

LOCAL COMMUNICATION BUS
Electrical interface : RS-485 differential pair, full-duplex
Protocol : IKUSUP
Main feature : Automatic assignation of addresses to the modules of the headend

CONNECTORS
GSM antenna : FME
RF input (headend output's tapping) : female F
Local bus : 2x 4-pin socket
Monitoring : RJ-45
Terminal : DB-9
GSM modem card : SIM socket
RF output (loop-through) : 2x F female
DC : banana sockets
Peripheral accessories : USB

INDICATOR LEDS
POWER
STATUS
GSM (GSM link)
ALARM
LINK (ethernet link)
ACT (ethernet activity)

GENERAL
Supply voltage : +12 VDC
Consumption : 600 mA
Operating temperature : 0° to +45°C
Dimensions : 230 x 195 x 32 mm

Application
The HMS-120 unit provide advanced remote control features for ClassA headends. These features include sending alarms via SMS, detecting RF levels of the headend multichannel output signal, automatically equalising these levels and the possibility of scheduling parameter settings, generating OSD messages and updating firmwares.
The HMS units include a web server which allows the control operation to be performed from any local or remote PC using a standard browser.
The control unit is positioned in the ClassA headend as the last module on the right of the cascade of signal modules (processors, receivers, transmodulators, regenerators). The installation of the communication local bus (IKUSUP) along the modules is required, as well as the connection of a tapped signal from the HPA amplifier to the HMS control unit.

Access Interfaces
The HMS control units have two interfaces for remote communication:
• A GSM/GPRS interface which uses an internal modem to perform control operations from any remote PC connected to the modem telephone number. A slot on the front panel allows to insert the SIM card.
• An Ethernet interface which, via an external modem/router, allows monitoring from any remote PC connected to Internet. If the headend is installed in a LAN environment, the control operations can be performed from any PC integrated therein. The interface also allows local use of a PC connected directly connected to the HMS module.

Application example:
Pág. 125

Power Amplifiers

HPA

MODEL			HPA-125	HPA-120
REF.			4427	4426
Technology			Push-pull	
Bandwidth		MHz	47 - 862	
Gain		dB	45	47
Interstage variable attenuator		dB	0 - 20	0 - 20
Noise figure		dB	≤ 6	
Output level (IMD3 -60dB, DIN 45004B)		dB	≥ 125 [1]	≥ 120
Output level (IMD2 -60dB, EN 50083-3)		dBµV	≥ 120	≥ 115
Output level (CTB -60 dB, EN 42 channels)		dBµV	≥ 111	≥ 105
Output level (CSO -60 dB, EN 42 channels)		dBµV	≥ 115	≥ 108
Input test		dBµV	-20 ±1.5	
Output test		dB	-30 ±1	
Extension input	Bandwidth	MHz	47 - 862	47 - 862
	Gain	dB	6	6
Supply voltage		VDC	+12	
Consumption		mA	830	600
RF and Test connectors			female F	
DC connector type			banana socket	
Dimensions		mm	230 x 195 x 32	

[1] The indicated level refers to amplification of 2 TV channels. If more than 2 TV channels (included those fed into the extension input) are used, see Reduction Table in technical annex.

HPA. 47-862 Mz RF Power amplifier

- Amplification of the combined multichannel signal in a ClassA assembly.
- Variable attenuation is shared on two interstage sections, featuring delayed behaviour on the first one. Maintenance of a low noise figure.
- Extension input allows coupling of the wideband signal provided by another existing headend.
- Each module is packed with a DC plug bridge, 53 mm length, for connection of +12 VD voltage.

Sat-IF Combiner/Amplifier

HPA-920

MODEL		HPA-920
REF.		4437
Sat-IF band	MHz	950 - 2150
Response flatness	dB	±1
Nominal gain	dB	40
Continuous gain adjustment	dB	0 - 18
Slope switchable	dB	0 / 7
Output level (-35 dB IMD3, EN 50083-3)	dBµV	≥ 120
Input/output return loss	dB	≥ 10
Noise figure	dB	< 7
TV band	MHz	5 - 862
Output test (TV+IF)	dB	TV : -30 ±1 ,, IF : -30 ±1.5
Supply voltage	VDC	+12
Consumption	mA	250
Dimensions	mm	230 x 195 x 32

The module is packed with:
- 2 F plug bridges, 64 mm length, for input tap line and output coupling line.
- 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.

- Application in ClassA headends to drive Sat-IF distribution lines. One HPA-920 per polarity or IF signal being distributed.
- 1 satellite IF input port, with adjustable gain and 0 / 7 dB switchable slope to compensate for cable losses ; 1 terrestrial TV coupling port ;
  1 combined TV+IF output port; 1 output test port.
- "Banana" socket to connect the power for the attached LNB.

Programming Unit

SPI

MODEL	SPI-300
REF.	4070

Programming Unit

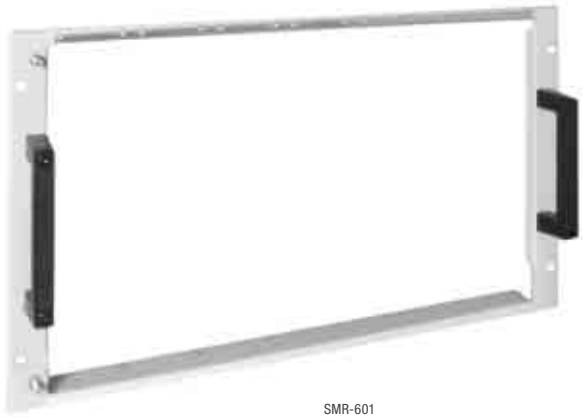
- For programming the ClassA modules. Cable connection to the DB-9 front panel socket.
- 20x4 character alphanumerical display. Numerical and function keys.
- Microprocessor controlled. User friendly software (selectable language: english, spanish, french). Built-in diagnostic and error identification. Module firmware update. Firmware of the SPI-300 can also be updated through a PC.
- Capacity of 500 preset memory allocations for repetitive ClassA module configurations.
- No battery required. Powered through the interface lead (max consumption: 150 mA). DC jack to connect a +15 VDC voltage from an auxiliary power supply when updating the internal firmware through a PC.
- Dimensions: 160x75x40 mm.

ClassA Accessories

Accessories

BAS-700

COF-700



SMR-601

PMR-601 OMR-601

ACCESSORIES	MODEL	REF.	DESCRIPTION
Base plate Housing Jumper Power cord	BAS-700	4403	Base plate. Capacity: 7 modules. Dimensions: 441x257x24 mm.
	BAS-900	4411	Base plate. Capacity: 9 modules. Dimensions: 563x257x24 mm.
	COF-700	4402	Housing for 1 BAS-700. Dimensions: 430x341x258 mm. Indoor mounting. Metallic. Lock/key closing system.
	BUS-013	4430	Pack containing 11 (10x short + 1x long) jumpers for IKUSUP communication bus between ClassA modules.
Rack-frame	SMR-601	4280	Rack-frame for ClassA assemblies, 6U hight. Easy integration in standard 19" racks. Capacity: 7 modules.
	PMR-601	4281	Fixing-plate to fasten a ClassA module to the SMR-600 rack-frame.
	OMR-601	4282	6U - 12E (260x60 mm) blank panel to fill the unoccupied places on the SMR-601 rack-frame.

Distribution

Extension amplifiers

TAE | TSI | SAE

MODEL			TAE-581	TAE-583	TAE-588
REF.			3201	3207	3208
Powering mode			Mains		Line input ↔ output [1] power passing
Bandwidth - Forward way		MHz	47 - 862	86 - 862	
Bandwidth - Reverse way		MHz	5 - 30	5 - 66	
Forward way	Response flatness	dB	± 0.75		
	Nominal gain	dB	35		
	Input variable attenuator	dB	0 - 18		
	Slope control range	dB	0 - 18		
	Noise figure	dB	≤ 7.5		
	Output level (IM3 -60dB, DIN 45004B)	dBµV	124		
	Output level (IM2 -60dB, EN 50083-3)	dBµV	115		
	Output level (CTB -60dB, EN 42 ch)	dBµV	110		
	Output level (CSO -60dB, EN 42 ch)	dBµV	114		
	Output test	dB	-30		
Reverse way	Nominal gain	dB	25.5		
	Variable attenuator	dB	0 - 18		
	Noise figure	dB	≤ 6.5		
	Output level (-60dB, DIN 45004B)	dBµV	115		
	Output level (IM2 -60dB, EN 50083-3)	dBµV	108		
	Output test	dB	-30		
General	Operating supply voltage	VAC	100 - 264		24 - 90
	Consumption	W	19		
	Dimensions	mA	220 x 150 x 55		

1 Max AC through current: 1A

MODEL			TAE-736AR
REF.			3210
Powering mode			Mains
Bandwidth - Forward way		MHz	86 - 862
Bandwidth - Reverse way		MHz	5 - 66
Forward way	Response flatness	dB	± 1.5
	Nominal gain	dB	30
	Input variable attenuator	dB	0 - 18
	Slope control range	dB	0 - 15
	Noise figure	dB	≤ 7
	Output level (IM3 -60dB, DIN 45004B)	dBµV	118
	Output level (IM2 -60dB, EN 50083-3)	dBµV	115
	Output level (CTB -60dB, EN 42 ch)	dBµV	103
	Output level (CSO -60dB, EN 42 ch)	dBµV	106
	Output test	dB	-30
Reverse way	Nominal gain	dB	12
	Variable attenuator	dB	0 - 18
	Noise figure	dB	≤ 6
	Output level (-60dB, DIN 45004B)	dBµV	116
	Output level (IM2 -60dB, EN 50083-3)	dBµV	109
	Output test	dB	-30
General	Operating supply voltage	VAC	230 - 240
	Consumption	W	6
	Dimensions	mA	150 x 150 x 55

- Distribution of television, sound and interactive multimedia signals.
- Active return path, 862 MHz amplifiers.
- Mains or line powering, 50/60 Hz.
- Forward path extends to 862 MHz.
- Continuous attenuation and equalization adjustments.
- TAE-500: Power Doubling technology.
  TAE-736AR:Push-pull technology.
- Electrical safety protection level: Cass II.
- Wall fixing. Outdoor mounting. Grounding terminal.

Extension amplifiers

TAE | TSI | SAE

MODEL			TAE-733	TAE-736
REF.			3931	3192
Powering mode			Mains	
Bandwidth - Forward way		MHz	47 - 862	86 - 862
Bandwidth - Reverse way		MHz	5 - 30	5 - 66
Forward way	Response flatness	dB	± 1.5	
	Nominal gain	dB	29.5	
	Input variable attenuator	dB	0 - 18	
	Slope control range	dB	0 - 15	
	Noise figure	dB	≤ 7	
	Output level (IM3 -60dB, DIN 45004B)	dBµV	118	
	Output level (IM2 -60dB, EN 50083-3)	dBµV	115	
	Output level (CTB -60dB, EN 42 ch)	dBµV	103	
	Output level (CSO -60dB, EN 42 ch)	dBµV	106	
	Output test	dB	-30	
Return	Return path through loss	dB	≤ 2	
	Output test	dB	-30	
General	Operating supply voltage	VAC	230 - 240	
	Consumption	W	6	
	Dimensions	mA	150 x 150 x 55	

- Passive return path, 862 MHz amplifiers.
- TAE-900: Available split: 55/86 MHz.
- Two available split: 30/47 or 66/86 MHz.
- Push-pull technology.
- Continuous attenuation and equalization adjustments.
- Mains or line powering, 50/60 Hz.
  Electrical safety protection level Clase II.

MODEL			TAE-933	TAE-935	TAE-923	TAE-925
REF.			3183	3184	3181	3182
Powering mode			Mains		Line RF input port	
Bandwidth - Forward way		MHz	47 - 862	86 - 862	47 - 862	86 - 862
Bandwidth - Reverse way		MHz	5 - 30	5 - 55	5 - 30	5 - 55
Forward way	Response flatness	dB	± 0.75			
	Nominal gain	dB	36			
	Input variable attenuator	dB	0 - 18			
	Slope control range	dB	0 - 15			
	Noise figure	dB	≤ 7			
	Output level (IM3 -60dB, DIN 45004B)	dBµV	120			
	Output level (IM2 -60dB, EN 50083-3)	dBµV	115			
	Output level (CTB -60dB, EN 42 ch)	dBµV	105			
	Output level (CSO -60dB, EN 42 ch)	dBµV	108			
	Output test	dB	-30			
Return	Return path through loss	dB	≤ 2			
	Output test	dB	-30			
General	Operating supply voltage	VAC	185 - 264		24 - 60	
	Consumption	W	8			
	Dimensions	mA	220 x 150 x 55			

- Forward way and Return way output test.
- Access to the adjustment elements through an easy-to-open frontal panel.
- Wall fixing. Grounding terminal.

AC Power suppy/Power inserter

TAE | TSI | SAE

MODEL			TSI-500
REF.			2179
Bandwidth		MHz	5 - 862
Nominal mains supply		VAC	230 - 240
Nominal inserted voltage (at max load)		VAC	58
Impedance		Ω	75
Return loss		dB	> 16
Max insertion loss	"sigle inserter" configuration	dB	0.6
	"splitter" configuration		(2x) 4.5
	"tapoff" configuration		1.6 and 12
Response flatness		dB	≤ ±0.5
Max current to one RF port		A	5
Max current to all RF ports		A	5
Hum modulation		dB	≤ -70
Efficiency		%	90
Load regulation		%	0 ... 6
Screening factor		dB	> 80
Fuse/switch of AC injection			(3x) Semi-delay 6.3A / 250V
Fuse of transformer primary			T 3,15A / 250V
Fuse of transformer secondary			T 6,3A / 250V
AC requirements		VA	330
Operating temperature		ºC	-20 ... +70
Dimensions		mm	105 x 60 x 38
Packed weight		kg	5.980

The TSI-500 is a «power supply/power inserter» that may be RF configured as single inserter, 2-way splitter or 1-port tapoff. Inserts a 60 VAC voltage to any of the coaxial cables connected to the unit —two cables when it is used as single inserter or three cables in the splitter or tapoff configurations.

The unit is presented in a tough aluminium die-cast housing for outdoor mounting. A neoprene compression gasket and a neoprne/metal-mesh radiation gasket provide maximum RFI shieding and IP67 grade weatherproofing. RF ports are 5/8”-24 type.

- Three fuses/switches for AC insertion to one, two, or the three RF ports.
- Built-in protection for overcurrents.
- Input and output fuses with status LED indicators.
- Output overvoltage VDR protection.
- Wall fixing.
- Grounding and sealing facilities.

Single and Double 2150 MHz amplifiers

TAE | TSI | SAE

MODEL			SAE-912	SAE-916
REF.			3500	3503
Powering mode			Mains	
Bandwidth	Terrestrial (TV) Satellite (FI) Return	MHz	45 - 862 950 - 2150 5 - 35 (passive path)	86 - 862 950 - 2150 5 - 65 (active path)
Terrestrial path (TV)	Response flatness	dB	± 1.5	
	Nominal gain	dB	35	
	Variable interstage attenuator	dB	0 - 18	
	Slope control range	dB	0 - 18	
	Noise figure	dB	≤ 8	
	Output level	dBµV	118 [1] / 115 [2] / 103 [3]	
	Output test	dB	-20 ±1.5	
Satellite path (FI)	Ondulación en banda	dB	± 2	
	Nominal gain	dB	40	
	Variable interstage attenuator	dB	0 - 18	
	Slope control range	dB	0 - 12	
	Noise figure	dB	≤ 6	
	Output level	dBµV	120 [4]	
Return path	Nominal gain	dB	-2.5	12
	Selectable attenuation *	dB	—	0 - 11
	Max RF input level	dBµV	—	98 [1] / 93 [2]
	Noise figure	dB	—	≤ 7
	Output level	dBµV	—	110
General	Operating temperature	˚C	-10 ... +55	-10 ... +55
	Mains supply voltage (50/60 Hz)	VAC	230 - 240	230 - 240
	Consumption	W	8.5	9
	Dimensions	mm	222 x 140 x 44	

- Distribution of terrestrial TV, satellite IF and multimedia signals.
- 1 RF input - 1 RF output. Terrestrial and satellite frequencies amplified separately. Passive or active return path, with respective 35/45 MHz or 65/86 MHz splits. Attenuation and equalization adjustments of TV and IF signals by potentiometer.
- 75Ω test port for forward (TV+IF) and reverse output signals.

MODEL			SAE-920
REF.			3507
Powering mode			Mains
Bandwidth	TV FI-1 FI-2	MHz	45 - 862 950 - 2150 950 - 2150
RF inputs			2 (TV+FI-1 ; FI-2)
RF outputs			2 (TV+FI-1 ; TV+FI-2)
Terrestrial path (TV)	Response flatness	dB	± 1.5
	Nominal gain	dB	35
	Variable interstage attenuator	dB	0 - 18
	Slope control range	dB	0 - 18
	Noise figure	dB	≤ 8
	RF output level	dBµV	(2x) 118 [1] / 115 [2] / 103 [3]
	Output test	dB	-20 ± 1.5
Satellite path (FI-1 and FI-2)	Response flatness	dB	± 2
	Nominal gain	dB	40
	Variable interstage attenuator	dB	0 - 18
	Slope control range	dB	0 - 12
	Noise figure	dB	≤ 6
	RF output level	dBµV	120 [4]
	Output test	dB	-20 ± 1.5
General	Operating temperature	˚C	-10 ... +55
	Mains supply voltage	VAC	230 - 240
	Consumption	W	15
	Dimensions	mm	222 x 140 x 44

1 IMD3 -60dB (DIN 45004B). See reduction table ; 2 IMD2 -60dB (EN 50083-3)
3 CTB,CSO -60dB (42 ch, EN 50083-3) ; 4 IMD3 -35dB (EN 50083-3). See reduction table

- 1 TV + IF-1 input—1 IF-2 input ,, 1 TV + IF-1 output — 1 TV + IF-2 output.
- Separated amplification paths for TV, IF-1 and IF-2 signals, each including attenuation and equalization adjustment potentiometers. GaAs-MESFET technology used for terrestrial amplification.

Power supply
Spare Parts
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862 MHz amplifiers

TAE-326 ATP-300

TAE-326 ATP-300

MODEL		TAE-326
REF.		3966
Bandwidth - forward way	MHz	86 - 862
Bandwidth - reverse way	MHz	5 - 66
Nº of RF outputs		2 (symmetrical) [1]
Gain	dB	15.5
Input variable attenuator	dB	0 - 20
Slope control range	dB	0 - 6
Noise figure	dB	≤ 5
Output level (IM3 -60dB, DIN 45004B)	dBµV	(2x) 108
Output level (IM2 -60dB, EN 50083-3)	dBµV	(2x) 97
Output level (CTB -60 dB, EN 42 ch)	dBµV	(2x) 93
Output level (CSO -60 dB, EN 42 ch)	dBµV	(2x) 96
Return path through loss	dB	4
Mains supply voltage	VAC	230 - 240
Consumption	W	3
Dimensions	mm	125 x 85 x 55

1 In only one of the two outputs is being used, the spare port must be terminated with the 75Ω termiator provided.

MODEL		ATP-332	ATP-322	ATP-302
REF.		3509	3489	3488
Frequency range	MHz	40-318 and 470-862	47-862	
Nº of RF outputs		2 (symmetrical) [1]	2 (symmetrical) [1]	2 (asymmetrical)
Gain	dB	14 (VHF) 24 (UHF)	15 ... 21 (fixed slope 6 dB)	18 ... 24 and 7 ... 13 (fixed slope 6 dB)
Gain adjustment	dB	-16 (VHF) -12 (UHF)	-10 (VHF/UHF)	
Noise figure	dB	4.5 (VHF) ,, 5.5 (UHF)		
RF output level	dBµV	(2x) 105 [2]	(2x) 108 [2]	111 and 100 [2]
Mains suppy voltage	VAC	230 - 240		
Consumption	W	2.3	2.5	2.5
Dimensions	mm	125 x 85 x 55		

1 If only one of the two outputs is being used, the spare port must be terminated with a CTF-125 (Ref. 1519) 75Ω terminator.
2 IMD3=-60 dB (DIN 45004B). The indicated level refers to the amplification of 2 TV channels. If more than 2 channels are used, see Reduction table on Technical Annex.

- TV+VR bidirectional amplifier.
- Forward path to 862 MHz. Passive return path. Available splits: 66/86 MHz.
- Push-pull technology: very low 2nd order intermodulation distortion.
- 1 RF input — 1 or 2 RF outputs.
- Continuous attenuation and equalization adjustments.
- Mains powering, 50/60 Hz. Electrial safety protection level: Class II. Mains lead with bipolar plug.
- External plastic box. F type connection. Wall fixing.

- One way, 862 MHz amplifiers.
- 1 RF input — 2 RF output.
- Gain adjustment potentimeters.
- In ATP-332, two separate amplification paths for VHF and UHF signals, with adjustment potentiometer on each one (interstage position in UHF amplification for maintenance of low figure).
- In ATP-322 and ATP-302, sloped frequence response.
- Main powered, 50/60 Hz. Electrical safety protection level: Class II. Mains lead with bipolar plug.
- External platic box. Earthing terminal. Wall fixing.

2150 MHz amplifiers (two-way)

ATP-900

MODEL			ATP-931	ATP-961
REF.			3490	3491
Frequency range	Terrestrial (TV) Satellite (IF) Return	dB	47 - 862 950 - 2150 5 - 30	86 - 862 950 - 2150 5 - 66
Terrestrial path (TV)	Nominal gain	dB	18	
	Gain adjustment	dB	-10	
	Noise figure	dB	≤ 7	
	RF output level	dBµV	108[1] / 100[2]	
Satellite path (FI)	Nominal gain	dB	18 - 24 (6 dB fixed slope)	
	Noise figure	dB	≤ 10	
	Input return loss	dB	≥ 6	
	RF output level (IMD3 -35 dB, EN 50083-3)	dBµV	112	
Return path	Through loss	dB	1.5	
General	Operating temperature	˚C	0 ... +45	
	DC transit		24 V / 500 mA	
	Mains supply voltage	VAC	230 - 240	
	Consumptin	W	3	
	Dimensions	mm	125 x 85 x 55	

1 Output level stated for IMD3 -60dB (DIN 45004B), applicable for amplification of 2 TV channels. If more than 2 channels are used, see reduction table in technical annex.
2 IMD2 -60 dB (EN 50083-3)

- Terrestrial (TV) and satellite (IF) frequencies amplified separately. Passive return path.
- Single RF Input and Single RF Output with DC power passing capability.
- Adjustable gain for terrestrial frequencies.
- Mains powered 50/60 Hz. External plastic box. Wall fixing.

Multiswitches

Cascadable | Stand alone | Amplifiers

MODEL			SMC-0904	SMC-0908	SMC-0916	SMC-1708	SMC-1716
REF.			3268	3269	3270	3272	3273
Line inputs			8 Sat+1 TV			16 Sat+1 TV	16 Sat+1 TV
Tap outputs			4	8	16	12	16
Line outputs			8 Sat+1 TV			16 Sat+1 TV	16 Sat+1 TV
Frequency range	SAT	MHz	950 - 2150				
	TERR		47 - 862				
Through losses	SAT	dB	-1.5 ... -2.5	-2 ... -3	-2.5 ... -4.8	-2 ... +3	-2.5 ... -4.8
	TERR		-2 ... -2.5	-2 ... -3	-3 ... -4	-2 ... +3	-3 ... -4
Tap loss	SAT	dB	-2 ... +4		-3 ... +3	-4 ... +2	
	TERR		-2 ... +4		-3 ... +3	-2 ... +4	-3 ... +3
Input/output isolation	SAT-SAT	dB	30			30	
	SAT-TER		25			25	
Output level	SAT	dBVµ	95			95	
	TERR		85			85	
Max consumption		mA	70			70	
Line and tap connection type			Female F			Female F	
Operating temperature		ºC	-20 ... +60			-20 ... +60	
Dimensions		mm	105x255x45	149x255x45	237x255x45	144x401x45	232x401x45

- Cascadable multiswitches for 8 and 16 Sat-IF polarizations and 1 terrestrial TV signal. 4, 8, 12 and 16 tap lines per multiswitch.
- A single model for all levels (depending of number of input)
- Remote powering from users receivers.
- The 8 and 16 Sat input models, need DiSEqC 2.0 commands to be controlled.
- High isolation between polarizations by using multilayer technique.
- DC passing between input and output SAT lines.
- Indoor mounting. Wall fixing.

Application example:
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Multiswitches

Cascadable | Stand alone | Amplifiers

MODEL			SM-0504	SM-0508	SM-0512	SM-0516	SM-0904	SM-0908	SM-0912	SM-0916	SM-1708	SM-1712	SM-1716
REF.			3274	3275	3276	3277	3278	3279	3280	3281	3282	3283	3284
Number of SAT inputs			4 Sat+1 TV				8 Sat+1 TV				16 Sat+1 TV		
Number of outputs (users)			4	8	12	16	4	8	12	16	8	12	16
Frequency range	SAT	MHz	950 - 2150										
	TERR		47 - 862										
Adjusting Range (attenuation)	SAT	dB	0-20				0-20				0-20		
	TERR		0-20				0-20				0-20		
Tap loss	SAT	dB	-1 ... +5	-2 ... +4		-3 ... +3	-2 ... +4			-3 ... +3	-4 ... +2		
	TERR		-2 ... +4		-3 ... +3		-2 ... +4		-3 ... +3		-2 ... +4		-3 ... +3
Input/output isolation	SAT-SAT	dB	30				30				30		
	SAT-TER		25				25				25		
Output level	SAT	dBµV	95				95				95		
	TERR		85				85				85		
Max consumption		mA	50		70		70				70		
Line and tap connection type			Female F				Female F				Female F		
Operating temperature		ºC	-20 ... +60				-20 ... +60				-20 ... +60		
Dimensions		mm		141x183x45	185x183x45	229x183x45	97x255x45	141x255x45	185x255x45	229x255x45	136x401x45	224x401x45	224x401x45

- Star distribution multiswitch equipments of 4, 8 or 16 Sat-IF polarizations plus 1 terrestrial TV signal to 4, 8, 12 or 16 users.
- The 8 and 16 Sat input models, need DiSEqC 2.0 commands to be controlled.
- External power supply included.
- Input control gain.
- Indoor mounting and wall fixing.

Application example:
Pág. 133

Available for:

NEW

Multiswitches

Cascadable | Stand alone | Amplifiers

MODEL			SMU-009	SMU-017
REF.			3285	3286
Line input			8 Sat+1 TV	16 Sat+1 TV
Frequency range	SAT	MHz	950 - 2150	950 - 2150
	TERR		47 - 862	47 - 862
Trunk Loss/Gain	SAT	dB	+20 ... +30	+20 ... +30
	TERR		+3 ... +18	+3 ... +18
Adjusting Range (attenuation)	SAT	dB	0-20	0-20
	TERR		0-20	0-20
Input/output isolation	SAT-SAT	dB	30	30
	SAT-TER		25	25
Line input/output return loss	SAT	dB	8	8
	TERR		8	8
Output level	SAT	dBVµ	110	110
	TERR		105	105
Max consumption		mA	350	700
Connectors type			F Female	F Female
Operating temperature		ºC	-20 ... +60	-20 ... +60
Dimensions		mm	149 x 255 x 45	144 x 401 x 45

- Line amplifiers for 8, 16 satellite polarizations and 1 terrestrial signal.
- Amplification of 8 and 16 Sat (+ 1 TV) for compensating through losses of multiswitches, taps, splitters and interconnection cables in 9 and 17 cable distribution systems.
- Continuous attenuation adjustment. Fixed or adjustables slope response for satellite frequences, depending on model.
- Line powering (+15 VDC) through input or output SAT lines, with passing switch. Also local powering using the SPS-1820 power supply (included).

Application example:
Pág. 132

Multiswitches

Power Supply

MODEL	SPS-1820
REF.	3287
Mains voltage	90-240 VAC 50/60 Hz
Output voltage/current	18 VDC / 2A
Dimensions	5.5 x 2.1 x 10 mm

Coaxial cables

Indoor | Outdoor

CCH-175 ** CCI-175 CCI-179

MODEL		CCH-175	CCI-175	CCI-179	* CCI-059 (RG59)
REF.		2506	2522	2521	2500
Inner conductor		Cu	Cu	Cu	Cu
Diameter	mm	1.13	1.13	1.10	0.81
Dielectric		PE	PE	PE	PE
Diameter	mm	4.8	4.8	5	3.66
Outer conductor		Cu (tape) + Cu (braid)	Cu (tape) + Cu (braid)	Al (tape) +Al (braid)	Al (tape) +Al (braid)
Diameter	mm	6.1	6.1	6.3	4.1
Outer sheath		polyolefin white (LSOH) **	PVC white	PVC white	PVC white
Diameter	mm	6.8	6.8	7	6.1
Attenuation/100m					
47 MHz		3.7	3.7	4.6	5.8
100 MHz		5.3	5.3	6.0	6.0
230 MHz		8.0	8.0	8.9	11.2
470 MHz	dB	11.9	11.9	13.2	16.1
862 MHz		16.6	16.6	18.0	24.1
950 MHz		17.5	17.5	19.5	27.2
1750 MHz		24.5	24.5	27.0	35.8
2150 MHz		27.5	27.5	29.8	39.7
Characteristics impedance	Ω	75 ±3			
Supply unit		(6x) reel 100 m	(4x) reel 100 m	(4x) reel 100 m	(4x) reel 100 m

All the cables are manufactured using the Physical Process. Advantages: high mechanical strength, optimum electrical isolation and good stability of characteristics over time.

* CCI-059 (RG59): Mesh formed by an aluminum wire braid,coverage factor > 75%.

**LSOH: Low Smoke Zero Halogen. Outer sheath of the CCH-175 does not contain halogens. It is flame retardant (EN/IEC 60332-3), the density of the smoke produced when the cable is burnt is very low (EN/IEC 61034-2) and the fumes are nontoxic (IEC 60754-2).

Coaxial cables

Indoor | Outdoor

CCT-171

CCT-125

CCT-650

MODELO		CCT-171	CCT-125	CCT-650
REF.		2505	2514	2507
Inner conductor		Cu	Cu	Cu clad Al
Diameter	mm	1.10	1.65	3.15
Dielectric		foam PE	foam PE	foam PE
Diameter	mm	5	7.1	13
Outer conductor		Al (tape) + Al (braid)	Al (tape) + Cu/Sn (braid)	Al (tube)
Diameter	mm	6.3	7.8	13.7
Outer sheath	mm	PE	PE	PE
Diameter		7	10.2	15.4
Impedancia característica	Ω	75 ±3		
Max attenuation at 20°C *				
f = 100 MHz	dB/100m	6.0	4.6	2.1
200 MHz		8.2	6.2	3.0
500 MHz		13.4	10.1	4.9
600 MHz		14.4	11.0	5.4
750 MHz		16.6	12.3	6.1
862 MHz		18.0	13.1	6.5
950 MHz		19.5	15.2	7.5
1750 MHz		27.0	20.5	10.2
2150 MHz		29.8	23.0	11.5
DC resistance of:				
-inner conductor	Ω/100m	1.72	0.9	0.33
-outer conductor		1.14	1.2	0.19
Velocity ratio of propagation	%	77	77	88
Nominal capacitance	pF/m	55	55	50
Operating temperature	°C	-20 ... +50		
Minimum bending radius	cm	7	8	13
Pulling tension	daN	40	60	100
Weigth	kg/100m	4.2	8.6	20
Supply uit		(6x) reel 100 m	(1x) reel 500 m	(1x) reel 1000 m

* Attenuation coefficient: 2.10^{-3} / °C

Connectors for distribution cables

Indoor Outdoor

CFR-680

CTF-190

FDH-215

CAD

CHD-950

CFC-600

UCR-600

TYPE	MODEL	REF.	DESCRIPTION
F CONNECTORS	**CFR-680**	**2377**	Screw-on plug. Use cable: CCH, CCI, and CCT-171.
	CTF-190	**2368**	Crimp plug. Use cable: CCH, CCI y CCT-171.
TOOL	**UCF-170**	**1847**	Hex crimp tool for CTF-125 and CTF-190 connector.
F ADAPTERS	**FDH-215**	**2371**	Joining connector: F female - F female.

TYPE	MODEL	REF.	DESCRIPTION
IEC CONNECTORS	**CAD**	**1502**	Elbow plug.
	CHD-950	**1503**	Elbow jack.
ADAPTERS	**TIF-100**	**2365**	IEC male - F female.
COMPRESSION CONNECTOR	**CFC-600**	**3131**	F male conector for all cables, CCT-125 and CCT-650 except.
COMPRESSION CONNECTOR TOOL	**UCR-600**	**3132**	Easy to handle and secure attachment.

Indoor Outdoor

CPF-650

CMC-650

CMM-580

CTF-075

TYPE	MODEL	REF.	DESCRIPTION
F CONNECTORS	**CPF-650**	**2689**	F plug. Material: Nickeled brass. Use cable: CCT-650.
	CTF-125	**2513**	Crimp F plug. Material: Nickeled brass. Use cable: CCT-125.
5/8" CONNECTORS	**CTP-125**	**2512**	Pin 5/8". Nickeled brass. Use cable: CCT-125.
	EHP-162	**1538**	5/8" double female. Nickeled brass.
ADAPTERS DOUBLE	**SAI-311**	**1640**	F double female. Nickeled brass.

TYPE	MODEL	REF.	DESCRIPTION
ADAPTERS	**TCF-580**	**1516**	F female - 5/8" male. Nickeled brass.
TOOLS	**PLC-650**	**1851**	For preparing the CCT-650 cable to fit pin 5/8" connectors.
CHARGE 75Ω	**CTF-075**	**2221**	F type. For loading an F port. Idem a 5/8" port through the TCF-580 adapter. Nickeled brass.

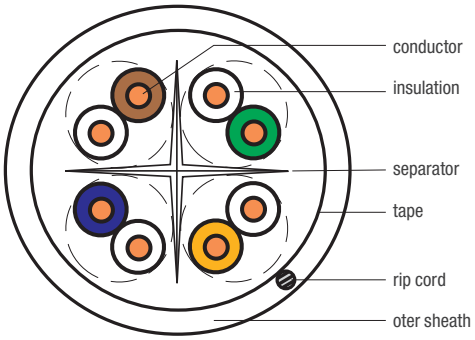
UTP (unshielded twisted pair) Cables

UTP cables

MODEL	REF.	DESCRIPTION
CPI-604U	5023	UTP cable, 4-pair, Cat 6, 250 MHz, halogen free.

CPI-604U

DESCRIPTION		CPI-604U
		5023
CONDUCTOR	Number of pairs	4
	Total number of conductors	8
	Conductor material	Solid bare copper
	Wire gauge	23 AWG
	Conductor diameter	≥Ø 0.57 mm
	Elongation rate	≥ 15%
INSULATE	Insulate material	HDPE - Polietileno
	Nominal insulate wall thickness	0.19 mm
	Insulate diameter	Ø 0.96 ±0,05 mm
	Elogation rate	≥ 300%
	Pair colour	Pair 1: Blue & White/Blue Pair 2: Orange & White/Orange Pair 3: Green & White/Green Pair 4: Brown & Whte/Brown
CABLING	Order of the pair	see picture
	Cross filler	PE
	Tape	PET - 0.02x20 mm
OUTER SHEATH	Sheath material	LSZH
	Sheath colour	White
	Rip cord	200Dx3
	Min thickness	0.40 mm
	Nominal diameter	Ø 6.20 ±0.30 mm



CPI-604U

ELECTRICAL CHARACTERISTICS			CPI-604U
			5023
Max conductor DC resistance 20ºC		Ω/100m	7.5
Unbalance of pair DC resistance 20ºC		%	≤ 2.5
Dielectric strength between pairs		kv/min	≤ 1.0
Insulation resistance		MΩ·km	≥ 5000
Capacitance		nf/100m	—
Unbalance of capacitance		pf/100m	≤ 330
Characteristics impedance		Ω	100 ±15
Return loss		dB	≥ 20.0
Max delay		ns/100m	45.0
Nominal Velocity of Propagation		%	67
Max insertion loss	1 MHZ 4 MHz 10 MHz 16 MHz 20 MHz 31.25 MHz 62.5 MHZ 100 MHz 200 MHz 250 MHz	dB	2.0 3.8 6.0 7.5 8.4 10.6 15.4 19.8 29.0 32.8
Min Near End Cross Talk	1 MHZ 4 MHz 10 MHz 16 MHz 20 MHz 31.25 MHz 62.5 MHZ 100 MHz 200 MHz 250 MHz	dB	74.3 65.3 59.3 56.2 54.8 51.9 47.4 44.3 39.8 38.3

OTHER CHARACTERISTICS	CPI-604U
	5023
Operating temperature	-20º a +75ºC
Min bend radius	8 x D
Net weight	40 kg/km
Supply unit	(1x) reel 305 m

2300 MHz indoor Tap-offs

UDL | UDU

MODEL			UDL-110	UDL-115
REF.			3226	3227
Tap loss (± 0.7 dB)		dB	10	15
Through loss	5-862 MHz	dB	≤ 1.1	≤ 1.0
	950-1550 MHz		≤ 1.7	≤ 1.7
	1551-2300 MHz		≤ 2.3	≤ 2.2
Directional isolation	5-300 MHz	dB	≥ 29	≥ 28
	301-862 MHz		≥ 29	≥ 27
	950-2300 MHz		≥ 19	≥ 23
Dimensions		mm	54 x 58 x 26	

MODEL			UDL-210	UDL-215	UDL-220
REF.			3244	3245	3232
Tap loss (± 0.7 dB)		dB	10	15	20
Through loss	5-862 MHz	dB	≤ 2.3	≤ 1.6	≤ 1.1
	950-1550 MHz		≤ 3.0	≤ 2.0	≤ 1.9
	1551-2300 MHz		≤ 3.7	≤ 2.6	≤ 2.6
Directional isolation	5-300 MHz	dB	≥ 26	≥ 29	≥ 31
	301-862 MHz		≥ 26	≥ 27	≥ 29
	950-2300 MHz		≥ 20	≥ 22	≥ 26
Tap-to-tap isolation	5-300 MHz	dB	≥ 38	≥ 39	≥ 46
	301-862 MHz		≥ 35	≥ 37	≥ 42
	950-2300 MHz		≥ 28	≥ 37	≥ 39
Dimensions		mm	54 x 58 x 26		

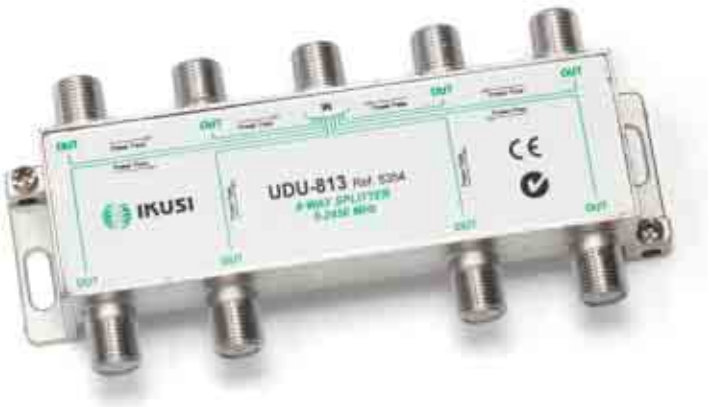
MODEL			UDL-410	UDL-415	UDL-420
REF.			3235	3236	3237
Tap loss (± 1 dB)		dB	10	15	20
Through loss	5-862 MHz	dB	≤ 4.0	≤ 1.9	≤ 0.9
	950-1550 MHz		≤ 4.4	≤ 2.8	≤ 1.5
	1551-2300 MHz		≤ 4.6	≤ 3.5	≤ 2.1
Directional isolation	5-300 MHz	dB	≥ 35	≥ 30	≥ 37
	301-862 MHz		≥ 33	≥ 30	≥ 33
	950-2300 MHz		≥ 29	≥ 23	≥ 25
Tap-to-tap isolation	5-300 MHz	dB	≥ 29	≥ 30	≥ 29
	301-862 MHz		≥ 26	≥ 28	≥ 26
	950-2300 MHz		≥ 24	≥ 28	≥ 24
Dimensions		mm	76 x 58 x 26		

MODEL			UDL-816	UDL-820
REF.			3366	3367
Tap loss (± 1 dB)		dB	16	20
Through loss	5-862 MHz	dB	≤ 4.0	≤ 1.8
	950-1550 MHz		≤ 4.4	≤ 2.0
	1551-2300 MHz		≤ 4.8	≤ 2.2
Directional isolation	5-300 MHz	dB	≥ 30	≥ 30
	301-862 MHz		≥ 30	≥ 30
	950-2300 MHz		≥ 27	≥ 23
Tap-to-tap islolation	5-300 MHz	dB	≥ 34	≥ 30
	301-862 MHz		≥ 32	≥ 28
	950-2300 MHz		≥ 25	≥ 28
Dimensions		mm	120 x 60 x 20	

- 1-, 2-, 4- and 8-way shielded directional tap-offs. Frequency range: 5-2300 MHz.
- Wall fixing, nickle-plated zinc diecast housing (2 screws attached). Grounding facilities. All ports F female connector.
- DC tansit (max +24 VDC, 0.5 A) on the main line.

2300 MHz indoor Tap-offs

UDL UDU



MODEL			UDU-205	UDU-307	UDU-408	UDU-612	UDU-813
REF.			5350	5351	5352	5353	5354
No. of ways			2	3	4	6	8
Insertion loss	5-862 MHz	dB	≤ 3.6	≤ 6.8	≤ 8.1	≤ 11.8	≤ 11.9
	950-1550 MHz		≤ 4.1	≤ 8.5	≤ 9.1	≤ 13.5	≤ 14.1
	1551-2300 MHz		≤ 4.8	≤ 9.7	≤ 10.4	≤ 15.1	≤ 15
Output isolation	5-300 MHz	dB	≥ 35	≥ 25	≥ 24	≥ 28	≥ 26
	301-862 MHz		≥ 34	≥ 25	≥ 22	≥ 25	≥ 28
	950-2300 MHz		≥ 20	≥ 21	≥ 22	≥ 25	≥ 28
Dimensions		mm	55 x 5 0x 25	78 x 50 x 25	76 x 58 x 25	120 x 58 x 25	120 x 58 x 25

- 2-, 3-, 4-, 6- and 8-way shielded inductive splitters. Frequency range: 5-2450 MHz.
- Wall fixing, nickle-plated zinc diecast housing (2 screws attached). Grounding facilities. All ports F female connector.
- Unidirectional DC transit (max +24 VDC, 0.5 A) on all ports.
- The Splitter has a 9mm Pathway underneath to allow cable distribution.

Outlets - TV and RD
Tree and Star distribution

ARTU2xx

ARTU201
ARTU000
ARTU001
ARTU002

MODEL			ARTU201
REF.			2750
Frequency range		MHz	5 - 862
Transfer loss (±0.5 dB)	input - TV	dB	7.5
	input - RD		27.5
Max through loss		dB	2.5
Isolation	output - TV	dB	> 26
	output - RD		> 44
TV-RD isolation		dB	> 20

Outlets - TV and RD
individual

ARTU0xx

ARTU050
ARTU051

MODEL			ARTU001	ARTU002	ARTU000
REF.			2736	2737	2735
MODEL	whitout coverplate *		ARTU051		ARTU050
REF.			2766		2734
Technology			Resistive	LC filters	Bridged
Frequency range		MHz	5 - 862	TV: 5 - 68 and 118 - 1000 RD: 87.5 - 108	5 - 862
Transfer loss	input - TV	dB	≤ 3.5	≤ 1	—
	input - RD		≤ 10	≤ 3	—
TV-RD isolation		dB	> 12.5	> 10	—

* Without fixing hooks in model ARTU 050 (Ref. 2734)

- The ARTU001 and ARTU051 models may be also used respectively as final outlets for a cascade of ARTU201 or ARTU251 outlets.

- For use in single-cable tree distributions and for single systems or star distributions.
- Sturdy injection-moulded zinc alloy housing. Flush mounting in box Ø56 mm.
- Dimensions of coverplate: 80x80 mm. Fast and easy connection of the coaxial cable.
- Surface mounting using the ABT-210 (Ref. 1460).
- Versions without coverplate available.
- Connectors:

  TV: male IEC
  RD: female IEC

Outlets - TV/RD and SAT
Tree and Star distribution

ARTU9xx

ARTU900
ARTU901
ARTU902
ARTU903
ARTU009

MODEL			ARTU900	ARTU901	ARTU902	ARTU903
REF.			2474	2475	2476	2477
MODEL	without coverplate without fixing hooks			ARTU951		
REF.				2479		
Frequency range		MHz	TV/RD : 5 - 862 SAT : 950 - 2300			
Transfer loss	input - TV/RD	dB	4.5	11	15	19
	input - SAT		5.5	11	15	18
Max through loss	5-862 MHz	dB	— *	2	1.3	1.3
	950-2300 MHz		— *	3	2.5	2.5
Isolation	output - TV/RD	dB	— *	> 23	> 26	> 25
	output - SAT		— *	> 16	> 17	> 19
TV/RD - SAT isolation		dB	> 25			
DC transit through the SAT output			Yes	Yes	Yes	Yes

* ARTU900 are final outlet

Outlets - TV/RD and SAT
individual

ARTU0xx

ARTU951
ARTU058
ARTU059

MODEL			ARTU009	
REF.			2472	
MODEL	without coverplate without fixing hooks		ARTU058	ARTU059
REF.			2740	2473
Frequency range		MHz	TV/RD : 5 - 862 SAT : 950 - 2300	
Transfer loss	entrada - TV/RD	dB	≤ 1.5	
	entrada - SAT		≤ 2	
TV/RD-SAT isolation		dB	> 25	
DC transit through the SAT output			Yes	NO

- For use in single-cable tree distributions and for single systems or star distributions.
- Sturdy injection-moulded zinc alloy housing. Flush mounting in box Ø56 mm. Dimensions of coverplate: 80 x 80 mm. Fast and easy connection of the coaxial cable. Surface mounting using the ABT-210 (Ref. 1460).
- Versions without coverplate or fixing hooks available.
- Connectors:

  TV/RD: male IEC
  SAT: female IEC
- DC transit through the SAT output (24V/350mA, plus 22 kHz and DiSEqC signals). Easy elimination.

Outlets sockets - TV , RD & SAT

PSE

MODEL			PSE-300
REF.			5360
Frequency range		MHz	TV : 5 - 68 and 125 - 862 RD : 88 - 108 SAT : 950 - 2300
Transfer loss	input - TV	dB	≤ 2
	input - RD		≤ 2
	input - SAT		≤ 3
Max. through loss	5-68 MHz & 125-862 MHz	dB	—
	88-108 MHz	dB	—
	950-2300 MHz	dB	—
TV-RD and TV-SAT isolation		dB	> 18
SAT-RD isolation		dB	> 18
DC transit through the SAT output		dB	Yes

- For single system or star distribution.
- Sturdly injection-moulded zinc a Ø 56 mm.
- Convenient and fast connection of coaxial cable.
- It incorporates a socket for wall mounting.
- Coverplate (80 x 80 mm) including.
- Connectors type, TV: IEC male; RD: IEC female; SAT: F female.
- DC transit through the SAT output (24V/350mA, plus 22 kHz and DiSEqC signals).

Outlets sockets accessories

ABT-210

MODEL	REF.	DESCRIPTION
ABT-210	1460	Mounting of the outlets without embedding the body in the wall.

Plug-in Electronic Accessories

FAV-020

FAV-920

BCF-060

CTF-075

FIS-950

TYPE	MODEL	REF.	DESCRIPTION
ATTENUATORS	**FAV-020**	**3150**	Variable 0-20 dB in VHF/UHF. Constant impedance. Female-Male.
IF ACCESSORIES	**FAV-920**	**3242**	18 dB variable attenuator. Min attenuation: ≤ 1.5 dB (5-1000 MHz) and ≤ 4 dB(1001-2150 MHz). DC by-pass. F type male-female connectors. Dimensions: 51 x 49 x 22 mm.
	FIS-950	**1107**	950-2150 MHz IF amplifier. Sloped gain: 12 up to 20 dB. Noise figure: 7 dB. Operating voltage: +15 ... +18 VDC. Consumption: 40 mA. Mounting outdoors. F-type female connectors. Dimensions: 80 x 27 x 20 mm.
OTHERS	**CTF-075**	**2221**	Shielded load 75Ω.

TV-IF combiners - 2150 MHz

DMS

MODEL		DMS-200	DMS-300
REF.		3371	3372
RF inputs		2 TV (5-862 MHz) FI (950-2150 MHz)	3 TV (5-862 MHz) FI-1 (950-2150 MHz) FI-2 (950-2150 MHz)
RF outputs		1 TV + FI	2 TV + FI-1 TV + FI-1
Insertion loss	dB	TV: ≤ 1.0 " FI: ≤ 1.5	TV: ≤ 4 " FI-1/FI-2: ≤ 2
Input isolation	dB	≥ 25	≥ 25
Power passing to IF input/s		YES (18V/500 mA max)	
Dimensions	mm	80 x 45 x 20	122 x 45 x 20
Housing for using outdoors		OMH-110 (Ref. 3378)	—

Instrumentation

NEW

Signal analyzers

DSA-103 DSA-503 DSA-700 DSA-840

DSA-103 DSA-503 DSA-700 DSA-840

MAIN FUNCTIONS DSA-103

- TV tuner from 4 to 1000 MHz, extended CABLE and GSM band.
- Automatically recognises and selects analog and digital TV CO-FDM/QAM signals in both measurement and spectrum mode.
- Detects and measure all the MPEG4 HD signals & High Definition programs.
- Automatic quality analysis: FAIL-MARG-PASS.
- Rotational encoder and numerical keyboard.
- New, ultra-bright graphics display.
- Visualisation of the program list MPEG-2/4 HD and A/V PIDs.
- Auto and Manual memories, Data Logger.
- Pre-memorized Transponder navigation in all worldwide satellites and in all the worldwide standard TV channel plans.
- Assisted satellite dish pointing, double input (DUAL LNB) dish pointing and Sat Finder functions.
- All DiSEqC commands and SCR Ready with automatic search.
- Constellation, MER, PER, LDPC, BCH, aBER, bBER, EVM, Noise Margin, Level/Power measurements and Spectrum Analyzer.
- Weighs only 1 kg, H 8 x L 22.5 x D 16.5 cm
- Up to 4-hour battery autonomy.
- Supplied with hard case for transport, soft bag, mains adaptor and 12V vehicle adaptor.
- Upgradeable online (USB-2 socket).

MAIN FUNCTIONS DSA-503

- TV Tuner from 4 to 1.000 MHz, extended CABLE and GMS bands,
- SAT tuner 930-2250 MHz, extended.
- Automatically recognises and selects analog and digital TV COFDM signals in both measurement and spectrum mode.
- Detects ans measures MPEG4 HD High Definition programs.
- Automatic quality analysis: FAIL-MARG-PASS.
- New, ultra-bright TFT with excellent resolution.
- Rotational encoder and numerical keyboard.
- All measurements, prog, list, A/V PID, settings and picture on one screen.
- Auto memory. Manual memory and Data Logger.
- Upgradeable online (USB-2 socket).
- 2 to 3 hour battery autonomy.
- Weighs only 1,4 kg. Dimensions: 22 x 8 x 19 cm
- Supplied with soft bag for transport, mains adaptor and 12V vehicle adaptor.
- Only six direct keys for all functions.

Model Ref.	DSA-103 4823	DSA-503 4822	DSA-700 4821	DSA-840 4830
DVB-T (COFDM)	Yes	Yes	Yes	Yes
DVB-S/S2 (QPSK/8PSK)	Yes	Yes	Yes	Yes
DVB-C (QAM)	Yes	Yes	Yes	Yes
MPEG-4 Decoder	No	No	Yes	Yes
MPEG-2 Decoder	No	Yes	Yes	Yes
Display TFT (16:9)	2.5"	3.1"	4.5"+ 2.5"	7" touch
Optical input / IPTV	No	No	Yes	No
Output HDMI	No	No	Yes	Yes
Return frequency	Yes	Yes	Yes	Yes
Conditional Access	No	No	Yes	Yes

Signal analyzers

DSA-103 DSA-503 DSA-700 DSA-840

DSA-103 DSA-503 DSA-700 DSA-840

MAIN FUNCTIONS DSA-700

- TV Tuner from 4 to 1.000 MHz, extended CABLE and GMS bands, SAT tuner 930-2250 MHz, extended
- Optical input Spect and Power.
- IPTV input.
- HDMI input.
- Conditional Access. Comon Interface
- Automatically recognises and selects analog and digital TV CO-FDM signals in both measurement and spectrum mode.
- Automatic quality analysis: FAIL-MARG-PASS.
- Detects, measures and Shows pictures of the MPEG4 HD High Definition programs.
- Rotational encoder & numerical keyboard.
- Simultaneous visualization of pictures and the program list, MPEG-2 & MPEG-4 HD and A/V PID.
- Dual display new, ultra-bright TFT with excellent resolution.
- Upgradeable online (USB-2 socket)
- Auto memory, Manual memory & Data Logger.
- 2 to 3 hour battery autonomy.
- Weighs: 2,5 kg. Dimensions: 11,5 x 24,5 x 18 cm
- Supplied with soft bag and hard case for transport, mains adaptor and 12V vehicle adaptor.

MAIN FUNCTIONS DSA-840

- TV tuner 4–1,000 MHz, extended GSM and CATV band.
- 930-2250 MHz sat tuner.
- DVB-S2, DVB-T2 and DVB-C measurement.
- HDMI connector.
- Real-time echo measuring.
- Faster SAT spectrum.
- MPEG 4 card for viewing HD content.
- Automatically recognises and selects analogue and digital CO-FDM TV signals in measuring and spectrum mode.
- Automatic quality analysis: POOR-REG-GOOD.
- 16:9 format 7” ultra-bright colour TFT touchscreen with excellent resolution.
- Fast-spectrum with storage of maximums.
- Touch-sensitive rotary switch.
- All measurements, programmes list, A/V PID, settings and images on a single screen.
- Automatic memory, manual memory and data logger.
- Conditional access.
- USB-2 interface for data downloading, uploading and down-loading plans from memory, printing of stored measurements and firmware updating.
- New forms of navigation, making it very easy to use and very professional.
- Weight: 2.5 kg: Dimensions: 11.5 x 24.5 x 18 cm.
- Lithium battery offering 4–6 hours of operation, depending on the enabled features.

Others solutions

TV+SAT-IF Optical transmitter

FTD-420

MODEL			FTD-420
REF.			4915
Optical output power		mW	4 (=6 dBm)
RF inputs			2 TV (45-862 MHz) IF (950-2150 MHz)
Optical section	Optical wavelength	nm	1310 (±20)
	Relative intensity noise (RIN) of the laser	dB/Hz	< -150
	Optical output return loss	dB	> 50
	Optical output connector		SC / APC 8º
RF section	TV input level (for OMI 4% CENELEC carriers)	dBµV	72 ... 87
	IF input level (for OMI 1.6%)	dBµV	72 ... 87
	RF flatness	dB	±0,75 (TV) ,, ±1 (IF)
	Adjustm. of TV level to laser - TV-OMI adjustment	dB	-15 ... 0
	Adjustm. of IF level to laser - IF-OMI adjustment	dB	-15 ... 0
	RF input impedance	Ω	75
	RF input return loss	dB	> 12 (TV) ,, > 10 (IF)
General	Power requirements		+12 VDC / 650 mA
	DC connector type		banana socket
	Dimensions	mm	230 x 195 x 32

The module is packed with 1 DC blug bridge for +12 VDC power cascade.

- 1 TV input (45-862 MHz) — 1 SAT-IF input (950-2150 MHz) — 1 Optical output (1310 nm). Connection of singlemode type optical fibre.
- Solution for distribution of terrestrial TV and satellite IF signals (analog and digital) over large collective installations: residential districts, hotels, hospitals.
- Ultralineal, APC-controlled, 4 mW DFB (Distributed Feedback) laser. Fully compatible with PAL, SECAM, NTSC, FM, DVB-S, DVB-T, DVB-C and other standards.
- TV and SAT-IF separate ways with very high RF amplification gain. Independent OMI settings for TV and SAT-IF.
- DC powered by a CFP power supply module. Mountable on baseplates or rack-frame of ClassA headend.

Return path optical receiving

FRR-310

MODEL			FRR-310
REF.			4907
Optical window		dBm	-6 ... +1
RF output frequency		MHz	5 - 300
Optical section	Optical wavelength	nm	1290 - 1600
	Optical input return loss	dB	> 50
	Optical input connector type		SC / APC 8º
RF section	RF output level (opt. input: -5 dBm; OMI: 6%)	dBµV	75
	RF flatness	dB	± 0.5
	Output variable attenuator	dB	0 - 15
	RF output impedance	Ω	75
	RF output return loss	dB	> 15
	RF output test	dB	-20
General	Supply voltage	VDC	+12
	Consumption	mA	85
	DC connector type		banana socket
	Dimensions	mm	230 x 195 x 32

- 1 optical input 1290-1600 nm — 1 RF output 5-300 MHz. Connection of singlemode type optical fibre.
- Application in two-way HFC networks. The RF signal at the output of the receiver module is used in the headend to deliver data services to the subscribers (broadband internet access, VOD, IPTV, VoIP, etc.). On an alternating application, such a signal could bring to the headend, as TV channels, events and images originated in particular sites of the network and transmitted via optical node.
- Low-noise PIN photodiode operating in the linear section of the “optical power - electrical current” transfer function.
- DC powered by a CFP power supply modules. Mountable on baseplates or rack-frame of the ClassA headend.

TV + IF-SAT optical receiver

FRD-400

MODEL				FRD-400
REF.				4914
Optical window			dBm	-4 ... +1
Forward RF output frequency			MHz	45-862 (TV) and 950-2150 (IF)
Optical section	Optical wavelength		nm	1290 - 1600
	Optical output return loss		dB	> 50
	Optical input connector type			SC / APC 8º
RF section	RF flatness		dB	±1.5 (TV) ,, ±2 (IF)
	RF output level	Analogue TV	dBµV	119 [1] / 104 [2]
		IF		120 [3] / 105 [4]
	CNR	Analogue TV	dB	52,5 [5] / 50 [6]
		IF		36 [7] / 33,5 [8]
	CTB		dB	58 [5] / 60 [6]
	CSO		dB	59 [5] / 63 [6]
	Variable attenuator for TV		dB	0 - 15
	Range of slope control for TV		dB	0 - 15
	IF Variable attenuator		dB	0 - 15
	IF slope control		dB	0 - 10
	Output return loss		dB	>12 (TV) , 10 (IF)
	Output test		dB	-30
General	Mains voltage		VAC	230 - 240
	Consumption		W	15
	Dimensions		mm	222 x 140 x 44

1 -60dB IMD3 (DIN 45004B)

2 With 42 Cenelec carriers and 4% OMI

3 -35dB IMD3 (EN 50083-3)

4 1.6% OMI5

5 For maximum optical input power and note2-marked RF output level.

6 For minimum optical input power and note2-marked RF output level.

7 For maximum optical input power and note4-marked RF output level.

8 For minimum optical input power and note4-marked RF output level.

- 1 optical input (1290-1600 nm) — 1 RF output (45-2150 MHz).
  • Connection of singlemode type optical fibre.
- Especially designed for the delivery of terrestrial and satellite signals (analog and digital) over large collective installations.
- Mains powered, 50/60 Hz. Electrical safety protection level: Class II. Insertable power cord with bipolar plug.
- Injection-moulded zinc alloy housings. Wall-fixing. Indoor mounting. Grounding terminal.

Return path optical transmitter

FTR-301

MODEL			FTR-301
REF.			4906
Optical output power		mW	1 (=0 dBm)
RF input frequency		MHz	5 - 300
Optical section	Optical wavelength	nm	1310 (±20)
	Relative intensity noise (RIN) of laser	dB/Hz	< -140
	Optical output return loss	dB	> 55
	Optical input connector type		SC / APC 8º
RF section	RF output level	dBµV	75 ... 90
	RF flatness	dB	± 0.5
	Optical Modulation Index (OMI) control	dB	-15 ... 0
	RF input impedance	Ω	75
	RF input return loss	dB	> 15
General	Mains voltage	VAC	230 - 240
	Consumption	W	5
	Dimensions	mm	150 x 50 x 55

- 1 RF input 5-300 MHz — 1 optical output 1310 nm. Connection of singlemode type optical fibre.
- Application in two-way HFC networks that deliver data services to their subscribers (broadband internet access, VOD, IPTV, VoIP, etc.).
- Fabry-Pérot laser of 1 mW.
- An optical budget of 6 dB is available between the transmitter and the related FRR receiver module.
- Mains powered, 50/60 Hz. Electrical safety protection level: Class II. Insertable power cord with mains plug.
- Injection-moulded zinc alloy housing. Wall-fixing.
- Indoor mounting. Grounding terminal.

Optical splitting modules

FSP-300

MODEL		FSP-302	FSP-303	FSP-304	FSP-306
REF.		4904	4905	4916	4918
No. of optical outputs		2	3	4	6
Wavelength	nm	1310 ±40 1550 ±40			1310 ±40
Insertion loss	dB	3.7	5.5	7.2	9.0
Return loss	dB	> 55			
Output isolation	dB	> 55			
Input/output connectors		SC / APC 8º			
Dimension	mm	230 x 195 x 32			

- 2, 3, 4, and 6-way optical splitters for singlemode fibre applications.
- Mountable on baseplates or rack-frame of ClassA headend. The splitters share out the optical power of FTD transmitters to feed multiple field nodes, hence maximizing the use of optical transmission equipment.
- The units are reciprocal and can also be used to combine multiple return path fibres to feed one FRR return path receiving module.

Distribution and Splice kits

Splice kit

MODEL	FKH-208
REF.	4910
CAPACITY (SPLICES)	8
Cabinet 19"-1U-250 mm, with slide-out tray. Material: epoxy painted, 1.5 mm thickness steel	1
Splice protectors	8
SC/APC pigtails - 1 metre, 900 microns	
SC/APC adapters	
Stoppers	16

- Construction of optical splice and fibre distribution centres at the headend site.
- The kits include a rack-mount cabinet with a slide-out tray where the splice tray holders are fixed, and a complete set of loose accessories required for the application: splice protectors, pigtails, SC/APC adapters and stoppers. The side wings of the cabinet are movable,which allows an offset of the front panel.
- Three models made for with 1, 2 or 3 four-fibre cables.

UHF driver amplifier

LRA-112

MODEL		LRA-112
REF.		2158
Function		DRIVER
Technology		Push-Pull
Frequency band	MHz	470 - 862
Response flatness	dB	± 1
Nominal gain	dB	23
Atenuador variable interetapas	dB	0 - 18
Noise figure	dB	< 8
Output level - digital channel	dBµV	(2x) 115
Input/output impedance	Ω	75
Input/output return loss	dB	> 10
75Ω input test	dB	-20 ±1
Supply voltage	VDC	+ 12
Consumption	mA	290
LED indicators		ON
RF and test connectors		F female
DC connector type		banana socket
Operating temperature	ºC	-10 ... +55
Dimensions	mm	230 x 195 x 32

UHF power amplifier

HRA-128

MODEL		HRA-128
REF.		2154
Function		POWER AMPLIFIER
Technology		FET-AsGa
Frequency band	MHz	470 - 862
Response flatness	dB	± 1
Nominal gain	dB	45
AGC range	dB	> 10
Interstage attenuation	dB	—
Noise figure (at max gain)	dB	< 8
Outupt level-digital channel	dBµV	(2x) 134 (shoulders at -38 dB)
Output level-analogue channel		(2x) 142 (-54 dB, DIN 45004K)
Input and output impedance	Ω	75
Input/output return loss	dB	> 10
75Ω Input test	dB	-20 ±3
75Ω Output test	dB	-40 ±2
Tensión de alimentación	VDC	+ 12
Consumption	mA	1350
LED indicators		STATUS - AGC
RF and test connectors		F female
DC connector type		banana socket
Operating temperature	ºC	-10 ... +55
Dimensions	mm	230 x 195 x 49

HD DVB-T Set Top Box with USB connector

HD200 R

MODEL	HD200 R
REF.	3076

Standards
DVB-T/TDT/HD DTT (HDTV), H.264, JPEG, WMA, MP3, AVI, MPEG-1/2/4

Features
- Standard MPEG4 AVC/H.264 HP@L4, MPEG-2 MP @HL / M
- Video resolution: 1920x1080i
- Aspect Ratio: 4:3, 16:9
- Support EPG/Display Present/ Next TV Program
- Multi-languages Support
- Auto / Manual scan
- 1000 channels
- Support USB SW Upgrade/Media

Playback/Recording
- Parent Control
- 4 digit LED display
- Playback formats: JPEG, WMA, MP3, AVI, MPEG-1/2/4
- Recording format: MPEG-2 TS
- Timeshifting
- USB for external storage FAT32 device

Connectors
- HDMI 1.3
- SCART: TV (RGB)
- SPDIF: Coaxial Output
- Antenna Input: IEC Female

Tuner & Demodulator
- Front End: DVB-T tuner 5007
- Input Frequency Range: 170~866MHz
- RF input Signal Level: -78 ~ -5 dBm
- RF Loop through function
- Demodulation: QPSK/16QAM/64QAM
- OFDM Spectrum: 2K and 8K
- Standard DVB-T EN300744

General Data
- Input Voltage range: 90 VAC ~ 240VAC
- Power Consumption: max 8W
- Stand-by mode: <1W
- Flash Memory: 64µs
- Dimensions: 220 x 170 x 45 mm
- Weight: 1.2 kg

- Fully comply with DVB-T and H.264, AVC,
- MPEG4, MPEG2 Standard
- PAL & NTSC Auto Switch
- 1xSCART
- USB 2.0
- HDMI (up to 1080i) Output
- Timeshift
- SPDIF Coaxial Output
- RF Loop through function
- Multi-languages support
- Support EPG, Display Present/Next TV
- Auto/Manual scan
- 1000 channels
- Support USB SW Upgrade/Media
- Parent control
- Playback formats: JPEG, WMA, MP3, AVI, MPEG-1/2/4
- Recording format : MPEG-2 TS
- Timeshifting
- USB for external storage FAT32 device

The best protection against the LTE signal

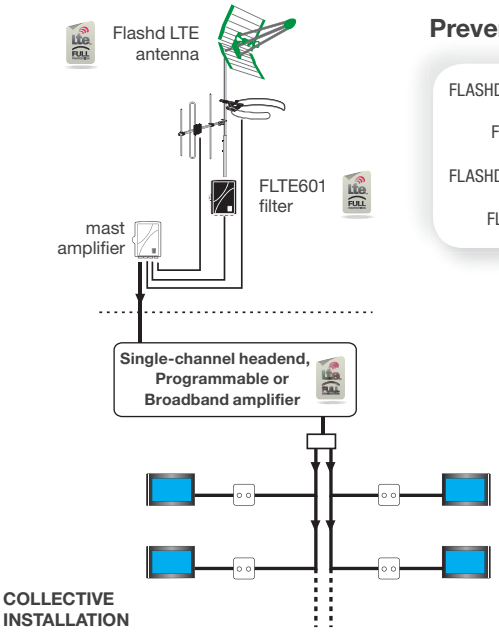
Ikusi has designed and patented technological solutions capable of rejecting any interference from the LTE signals on the TV channels, even in areas close to the main broadcasters (exclusion zone) and regardless of the existing equipment.
These solutions are developed by focusing on three areas: The antenna, the filter on the headend and the protection of the headend equipment.

▲ NBS amplification headend page 28

▲ FLTE601 filter page 14

▲ ONE programmable headend page 32

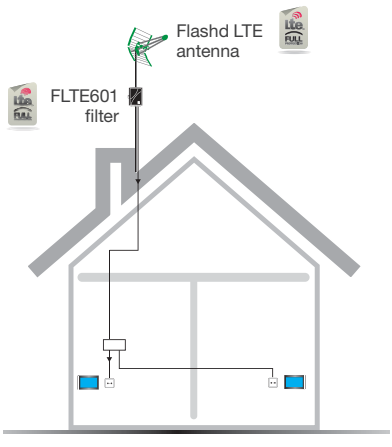
▲ SZB single-channel headend page 34



COLLECTIVE INSTALLATION

Prevention Solutions against LTE signals

FLASHD LTE c58 antenna or FLTE601 filter	• In case of NOT having channels 59 and 60
FLASHD LTE c60 antenna + FLTE601 filter	• In istallations with channel 59 or 60 • Proximity of 4G mobile base station



SINGLE-FAMILY INSTALLATION

ONE

RPS-MAO
ref. 4483

NBS

RPS-NBS
ref. 3519

SAE

RPS-SAE
ref. 3501

MAC-HOME

RPS-MAH
ref. 4484

MAC-400

RPS-MAO
ref. 4483

Spare Parts

Model	Reference	Description	Product Page
RPS-MAO	4483	Power supply for ONE programmable amplifiers and MAC-400 modulator	34 and 43
RPS-NBS	3519	Power supply for NBS amplification headends	30
RPS-SAE	3501	Power supply for SAE extension amplifiers	83
RPS-MAH	4484	Power supply for MAC-HOME stand alone modulator	42

World Analog TV Standards

Country	VHF	UHF	Colour System
Algeria	B	H	PAL
Argentina	N	N	PAL
Australia	B	B	PAL
Austria	B	G	PAL
Bahrain	B	—	PAL
Belarus	D	K	SECAM
Belgium	B	H	PAL
Bulgaria	D	K	SECAM
China	D	K	PAL
Cyprus	B	G	PAL
Czech Republic	D	K	SECAM
Denmark	B	G	PAL
Egypt	B	G / H	SECAM
Estonia	D	K	SECAM
Finland	B	G	PAL
France	L	L	SECAM
Germany	B	G	PAL
Great Britain	I	I	PAL
Greece	B	G	SECAM
Holland	B	G	PAL
Hong Kong I	I	PAL	
Hungary	D	K	SECAM
Iceland	B	G	PAL
India	B	—	PAL
Indonesia	B	—	PAL
Iran	B	G	SECAM
Iraq	B	—	SECAM
Ireland	I	I	PAL
Israel	B	G	PAL
Italy	B	G	PAL
Japan	M	M	NTSC
Jordan	B	G	PAL
Korea	M	—	NTSC
Kuwait	B	G	PAL
Latvia	D	K	SECAM
Lebanon	B	—	SECAM

Country	VHF	UHF	Colour System
Libya	B	H	SECAM
Lithuania	D	K	SECAM
Luxembourg	C	L	PAL/SECAM
Malaysia	B	G	PAL
Malta	B	H	PAL
Mexico	M	M	NTSC
Moldova	D	K	SECAM
Monaco	E	L	SECAM
Morocco	B	H	SECAM
Nigeria	B	G	PAL
Norway	B	G	PAL
Oman	B	G	PAL
Pakistan	B	—	PAL
Philippines M	M	NTSC	
Poland	D	K	SECAM
Portugal	B	G	PAL
Qatar	B	—	PAL
Romania	D	K	PAL
Russia	D	K	SECAM
Saudi Arabia	B	G	PAL/SECAM
Singapore	B	G	PAL
Slovakia	D	K	SECAM
South Africa	I	I	PAL
Spain	B	G	PAL
Sri Lanka	B / H	—	PAL
Sweden	B	G	PAL
Switzerland B	G	PAL	
Syria	B	H	SECAM
Thailand	B	—	PAL
Tunisia	B	—	SECAM
Turkey	B	G	PAL
Ukraine	D	K	SECAM
United Arab Emirates	B	G	PAL
USA	M	M	NTSC
Yemen	B	—	PAL
Yugoslavia B	G	PAL	

TV Standard

TV Standard		B	D	G	H	I	K	K'	L	M	N
Allocation		**VHF**	**VHF**	**VHF/UHF**	**UHF**	**VHF/UHF**	**VHF**	**VHF/UHF**	**VHF/UHF**	**VHF/UHF**	**VHF/UHF**
Number of lines		625	625	625	625	625	625	625	625	525	625
Number of raster per second		50	50	50	50	50	50	50	50	60	50
Number of images per second		25	25	25	25	25	25	25	25	30	25
Line frequency per second		15 625	15 625	15 625	15 625	15 625	15 625	15 625	15 625	15 750	15 625
Channel bandwidth	MHz	7	8	8	8	8	8	8	8	6	6
Video bandwidth	MHz	5	6	5	5	5.5	6	5	6	4.2	4.2
Video-to-Sound spacing	MHz	5.5	6.5	5.5	5.5	6	6.5	6.5	6.5	4.5	4.5
Vestigial side band	MHz	0.75	0.75	0.75	1.25	1.25	1.25	1.25	1.25	0.75	0.75
Video modulation		Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Pos.	Neg.	Neg.
Audio modulation		FM	FM	FM	FM	FM	FM	FM	AM	FM	FM
Power ratio: vision / sound		5/1 - 10/1	2/1 - 5/1	5/1 - 10/1	5/1	5/1	2/1 - 5/1	2/1 - 5/1	8/1	5/1 - 10/1	5/1 - 10/1
Frequency deviation for sound	kHz	±50	-	±50	±50	±50	-	-	-	±25	±25
Pre-emphasis	µs	50	-	50	50	50	-	-	-	75	75

TV channels allocations - System B/G (Europe) + K, I, L for B-IV/V *

Band	Channel	Ch frequency MHz	Picture carrier MHz	Sound carrier MHz	Digital Freq. MHz
I	E2	47 - 54	48.25	53.75	50.5
	E3	54 - 61	55.25	60.75	57.5
	E4	61 - 68	62.25	67.75	64.5
Low S-band (SI)	S3	118 - 125	119.25	124.75	121.75
	S4	125 - 132	126.25	131.75	128.75
	S5	132 - 139	133.25	138.75	135.5
	S6	139 - 146	140.25	145.75	142.5
	S7	146 - 153	147.25	152.75	149.5
	S8	153 - 160	154.25	159.75	156.5
	S9	160 - 167	161.25	166.75	163.5
	S10	167 - 174	168.25	173.75	170.5
III	E5	174 - 181	175.25	180.75	177.5
	E6	181 - 188	182.25	187.75	184.5
	E7	188 - 195	189.25	194.75	191.5
	E8	195 - 202	196.25	201.75	198.5
	E9	202 - 209	203.25	208.75	205.5
	E10	209 - 216	210.25	215.75	212.5
	E11	216 - 223	217.25	222.75	219.5
	E12	223 - 230	224.25	229.75	226.5
High S-band (SI-1)	S11	230 - 237	231.25	236.75	233.5
	S12	237 - 244	238.25	243.75	240.5
	S13	244 - 251	245.25	250.75	247.5
	S14	251 - 258	252.25	257.75	254.5
	S15	258 - 265	259.25	264.75	261.5
	S16	265 - 272	266.25	271.75	268.5
	S17	272 - 279	273.25	278.75	275.5
	S18	279 - 286	280.25	285.75	282.5
	S19	286 - 293	287.25	292.75	289.5
	S20	293 - 300	294.25	299.75	296.5
Hiperband (SII)	S21	302 - 310	303.25	308.75	306
	S22	310 - 318	311.25	316.75	314
	S23	318 - 326	319.25	324.75	322
	S24	326 - 334	327.25	332.75	330
	S25	334 - 342	335.25	340.75	338
	S26	342 - 350	343.25	348.75	346
	S27	350 - 358	351.25	356.75	354
	S28	358 - 366	359.25	364.75	362
	S29	366 - 374	367.25	372.75	370
	S30	374 - 382	375.25	380.75	378
	S31	382 - 390	383.25	388.75	386
	S32	390 - 398	391.25	396.75	394
	S33	398 - 406	399.25	404.75	402
	S34	406 - 414	407.25	412.75	410
	S35	414 - 422	415.25	420.75	418
	S36	422 - 430	423.25	428.75	426
	S37	430 - 438	431.25	436.75	434
	S38	438 - 446	439.25	444.75	442

Band	Channel	Ch frequency MHz	Picture carrier MHz	Sound carrier MHz	Digital Freq. MHz
IV	21	470 - 478	471.25	476.75	474
	22	478 - 486	479.25	484.75	482
	23	486 - 494	487.25	492.75	490
	24	494 - 502	495.25	500.75	498
	25	502 - 510	503.25	508.75	506
	26	510 - 518	511.25	516.75	514
	27	518 - 526	519.25	524.75	522
	28	526 - 534	527.25	532.75	530
	29	534 - 542	535.25	540.75	538
	30	542 - 550	543.25	548.75	546
	31	550 - 558	551.25	556.75	554
	32	558 - 566	559.25	564.75	562
	33	566 - 574	567.25	572.75	570
	34	574 - 582	575.25	580.75	578
	35	582 - 590	583.25	588.75	586
	36	590 - 598	591.25	596.75	594
	37	598 - 606	599.25	604.75	602
UHF	38	606 - 614	607.25	612.75	610
	39	614 - 622	615.25	620.75	618
	40	622 - 630	623.25	628.75	626
	41	630 - 638	631.25	636.75	634
	42	638 - 646	639.25	644.75	642
	43	646 - 654	647.25	652.75	650
	44	654 - 662	655.25	660.75	658
	45	662 - 670	663.25	668.75	666
	46	670 - 678	671.25	676.75	674
	47	678 - 686	679.25	684.75	682
	48	686 - 694	687.25	692.75	690
	49	694 - 702	695.25	700.75	698
	50	702 - 710	703.25	708.75	706
	51	710 - 718	711.25	716.75	714
	52	718 - 726	719.25	724.75	722
	53	726 - 734	727.25	732.75	730
	54	734 - 742	735.25	740.75	738
	55	742 - 750	743.25	748.75	746
	56	750 - 758	751.25	756.75	754
	57	758 - 766	759.25	764.75	762
	58	766 - 774	767.25	772.75	770
	59	774 - 782	775.25	780.75	778
	60	782 - 790	783.25	788.75	786
	61	790 - 798	791.25	796.75	794
	62	798 - 806	799.25	804.75	802
	63	806 - 814	807.25	812.75	810
	64	814 - 822	815.25	820.75	818
	65	822 - 830	823.25	828.75	826
	66	830 - 838	831.25	836.75	834
	67	838 - 846	839.25	844.75	842
	68	846 - 854	847.25	852.75	850
	69	854 - 862	855.25	860.75	858

* Systems K,L : Sound carrier = Picture carrier+6.5 MHz
System I : Sound carrier = Picture carrier+6 MHz

Frequency table. Radio DAB

Block 8A to 8D	Block 9A to 9D	Block 10A to 10D	Block 11A to 11D
8A 195.936 MHz	**9A** 202.928 MHz	**10A** 209.936 MHz	**11A** 216.928 MHz
8B 197.648 MHz	**9B** 204.640 MHz	**10B** 211.648 MHz	**11B** 218.640 MHz
8C 199.360 MHz	**9C** 206.640 MHz	**10C** 213.360 MHz	**11C** 220.352 MHz
8D 201.072 MHz	**9D** 208.064 MHz	**10D** 215.072 MHz	**11D** 222.064 MHz

1 Block ⇛ 6 Radio channels

Other Systems and Channels (Europe, Morocco)

Band	Channel	Ch. frequency MHz	Picture carrier MHz	Sound carrier MHz
System D (OIRT)				
I	R1	48.5 - 56.5	49.75	56.25
	R2	58 - 66	59.25	65.75
II	R3	76 - 84	77.25	83.75
	R4	84 - 92	85.25	91.75
	R5	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	157.75
	S7	158 - 166	159.25	165.75
	S8	166 - 174	167.25	173.75
III	R6	174 - 182	175.25	181.75
	R7	182 - 190	183.25	189.75
	R8	190 - 198	191.25	197.75
	R9	198 - 206	199.25	205.75
	R10	206 - 214	207.25	213.75
	R11	214 - 222	215.25	221.75
	R12	222 - 230	223.25	229.75
Special channel	S11	230 - 238	231.25	237.75
	S12	238 - 246	239.25	245.75
	S13	246 - 254	247.25	253.75
	S14	254 - 262	255.25	261.75
	S15	262 - 270	263.25	269.75
	S16	270 - 278	271.25	277.75
	S17	278 - 286	279.25	285.75
	S18	286 - 294	287.25	293.75
	S19	294 - 302	295.25	301.75
	S20	302 - 310	303.25	309.75
	S21	303 - 310	311.25	317.75
	S22	310 - 318	319.25	325.75
	S23	318 - 326	327.25	333.75
	S24	326 - 334	335.25	341.75
	S25	334 - 342	343.25	349.75
	S26	342 - 350	351.25	357.75
	S27	350 - 358	359.25	365.75
	S28	358 - 366	367.25	373.75
	S29	366 - 374	375.25	381.75
	S30	374 - 382	383.25	389.75
	S31	382 - 390	391.25	397.75
	S32	390 - 398	399.25	405.75
	S33	398 - 406	407.25	413.75
	S34	406 - 414	415.25	421.75
	S35	414 - 422	423.25	429.75
	S36	422 - 430	431.25	437.75
	S37	430 - 438	439.25	445.75
	S38	438 - 446	447.25	453.75
	S39	446 - 454	455.25	461.75
	S40	454 - 462	463.25	469.75
	S41	462 - 470	471.25	477.75

Band	Channel	Ch. frequency MHz	Picture carrier MHz	Sound carrier MHz
System B (Italy)				
I	A	52.5 - 59.5	53.75	59.25
	B	61 - 68	62.25	67.75
II	C	81 - 88	82.25	87.75
III	D	174 - 181	175.25	180.75
	E	182.5 - 189.5	183.25	189.75
	F	191 - 198	192.25	197.75
	G	200 - 207	201.25	206.75
	H	209 - 216	210.25	215.75
	H1	216 - 223	217.25	222.75
	H2	223 - 230	224.25	229.75

Band	Channel	channel frequency MHz	Picture carrier MHz	Sound carrier MHz
System I (Great Britain, Ireland)				
I	A	44.5 - 52.5	45.75	51.75
	B	52.5 - 60.5	53.25	59.75
	C	60.5 - 68.5	61.25	67.75
III	D	174 - 182	175.25	181.75
	E	182 - 190	183.25	189.75
	F	190 - 198	191.25	197.75
	G	198 - 206	199.25	205.75
	H	206 - 214	207.25	213.75
	I	214 - 222	215.25	221.75
	J	222 - 230	223.25	229.75

Band	Channel	channel frequency MHz	Picture carrier MHz	Sound carrier MHz
System B (Morocco)				
III	M4	162 - 169	163.25	168.75
	M5	170 - 177	171.25	176.75
	M6	178 - 185	179.25	184.75
	M7	186 - 193	187.25	292.75
	M8	194 - 201	195.25	200.75
	M9	202 - 209	203.25	208.75
	M10	210 - 217	211.25	216.75

Band	Channel	channel frequency MHz	Picture carrier MHz	Sound carrier MHz
System L (France)				
I	02	49 - 57	55.75	49.25
	03	53.5 - 61.75	60.50	54.00
	04	57 - 65	63.75	57.25
III	05	174.75 - 182.75	176	182.50
	06	182.75 - 190.75	184	190.50
	07	190.75 - 198.75	192	198.50
	08	198.75 - 206.75	200	206.50
	09	206.75 - 214.75	208	214.50
	10	214.75 - 222.75	216	222.50

Australian Channels - Analogue & Digital

Band	Channel	Australian Channels	Picture carrier MHz	Digital Freq. MHz	Sound carrier MHz
I		0	46.25		51.75
		1	57.25		62.75
		2	64.25		69.75
Low S-Band (SI)	S2		112.25		117.75
	S3		119.25		124.75
	S4		126.25		131.75
	S5		133.25		138.75
	S6		140.25		145.75
	S7		147.25		152.75
	S8		154.25		159.75
	S9		161.25		166.75
	S10		168.25		173.75
III		6	175.25	177.5	180.75
		7	182.25	184.5	187.75
		8	189.25	191.5	194.75
		9	196.25	198.5	201.75
		9a	197.25	205.5	202.75
		10	209.25	212.5	214.75
		11	216.25	219.5	221.75
		12	223.25	226.5	228.75
High S-Band (SI-1)	S11		231.25		236.75
	S12		238.25		243.75
	S13		245.25		250.75
	S14		252.25		257.75
	S15		259.25		264.75
	S16		266.25		271.75
	S17		273.25		278.75
	S18		280.25		285.75
	S19		287.25		292.75
	S20		294.25		299.75
Hyperband (SII)	S21		303.25		308.75
	S22		310.25		315.75
	S23		317.25		322.75
	S24		324.25		329.75
	S25		331.25		336.75
	S26		338.25		343.75
	S27		345.25		350.75
	S28		352.25		357.75
	S29		359.25		364.75
	S30		366.25		371.75
	S31		373.25		378.75
	S32		380.25		385.75
	S33		387.25		392.75
	S34		394.25		399.75
	S35		401.25		406.75
	S36		408.25		413.75
	S37		415.25		420.75
	S38		422.25		427.75
	S39		429.25		434.75
	S40		436.25		441.75
	S41		443.25		448.75

Band	Channel	Australian Channels	Picture carrier MHz	Digital Freq. MHz	Sound carrier MHz
UHF	E 21		471.25		476.75
	E 22		479.25		484.75
	E 23		487.25		492.75
	E 24		495.25		500.75
	E 25		503.25		508.75
	E 26		511.25		516.75
	E 27		519.25		524.75
		28	527.25	529.5	532.75
		29	534.25	536.5	539.75
		30	541.25	543.5	546.75
		31	548.25	550.5	553.75
		32	555.25	557.5	560.75
		33	562.25	564.5	567.75
		34	569.25	571.5	574.75
		35	576.25	578.5	581.75
		36	583.25	585.5	588.75
		37	590.25	592.5	595.75
		38	597.25	599.5	602.75
		39	604.25	606.5	609.75
		40	611.25	613.5	616.75
		41	618.25	620.5	623.75
		42	625.25	627.5	630.75
		43	632.25	634.5	637.75
		44	639.25	641.5	644.75
		45	646.25	648.5	651.75
		46	653.25	655.5	658.75
		47	660.25	662.5	665.75
		48	667.25	669.5	672.75
		49	674.25	676.5	679.75
		50	681.25	683.5	686.75
		51	688.25	690.5	693.75
		52	695.25	697.5	700.75
		53	702.25	704.5	707.75
		54	709.25	711.5	714.75
		55	716.25	718.5	721.75
		56	723.25	725.5	728.75
		57	730.25	732.5	735.75
		58	737.25	739.5	742.75
		59	744.25	746.5	749.75
		60	751.25	753.5	756.75
		61	758.25	760.5	763.75
		62	765.25	767.5	770.75
		63	772.25	774.5	777.75
		64	779.25	781.5	784.75
		65	786.25	788.5	791.75
		66	793.25	795.5	798.75
		67	800.25	802.5	805.75
		68	807.25	809.5	812.75
		69	814.25	816.5	819.75

Systems M/N (South America, USA)

Band	Channel	Channel frequency MHz	Video carrier MHz	Sound carrier MHz
LOW	2	54 - 60		
	3	60 - 66	77.25	83.75
	4	66 - 72	85.25	91.75
	5	76 - 82	93.25	99.75
	6	82 - 88		
HIGH	7	174 - 180	175.25	181.75
	8	180 - 186	183.25	189.75
	9	186 - 192	191.25	197.75
	10	192 - 198	199.25	205.75
	11	198 - 204	207.25	213.75
	12	204 - 210	215.25	221.75
	13	210 - 216	223.25	229.75
UHF	14	470 - 476	471.25	475.75
	15	476 - 482	477.25	481.75
	16	482 - 488	483.25	487.75
	17	488 - 494	489.25	493.75
	18	494 - 500	495.25	499.75
	19	500 - 506	501.25	505.75
	20	506 - 512	507.25	511.75
	21	512 - 518	513.25	517.75
	22	518 - 524	519.25	523.75
	23	524 - 530	525.25	529.75
	24	530 - 536	531.25	535.75
	25	536 - 542	537.25	541.75
	26	542 - 548	543.25	547.75
	27	548 - 554	549.25	553.75
	28	554 - 560	555.25	559.75
	29	560 - 566	561.25	565.75
	30	566 - 572	567.25	571.75
	31	572 - 578	573.25	577.75
	32	578 - 584	579.25	583.75
	33	584 - 590	585.25	589.75
	34	590 - 596	591.25	595.75
	35	596 - 602	597.25	601.75

Band	Channel	Channel frequency MHz	Video carrier MHz	Sound carrier MHz
UHF	36	602 - 608	603.25	607.75
	37	608 - 614	609.25	613.75
	38	614 - 620	615.25	619.75
	39	620 - 626	621.25	625.75
	40	626 - 632	627.25	631.75
	41	632 - 638	633.25	637.75
	42	638 - 644	639.25	643.75
	43	644 - 650	645.25	649.75
	44	650 - 656	651.25	655.75
	45	656 - 662	657.25	661.75
	46	662 - 668	663.25	667.75
	47	668 - 674	669.25	673.75
	48	674 - 680	675.25	679.75
	49	680 - 686	681.25	685.75
	50	686 - 692	687.25	691.75
	51	692 - 698	693.25	697.75
	52	698 - 704	699.25	703.75
	53	704 - 710	705.25	709.75
	54	710 - 716	711.25	715.75
	55	716 - 722	717.25	721.75
	56	722 - 728	723.25	727.75
	57	728 - 734	729.25	733.75
	58	734 - 740	735.25	739.75
	59	740 - 746	741.25	745.75
	60	746 - 752	747.25	751.75
	61	752 - 758	753.25	757.75
	62	758 - 764	759.25	763.75
	63	764 - 770	765.25	76975
	64	770 - 776	771.25	775.75
	65	776 - 782	777.25	781.75
	66	782 - 788	783.25	787.75
	67	788 - 794	789.25	793.75
	68	794 - 800	795.25	799.75
	69	800 - 806	801.25	805.75
	70	806 - 812	807.25	811.75
	71	812 - 818	813.25	817.75
	72	818 - 824	819.25	823.75
	73	824 - 830	825.25	829.75
	74	830 - 836	831.25	835.75
	75	836 - 842	837.25	841.75
	76	842 - 848	843.25	847.75
	77	848 - 854	849.25	853.75
	78	854 - 860	855.25	859.75
	79	860 - 866	861.25	865.75
	80	866 - 872	867.25	871.75
	81	872 - 878	873.25	877.75
	82	878 - 884	879.25	883.75
	83	884 - 890	885.25	889.75

Level/Voltage conversion table

dBµV	0	1	2	3	4	5	6	7	8	9
0	1.0 µV	1.1 µV	1.3 µV	1.4 µV	1.6 µV	1.8 µV	2.0 µV	2.2 µV	2.5 µV	2.8 µV
10	3.2 µV	3.5 µV	4.0 µV	4.5 µV	5.0 µV	5.6 µV	6.3 µV	7.1 µV	7.9 µV	8.9 µV
20	10.0 µV	11.2 µV	12.6 µV	14.1 µV	15.8 µV	17.8 µV	20.0 µV	22.4 µV	25.1 µV	28.2 µV
30	31.6 µV	35.5 µV	39.8 µV	44.7 µV	50.1 µV	56.2 µV	63.1 µV	70.8 µV	79.4 µV	89.1 µV
40	100 µV	112 µV	126 µV	141 µV	158 µV	178 µV	200 µV	224 µV	251 µV	282 µV
50	316 µV	355 µV	398 µV	447 µV	501 µV	562 µV	631 µV	708 µV	794 µV	891 µV
60	1.0 mV	1.1 mV	1.3 mV	1.4 mV	1.6 mV	1.8 mV	2.0 mV	2.2 mV	2.5 mV	2.8 mV
70	3.2 mV	3.5 mV	4.0 mV	4.5 mV	5.0 mV	5.6 mV	6.3 mV	7.1 mV	7.9 mV	8.9 mV
80	10.0 mV	11.2 mV	12.6 mV	14.1 mV	15.8 mV	17.8 mV	20.0 mV	22.4 mV	25.1 mV	28.2 mV
90	31.6 mV	35.5 mV	39.8 mV	44.7 mV	50.1 mV	56.2 mV	63.1 mV	70.8 mV	79.4 mV	89.1 mV
100	100 mV	112 mV	126 mV	141 mV	158 mV	178 mV	200 mV	224 mV	251 mV	282 mV
110	316 mV	355 mV	398 mV	447 mV	501 mV	562 mV	631 mV	708 mV	794 mV	891 mV
120	1.0 V	1.1 V	1.3 V	1.4 V	1.6 V	1.8 V	2.0 V	2.2 V	2.5 V	2.8 V

Ex.: 66 dBµV = 2.0 mV
125 dBµV = 1.8 V

«dBµV / dBm» conversion on 75Ω

Convert dBµV to dBm → Subtract 108.7 from the figure in dBµV :
(N) dBµV = (N - 108.7) dBm
Ex.: 110 dBµV = 1.3 dBm

Convert dBm to dBµV → Add 108.7 to the figure in dBm :
(M) dBm = (M + 108.7) dBµV
Ex.: -50 dBm = 58.7 dBµV

«dBµV / dBmV» conversion

Convert dBµV to dBmV → Subtract 60 from the figure in dBµV :
(N) dBµV = (N - 60) dBmV
Ex.: 100 dBµV = 40 dBmV

Convert dBm to dBµV → Add 60 to the figure in dBmV :
(M) dBmV = (M + 60) dBµV
Ex.: 22 dBmV = 82 dBµV

Earthing and equipotencial bonding cables

The EN 50083-1 standard specifies the following earthing and equipotencial bonding cables for antenna systems:

Earthing cables:

Material	Cross-section	Ø	Condition
Copper	≥ 16 mm2	≥ 4.6 mm	bare or insulated
Aluminium	≥ 25 mm2	≥ 5.7 mm	bare (indoors only) or insulated
Steel wire	≥ 50 mm2	≥ 8.0 mm	galvanized
Steel strip	2.5 x 20 mm	-	galvanized

Cable type: single conductor or multi-conductor, but no fine wires

Equipotencial bonding cables:

Material	Cross-section	Ø	Condition
Copper	≥ 4 mm2	≥ 2.3 mm	bare or insulated

Output level reduction in broadband amplifiers

BROADBAND TERRESTRIAL TV AMPLIFIERS : The RF output levels specified in this catalogue for IMD3=-60 dB (DIN 45004 B) are applicable when 2 analog TV channels are amplified. If, as is usual, more than 2 TV channels are amplified, such levels have to be reduced according to the following table:

Number of Channels (n)		2	3	4	5	6	7	8	9	10	15	20
Output level reduction = 7,5 · log (n-1)	**dB**	**0**	**2**	**3.5**	**4.5**	**5**	**5.5**	**6**	**6.5**	**7**	**8.5**	**9.5**

FM, DAB AND COFDM SIGNALS : If output levels of the FM, DAB and Digital TV (COFDM) signals are adjusted 10 dB or more below the levels of the analog TV channels, those signals can be ignored when calculating the output reduction level. If referred levels are not reduced as indicated, those signals must be counted as normal channels and the output level de-rated accordingly.

BROADBAND SATELLITE TV OR DIGITAL TERRESTRIAL TV AMPLIFIERS : The RF output levels specified in this catalogue for IMD3=-35 dB (EN 50083-3) are applicable when 1 FM-, QPSK- or COFDM-modulated TV channel is amplified. For a bigger number of channels, such levels have to be reduced according to the following table:

Number of Channels (n)		2	3	4	5	6	7	8	9	10	15	20
Output level reduction = 10 · log (n-1)	**dB**	**3**	**4.5**	**6**	**7**	**8**	**8.5**	**9**	**9.5**	**10**	**11.5**	**13**

CASCADE REDUCTION : When m same-type broadband amplifiers are laid out in cascade, an additional reduction of the output level equals 10 · log m must be taken into account for every amplifier.

Channel allocation for CTB and CSO measurement - CENELEC Frequency Plan

Frequency MHz	
48.25	**GROUP A**
119.25	
175.25	
191.25	
207.25	
223.25	
231.25	
247.25	
263.25	
287.25	
311.25	
327.25	
343.25	
359.25	
375.25	
391.25	
407.25	
423.25	
439.25	

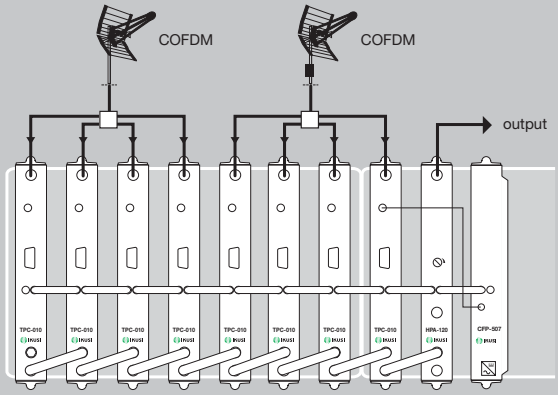
Frequency MHz	
447.25	**GROUP B**
463.25	
479.25	
495.25	
511.25	
527.25	
543.25	
567.25	**GROUP C**
583.25	
599.25	

Frequency MHz	
663.25	**GROUP D**
679.25	
695.25	
711.25	
727.25	
743.25	
759.25	**GROUP E**
775.25	
791.25	
807.25	
823.25	
839.25	
855.25	

EN 50083-3

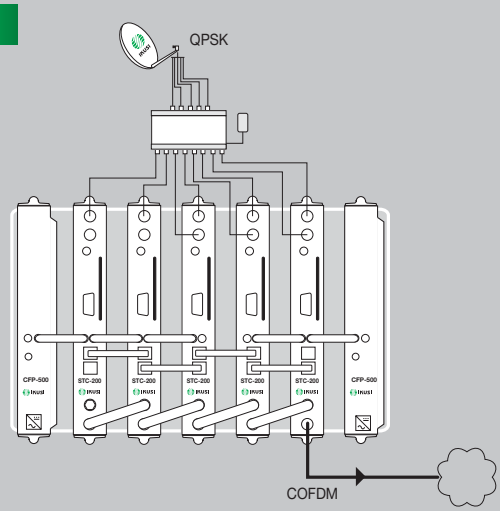
ClassA

TPC



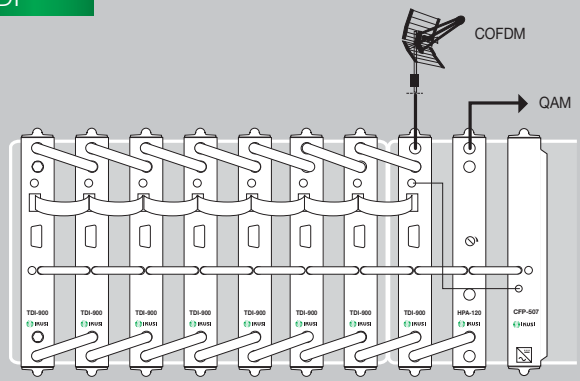
Example of TPC headend for conversion on four digital multiplex and processing of others four ones. Contains 8 processor TPC, 1 amplifier HPA and 1 power supply, all fixed on 2 base-plates.

STC



Example of STC headend. Contains 5 STC-200 tansmodulators and 2 power supplies, all fixed on 1 BAS-700 base-plate.

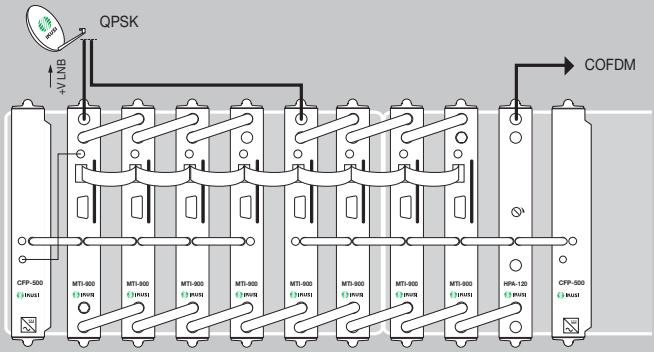
TDI



Example of TDI headend for eight digital terrestrial channels. Contains 8 transmodulators, 1 amplifier and 2 power supplies, all fixed on 2 base-plates.

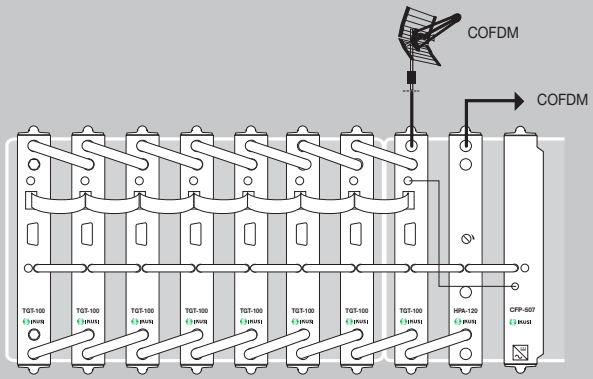
ClassA

MTI



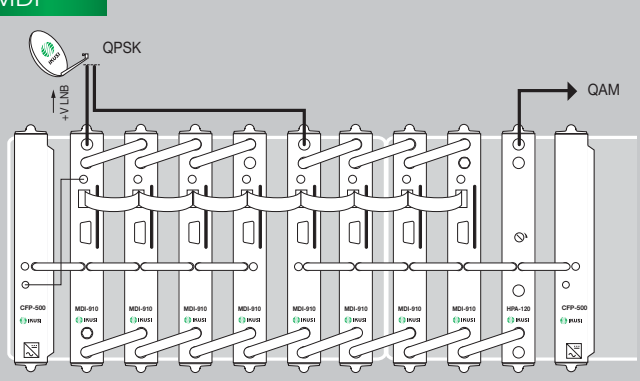
Example of MTI headend for eight transponders. Contains 8 MTI transmodulators, 1 HPA amplifier and 2 power supplies, all fixed on 2 base-plates.

TGT



Example of TGT headend. Contains 8 Regenerators, 1 amplifier and 1 power supply, all fixed on 2 base-plates.

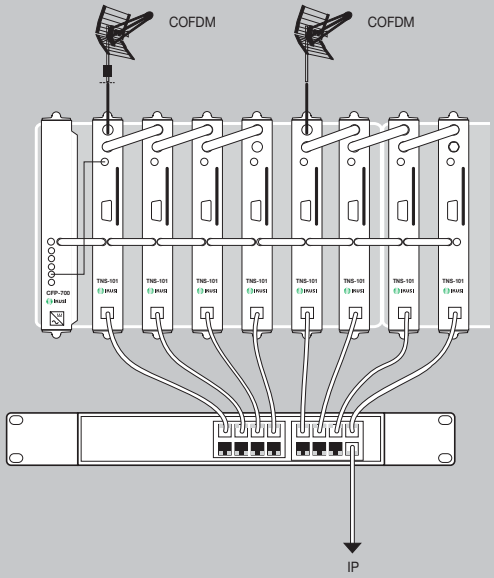
MDI



Example of MDI headend for eight transponders. Contains 8 MDI transmodulators, 1 amplifier and 2 power supplies, all fixed on 2 base-plates.

ClassA

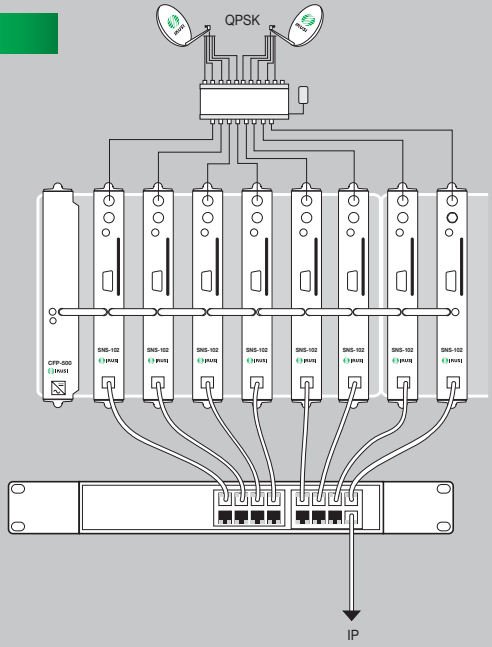
TNS



Example of TNS headend for eight digital terrestrial streamers TV channels. Contains 8 TNS streamers and 1 power supply, all fixed on 2 base-plates.

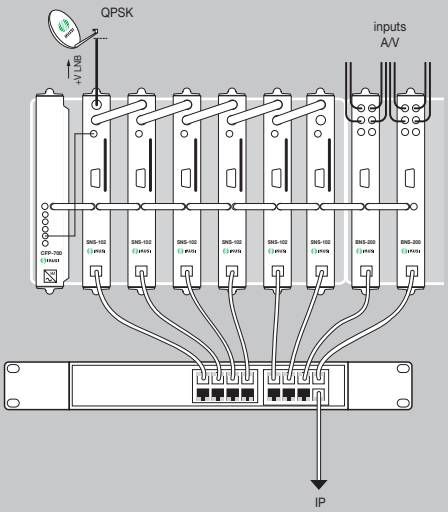
ClassA

SNS



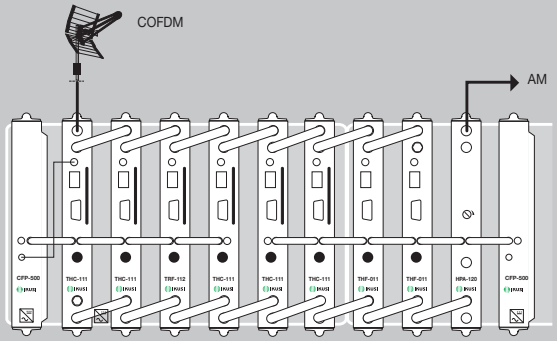
Example of SNS headend for eight digital satellite streamers TV channels. Contains 8 SNS streamers and 1 power supply, all fixed on 2 base-plates.

BNS



Example of mixed SNS/BNS headend for six digital satellite TV transponders and four video/audio local sources. Contains 6 SNS, 2 BNS-200 and 1 CFP-700 power supply, all fixed on 2 base-plates. The headend can feed the IP network with 48 TV programmes (8 programmes at the most per SNS streamer) plus 4 local TV broadcasts (2 mono sound's and 2 stereo sound's).

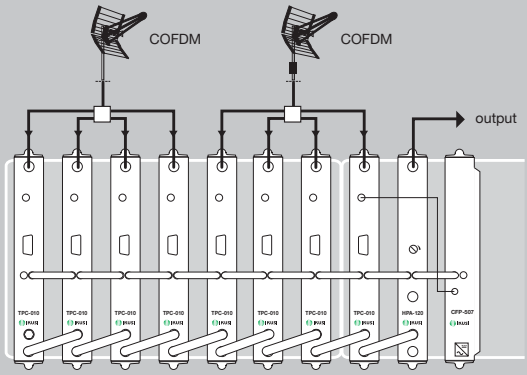
THC/THF



Example of mixed THC/THF headend for six digital terrestria TV programmes MPEG4 and two free to air. Contains 6 THC, 2 THF, 2 CFP-500 power supply and 1 amplifier HPA, all fixed on 2 base-plates.

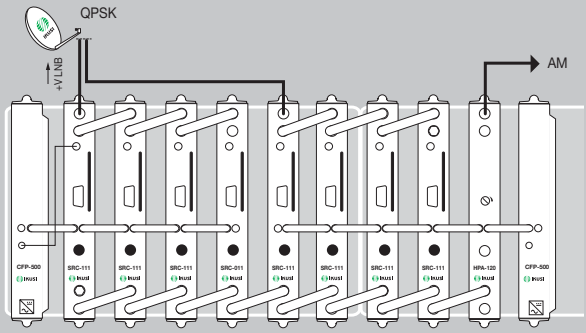
ClassA

TRF



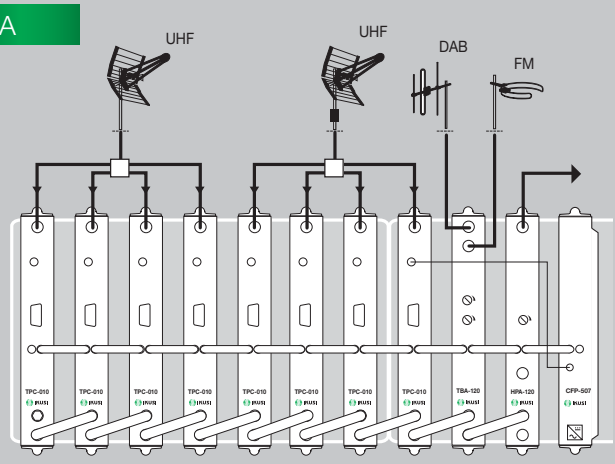
Example of TRF headend for eight clear digital terrestrial TV programs. Contains 8 receivers, 1 amplifier and 2 power supplies, all fixed on 2 base-plates.

SRC



Example of SRC headend for eight encrypted digital TV programs; four programmes access via a down leas cable and other four one via another. Contains 8 SRC receivers, 1 amplifier and 2 power supplies, all fixed on 2 base-plates.

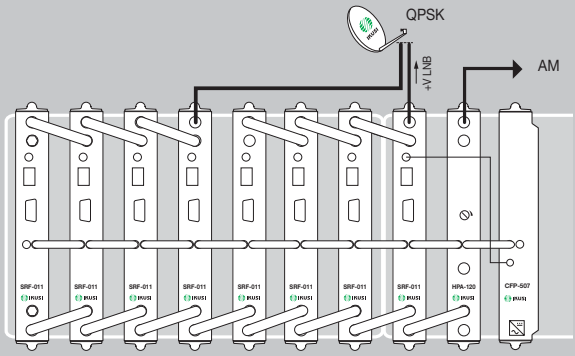
TBA



TBA-120 installed in a TV channel processing «TPC» headend.

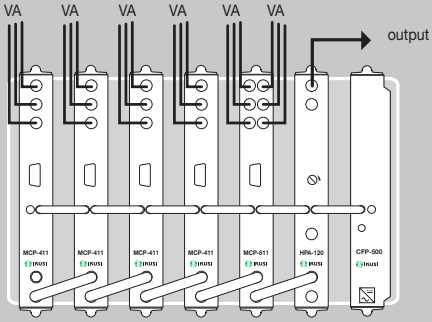
ClassA

SRF



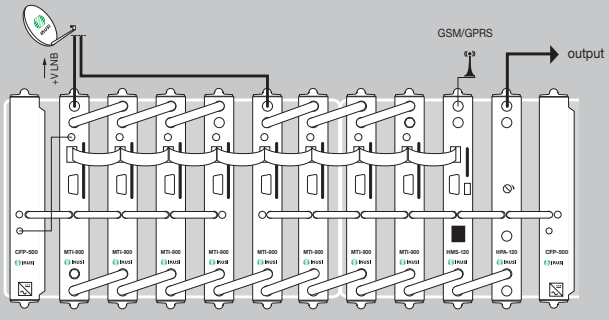
Example os SRF headend of eight clear digital satellite TV programs; four programmes access via a down lead cable and other four ones via another. Contains 8 receives, 1 amplifier and 2 power supplies, all fixed on 2 base-plates.

MCP



Example of MCP headend with 5 modulators (one double), 1 amplifier and 1 power supply, all fixed on 1 base-plate.

HMS



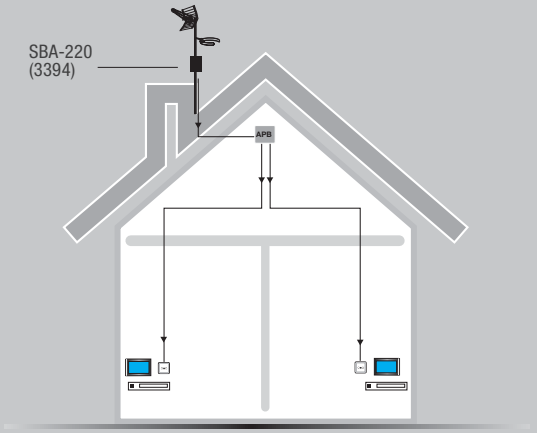
Example of MTI headend + one HMS control unit module with remote access via GSM/GPRS.

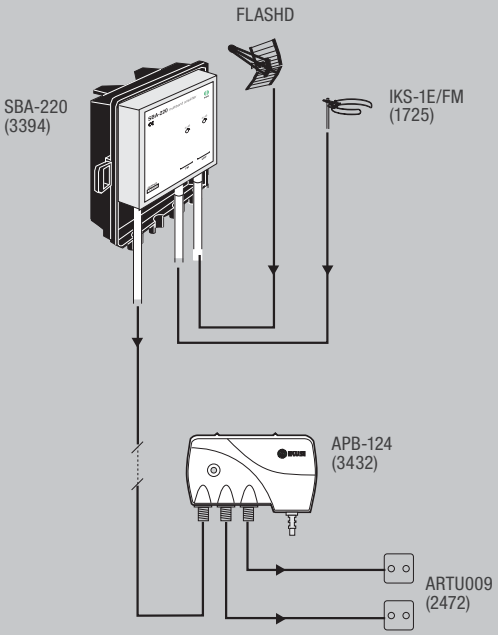
TV Terrestrial installation for 2 outlets

SBA-220

- SBA-220 mast amplifier 2 inputs UHF and FM.
- APB-124 power supply 2 outputs.

- Family housing
- 2 TV outlets



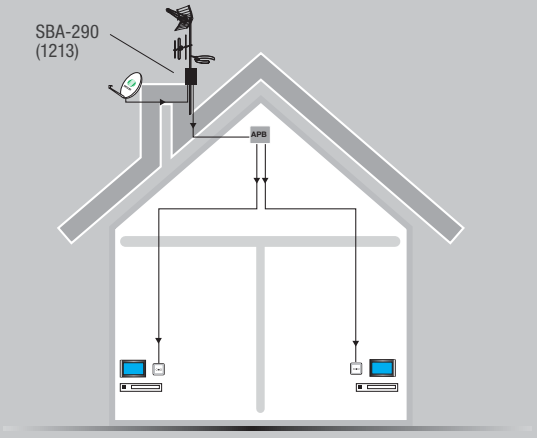


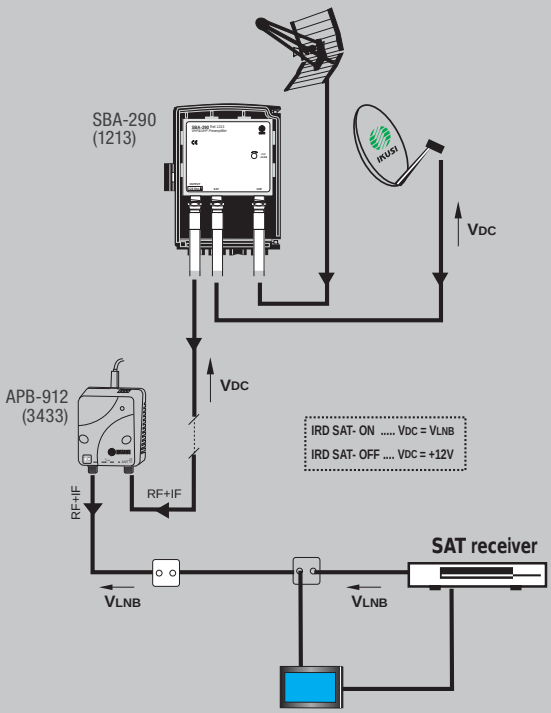
TV terrestrial+satellite installation for 2 outlets

SBA-290

- SBA-290 mast amplifier 2 inputs UHF and SAT.
- APB-912 power supply one output.

- Family housing
- 2 TV outlets





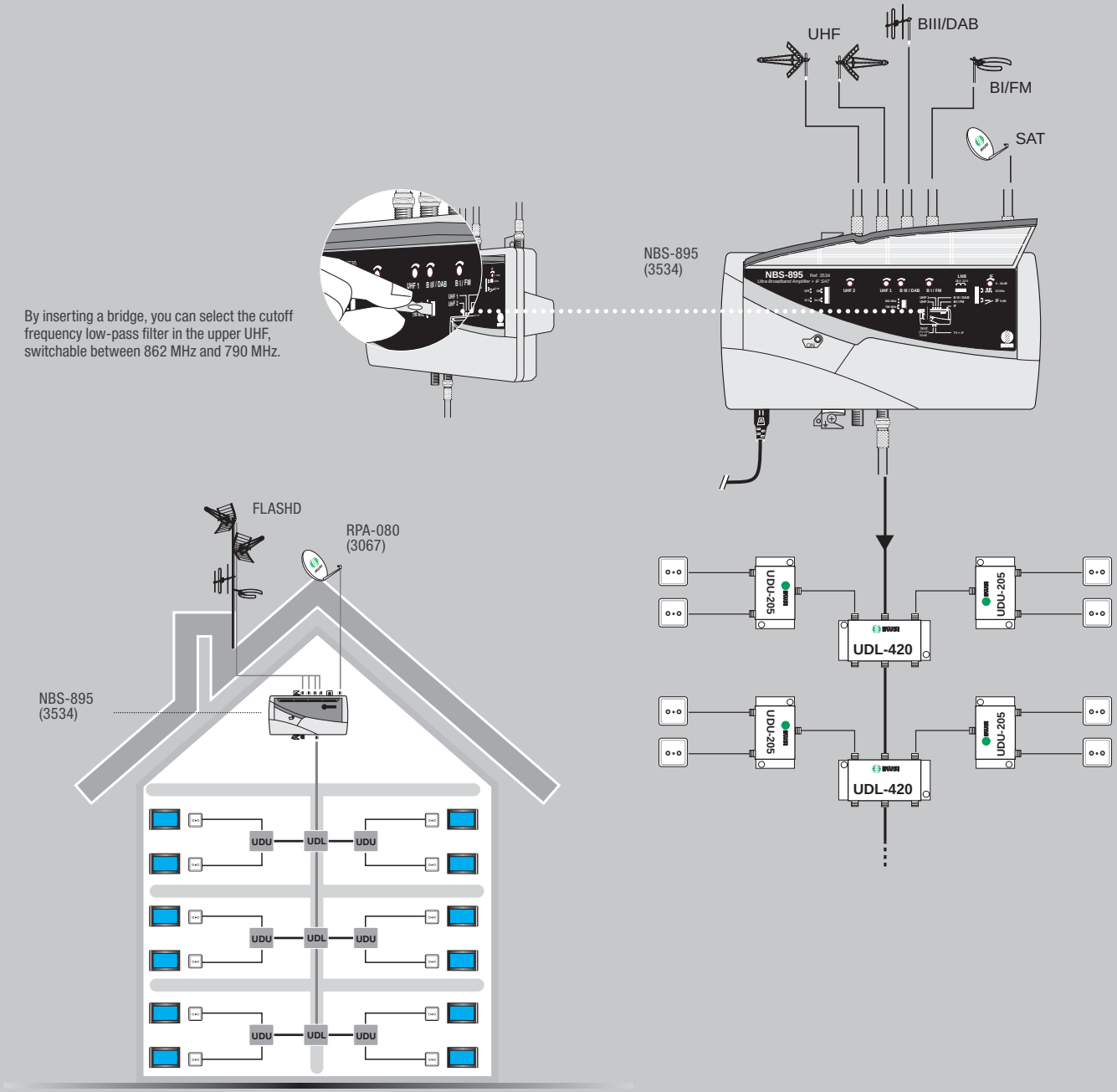
TV Terrestrial+Satellite installation for 6 users

NBS-895

- A NBS-895 terrestrial and satellite amplification headend.
- A distribution network composed:

  1 UDL tap for housing floor
  1 UDU splitter per user
  2 ARTU outlets per housing

- 3 floors
- 2 users per floor
- 2 outlets per user
- Total: 12 outlets

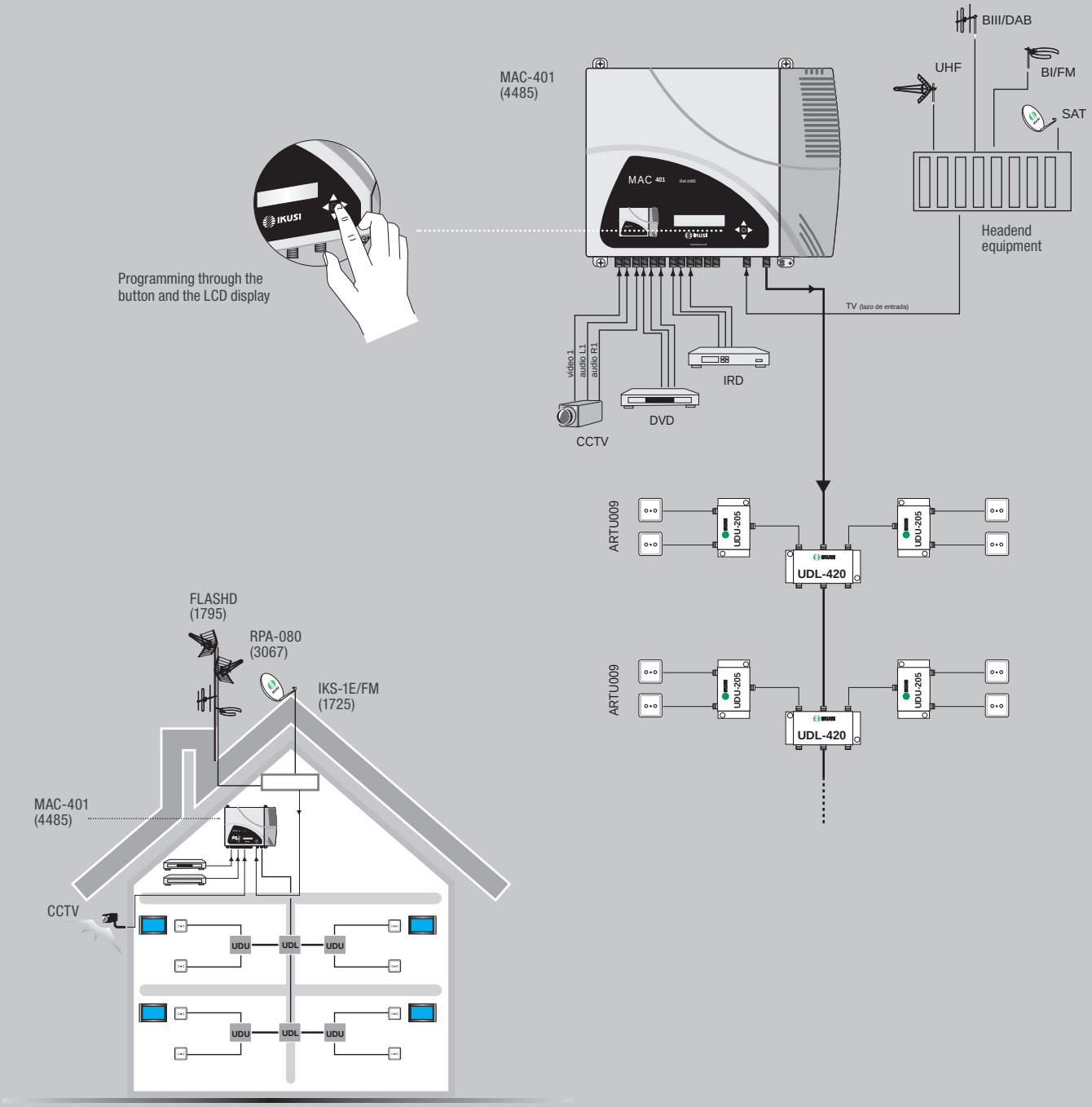


TV + SAT + CCTV + DVD modulator installation

MAC-401

- Ter and Sat reception headend.
- AV-COFDM stand alone modulator with 4 inputs AV + 1 TV and 1 output.
- Different video/audio signal distribution options (CCTV camera, DVD, IRD satellite receptor ...).
- A distribution network included:
  1 UDL tap-off on each floor
  2 UDU splitter on each floor
  2 ARTU outlets per user

- 2 floors
- 2 users per floor
- 2 outlets per user
- Total: 8 outlets

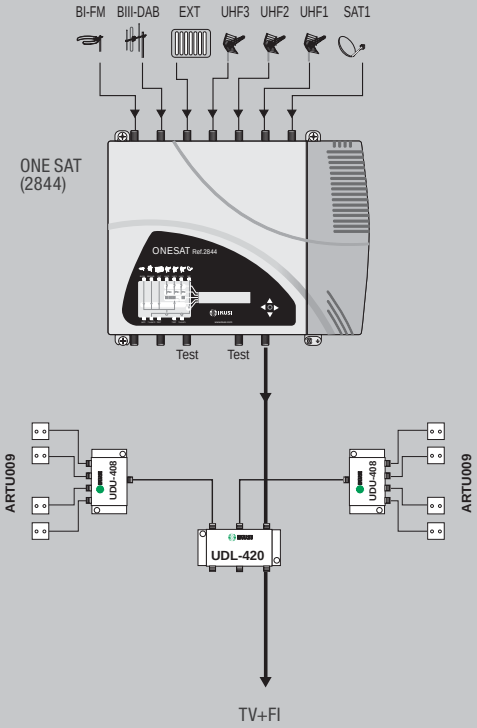


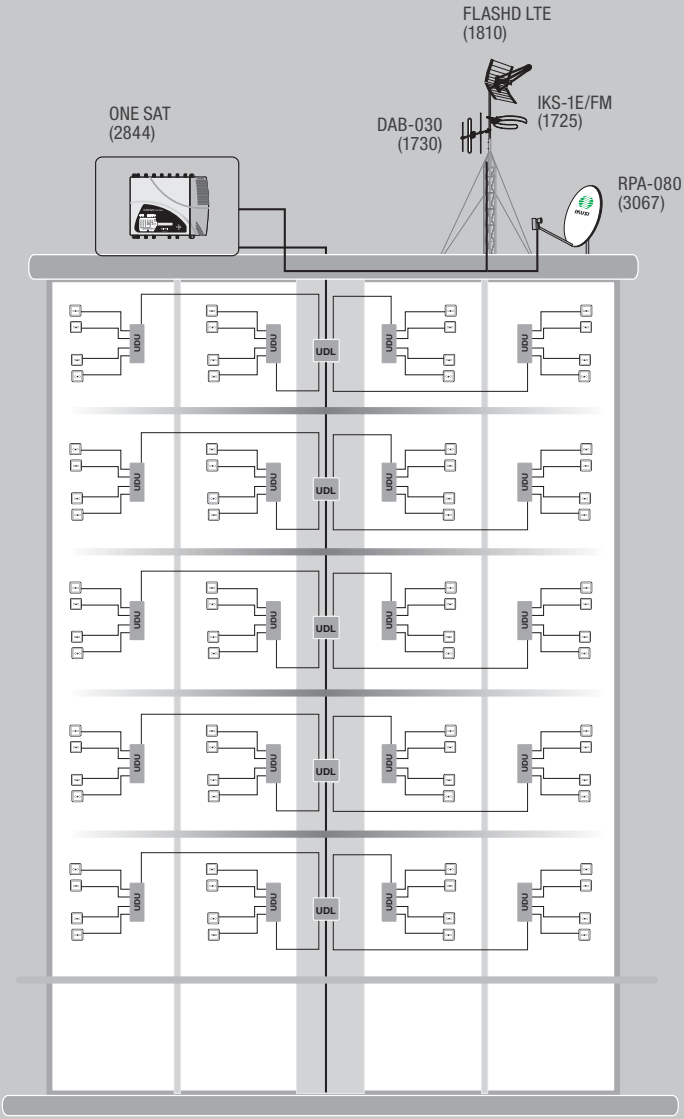
TV Terrestrial+Satellite installation - 20 apartments

ONE SAT

- A programmable multichannel amplifier ONE SAT with configurable UHF filters.
- A distribution network comprises:
  1 UDL tap-off on each floor
  2 UDU splitter on each floor
  4 ARTU outlets per each apartment

- 5 floors
- 4 users per floor
- 4 outlets per user
- Total: 80 outlets





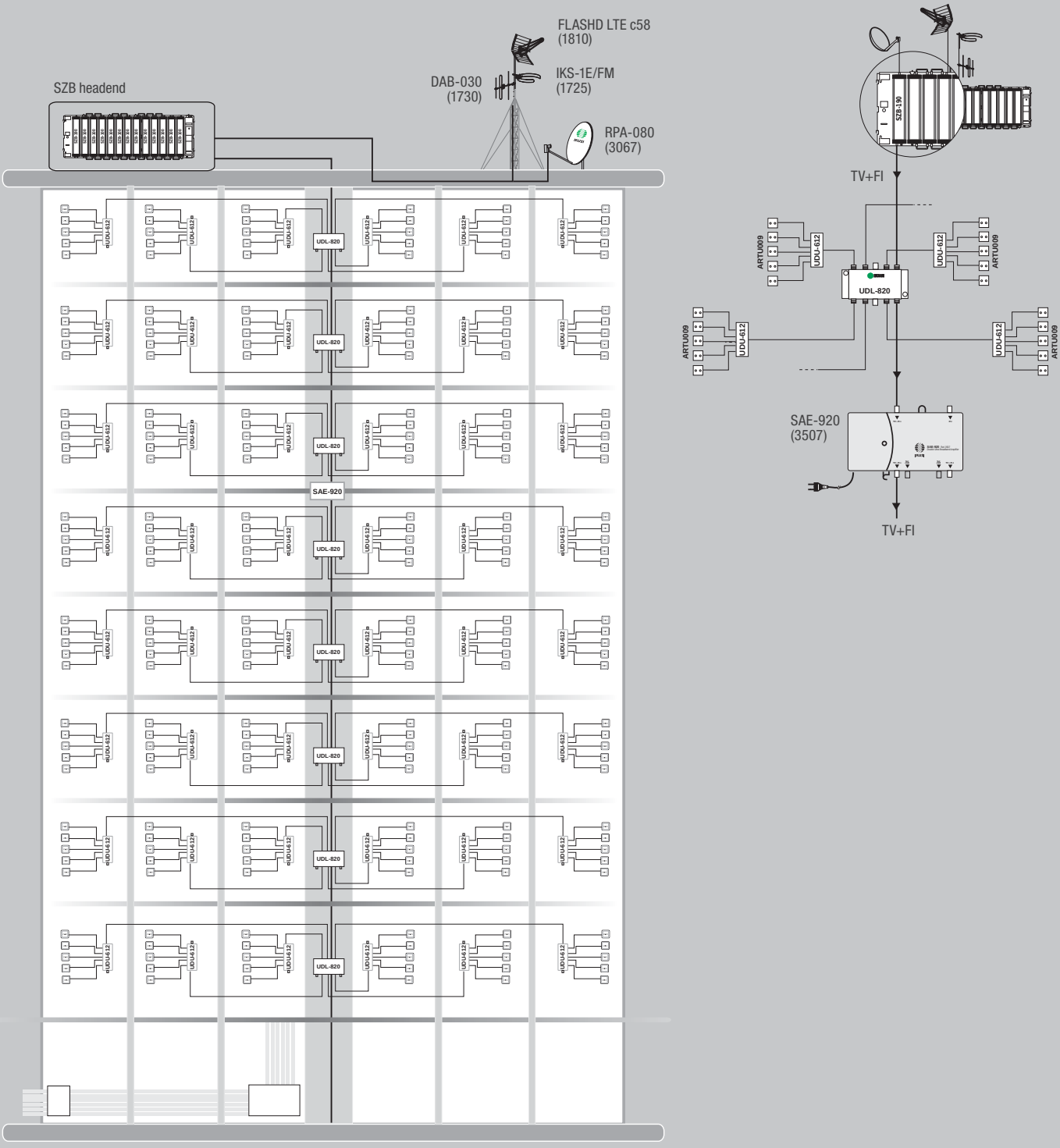
TV Terrestrial+Satellite installation - 48 apartments

SZB

- Terrestrial and Satellite amplification and modulation multichannel headend
- A distribution network comprises:

  2 UDL tap-offs per floor
  1 UDU splitter per user
  4 ARTU outles per apartment
  1 extension amplifier SAE

- 8 floors
- 6 users per floor
- 4 outlets per user
- Total: 192 outlets



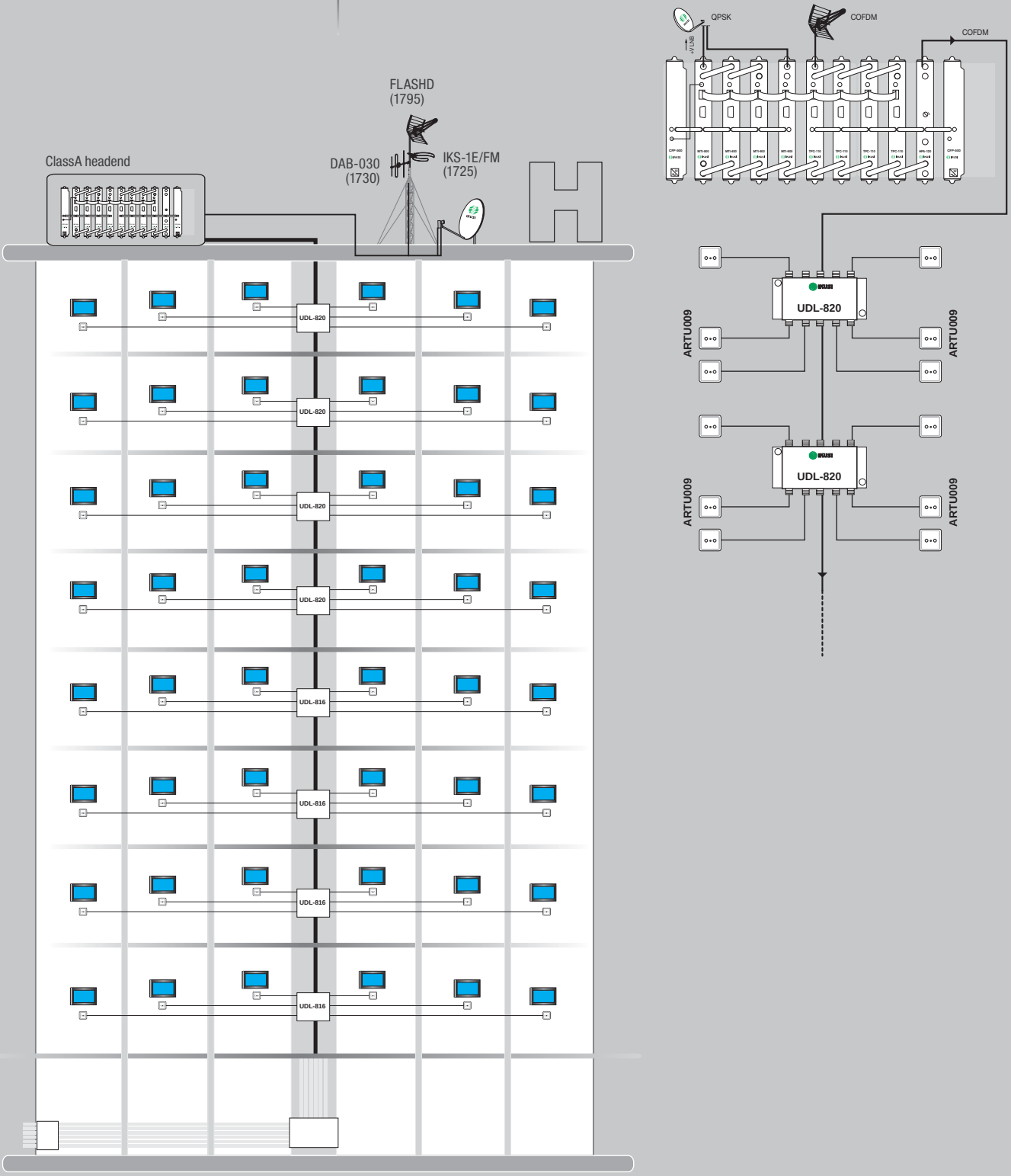
TV Terrestrial and Satellite installation - Hotels

ClassA

- A headend with MTI transmodulators + TPC processors headend
- A distribution network comprises:

  1 UDL tap-off per floor
  1 ARTU outlet per room

- 8 floors
- 6 rooms per floor
- 1 outlet per room
- Total: 48 outlets



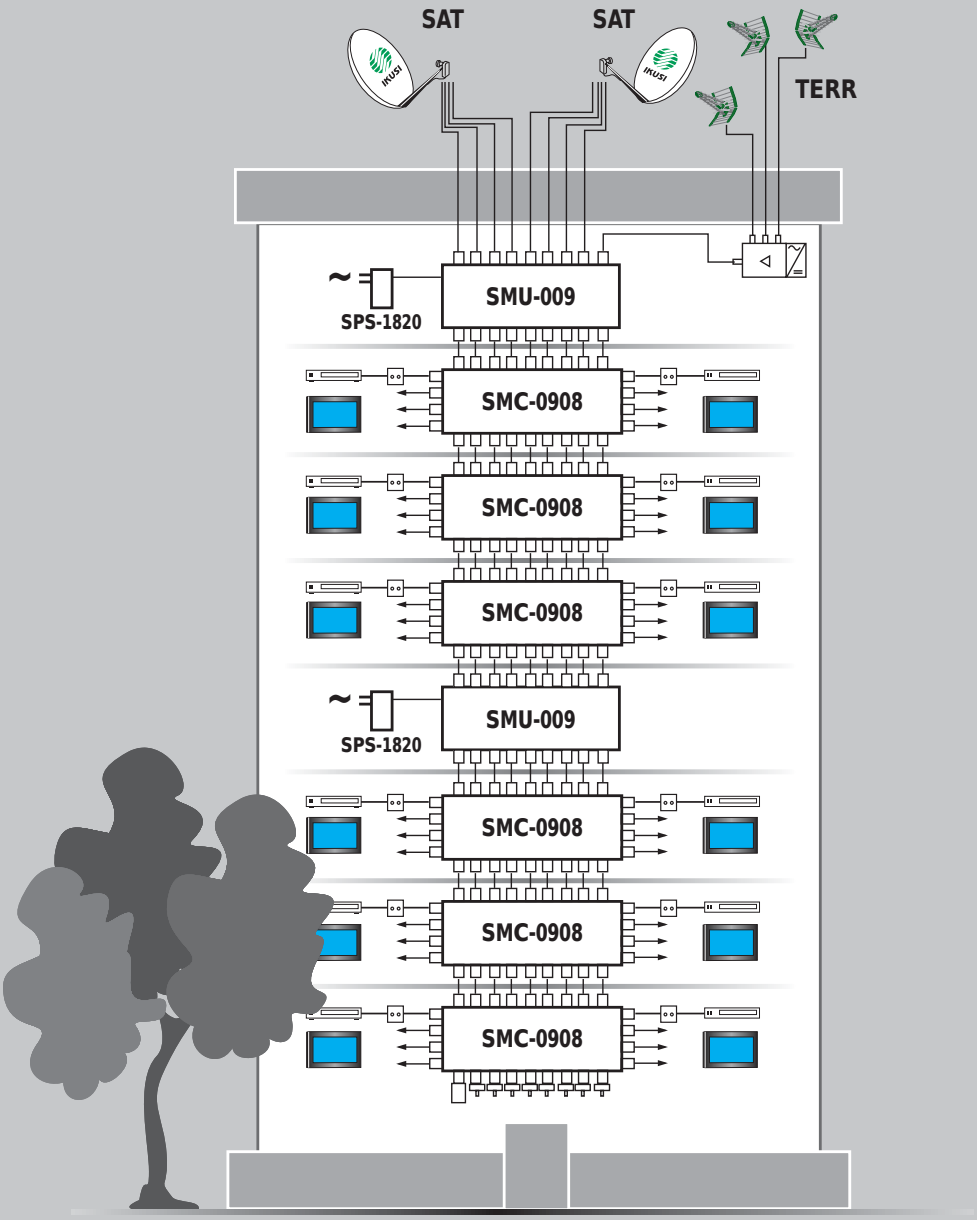
TV Terrestrial+Satellite installation - Cascadables Multiswitches

SMC

- 8 Sat-IF polarities plus Terrestrial through SMC cascadable multiswitches
- A distribution network comprises:

  7 SMC-0908 multiswitches
  2 SMU-009 amplifier
  2 SPS-1820 power supply
  4 outlets per user

- 7 floors
- 2 users per floor
- 4 otulets per user
- Total: 56 outlets

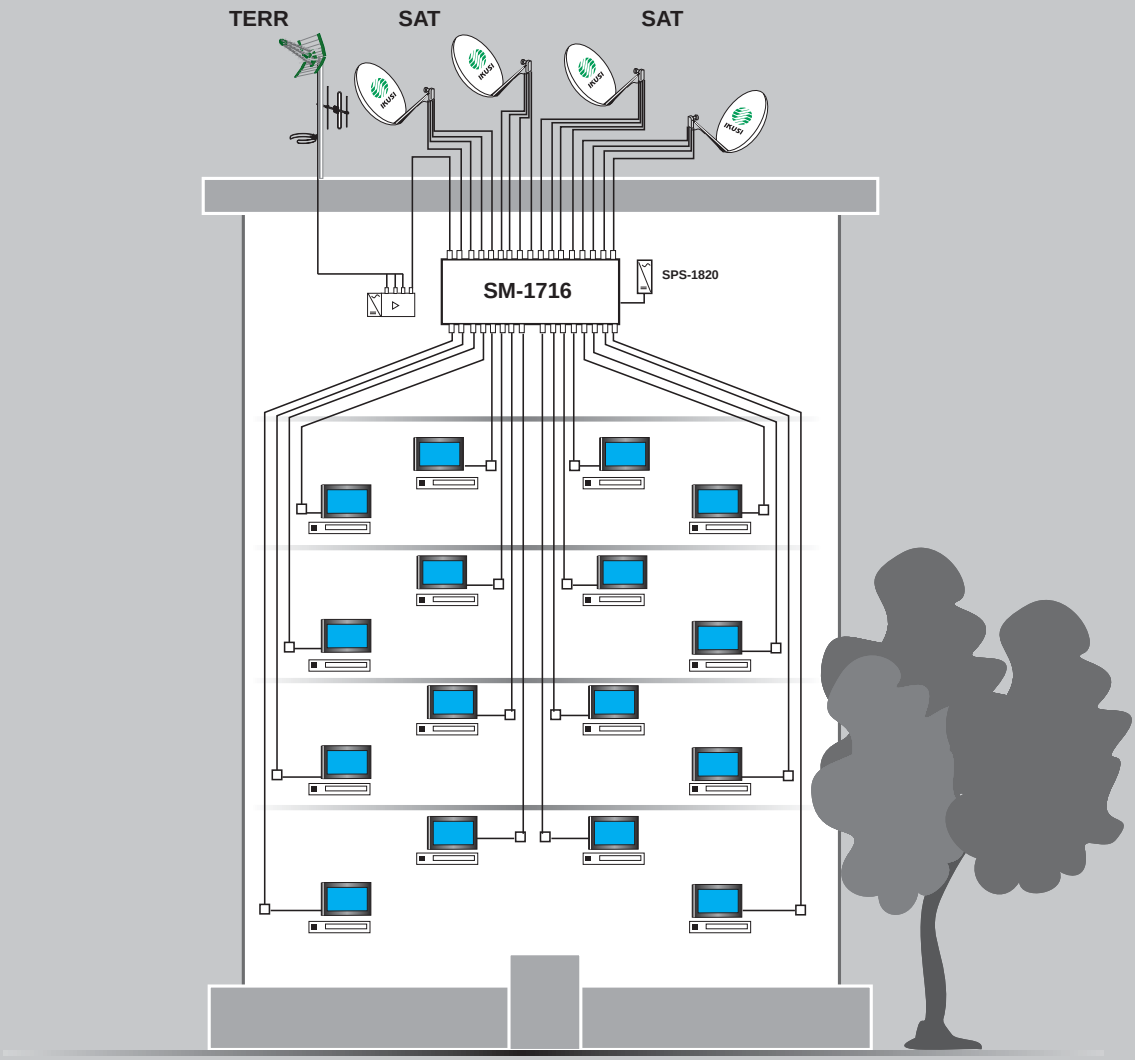


TV Terrestrial+Satellite installation - Stand alone Multiswitches

SM

- 16 Sat-IF polarities plus Terrestrial through SM-1716 stand alone multiswitches

- 4 floors
- 4 users per floor
- 1 outlet per user
- Total: 16 outlets



Reference list

Reference list

Model list

Model list

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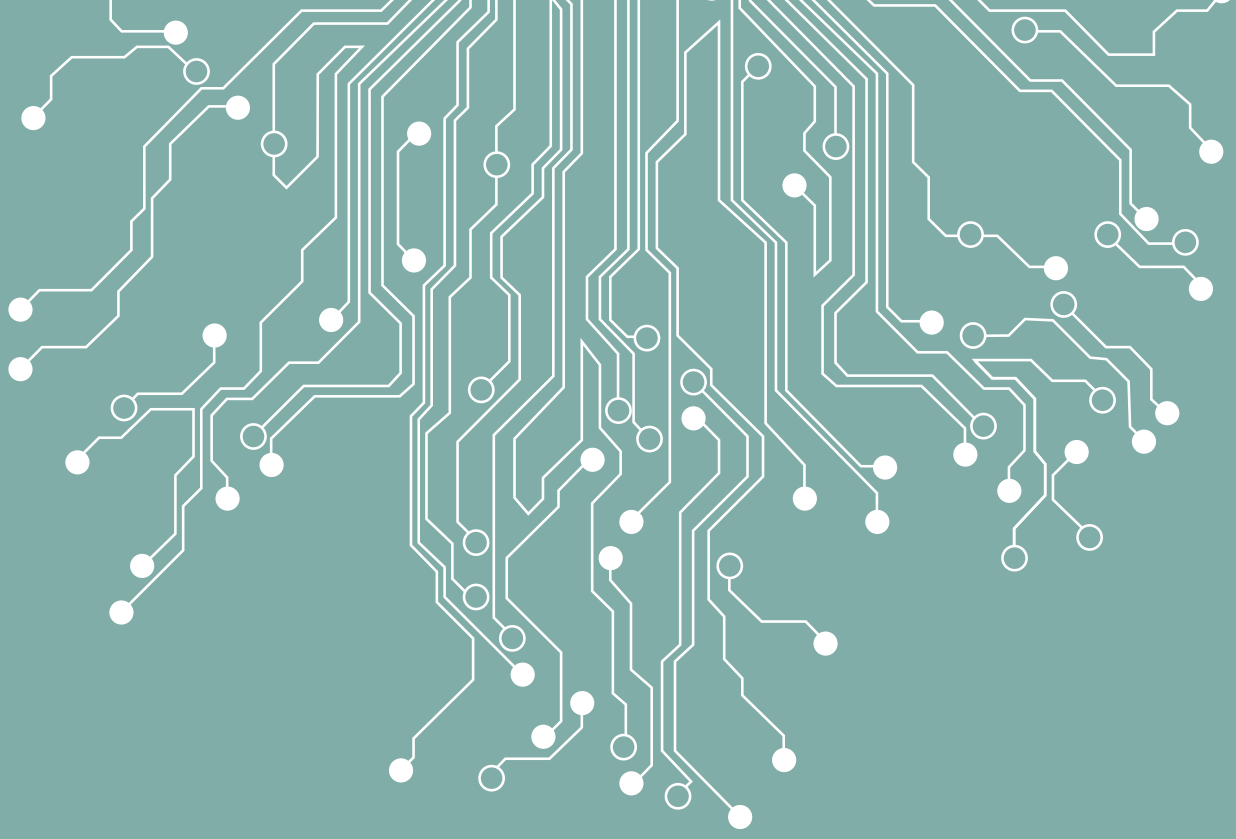

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