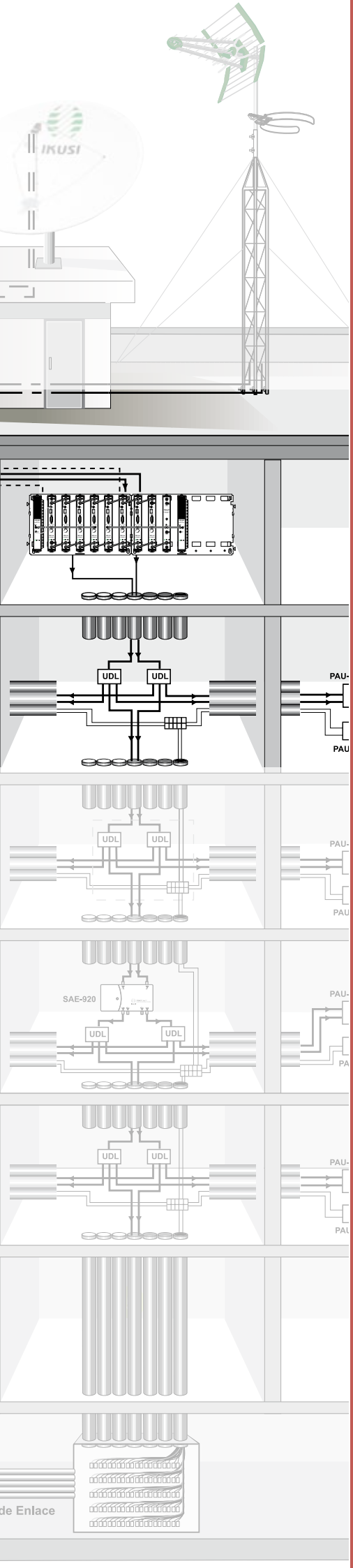


ClassA Headends

5

Headend Control Unit

TV Receivers, Signal Processors, Transmodulators, Modulators, Regenerators, Fibre Optics equipments SAT-IF Combiner/Amplifier, etc

IPTV Streamers

Programming Unit

Power Amplilfiers, Power Supplies and Installation Accessories

ClassA HEADENDS

Range and General Features

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.

TV Receivers

Free-to-air

SAT QPSK	DVB-S -	**SRF ...**
Terrestrial COFDM	DVB-T -	**TRF ...**
Cable DVB-C	DVB-C -	**CRF ...**

Encrypted
Embedded Conditional Access

SAT QPSK	DVB-S -	**SDC ...**
Terrestrial COFDM	DVB-T -	**TDC ...**
Cable DVB-C -	DVB-C -	**CDC ...**

Common Interface

SAT QPSK	DVB-S -	**SRC ...**
Cable DVB-C -	DVB-C -	**CRC ...**

Local Channel

Side band TV Modulator	**MCP ...**

Signal Processors

Channel Processors

Terrestrial/Cable AM / CODFM	**TPC ...**

Channel Converters

Satellite IF-IF	**SPC ...**

Transmodulators

QPSK/8PSK-QAM	**MDI ...**
QPSK/8PSK-COFDM	**MTI ...**
COFDM-QAM	**TDI ...**

Regenerators

COFDM-COFDM	**TGT ...**
Cable QAM-QAM	**CGT ...**

Fibre Optics

Optical Transmitters	**FTD ...**
Optical Receivers	**FRR ...**
Optical Splitters	**FSP ...**
TV+SAT-IF Optical Receivers	**FRD ...**
Return Path Optical Transmitter	**FTR-301**

LANTV

IPTV Streamers

DVB-S/S2-IP. CI	**SNS-102**
COFDM-IP. CI	**TNS-101**
A/V-IP	**BNS-200**
DVB-S Radio-IP	**RNS-101**

Radio Amplifier

FM&DAB Radio Amplifier	**TBA-120**

Accessories

Headend Control Units

GSM/GPRS	**HMS-120**

Power Amplifiers

120 dBuV	**HPA-120**
125 dBuV	**HPA-025**
125 dBuV	**HPA-125**

Sat-IF Combiner/Amplifier

120 dBuV	**HPA-920**

Active Combiner **AMX-400**

Power Supplies **CFP-700**, **CFP-507**, **CFP-500**

Wall-fixing
ClassA Headend

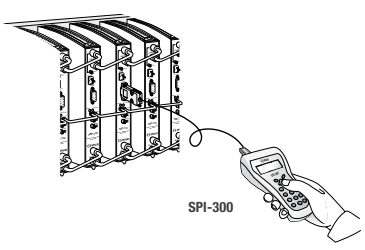
Rack-mountable
ClassA Headend

FUNCTIONAL DESCRIPTIONS

- Signal processing:
  Terrestrial & Satellite / Analog & Digital
- Software for local and remote programming
- Firmware update from our website
- Agile & adjacent channels
- VSB or DSB output channel spectrums
- B/G, D/K, I, L TV systems
- Mono, A2 or NICAM stereo/dual sonds
- Embedded Conditional Access:
  . Viaccess ™
  . Conax ™
  . Mediaguard ™
  . Videoguard (Viasat)

PROGRAMMING AND FIRMWARE UPDATE

ClassA modules are programmed and set locally with the SPI-300 programming unit from IKUSI. If an HMS control unit is installed in the headend, programming and setting can be done remotely with a PC and a standard browser. Parameter values are controlled in each module by a built-in, powerful microprocessor and remain unalterable unless they are modified with the SPI or PC.
Firmwares of modules and programming unit can be updated. The corresponding files are downloaded from www.ikusi.com.



ClassA HEADENDS

HMS. Headend Control Unit

HMS-120

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

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.

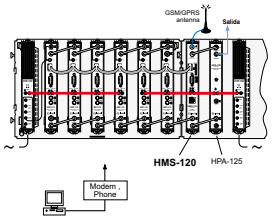
The control unit is positioned in the ClassA headend as the last module on the right of the cascade of signal modules (processors, receivers, transmodulators, regenerators). The installation of the communication local bus (IKUSUP) along the modules is required, as well as the connection of a tapped signal 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.

MODEL	HMS-120
REF.	4435
INFO channel	NO



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

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

'TERMINAL' PORT

Electrical interface : V28/RS-232

INFO CHANNEL (only HMS-130)

Frequency range : 45-862 MHz
TV System : B-G-D-K-I-L, Pal-Secam
Adjustable output level : 70-80 dBµV

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

MONITORING ETHERNET PORT

Standard : IEEE 802.3 10/100 BaseT
Bit rate : up to 100 Mbps
Transmission protocol : TCP/IP

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

ClassA HEADENDS

SPI. Programming Unit

MODEL	SPI-300
REF.	4070

- 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.

SPI-300

HPA. 47-862 MHz RF Power Amplifiers

MODEL			HPA-125	HPA-025	HPA-120
REF.			4427	4428	4426
Technology			Push-pull		
Bandwidth		MHz	47 - 862		
Gain		dB	45	23	47
Interstage variable attenuator		dB	0 - 20	0 - 7	0 - 20
Noise figure		dB	≤ 6		
Output level (IMD3 -60dB, DIN 45004B)		dBµV	≥ 125		≥ 120
Output level (IMD2 -60dB, DIN 50083-3)		dBµV	≥ 120		≥ 115
Input test		MHz	-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
Dimensions		mm	230x195x32		

HPA-125

CFP. Power Supplies

MODEL		CFP-700	CFP-507	CFP-500
REF.		4401	4439	4429
Regulation type		switch mode		
Mains supply voltage (50/60 Hz)	VAC	110 - 240		230 - 240
Outputs		+12 V (5A) for ClassA modules +24 V (60 mA) for mast-head preamplifiers +18 V (300 mA) +18 V / 22 kHz (300 mA) +13 V (300 mA) +13 V / 22 kHz (300 mA)	+12 V (7 A) for ClassA modules and LNB +24 V (60 mA) for mast-head preamplifiers	+12 V (5.3 A) for ClassA modules and LNB +24 V (60 mA) for mast-head preamplifiers
Max total current for +24, +18 and +13 V	mA	700	—	
Efficiency	%	75		
Dimensions	mm	230x195x32		

CFP-700

ClassA HEADENDS

Installation Accessories

MODEL	REF.	DESCRIPTION
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.
CTF-175	1519	75Ω load plug. To load both input tap-line(s) and output coupling line in a ClassA headend.
BUS-013	4430	Pack containing 11 (10x short + 1x long) jumpers for IKUSUP communication bus between ClassA modules.
CDB-200	4706	Two DB-9 female connectors to assemble the PC ↔ headend connecting cable.
CDP-102	4704	2-pair shielded, twisted cable (1m) to assemble the PC ↔ headend connecting cable.
COR-220	3616	Europe Schuko power cord, 1.5m. CEE 22 moulded socket on one end and a moulded plug on the other.
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.

BAS-900

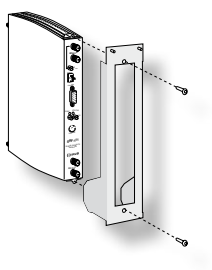
COF-700

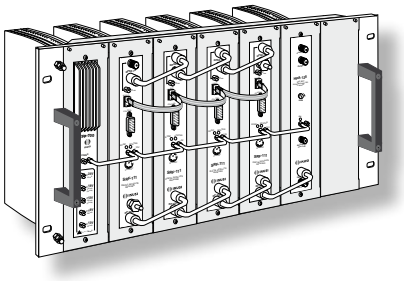
SMR-601

PMR-601

OMR-601

Installing the modules in rack





IKUSI

ClassA HEADENDS

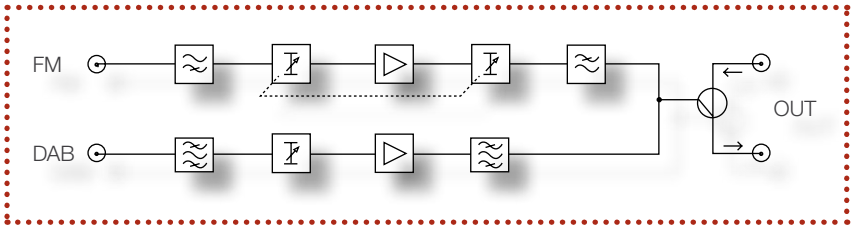
TBA. FM & DAB Radio Amplifier

- 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.

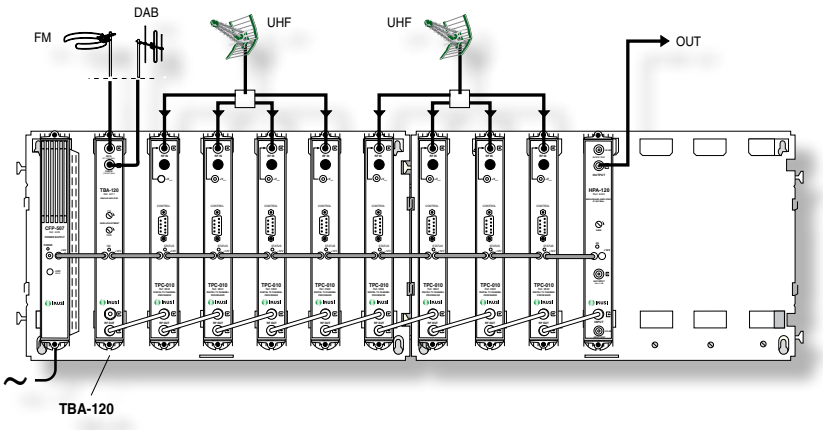
MODEL		TBA-120
REF.		4277
Inputs		2 FM (87.5 - 108 MHz) DAB (195 - 223 MHz)
Response flatness	dB	± 1
Nominal FM gain	dB	10
Nominal DAB gain	dB	2
Variable FM attenuator	dB	0 - 40
Variable DAB attenuator	dB	0 - 20
Noise figure	dB	< 8
FM output level (-50dB IMD3, 2 carriers)	dBµV	80
DAB output level (-50dB IMD3, 2 carriers)	dBµV	80
Output loop-through loss	dB	1.5
Supply voltage	VDC	+12
Consumption	mA	175
Dimensions	mm	230x195x32

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

Block diagram



Application example



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

TBA

ClassA HEADENDS

TPC. Terrestrial/Cable TV Channel Processing Equipment

- Agile Processing Modules, usable either as channel converters (output channel is different to input channel) or as channel processors (output channel is the same as input channel). Adjacent channel operation at input and output.

Channel Processors - Digital & Analogue

MODEL		TPC-110	TPC-010	
REF.		3843	3842	3651
Type of application channel		Digital	Digital	Analogue
Remote Programming Function		YES	NO	NO
TV System/Standard		B/G ,, D/K ,, I ,, L ,, 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
Selectable tuning offset	kHz	(±) 125 / 250 / 375 / 500		
Input level (CAG 40 dB ; manual adjustment for L-system channels)	dBµV	40 - 80		50 - 90
Adjustable output level	dBµV	55 to 70		65 to 80
Supply voltage	VDC	+12		
Consumption	mA	590	540	

TPC-010

FUNCTIONAL DESCRIPTION OF THE TPC PROCESSORS

In a TPC module can be distinguished three main sections:

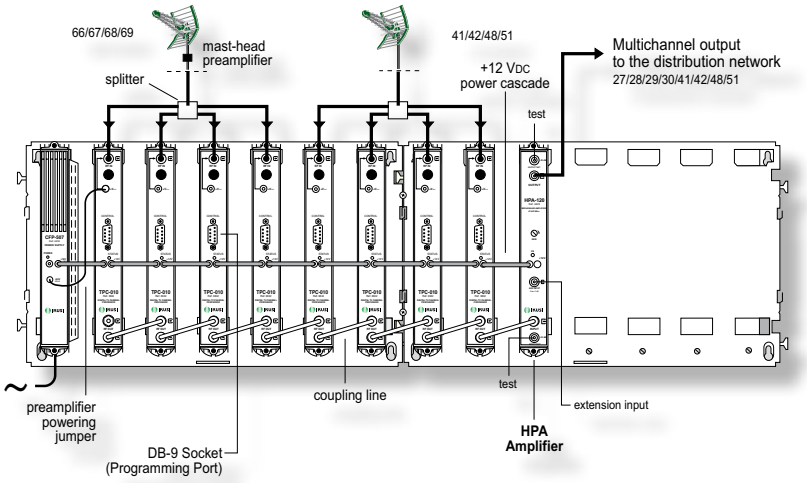
a) "Input Channel → IF" conversion. Includes a delayed AGC circuitry that operates in the 50-90 dBmV (analog) or 40-80 dBmV (digital) input level ranges.

b) 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).

c) "IF → Output Channel" conversion. The output level can be adjusted between 65 and 80 dBmV.

Programming of a TPC processor involves the following selections and settings:

- Input Frequency. Is the picture carrier for analog channel and the central frequency for digital channel.
- Tuning Offset (TPC-110 only). 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.



Example of TPC headend for conversion on three channels and processing of other five ones.

ClassA HEADENDS

TRF. Free-To-Air Digital Terrestrial TV Reception Equipment

- 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 (VSB vestigial side band or DSB double side band; any TV system and Colour system).

COFDM Receivers

MODEL	Output TV channel spectrum **VSB** (Vestigial Side Band)		**TRF-011**	**TRF-112**
REF.			**4085**	**4420**
Remote Programming Function			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	
Input frequency		MHz	174 - 230 and 470 - 862	
Input level		dBµV	35 ... 100	
Selectable output channel located between:		MHz	45 - 862	
Adjustable output level		dBµV	65 to 80	
Supply voltage		VDC	+12	
Consumption		mA	590	640

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 "audio1", "audio2" or "audio1+audio2" signals.

TRF-112

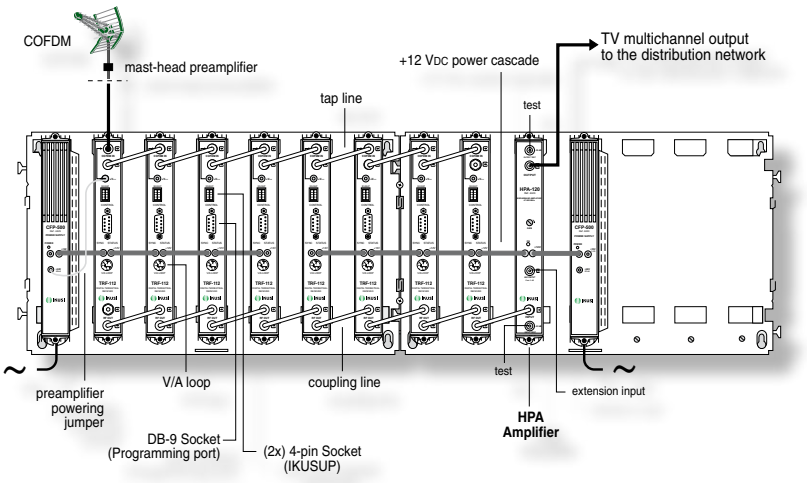
FUNCTIONAL DESCRIPTION OF THE TRF RECEIVERS

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.

Programming of each module involves the following selections and settings:

- 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.



Example of TRF headend for eight clear digital terrestrial TV programmes.

TRF

ClassA HEADENDS

TDI. Digital Terrestrial COFDM-QAM Transmodulation Equipment

- Digital Transmodulation (COFDM → 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.

TDI-900

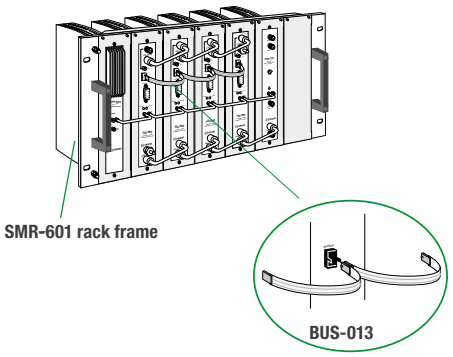
FUNCTIONAL DESCRIPTION OF THE TDI TRANSMODULATORS

A TDI transmodulator carries out the complete channel processing from the input to the output:

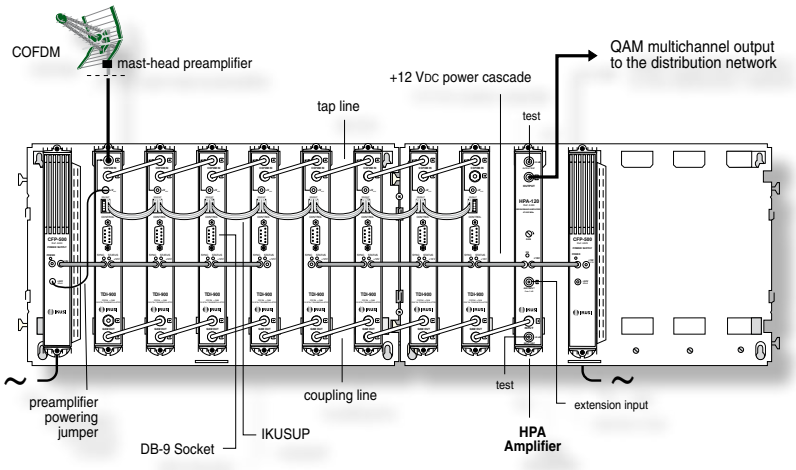
- tunes a COFDM digital channel,
- demodulates the signal being received,
- processes the transport stream, and
- re-modulates it in QAM format (16, 32, 64, 128 or 256 symbols) on an RF channel that is selectable within the 45-862 MHz frequency range.

Programming of the module involves the following selections and settings:

- Central Input Frequency (125 kHz increments)
- Bandwidth (7 or 8 MHz)
- Hierarchy Level (high or low priority)
- Central Output Frequency (250 kHz increments)
- Output Modulation Scheme (16, 32, 64, 128 or 256QAM)
- Roll-Off factor (“half Nyquist filter”)
- RF Output Level
- Output Symbol Rate
- Service and Conditionnal Access Blockade



Jumpers for IKUSUP communication bus between ClassA modules



Example of TDI headend for eight digital terrestrial channels.

TDI

ClassA HEADENDS

TDI. Digital Terrestrial COFDM-QAM Transmodulation Equipment

COFDM-QAM Transmodulator

MODEL			TDI-900
REF.			4021
Transport Stream (TS) processing			YES
Input Section (COFDM)	Standard		EN 300 744
	Input frequency	MHz	174 - 230 and 470 - 862
	Bandwidth	MHz	7 ,, 8
	Mode (automatic detection)		2K ,, 8K
	Constellation (automatic detection)		
	Hierarchy		High Priority ,, Low Priority
	Input level	dBµV	35 ... 100
	Input loop-through gain	dB	0.5 (±
	Guard interval (automatic detection)		1/2 ,, 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
	Output symbol rate	MS/s	1 ... 8
	Selectable Roll-Off factor	%	12 ,, 13 ,, 15
Output Section (QAM)	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	600
	Operating temperature	°C	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.

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.

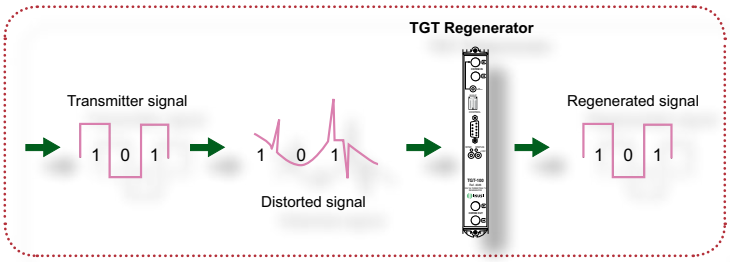
Abbreviations

CA : Conditional Access
CAT : Conditional Access Table
NIT : Network Information Table
PAT : Program Association Table
PCR : Program Clock Reference
SDT : Service Description Table
TS : Transport Stream

ClassA HEADENDS

TGT. COFDM-COFDM Regeneration Equipment

- The TGT is a COFDM → 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.
- 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

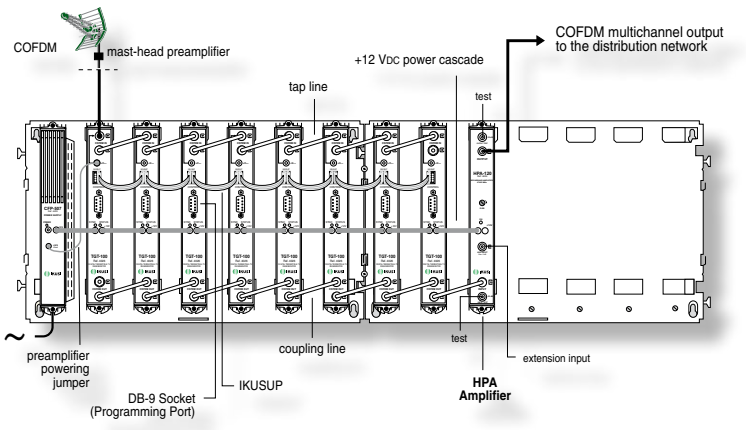
A TGT module carries out the complete COFDM stream regeneration plus full processing from input to output:

- 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.

Programming of the module involves the following selections and settings:

- 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)

TGT



Example of «TGT» headend for eight COFDM-modulated channels.

ClassA HEADENDS

TGT. COFDM-COFDM Regeneration Equipment

COFDM-COFDM Regenerator

MODEL			TGT-100
REF.			**4026**
Remote mode			YES
Transport Stream (TS) processing			YES (see functions below)
Input Section (COFDM)	Standard		EN 300 744
	Input frequency	MHz	174 - 230 and 470 - 862
	Bandwidth	MHz	7 ,, 8
	Mode (automatic detection)		2K ,, 8K
	Cosntellation (automatic detection)		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-modulation Section	Data processing		EN 300 744
	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
	In-depth interleaving (only on DVB-H)		Applicable (on 2K and 4K modes)
	MER (Modulation Error Ratio)	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	≤ ± 10
	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	600
	Operating temperature	°C	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.

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.

Abbreviations

CA : Conditional Access
CAT : Conditional Access Table
NIT : Network Information Table
PAT : Program Association Table
PCR : Program Clock Reference
SDT : Service Description Table
TS : Transport Stream

classA

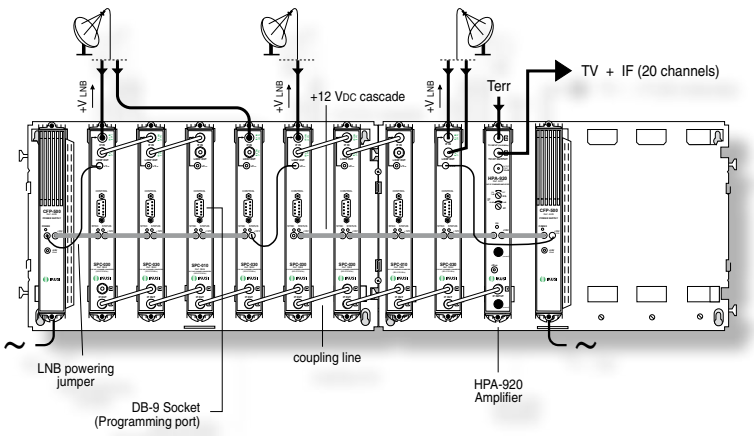
ClassA HEADENDS

SPC. Satellite IF-IF Conversion Equipment

- 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. Range includes two types of converters:
  - **SPC-010** Single Converter. Conversion of one channel.
  - **SPC-030** Triple Converter. Conversion of three 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.
  - Housing units for the base plates if required.
  - If the headend being assembled is extensive, one or more AMX-400 combiners.
- Programming of each converter involves the following settings:
  - Central Input Frequencies (1 MHz increments)
  - Symbol Rates (6 to 45 MS/s, 1 MS/s increments)
  - Central Output Frequencies (1 MHz increments)
  - RF Output Levels
  - Only for SPC-030 model: Input Configuration (loop-through or 2 independent inputs)
- Programming connection using the SPI-300 programming unit is individual —module by module.

IF-IF Converters

MODEL		SPC-010	SPC-030
REF.		3846	3844
Number of SAt-IF channels converted		1	3
Input connection		Loop-through	Configurable: a) Loop-through b) Two independent inputs: port up : 2-channel input port down : 1-channel input
Input frequency	MHz	950 - 2150	
Input level	dBm	-60 ... -20	
Input symbol rate	MS/s	6 ... 45	
Max level difference between input signals	dB	—	25
Noise figure	dB	< 10	
Output frequency	MHz	950 - 2150	
Output response flatness	dB	< 3	
Adjustable output level	dBm	-38 ... -23	
Phase noise		DVB-S2 compatible	
Output loop-through loss	dB	1 (typ) , 1.8 (max)	
Supply voltage	VDC	+12	
Consumption	mA	210	520



Example of «SPC» headend for conversion and amplification of 20 satellite channels.

SPC

ClassA HEADENDS

SRF. Free-To-Air Digital Satellite TV Reception Equipment

- Satellite 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 or DSB double 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 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 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.

QPSK Receivers

MODEL	Output TV channel spectrum VSB (Vestigial Side Band)		SRF-011	SRF-112
REF.			4084	4062
Remote Programming Function			NO	YES
Output channel TV System			B / G / D / K / I / L	
Output channel Audio System			Mono	A2
Output channel Colour System			PAL , SECAM , NTSC	
Input frequency		MHz	950 - 2150	
Input level		dBm	-65 ... -25	
Selectable output channel located between:		MHz	45 - 862	
Adjustable output level		dBµV	65 to 80	
Supply voltage		VDC	+12	
Consumption		mA	540	590

SRF-112

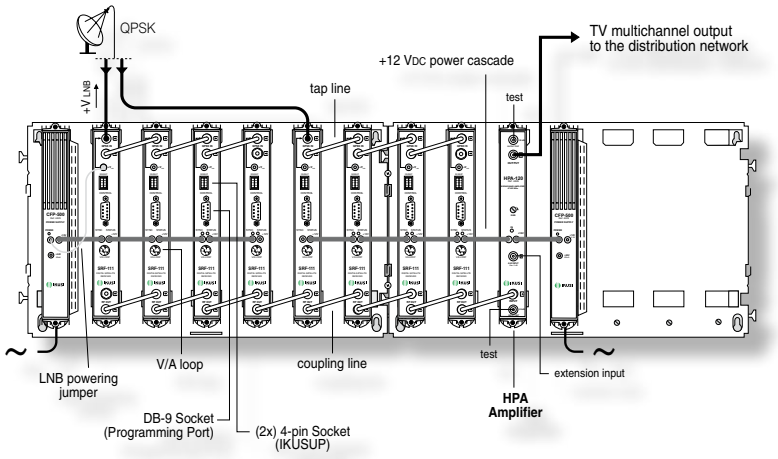
FUNCTIONAL DESCRIPTION OF THE SRF TRANSMODULATORS

An 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.

Programming of each module involves the following selections and settings:

- Central Input Frequency (1 MHz increments).
- Input Symbol Rate (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.



Example of SRF headend for eight clear digital saltellite TV programmes.

SRF

ClassA HEADENDS

SDC. Digital SAT-TV Reception Equipment with Embedded CA

- Satellite TV reception, standard DVB-S / MPEG-2 (EN 300 421).
- De-encryption and Digital-to-Analogue Transmodulation Process (Encrypted QPSK → Clear AM). The encrypted TV programmes transmitted in QPSK Sat-TV channels are de-encrypted and presented on conventional vestigial side band VHF/UHF channels (any TV system and Colour system).

QPSK Receivers with Embedded Conditional Access

MODEL		SDC-G106	SDC-C600
REF.		4023	4025
Remote Programming Function		YES	
Embedded Conditional Access		Videoguard™ (Viasat)	Conax™
Output channel TV System		B/G	
Output channel Audio System		Mono	Nicam
Output channel Colour System		PAL , SECAM , NTSC	
Input frequency	MHz	950 - 2150	
Input level	dBm	-65 ... -25	
Selectable output channel located between:	MHz	45 - 862	
Adjustable Output level	dBµV	65 to 80	
Supply voltage	VDC	+12	
Consumption	mA	570	650

SDC-C600

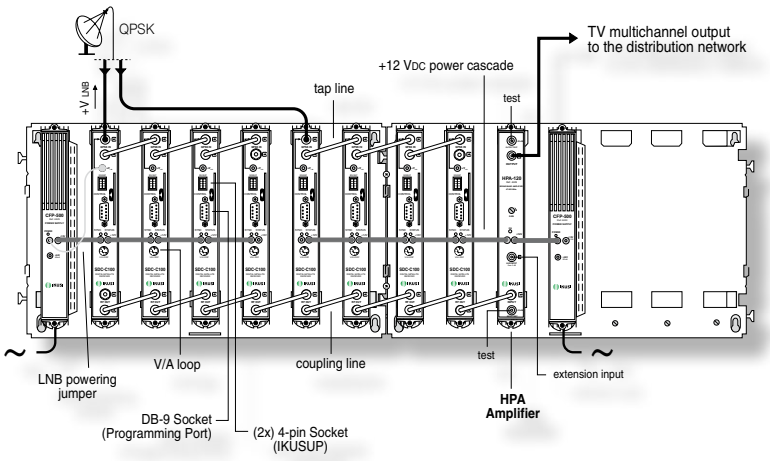
FUNCTIONAL DESCRIPTION OF THE SDC TRANSMODULATORS

An SDC embedded CA receiving module carries out a complete channel processing from the input to the output:

- 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 band.

Programming of each module involves the following selections and settings:

- Central Input Frequency (1 MHz increments).
- Input Symbol Rate (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.



Example of SDC headend for eight encrypted digital saltellite TV programmes.

SDC

ClassA HEADENDS

SRC. Digital Sat TV MultiCrypt Reception Equipment

- 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 conven-tional VHF/UHF channels (VSB vestigial side band or DSB double side band; 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.

QPSK Receivers with Common Interface

MODEL	Output TV channel spectrum **VSB** (Vestigial Side Band)		SRC-111
REF.			4096
Remote Programming Function			YES
Output channel TV System			B / G
Audio Operatin Mode			Mono
Output channel Colour System			PAL , SECAM , NTSC
Input frequency		MHz	950 - 2150
Input level		dBm	-65 ... -25
Selectable output channel located between:		MHz	45 - 862
Adjustable output level		dBµV	65 to 80 (63 to 78 in SRC-051)
Supply voltage		VDC	+12
Max Consumption (CAM included)		mA	680

SRC-111

FUNCTIONAL DESCRIPTION OF THE SRC RECEIVERS

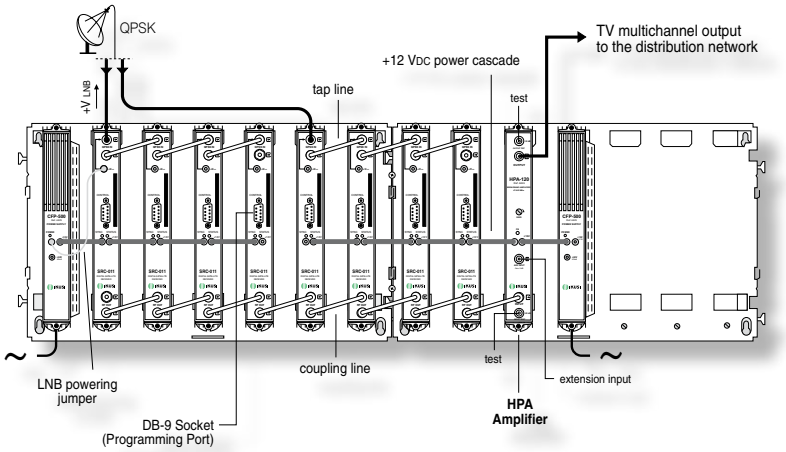
An SRC receiving module with CAM + Operator's Smart Card inserted, carries out a complete channel processing from the input to the output:

- 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 band.

Range includes different mono sound models for VSB or DSB output channel spectrums and for available or non-available remote programming function.

Programming of each module involves the following selections and settings:

- Central Input Frequency (1 MHz steps).
- Input Symbol Rate (0.001 MS/s steps).
- 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.



Example of SRC headend for eight clear digital saltellite TV programmes.

SRC

ClassA HEADENDS

MDI. xPSK-QAM Transmodulation Equipment

- Digital Transmodulation (xPSK → 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.
- The equipment includes two transmodulator models: MDI-900 for DVB-S, and MDI-910 for DVB-S and DVB-S2. Both models perform transport stream processing, and the MDI-910 features moreover common interface.

xPSK-QAM Transmodulators

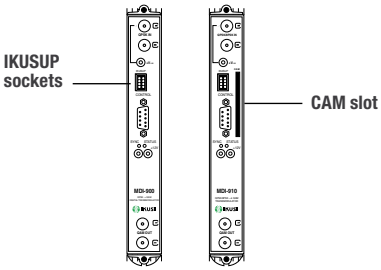
MODEL		MDI-910	MDI-900
REF.		**4020**	**4094**
Transport Stream processing		YES	
Common Interface (EN 50221)		YES (Conax, Cryptoworks, Irdeto, KeyFly, Mediaguard, Nagravision, Viaccess, ...)	NO
Reception		DVB-S2 / DVB-S (QPSK/8PSK) (QPSK)	DVB-S (QPSK)
Remote Programming Function		YES	
Standard		EN 302 307	EN 300 421
Input frequency	MHz	950 - 2150	
Input level	dBm	-70 ... -25	-65 ... -25
Selectable output channel located between:	MHz	47 - 862	
Adjustable output level	dBµV	65 to 80	
Supply voltage	VDC	+12	
Consumption	mA	770 (w/o CAM) ,, 910 (with CAM)	600

MDI-900 MDI-910

FUNCTIONAL DESCRIPTION OF THE MDI TRANSMODULATORS

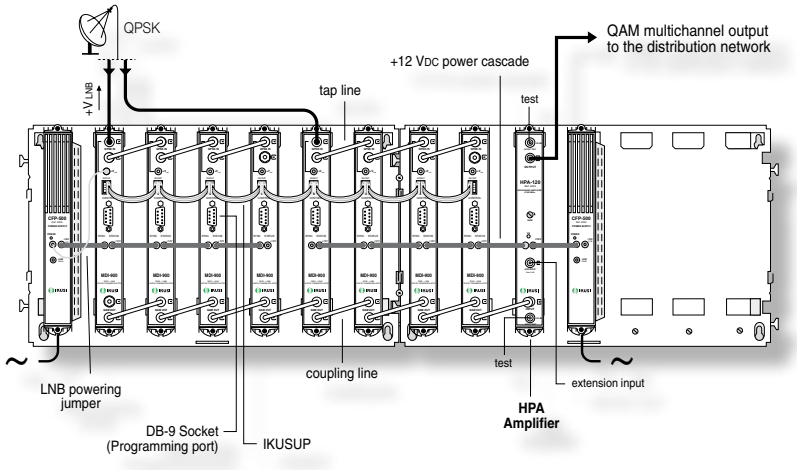
An MDI transmodulator carries out the complete channel processing from the input to the output:

- 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 for MDI-910 if a "CAM + Operator Card" couple is installed), and
- re-modulates it in QAM format on an RF channel that is selectable within the 47-862 MHz frequency range.



Module programming involves the following selections and settings:

- Central QPSK/8PSK Input Frequency (1 MHz steps)
- Input Symbol Rate (0.001 MS/s increments)
- Central Output Frequency (250 kHz increments)
- Output Modulation Scheme (16, 32, 64, 128 or 256QAM)
- Roll-Off factor ("half Nyquist filter")
- RF output level
- Output Symbol Rate and Service and CA Blockade



Example of MDI headend for eight transponders.

MDI

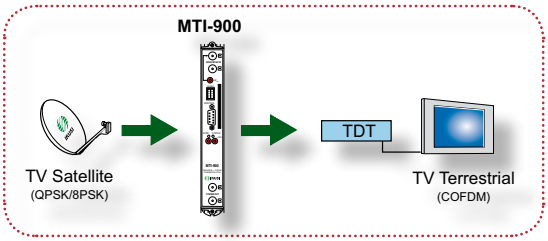
ClassA HEADENDS

MTI. xPSK/COFDM Transmodulation Equipment

MTI HEADENDS

- Digital transmodulation (xPSK → 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 for discretionary de-encrypting of TV programmes.



MTI-800 MTI-900

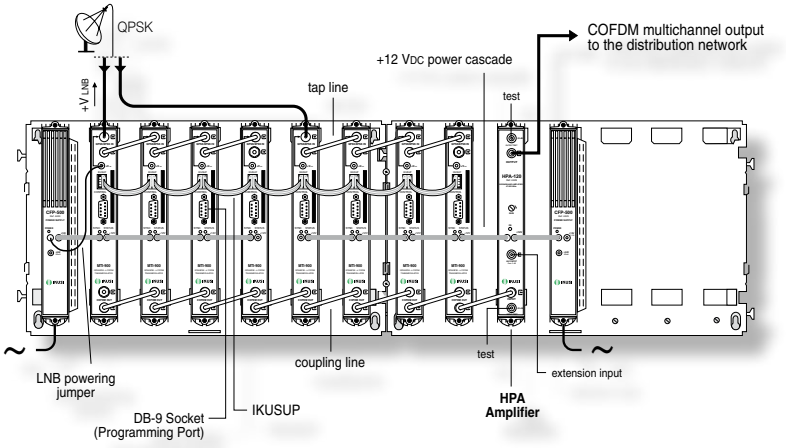
FUNCTIONAL DESCRIPTION OF THE MTI TRANSMODULATORS

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

- tunes a xPSK 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.

Module programming involves the following selections and settings:

- 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

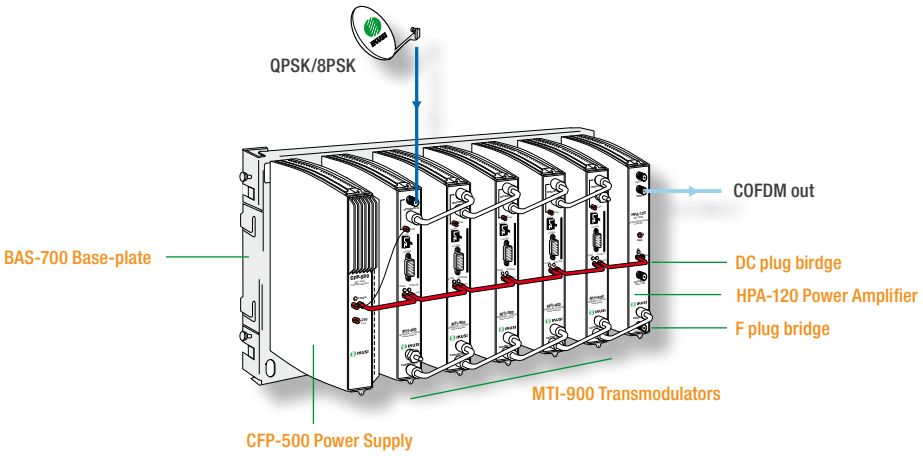


Example of «MTI» headend for eight transponders

MTI

ClassA HEADENDS

MTI. xPSK/COFDM Transmodulation Equipment



xPSK-COFDM Transmodulator with Common Interface

MODEL			MTI-900	MTI-800
REF.			4098	4099
Reception			DVB-S (QPSK) ,, DVB-S2 (QPSK/8PSK)	
Remote mode			YES	
Transport Stream (TS) processing			YES	
Number of encrypted programmes being supported			Variable (depends on the CAM)	—
Input Section (QPSK/8PSK)	Input frequency	MHz	950 - 2150	
	Input level	dBm	-65 ... -25 (DVB-S) ,, -70 ... -25 (DVB-S2)	-65 ... -25
	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	Constellation		xPSK ,, 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.)	
RF Output Section (COFDM)	Selectable output channel located between:	MHz	47 - 862	
	Bandwidth	MHz	5 (DVB-H) ,, 6 ,, 7 ,, 8	
	Adjustable output level	dBµV	65 a 80	
General	Supply voltage	VDC	+12	
	Consumption	mA	600 (w/o CAM) ,, 740 (with CAM)	600
	Operating temperature	˚C	0 ... +45	
	IKUSUP bus connector		(2x) 4-pin socket	
	Dimensions	mm	230x195x32	

• 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.

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.

Abbreviations

CA : Conditional Access
CAT : Conditional Access Table
NIT : Network Information Table
PAT : Program Association Table
PCR : Program Clock Reference
SDT : Service Description Table
TS : Transport Stream

ClassA HEADENDS

CRC. Digital Cable-TV MultiCrypt Reception Equipment

- Reception of encrypted Cable TV programs. Standard DVB-C / MPEG-2 (EN 300 429).
- Receiving Modules with Common Interface (EN 50221). The encrypted TV programmes transmitted on QAM Cable-TV channels are de-encrypted and presented on conventional VHF/UHF channels (VSB vestigial side band; any TV system or Colour system).

A CRC headend includes:

As many CRC 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 CRC headends provide a TV multichannel signal whose level is appropriate to feed the distribution network. With an CRC 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.

QAM receiver with Common Interface (Conax, Cryptoworks, Irdeto, keyFly, Mediaguard, Nagravision, Viaccess, ...)

MODEL		CRC-121
REF.		4441
Output channel TV System - VSB		B / G / D / K / I / L
Audio mode		Mono
Output channel Colour System		PAL , SECAM , NTSC
Remote Programming Function		YES
Input channel located between	MHz	51 - 858
Input level	dBm	-64 ... -20 (64QAM modulation)
Selectable output channel located between:	MHz	45 - 862
Adjustable output level	dBµV	65 to 80
Supply voltage	VDC	+12
Max consumption (CAM included)	mA	700

CRC-121

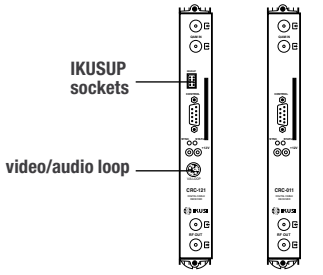
FUNCTIONAL DESCRIPTION OF THE CRC RECEIVERS

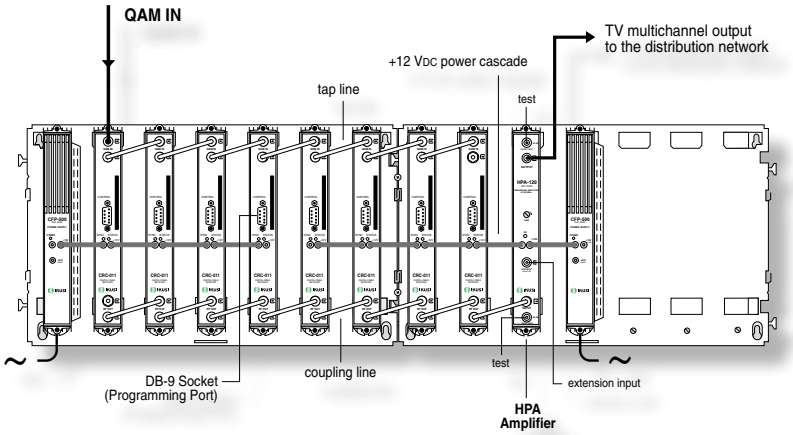
A CRC receiving module with CAM + Operator's Smart Card inserted, carries out a complete channel processing from the input to the output:

- tunes a QAM-modulated RF carrier in the 51-858 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 band.

Programming of the module involves the following selections and settings:

- Central Input Frequency (250 kHz steps).
- Input Symbol Rate (0.001 MS/s steps).
- Input Modulation Scheme (16, 32, 64, 128 or 256QAM).
- 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.





Example of CRC headend for eight encrypted digital cable TV programmes.

CRC

ClassA HEADENDS

CGT. Cable TV QAM-QAM Regeneration Equipment

- TV Standard : DVB-C / MPEG-2 (EN 300 429).
- Transparent Digital Transmodulation Process (QAM → QAM) that regenerates the QAM modulated carriers by correcting the errors arisen in the data stream in the transmission along the cable network. Carrier frequencies (from 51 to 858 MHz) and modulation scheme (16 to 256QAM) of the errorless, regenerated QAM signals can be set equal or different to those of the QAM incoming signals.

A CGT headend includes:

As many CGT Regenerators as QAM channels to be regenerated.
One HPA Amplifier that amplifies the sum of the combined output QAM channels from the regenerators.
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 CGT 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.

QAM-QAM Regenerator

MODEL		CGT-100
REF.		4074
Remote Programming Function		YES
Input channel located between:	MHz	51 - 858
Input level	dBm	-64 ... -20 (64 QAM modulation)
Selectable output channel located between:	MHz	51 - 858
Adjustable output level	dBµV	65 to 80
Supply voltage	VDC	+12
Consumption	mA	620

CGT-100

FUNCTIONAL DESCRIPTION OF THE CGT REGENERATORS

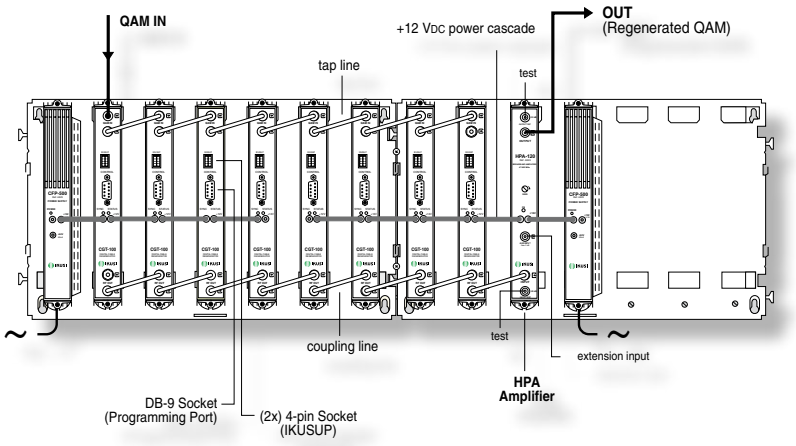
A CGT regenerator carries out the complete channel processing from the input to the output:

- tunes a QAM modulated RF carrier in the 51-858 MHz band,
- demodulates this carrier,
- corrects errors of data stream, and
- re-modulates the errorless data signal on a QAM channel that is selectable within the 51-858 MHz frequency range.

Programming of the module involves the following selections and settings:

-Central Input Frequency (250 kHz increments)
-Input Symbol Rate (0.001 MS/s increments)
-Input Modulation Scheme (16, 32, 64, 128 or 256QAM)
-Central Output Frequency (250 kHz increments)
-Output Modulation Scheme (16, 32, 64, 128 or 256QAM)
-Roll-Off factor (“half Nyquist filter”)
-RF output level

CGT



Example of CGT headend for eight QAM modulated channels.

ClassA HEADENDS

MCP. Vestigial Side Band TV Modulators

MCP-411

- 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.

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.

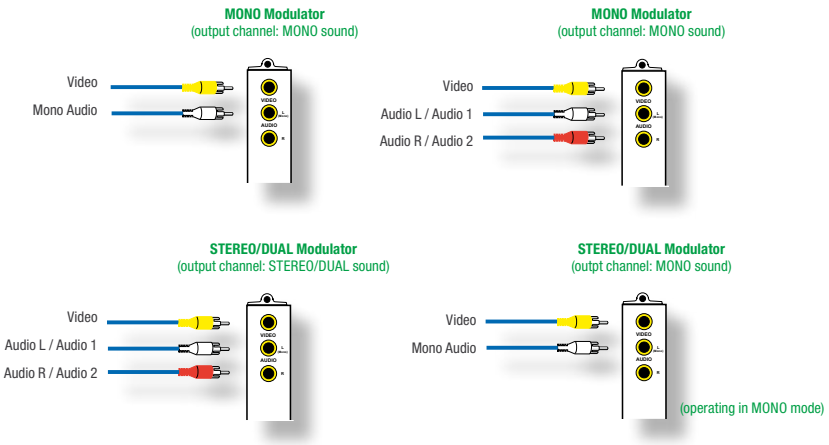
The MCP assembly provides a TV multichannel signal whose level is appropriate to feed the distribution network. An extension input at the HPA amplifier allows easy coupling of the wideband 47-862 MHz signal provided by an existing reception headend.

TV Modulators - Vestigial Side Band

MODEL			MCP-411	MCP-412	MCP-421
REF.			3826	3829	3827
TV System			B / G		D / K / I / L
Audio System			Mono	A2	Mono
Selectable output channel located between:		MHz	45 - 862		
Adjustable RF output level		dBµV	70 to 80		
Intercarrier frequency	Audio 1	MHz	5.5	5.5	6.5 (D,K,L) ,, 6 (I)
	Audio 2	MHz	—	5.742	—
Carrier level ratio		dB	12/16 (Mono ; A2/Nicam:Audio1) ,, 20 (A2:Audio2) ,, 18 to 27 (Nicam:Audio2)		
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		
Audio input impedance		Ω	> 600		
Broadband noise (ΔB=5 MHz)		dBc	< -77		
Supply voltage		VDC	+12		
Comsumption		mA	370	460	370

Audio functionality

The MCP modulators family includes models for mono and stereo/dual operations. The following pictures (*) show the normal use —1 audio source with "mono" models and 2 audio sources with "stereo/dual" models— as well as other possible uses: stereo sources with "mono" models (L and R signals are summed internally) and mono sources with "stereo/dual" models (the modulator is programmed for operating in mono mode).



(*) For simplicity, the pictures are referred to MCP-4xx models.

ClassA HEADENDS

MCP. Vestigial Side Band TV Modulators

MCP-812

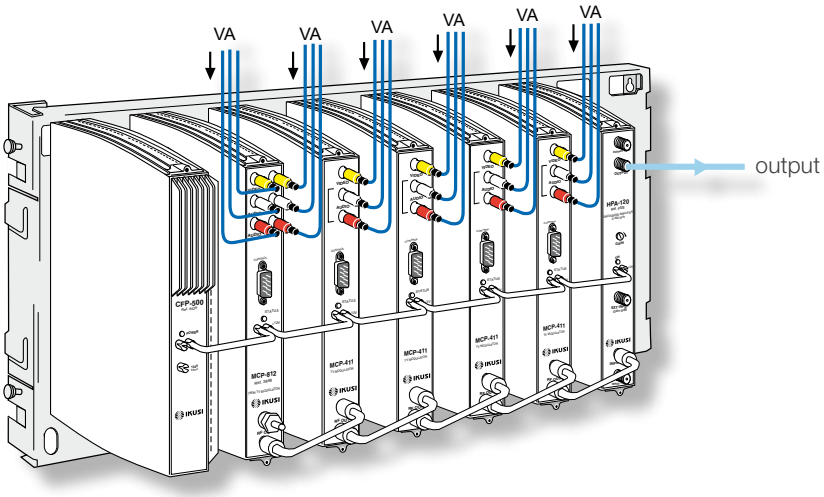
Twin TV Modulators - Vestigial Side Band

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		
Output			TV Bi-Channel each one of the two channels is selectable between: 45 - 862 MHz		
Group delay precorrection			NO	YES	YES
Adjustable output level		dBµV	68 to 78		
Intercarrier frequency	Audio 1	MHz	5.5 (B,G) ,, 6.5 (D,K,L) ,, 6(I)	5.5	5.5
	Audio 2		—	—	5.742
Carrier level ratio		dB	12 / 16	12 / 16	12 / 16 (Audio1) ,, 20 (Audio2)
Video input level		Vpp	0.7 ... 1.4		
Video input impedance		Ω	75		
Adjustable video modulation deph		%	80 to 90		
Audio input level		Vpp	0.5 ... 4.0		
Audio input impedance		Ω	> 600		
Adjustable audio modulation deph		%	60 to 80 (System L)	—	
Broadband noise (ΔB=5 MHz)		dBc	< -73		
Supply voltage		Vdc	+12		
Comsumption		mA	460		560

• 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.

Programming is carried out with the SPI-300 unit, which is connected to each module individually. The process involves the following selections and settings:

- Video Carrier Frequency
- TV System
- Video Modulation Depth
- Audio Modulation Deviation
- Carrier Level Ratio
- Audio Mode (mono-stereo-dual)
- RF Output Level
- Generation of Video Test Signal



MCP

ClassA HEADENDS

HPA. Sat-IF Combiner/Amplifier

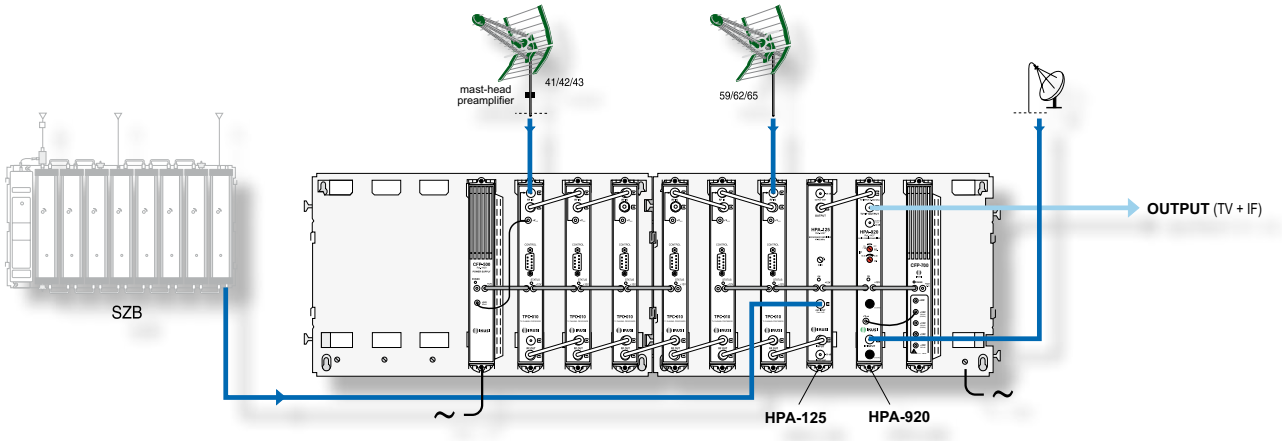
- Application in ClassA headends to drive Sat-IF distribution lines. One HPA-920 per polarity or IF signal being distributed.
- 1 satellite IF input port, with adjustable gain and 0 / 7 dB switchable slope to compensate for cable losses ; 1 terrestrial TV coupling port ; 1 combined TV+IF output port;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

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

HPA-920

- 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



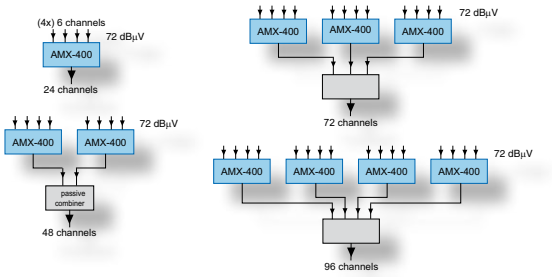
Application of 1 HPA-920 within a ClassA headend which process 6 terrestrial TV channels and amplifies one satellite polarity.

ClassA HEADENDS

AMX. 4-Way 47-862 MHz Active Combiner

- 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.
- Total isolation between inputs.
- Net combining gain. Push-pull amplification technology.
- Adjustable output level. 75Ω output test port.

MODEL		AMX-400
REF.		4433
No. of inputs		4
Frequency range	MHz	45 - 862
Gain	dB	7
Supply voltage	VDC	+12
Consumption	mA	470



AMX-400

Programming and Firmware update

- ClassA modules are programmed and set locally with the SPI-300 programming unit from IKUSI. Firmwares of modules and programming unit can be updated. The corresponding files are downloaded from www.ikusi.com.

SPI-300