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HEADEND KAB 3000

General system description

One of the main advantages of a community antenna system with a head-end is the ability to connect any standard television receivers directly to the distribution network without the need for additional set-top boxes and that the network itself, often in form of a low-cost tree-structure, need not be changed.

Easy system scalability, no additional insertion costs and simple utilization for subscribers are further arguments which speak for a closed community antenna system.

The KAB 3000 is predestined for small to middle-sized systems (e.g. hotels, residential accommodation, apartments or housing estates) due to its extremely high packing density and, in regard to the cost-benefit aspect, its optimized technical setup.

It is also ideal for the insertion (feed-in) of additional foreign-language programs into an existing CATV system.

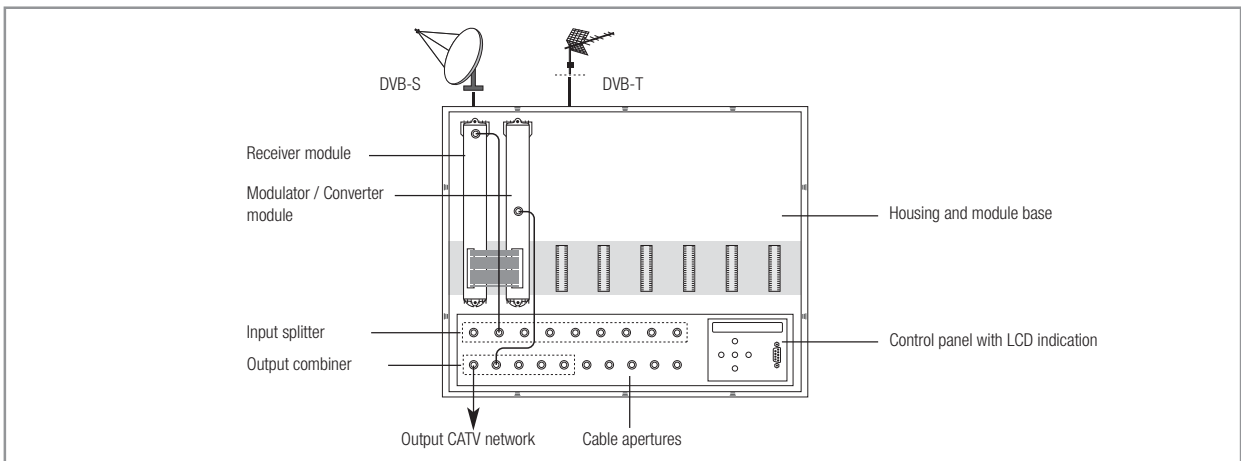
The KAB 3000 is a modular channel processing unit which decodes digital TV programs from DVB-S or DVB-T transponders.

The decoded digital TV programs are modulated to a suitable format for cable distribution. The high output level of >100 dB μ V allows a direct insertion into a distribution network without the need for post-amplifiers. More programs can be processed by interconnecting several KAB 3000 in a star-layout.

The system comprises of a base unit KAB 3000 as module base with a power supply, a return wiring board and a control panel, as well as a multitude of signal processing modules and expansion components which can be equipped.

Its high configurability enables the system to be easily adapted to the functional circumstances and requirements on site. The in- and output configuration of the modules results is done via a permanently installed control panel and can thus be adjusted on site at any time.

The settings are saved in non-volatile memories and thus persist even after a power failure. Software updates of the control panel and modules can be carried out via the built-in RS 232 interface.



Product overview KAB 3000

Type	Description	Input	Output	Tuner	CI	Twin	Quad	Page
KAB 3000	Base unit							81
KQR 342	Receiver module	QPSK	AV	2	1		■	82
KCR 341	Receiver module	COFDM	AV	1			■	82
KCR 342	Receiver module	COFDM	AV	2			■	82
KMM 341	Modulator module	AV	PAL/mono				■	83
KMS 342	Modulator module	AV	PAL/stereo				■	83
KCC 321	Converter module	COFDM	COFDM/VHF	2				83
KCC 322	Converter module	COFDM	COFDM/UHF	2		■		83
KQQ 323	Transmodulator module	QPSK	QAM	2	1	■		84
KQQ 324	Transmodulator module	QPSK	QAM/HDTV	2	1	■		84
KUB 325	FM-Amplifier module	FM	FM	1		■		84
KAD 340	AV-Adapter	AV	AV				■	85
KSI 319	Input splitter	1	9					85
KSI 320	Input splitter	1 + 1	6 + 4					85
KSO 381	Output combiner	8	1					85

QPSK = DVB-S; COFDM = DVB-T; QAM = DVB-C

HEADEND KAB 3000

Base unit

High packing density, low costs

Up to 16 PAL programs or QAM transponders can be processed per base unit. Alternatively, the program contents of up to 32 external sources can be modulated to standard PAL B/G channels (standard I on request) via the AV interfaces.

Stable, flexible and secure

The base unit acts as a module mounting base and offers protection through its housing.

- 8 long module slots, 8 short module slots
- Return wiring board for power supply of modules
- Power supply for modules and LNB
- Output combiner, 4 inputs, 1 output
- Control panel with LCD display, cursor keys and RS 232 interface
- Mountable angle brackets for wall, shelf or 19" rack assembly
- Housing with many prefabricated mounting apertures for:
 - > Input splitters, output combiners
 - > Fans
 - > F-connectors for RF cabling
- Screwable housing lid ensures EMC safety and protects from unauthorized access

Compact, accessible design

- Closed, powder-coated steel plate housing
- Low cost, sophisticated screening concept
- Simple, flexible RF cabling, per hand

Easy to control and reliable

- Settings can be made at any time via menu driven, permanently installed control panel
- Additional cooling possible by implanting of fans
- Energy efficient, reliable switch-mode power supply



Headend with 4x4 QPSK-PAL modules and 4x4 modulator modules for processing of up to 16 programs

Type	KAB 3000
Article no.	5700 1400
Processing options	<ul style="list-style-type: none"> • QPSK -> PAL/BG: up to 16 PAL channels • COFDM -> COFDM: up to 16 DVB-T multiplexes • QPSK -> QAM: up to 16 DVB-S transport streams • AV -> PAL/BG: up to 32 PAL channels
Input / output impedance	75 Ω
Programming	via integrated control unit
Software update	via RS 232 interface
Frequency range input (SAT)	950-2150 MHz
LNC voltage / max. current	12 V / 350 mA
Output channel range	C 02 - C 69 (incl. S 03 - S 41)
Selection of channels	suitable for adjacent channels
Output level	102 dBμV
Operating voltage	180 - 265 V AC
Power consumption (fully loaded)	max. 210 W
Weight (fully loaded)	approx. 15 Kg
Dimensions (W x H x D)	44,3 (19") x 35,5 (8 RU) x 22,8 cm

HEADEND KAB 3000



Quad QPSK-AV Receiver for DVB-S

- The IRD module is equipped with two tuners and selects one or two QPSK transponders from one or two SAT-IF lines. With this IRD module 4 programs can be processed to FBAS and R/L audio signals. Tuner „A“ receives 1...4 encrypted or unencrypted programs, tuner „B“ receives 0...3 unencrypted programs exclusively. Program selection and assignment to max. 4 output channels is done via the control panel, decoding of encrypted programs is possible via the common interface (CI) at the module.
- Status signalisation via coloured LEDs

Type	KQR 342
Article no.	5700 1402
Input tuners	2
AV outputs	4
Input frequency range	950 - 2150 MHz
Symbol rate	1 - 45 Msymb/s
Common Interface	for up to 4 channels via Tuner 1
Video S/N	58 dB
LNB supply	12 V / 350 mA



Quad COFDM-AV Receiver for DVB-T

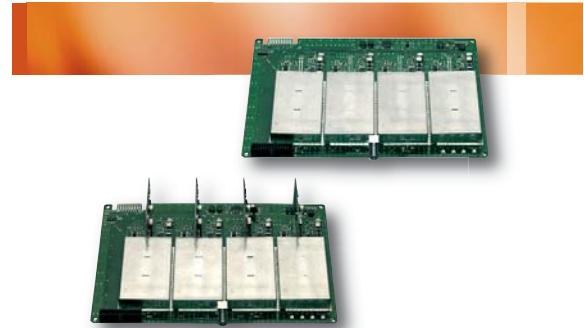
- The IRD modules selects a COFDM transponder and decodes from it 4 programs as FABS and R/L audio signals. Program selection is possible via the control panel.
- Status signalisation via coloured LEDs
- **KCR 341:** with tuner, decodes 4 programs from one transponder
- **KCR 342:** with two tuners, receives two independent transponders. The following selections are possible: 3 programs from tuner 1 + 1 program from tuner 2 or programs from tuner 1 + 2 programs from tuner 2

Type	KCR 341	KCR 342
Article no.	5700 1403	5700 1404
Input tuners	1	2
AV outputs	4	4
Input frequency range	177,5 - 226,5 MHz (VHF) 474 - 858 MHz (UHF)	177,5 - 226,5 MHz (VHF) 474 - 858 MHz (UHF)
Carriers	2 k and 8 k	2 k and 8 k
Symbol rate	2 - 40 Msymb/s	2 - 40 Msymb/s
Converted TV channels	4	4

HEADEND KAB 3000

Quad AV Modulator

- The KAB 3000 modulator modules are designed in single side-band technology and are thus suitable for neighbour-channel operation
- Each module is equipped with 4 independent modulators that can be tuned to any channel within the channel range C 02 - 69 (incl. S 03 - S 41)
- A forced neighbour channel allocation is not required, allowing maximum flexibility regarding network planning
- Up to 4 AV signals can be inserted via the input
- Status signalisation via coloured LEDs
- The AV adapter KAD 340 enables the insertion of external AV sources



Type	KMM 341	KMS 342
Article No.	5700 1405	5700 1406
Input signals	4 x AV	4 x AV
Channel grid	suitable for neighbour channels	suitable for neighbour channels
Sound output	Mono	Stereo (R/L), dual tone, mono
Standard	B/G, PAL (standard I on request)	B/G, PAL
Output channels	C 02 - C 69 incl. S 03 - S 14 and S 16 - S 41	C 02 - C 69 incl. S 03 - S 14 and S 16 - S 41
Video-signal to noise ratio (typ.)	55 dB	55 dB

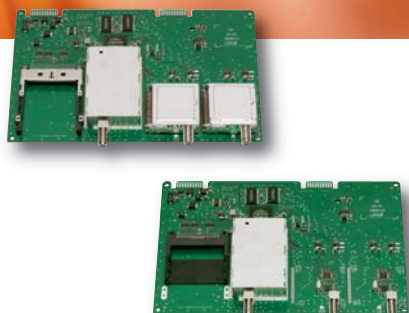
Twin COFDM-COFDM Converter

- Terrestrial modules for conversion of two terrestrial digital signals into two freely selectable channels in the VHF/UHF band



Type	KCC 321	KCC 322
Article no.	5700 1407	5700 1408
Input tuners	2	2
Loop-through outputs	2	2
Converted channels	2	2
Input frequency range	47 - 862 MHz	47 - 862 MHz
Output channels	VHF: S 03 - S 24 incl. C 05 - C 12	UHF: C 21 - C 69
Output channel bandwidth	7/8 MHz, selectable	7/8 MHz, selectable
RF output level	90 dB μ V	90 dB μ V

HEADEND KAB 3000



Twin QPSK-QAM Transmodulator

- Transmodulation of two different QPSK-modulated data streams (SCPC or MCPC) into two QAM-modulated data streams
- Integrated TPS module (Transport-Stream-Processing). The TPS module processes the data of the demodulated transport stream. This allows service information to be changed (NIT Network Information Table), data rates to be increased (stuffing) and individual channels to be deleted from the transport streams. Hereby, the remaining channels can be transmitted with bandwidth optimization. Additionally, the operator ID can be set.
- With common interface (CI) plug-in slot for transponder from Tuner "A"
- **KQK 324:** High-End transmodulator for HDTV, DVB-S2 standard

Type	KQK 323	KQK 324
Article no.	5700 1411	5700 1412
Input tuners	2	2
Converted transponders	2	2
Common Interface	1 (for converter A)	1 (for converter A)
Input frequency range	950 - 2150 MHz	950 - 2150 MHz
Symbol rate input QPSK	1 - 45 Msymb/s	2 - 45 Msymb/s
Symbol rate input DVB-S2	–	QPSK: 10 ... 30 Msymb/s 8PSK: 10 ... 31 Msymb/s
Symbol rate output	1 - 7 Msymb/s	1 - 7 Msymb/s
Modulation scheme	QAM 4, 16, 32, 64, 128, 256	QAM 4, 16, 32, 64, 128, 256
Frequency range output	45 - 862 MHz	45 - 862 MHz



FM Amplifier

- For selection and amplification of the FM-radio range
- To eliminate interference, up to 6 different input frequencies can be attenuated with tuneable traps

Type	KUB 325
Article no.	5700 1417
Frequency range	87,5 - 108 MHz
Input level	45 ... 65 dB μ V
FM selection	> 60 dB
Gain	17 ... 37 dB
Noise figure	6 ... 9 dB
Traps	6 (tuning range 87,5 - 108 MHz)
Attenuation	10 dB
Output level	max. 100 dB μ V

HEADEND KAB 3000

Quad AV-Adapter

- The quadruple AV-adapter is necessary for feeding in of external AV-signals via cinch connectors with the quadruple modulators KMM 341 and KMS 342



Type	KAD 340
Article no.	5700 1416

Input Splitter with integrated LNB supply

- The SAT-IF signal is divided via the input splitter and passed along to the inputs of the signal processing modules
- High isolation
- 8 RF cables included in the scope of delivery



Type	KSI 319	KSI 320
Article no.	5700 1413	5700 1414
Frequency range	950 - 2400 MHz	950 - 2400 MHz
Inputs / outputs	1 / 9	1/6 + 1/4
Attenuation	-	5 dB
Through loss	typ. 16 dB	9-14 dB + 9-12 dB
LNB supply	12 V / < 800 mA	12 V / < 800 mA

Output Combiner 8 to 1

- This active output collector gathers the output signals of the modulator modules and provides them via the output socket for the cable network
- For housing assembly with 5...8 QAM modules "KQQ" or COFDM converter "KCC"



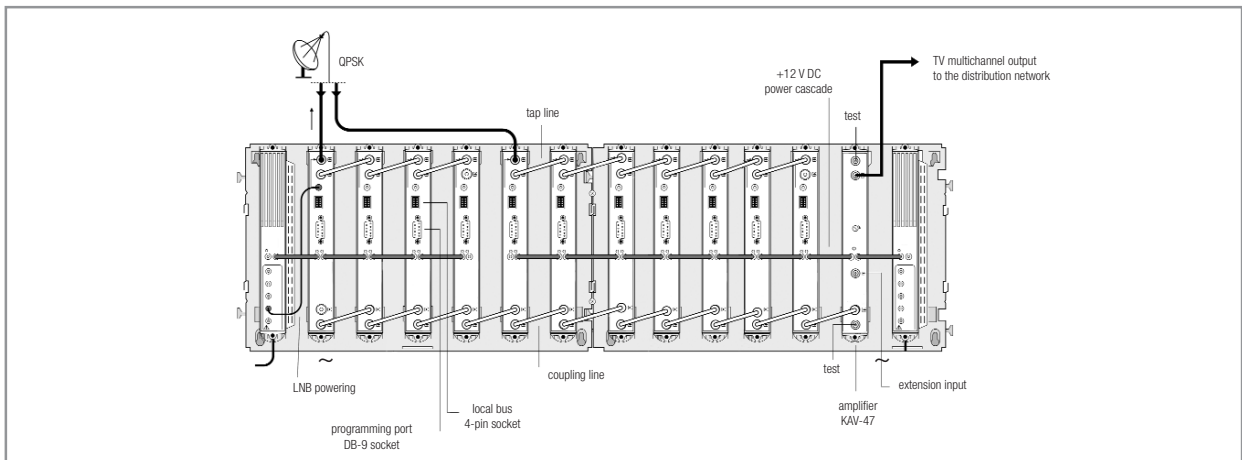
Type	KSO 381
Article no.	5700 1415
Frequency range	47 - 862 MHz
Gain	18 dB
Electronic attenuator	0 ... -31 dB
Output level	max. 101 dBμV
Inputs	8
Outputs	1
Test point	1 / -20 dB

HEADEND KAB 5000

General system description

KAB 5000 is a complete range of programmable, signal processing modules for terrestrial, satellite and cable TV headends. All modules have an identical format and are simple to place on a wall-fixing base plate or in a 6U rack frame. RF and DC connections are carried out on the front panel using plug bridges supplied. KAB 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. The KAB modules are programmed and adjusted either with the PRG-5000 programming unit or with a PC with PRG-300 software installed. Programming process offers information about input BER and general operating status of the connected module. The parameter values are controlled in each module by a built-in, powerful microprocessor and remain unalterable unless they are modified with the PRG or PC. When using a PC, programming and setting can also be done remotely via modem. Firmwares of the modules and programming unit can be updated.



Module overview KAB 5000

Type	Description	Input	Output	Tuner	CI	Mono	Stereo	Page
QPS	Receiver module	QPSK	PAL	1			■	89
QPSC	Receiver module	QPSK	PAL	1	■		■	89
QQ	Transmodulator module	QPSK	QAM	1			■	90
QPI	Transmodulator module	QPSK	IP (LAN)	1				91
QPIC	Transmodulator module	QPSK	IP (LAN)	1	■			91
TT	Converter module	TER / COFDM	TER / COFDM	1				92
QPDT	Converter module	QPSK	COFDM	1			■	93
DTP	Converter module	COFDM	PAL/UHF	1			■	94
DTQ	Transmodulator module	COFDM	QAM	1				95
MM	Modulator module	AV	PAL	1		■		96
MS	Modulator module	AV	PAL	1			■	96
HMS 120	Headend-Monitor-Server							97
KAV 47	Power amplifier	47-862	47-862					98
NT-5000	Power supply	100-240 V	12/13/18/24 V					98

QPSK = DVB-S (SAT); COFDM = DVB-T (Terrestrial); QAM = DVB-C (Cable TV); IP = Internet protocol

HEADEND KAB 5000

Description of modules and programming

A 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 station from the multiplex received, and
- directs it to a conventional TV channel which is selectable throughout the 45-862 MHz band

Programming of each module involves the following selections and settings

- Central Input Frequency (1 MHz increments)
- Input Data Rate (0.001 MSym/s increments)
- TV Station and Audio Service
(or a Radio Station. 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.

Models featuring VSB output are utilizable for adjacent channel operation. If this operation is not required, existing model featuring DSB output may be used without problems.

The first ones present, on the other hand, a very low broadband noise floor (< -75 dBc) that permit to use multiple modules in the headend with very little deterioration of the CNR.

The 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 in turn connected in the same way to the drive amplifier - the KAV-47 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.

Programming connection using the PRG-5000 is individual - module by module. When using a PC, programming may be local or remote

Mounting description



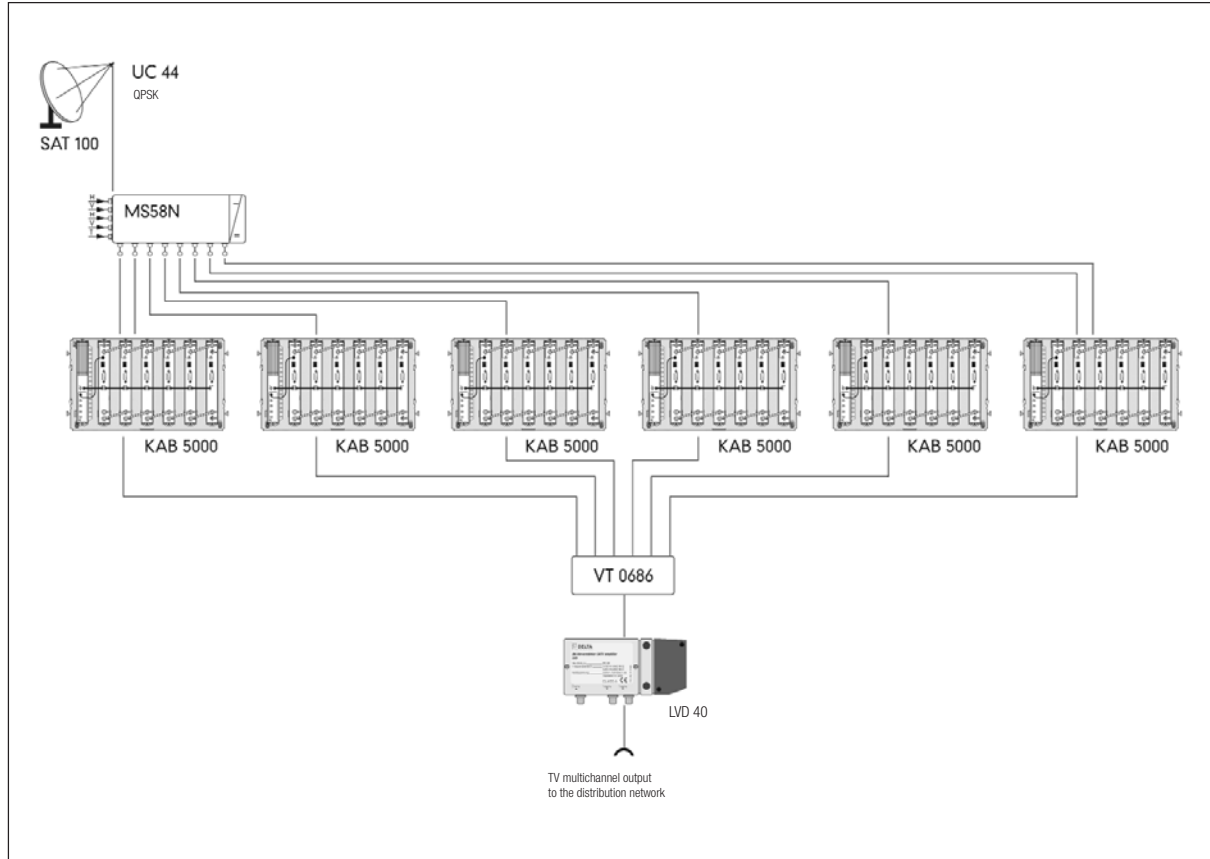
- Mounting on a wall-fixing base plate (RW 6)
- If required the housing (GHA) may be used



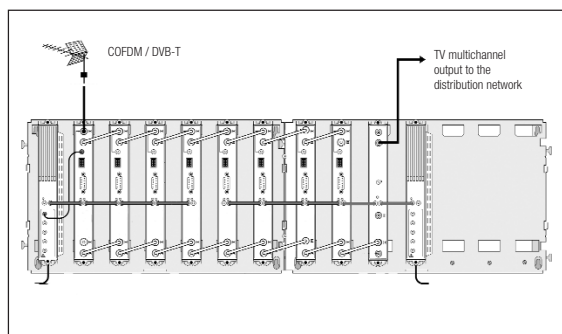
- Mounting in a 19" rack frame

HEADEND KAB 5000

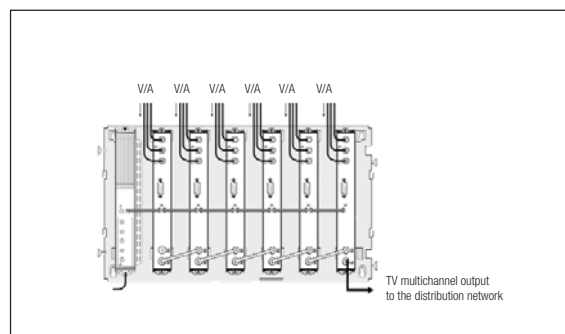
Examples



Example of headend for 36 digital SAT programmes. Contains 36 receivers, 6 power supplies, all fitted on 6 horizontally joined base plates. Amplification of the multichannel output with an external CATV amplifier LVD 40.



Example of «DTP» headend for eight clear digital terrestrial TV stations. Contains 8 receivers, 1 amplifier and 2 power supplies, all fitted on 2 horizontally joined base plates.



Example of headend with 6 modulators and 1 power supply, all fitted on 1 base plate.

HEADEND KAB 5000

QPSK-PAL Receiver for DVB-S

- Digital satellite receivers for free-to-air reception standard DVB-S / MPEG2
- QPSC: for Common-Interface (CI)
- Vestigial side band modulators
- Frequency agility, any selectable TV channel within the 45-862 MHz band
- IF modulation and SAW filtering for maximum harmonic reduction and true VSB response
- PLL frequency synthesized
- Programmed by central headend controller PRG-5000 or PC, interface RS 232 / DB-9



Type		QPS	QPSC
Article No.		5700 1206	5700 1208
Output channel TV system		B/G *	B/G *
Audio operation mode		Stereo/Dual	Stereo/Dual
Common-Interface		–	■
Frequency range output		MHz 45 - 862 (PAL, SECAM, NTSC)	
Input QPSK	Input frequency	MHz 950 - 2150	
	Input level	dBm -65 ... -25	
	Input loop-through loss	dB 1 ... 5 (950-2150 MHz)	
	AFC pull-in range	MHz ± 5	
	Input data rate	MSym/s 2 ... 45	
Decoding	Standard	MPEG-2	
	Video processing	Main Profile @ Main Level	
	Audio processing	Layer II	
	Teletext-subtitles insertion	yes	
Image format conversation	16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box		
Video/Audio	Video & Audio remodulation	RSB	
	Video modulation depth	% 80 ... 90	
	Audio peak deviation	kHz 10 ... 50	
Modulation	Audio modulation depth	% 10 ... 80	
	Output level, adjustable	dBμV 65 ... 80	
	Output loop-through loss	dB 1,1	
	Carrier level ratio, adjustable	dB 10 ... 20	
	Weighted SNR	dB > 60	
	Spurious in band	dBc < -58	
Broadband noise (ΔB = 5 MHz)	dBc < -75		
General	Operating voltage	V= + 12	+ 12
	Consumption	mA 770	720
	Operating temperature	°C 0 ... +45	
	Connectors input / output	2 x F-connector, female	
	DC connector type	banana socket	
	Dimensions	mm 230 x 195 x 32	
	Weigth	kg 1,03	

* Receivers for other TV systems available

HEADEND KAB 5000



QPSK-QAM Transmodulator

- Digital satellite transmodulator QPSK to QAM, standard DVB-S / MPEG2
- Transparent digital transmodulation process
The 33/26 MHz wide QPSK channels located in the Sat-IF band are transformed to 5,5 to 9 MHz wide QAM channels located in the 47-862 MHz band
- Programmed by central headend controller PRG-5000 or PC, interface RS 232 / DB-9
- NIT, TS monitoring

Type		QQ
Article No.		5700 1207
Input QPSK	Standard	EN 300 421
	Input frequency MHz	950 - 2150
	Input level dBm	-65 ... -25
	Input loop-through loss dB	1 ... 5 (950-2150 MHz)
	AFC pull-in range MHz	±5
	Input data rate MSym/s	6 ... 45
QAM	Standard	EN 300 429
	Modulation scheme output	16 QAM / 32 QAM / 64 QAM / 128 QAM / 256 QAM (selectable)
	Modulation Error Ratio, MER dB	38 (typ) / 36 (min)
	Output data rate MSym/s	3 ... 8
RF-Output	Roll-Off factor %	12 / 13 / 15
	Frequency range output MHz	47 - 862
	Output level, adjustable dBμV	65 ... 80
	Output loop-through loss dB	1,1
	Spurious in band dBc	< -55
General	Broadband noise (ΔB = 8 MHz) dBc	< -75
	Operating voltage V=	+ 12
General	Consumption mA	620
	Operating temperature °C	0 ... +45
	Connectors Input / Output	2 x F-connector, female
	DC connector type	banana socket
	Programming interface	RS 232 / DB-9
	PC-programming local bus connector	4-pin socket
	Dimensions mm	230 x 195 x 32
	Weigth kg	1,03

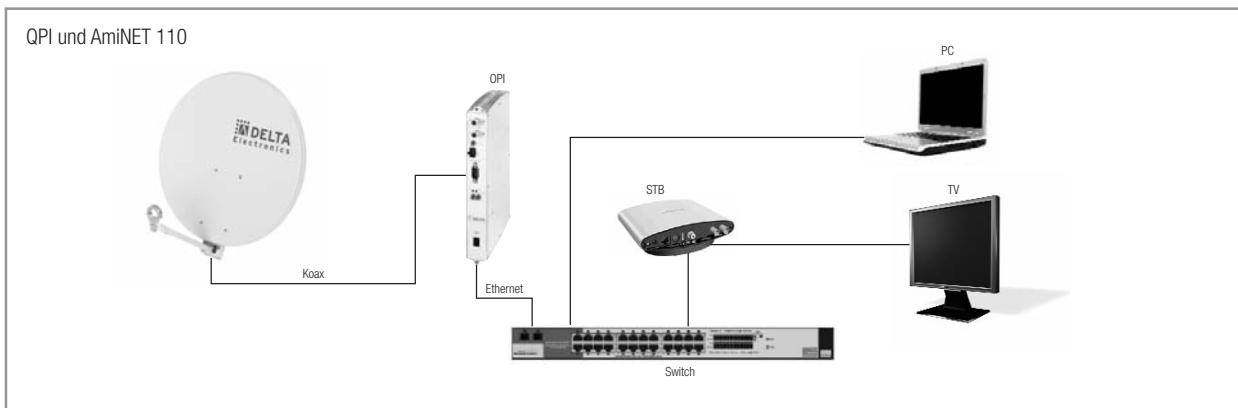
HEADEND KAB 5000

QPSK-IP Streamer

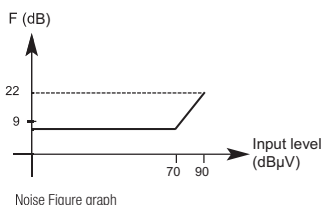
- Digital receiving module for transmutation of digital satellite programs according to IP (LAN) streaming
- DVB-S / MPEG2
- With slot for a CI module (QPIC)
- From a DVB-S transponder in up to 8 simultaneous transmitted IPTV programs in a multi-cast IP network
- Signal transmission with LAN, (no coax cable necessary), interesting for Hospitals, Hotel industry and businesses
- The IP program is present with an IPTV set-top box (e.g. AmiNet100) or with a media player (e.g. VLC)



Type		QPI	QPIC
Article No.		5700 1432	5700 1433
Common-Interface		–	■
Input QPSK	Frequency range input	MHz	950 - 2150
	Frequency selection step	MHz	1
	Input level	dBm	-65 ... -25
	Input loop-through loss	dB	0 (± 3)
	Symbol rate	MSym/s	2 ... 45
Output IP	Standard		IEEE 802.3 10/100 Base T
	Bit rate	Mbps	up to 100
	Transmission protocols		UPD / RTP
	No. of simultaneous streams		up to 8
Connectors	Multicast		yes
	RF input (loop-through)		2 x F-connector, female
	DC connection		banana socket
	Configuration		RS 232 / DB-9
General	Ethernet output		RJ-45
	Operating voltage	V=	+ 12
	Consumption	mA	260
	LED indication		ON - STATUS - LINK - ACT
	Operating temperature	°C	0 ... +45
	Dimensions	mm	230 x 195 x 32
	Weighth	kg	1,03



HEADEND KAB 5000



Terrestrial Converter

- For analogue or digital signals
- Agile processing modules, usable either as channel converters (output channel is different to input channel) or as channel processor (output channel is the same as input channel)
- Double heterodyne conversion in the 45-862 MHz frequency range
- IF SAW filtering
- Adjacent channel operation at input and output

Type	TT	
Article No.	5700 1244	
TV System	B/G, D/K, I, DVB-T, DVB-C	
Selectable input channel	MHz	45 - 862
Selectable output channel	MHz	45 - 862
Frequency selection steps	MHz	0,125
Input level		
Analogue	dBµV	50 - 90
Digital	dBµV	40 - 80
	AGC: 40 dB; manual adjustment for L-system channels	
Input loop-through gain	dB	1 (± 3)
Noise figure	dB	< 9 (input level: < 70 dBµV)
Input loop's noise figure	dB	6
Bandwidth of SAW filtering	3	
For 7 MHz channels	MHz	6,875
For 8 MHz channels	MHz	7,850
Selectivity for 7 MHz channels	dB	> 9 (fc ± 3,75 MHz) / > 70 (fc ± 4,75 MHz)
Selectivity for 8 MHz channels	dB	> 18 (fc ± 4,25 MHz) / > 70 (fc ± 5,25 MHz)
Image rejection	dB	> 70
Output level, adjustable	dBµV	65 ... 80 (analogue) / 55 ... 70 (digital)
Output loop-through loss	dB	1,1 (typ.) / 1,4 (max.)
Group delay	ns	< ± 40
Spurious in band	dBc	< - 58
Broadband noise (ΔB = 5 MHz)	dBc	< - 75
Operating voltage	V=	+ 12
Consumption	mA	780
Operating temperature	°C	0 ... +45
Connector types	F-connector female	
DC connector type	banana socket	
Programming interface	RS 232 / DB-9	
Dimensions	mm	230 x 195 x 32
Weight	kg	1,03

HEADEND KAB 5000

QPSK-COFDM Transmodulator

- Reception module for transmodulation of digital satellite programs to DVB-T
- Ideal for expansion of existing systems with established basic DVB-T provision
- TV sets with built-in DVB-T tuner do not require an additional receiver
- With slot for a CI module
- Transport stream processing enables the transmodulation of 4 freely selectable TV programs of a DVB-S transponder to DVB-T
- Adaption of NIT table possible



Type		QPDT
Article No.		5700 1463
Common-Interface		1
Transport-Stream (TS) Processing		yes
Input QPSK	Standard	EN 300421
	Input frequency MHz	950 - 2150
	Input level dBm	-65 ... -25
	Input loop-through loss dB	0 (± 3)
	AFC pull-in range MHz	± 5
	Symbol rate MSym/s	2 ... 45
Re-Modulation COFDM	Data processing	EN 300744
	Operation modes	2K / 8K (automatic detection)
	Constellation	QPSK, 16 QAM, 64 QAM
	Code rate	1/2, 2/3, 3/4, 5/6, 7/8
	Guard interval	1/4, 1/8, 1/16, 1/32
	Modulation error ratio (MER) dB	> 36
Output COFDM	Frequency range output MHz	47 - 862
	Bandwidth MHz	6, 7, 8
	Output level, adjustable dBμV	65 ... 80
	Frequency stability ppm	< ± 10
	Output loop-through loss dB	1,1
	Spurious in band dBc	< -50
	Broadband noise (ΔB = 8 MHz) dBc	< -75
General	Operating voltage V=	+ 12
	Consumption mA	350
	Operating temperature °C	0 ... +45
	Connector types	2 x F-connector, female
	DC connector type	banana socket
	Programming interface	RS 232 / DB-9
	PC programming bus connector	4-pin socket
	Dimensions mm	230 x 195 x 32
Weight kg	1,03	

HEADEND KAB 5000



DVB-T PAL Converter

- Digital terrestrial receiver DVB-T to PAL, standard DVB-T / MPEG2
- Digital-to-analogue transmodulation process
- The 7/8 MHz wide COFDM channels located in the 47-862 MHz band are transformed to conventional VHF/UHF channels
- Vestigial side band modulators
- Programmed by central headend controller PRG-5000 or PC, interface RS 232 / DB-9

Type		DTP		
Article No.		5700 1209		
Output channel TV system		B/G		
Audio operation mode		Stereo/Dual		
Output channel colour system		PAL, SECAM, NTSC		
Input (COFDM)	Standard	EN 300 744		
	Input frequency	MHz	174 - 230 / 470 - 862	
	Bandwidth	MHz	7 / 8	
	Mode	2K / 8K (automatic detection)		
	Constellation	QPSK / 16 QAM / 64 QAM (automatic detection)		
	Hierarchy	High Priority / Low Priority		
	Input level	dBµV	35 ... 100	
	Input loop-through gain	dB	0,5 (±1)	
	Guard interval	1/4 , 1/8 , 1/16 , 1/32 (automatic detection)		
Decoding	Standard	MPEG-2		
	Video processing	Main Profile @ Main Level		
	Audio processing	Layer II		
	Teletext - subtitles insertion	yes		
Image format conversation	16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box			
Video/Audio	Video & Audio remodulation	VSB		
	Video modulation depth	%	80 ... 90	
	Audio peak deviation	kHz	±10 ... ±50	
Output	Audio modulation depth	%	10 ... 80	
	Frequency range output	MHz	45 - 862	
	Output level, adjustable	dBµV	65 ... 80	
	Output loop-through loss	dB	1,1	
	Carrier level ratio, adjustable	dB	10 ... 20	
	Weighted SNR	dB	> 60	
	Spurious in band	dBc	< -60	
	Broadband noise (ΔB = 8 MHz)	dBc	< -75	
General	Operating voltage	V=	+12	
	Consumption	mA	770	
	Operating temperature	°C	0 ... + 45	
	Connectors input / output	2 x F-connector, female		
	DC connector type	banana socket		
	Dimensions	mm	230 x 195 x 32	
Weight	kg	1,03		

HEADEND KAB 5000

DVB-T-QAM Transmodulator

- Digital terrestrial transmodulator DVB-T to QAM, standard DVB-T / MPEG2
- Transparent digital transmodulation process
- The 7/8 MHz wide COFDM channels located in the 47-862 MHz band are transformed to 5,5 to 9 MHz wide QAM channels located in the same band
- Programmed by central headend controller PRG-5000 or PC, interface RS 232 / DB-9



Type		DTQ
Article No.		5700 1210
Standard		EN 300 744
Input (COFDM)	Input frequency	47 - 862 MHz
	Bandwidth	7 / 8 MHz
	Mode	2K / 8K (automatic detection)
	Constellation	QPSK / 16 QAM / 64 QAM (automatic detection)
	Hierarchy	High Priority / Low Priority
	Input level	35 ... 100 dBμV
	Input loop-through gain	2 (±2) dB
	Guard interval	1/4 , 1/8 , 1/16 , 1/32 (automatic detection)
Standard		EN 300 429
QAM	Modulation scheme output	16QAM / 32QAM / 64QAM / 128QAM / 256 QAM (selectable)
	Modulation error ratio (MER)	38 (typ) / 36 (min) dB
	Output symbol rate	1 ... 8 MSym/s
	Roll-Off factor, selectable	12 / 13 / 15 %
RF-Output	Frequency range output	47 - 862 MHz
	Output level, adjustable	65 ... 80 dBμV
	Output loop-through loss	1,1 dB
	Spurious in band	< -55 dBc
	Broadband noise (ΔB = 8 MHz)	< -75 dBc
General	Operating voltage	V= + 12
	Consumption	630 mA
	Operating temperature	0 ... +45 °C
	Connectors input / output	2 x F-connector, female
	DC connector type	banana socket
	Video-loop connector type	2 x RCA female
	Programming interface	RS 232 / DB-9
	PC-programming local bus connector	4-pin socket
	Dimensions	mm 230 x 195 x 32
	Weigth	kg 1,03

HEADEND KAB 5000



Audio/Video Modulator

- Vestigial side band modulator for adjacent channel operation
- IF modulation and SAW filtering for maximum harmonic reduction and true VSB response
- Frequency agility, any selectable TV channel within the 45-862 MHz band
- PLL frequency synthesized
- Built-in test pattern generator
- Programmed by central headend controller PRG-5000, interface RS 232 / DB-9

Type		MM	MS
Article No.		5700 1212	5700 1211
TV System		B / G *	B / G *
Audio System		Mono	Stereo
Frequency range	MHz	45 - 862	45 - 862
Output level, adjustable	dB μ V	70 ... 80	70 ... 80
Intercarrier frequency			
Sound 1	MHz	5,5	5,5
Sound 2	MHz	—	5,742
Carrier level ratio, adjustable	dB	10 ... 20	
Video input level	V _{pp}	0,7 ... 1,4	
Video input impedance	Ω	75	
Video modulation depth	%	80 ... 90	
Audio input level	V _{pp}	0,5 ... 4,0	
Audio input impedance	Ω	> 600	
Audio peak deviation	kHz	$\pm 40 \dots \pm 50$, adjustable	
Audio modulation depth	%	60 ... 80, adjustable	
Audio pre-emphasis	μ s	50	
Group delay precorrection		yes	yes
Weighted SNR	dB	> 60	
Differential gain	%	< 3	
Differential phase	°	< 2	
K-factor (2T pulse)	%	< 2	
Spurious in band	dBc	< - 60	
Broadband noise		< - 77 ($\Delta B = 5$ MHz)	
Output loop-through loss	dB	0,7	
Operating voltage	V=	+ 12	+ 12
Consumption	mA	360	420
Operating temperature	°C	-10...+55	
Connector types		Video 1x RCA, Audio 2x RCA, Output RF 2x F connector	
DC connector type		banana socket	
Programming interface		RS-232 / DB-9	
Dimensions	mm	230 x 195 x 32	
Weight	kg	<1,03	

* Modulators for other TV systems available

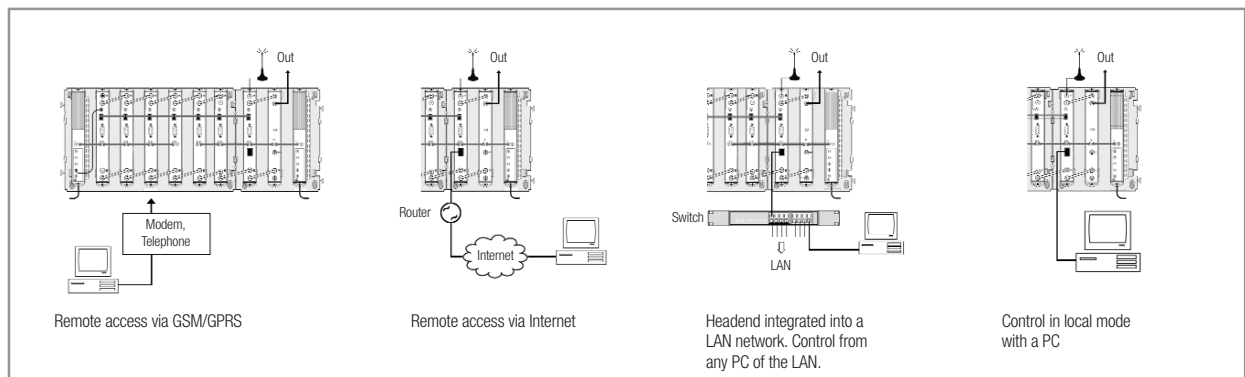
HEADEND KAB 5000

Headend-Monitor-Server

- For comfortable remote control of headends via a GSM/GPRS- or Ethernet interface
- Functions: Identification of the headend and dates of interventions, reading of the RF level outgoing from each signal module, and multichannel signal outgoing from the headend.
Automatic alarm advertisements via SMS, equalization of the RF multichannel signal outgoing from the headend. Scheduling of parameter settings, OSD messages and firmware updates.
- With embedded Web server, enables the control over a local or remote computer via a standard browser



Type		HMS 120	
Article No.		5700 1335	
Software	Software	Operation software embedded, Web server, internal GSM/GPRS modem, HTTP and support for SNMP v2, access password	
RF	Frequency range	MHz	45 - 862
	Output level	dB μ V	55 ... 90
	Accuracy of the reading	dB μ V	$\pm 1,5$
GSM/GPRS	Frequency range	MHz	GSM900: Tx 880-915, Rx 925-960 / GSM 1800: Tx 1710-1785, Rx 1805-1880
	Threshold	dBm	< 102
	RF output power	W	GSM900 = 2 W / GSM1800 = 1 W
Connectors	GSM antenna		FME
	GSM modem card		SIM socket
	Monitoring ethernet port		Bit rate up to 100 Mbps, transmission protocol TCP/IP
	RF input		F female
	Local bus		RS-485, 2x4 pin socket
	Monitoring		RJ-45
	Terminal port		Electrical interface: V28/RS-232 / Terminal DB-9
General	DC		banana socket
	Operating voltage	V=	12
	Consumption	mA	600
	Operating temperature	$^{\circ}$ C	0 ... +45
	Dimensions	mm	230 x 195 x 32
	Weigth	kg	1,03



HEADEND KAB 5000



RF-Power amplifier

- Push-Pull amplifier for high output level
- Low noise figure
- Variable interstage attenuation
- Input and output test points

Power supply

- High efficiency switch mode power supply
- Electrical safety protection level: Class II
- Efficiency 75%
- For powering of max. 6 headend modules

Type		KAV 47
Article No.		5700 1215
Frequency range	MHz	47 - 862
Gain	dB	47
Interstage attenuator	dB	0 ... 20
Noise figure	dB	< 6
Output level (DIN 45004 B/60dB IMA)	dB μ V	> 120
Output level (DIN 45004A1/60dB IMA)	dB μ V	> 115
Testpoint input	dB	-20 \pm 1,5
Testpoint output	dB	-30 \pm 1
Extension input		
Frequency range	MHz	47 - 862
Gain	dB	6
Operating voltage	V=	+ 12
Consumption	mA	600
RF and test connector types		F connector, female
DC connector type		banana socket

Type		NT-5000
Article No.		5700 1217
Operating voltage	V~	100 - 240
Outputs		
Headend modules		+12 V (5A) for max. 6 modules
Mast-head preamplifier		+24 V (60 mA)
LNB remote powering		+18 V (300 mA)
		+18 V / 22 kHz (300 mA)
		+13 V (300 mA)
		+13 V / 22 kHz (300 mA)
Max. total current for 24V, 18V, 13V	mA	700
Power consumption	W	max. 80

HEADEND KAB 5000

Programming Unit PRG-5000

- For programming the KAB modules. Cable connection to the DB-9 front panel socket
- 20x4 character alphanumeric 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 PRG-5000 can also be updated through a PC
- Capacity of 80 preset memory allocations for repetitive KAB assemblies
- No battery required. Powered through the interface lead (max consumption: 150 mA)
- Includes PC software PRG-300

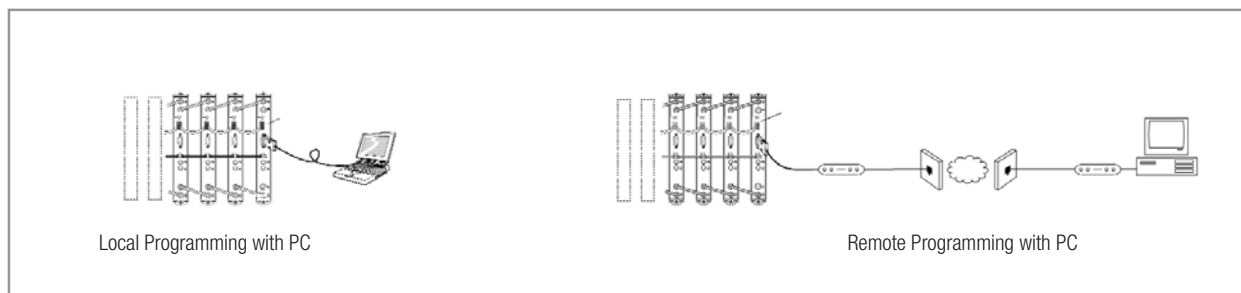


PC Software PRG-300



- For programming and monitoring the KAB headends from a PC, either locally or remotely via modem
- Operation language is automatically established in concordance with that used in Windows
- Windows-based graphical interface
- Use of preset memory allocations for repetitive KAB assemblies
- Stores complete headend information allowing reports to be printed






Type	PRG-5000	PRG-300
Article No.	5700 1216	5700 1227



HEADEND KAB 5000

Type	RW-6	GHA-6
		
Article No.	5700 1219	5700 1218
Description	Base plate capacity: 7 modules	Indoor housing for 1 base plate RW-6 lock/key closing system
Dimensions	441 x 257 x 24	430 x 341 x 258

Type	GH-19Z	OMR-600
		
Article No.	5700 1220	5700 1225
Description	Rack frame 19", 6U height capacity: 7 modules with power supply and 7 fixing plates to fasten the KAB modules	blank panel for 19" rack GH-19Z

Type	BUS-013
	
Article No.	5700 1226
Description	Kit of jumpers for communication bus between KAB modules (PC programming application) packing unit 11 pcs.



Complete Headends

- QPS-6: QPSK/PAL, 6 modules
- QQ-6: QPSK/QAM, 6 modules

Type	KAB 5000 - QPS/6	KAB 5000 - QQ/6
Article No.	5700 1205	5700 1224
Description	Complete Headend with 6 modules "QPS" QPSK/PAL, VSB, Stereo, power supply "NT-5000", power cord, base plate, housing with lock key	Complete Headend with 6 modules "QQ" QPSK/QAM, power supply "NT-5000", power cord, base plate, housing with lock key
Dimensions	430 x 341 x 258	430 x 341 x 258
Weight	15 kg	15 kg