



INTRODUCTION

- This catalogue describes the IKUSI products for reception, processing and distribution of terrestrial, satellite and cable signals in individual and collective installations. It includes IPTV streaming headends for Triple Play (internet-television-telephone) LAN networks.
- The catalogue also presents —section 15— products for implementation of Pay-Per-View services in coaxial collective installations.

GENERAL CHARACTERISTICS

- The nominal RF impedance of all electronic products is 75Ω. Return losses at the RF input and output ports are ≥10 dB unless other value is specified.
- Unless notified, the operative ambient temperature range for these products is -10° to +55° C.
- The TV frequency bands designated as BI, BIII and UHF (BIV-BV) are those of the B-G Europe system. The FM Radio band (BII) comprises the frequencies between 87.5 and 108 MHz, and the DAB band thoses comprises between 174 and 240 MHz (unless other frequency interval is specified).
- Specifications in this catalogue are typical and they are subject to change without notice.

CE AND DVB MARKINGS

- With the reproduction of the CE mark, IKUSI guarantees the compliance of the products with the appropriate EN 50083-1, EN 50083-2 and EN 60065 european standards of the European Committee for Electrotechnical Standardization (CENELEC).
- Likewise, with the reproduction of the DVB mark IKUSI guarantees the compliance of the products with the DVB standards. DVB is a registered trademark of the DVB Project.

ENGINEERING CHANGES

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

1 - Antennas — Terrestrial and Satellite Reception

- IKP — TV Antennas - BI 7
- IKS , DAB — FM (BI) and DAB Antennas 7
- INT — TV Antennas - BIII 7
- SGF , UCF , INU , PA , KSG — TV Antennas - UHF 8/9
- CAU — Antenna Connecting-Box UHF Preamplicifiers 9
- Masts, Supports, Pylons 10/11
- RPA — Satellite Dishes 12
- Supports for Satellite Dishes 12
- UEU — LNBS - Quattro and Universal 13

2 - Mast-Head Preamplicifiers

- SBA — Multiband Preamplicifiers - F Connectors 15
- MBS — Multiband Preamplicifiers - F Connectors 16
- MB — Multiband Preamplicifiers - Terminal-Clamp Connection 17
- MBA — Multiband Preamplicifiers - Terminal-Clamp Connection 17
- MMS , MTS — UHF Selective Preamp. - Terminal-Clamp Connection 18
- APB — +24VDC Power Supply - 2 RF Outputs 19
- JSBA , JMBS — «Preamplicifier + Power Supply» Sets 19
- MM — 2-way Band Multiplexers 20

3 - Multichannel and Multiband Headends

- STG — Agile, Amplification&Conversion Modular Equipment 21-26
- SZB — Amplification&Conversion&Modulation Modular Equipment 27-31
- MZB — Amplification Modular Equipment 32/33
- MZ6 — Amplification Modular Equipment 34/35
- CBG — Programmable Terr and Sat Amplification Mini-Headends 36/37
- CBS — Terrestrial Amplification Mini-Headends 38
- CBA — Terrestrial Amplification Mini-Headends 39
- CBM — Terrestrial and Satellite Amplification Micro-Headends 40
- AFI — Sat-IF Combiner/Amplifier 41

4 - ClassA Headends

- Range and General Features 43
- SPI - PRG — Programming Accessories 44
- Installation Accessories 45
- HPA — 47-862 MHz RF Power Amplifiers 46
- CFP — Power Supplies 46
- HMS — Control Units 47
- TPC — Terrestrial&Cable TV-Channel Processors 48/49
- TRF — FTA Digital Terrestrial-TV Receivers 50/51
- TDC — Digital Terrestrial-TV Receivers with Embedded CA 52/53
- TDI — COFDM-QAM Transmodulators 54/55
- SRF — FTA Digital Sat-TV Receivers 56/57
- SDC — Digital Sat-TV Receivers with Embedded CA 58/59
- SRC — Digital Sat-TV Receivers with Common Interface 60/61
- MDI — QPSK-QAM Transmodulators 62/63
- CRF — FTA Digital Cable-TV Receivers 64/65
- CDC — Digital Cable-TV Receivers with Embedded CA 66/67
- CRC — Digital Cable-TV Receivers with Common Interface 68/69
- CGT — QAM-QAM Regenerators 70/71
- MCP — VSB TV Modulators 72/73
- HPA — Sat-IF Combiner/Amplifier 74
- AMX — Active Combiner - 4-way, 47-862 MHz 75

5 - ClassB Headends

- Range and General Features 77
- SPI - PRG — Programming Accessories 78
- CFK — Power Supply 79
- Installation Accessories 79
- TDF — FTA Digital Terrestrial-TV Demodulators 80/81
- SDF — FTA Digital Sat-TV Demodulators 82/83
- SDE — Digital Sat-TV Demodulators with Embedded CA 84/85
- CMK — VSB TV Modulators 86-88

6 - LANTV (Television on IP Networks)

- Range and General Features 89
- TNS — DVB-T to IP Streaming Modules 90
- SNS — DVB-S to IP Streaming Modules 91

7 - Fibre Optics

- FTD — TV + SAT-IF Optical Transmitting Modules 93
- FSP — Optical Splitting Modules 93
- FRD — Compact TV + SAT-IF Optical Receivers 94
- FTR — Compact Return Path Optical Transmitters 95
- FRR — Return Path Optical Receiving Modules 96
- FKH — Distribution and Splice Kits - "Headend" Site 97
- FKR — Distribution and Splice Kit - "Node" Site 97
- Optical Fibre Cables and Jumpers 97

8 - SAT-IF Multiswitches

- Application and Range 99
- RC — Cascadeable Multiswitches Equipment 100-108
- MS — Stand-Alone Multiswitches 109
- RS — Stand-Alone Multiswitches 110

9 - Extension Amplifiers — Apartment Amplifiers

- TAE-500 — Two-way, 862 MHz Extension Amplifiers 111
- TAE-700AR — Two-way, 862 MHz Extension Amplifiers 112
- TAE-900 — Two-way, 862 MHz Extension Amplifiers 113
- TAE-700 — Two-way, 862 MHz Extension Amplifiers 114
- TAE-200 — One-way, 862 MHz Extension Amplifiers 115
- SAE-910 — Two-way, 2150 MHz Extension Amplifiers 116
- SAE-820 , SAE-920 — One-way, Double 2150 MHz Ext. Amplifiers 117
- ACP-425 — AC Power Supply 118
- TAE-300 — Two-way, 862 MHz Apartment Amplifiers 119
- ATP-900 — Two-way, 2150 MHz Apartment Amplifiers 120
- ATP-300 — One way, 862 MHz Apartment Amplifiers 121
- ATB-100 — One way, 862 MHz Apartment Amplifiers 122

10 - Line and Distribution CATV Amplifiers — Return TV Modulators

- TAL — Configurable Line and Distribution Amplifiers 123-126
- TSI — AC Power Supply/Power Inserter - RF Configurable 127
- MVR — Return VSB TV Modulator 128

11 - Distribution Elements

- DLS — Indoor Tap-offs - 1000 MHz 129/130
- UDL — Indoor Tap-offs - 2300 MHz 131/132
- DVS — Indoor Splitters - 1000 MHz 133
- UDV — Indoor Splitters - 2300 MHz 133
- CIS , SIS , IIS — Indoor, Divers - 2150 MHz 134
- RLDC , RLS , RPI , GS — Outdoor, Divers - 1000 MHz 135-137
- RMT — Outdoor Tap-offs - 1000 MHz 138/139
- ARTU — Wall Outlets (TV - RD) 140
- ARTU — Wall Outlets (TV/RD - SAT) 141
- ARTU — Wall Outlets (TV - RD - SAT) 142

12 - Coaxial Cables and Connectors

- Indoor Distribution Cables 143
- CATV Trunk&Feeder Cables 144
- Cable Connectors 145

13 - Rack Cabinets — Electronic Accessories

- 19" Rack Cabinets — "Top Line" 147
- 19" Rack Cabinets — "Standard Line" 148
- Plug-in Electronic Accessories - 862 MHz 149
- Electronic Accessories - 862 MHz 150
- Electronic Accessories - 2150 MHz 151

14 - User's Equipment — Measuring Equipment

- MAW — Home DSB TV Modulator 153
- DSA — Signal Analysers 154/155

15 - Pay-Per-View

- vHOTEL — PPV System for Hotels 157-161

16 - Technical Annex

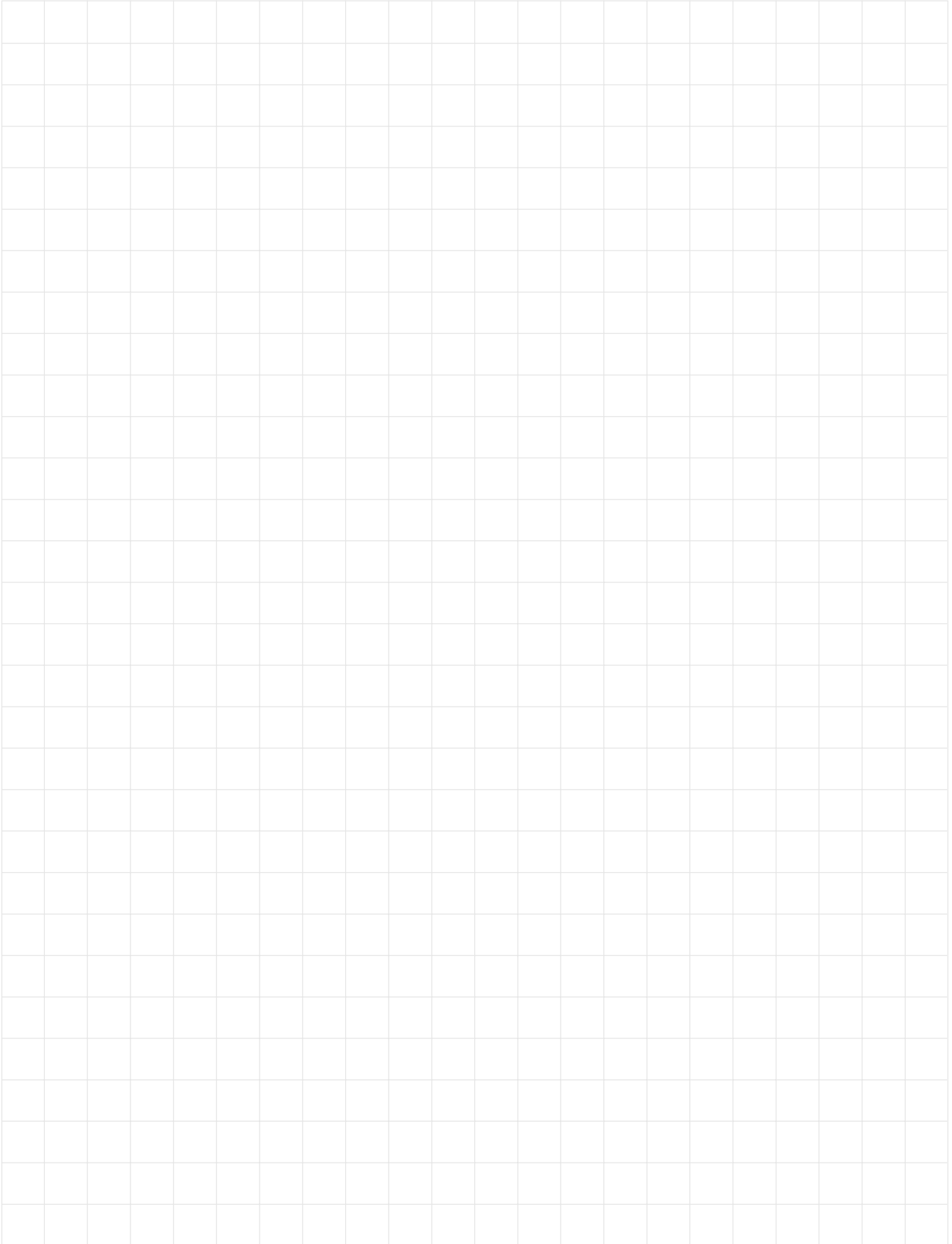
- World Analog TV Standards 163
- TV Channel Allocation 164-167
- Diverse Technical Information 168/169

Model List

Model	Page	Model	Page	Model	Page	Model	Page	Model	Page	Model	Page		
ABF-010	149	CCI-191	143	FAV-120	149	MS-1712	109	RMT102-26	138	STG-140	22	TIF-100	145
ABR-906	31,33,35	CCIB175	143	FAV-920	151	MS-1716	109	RMT104-8	139	STG-142	22	TIF-102	145
ABT-210	142	CCIB190	143	FCA-400	97	MTS-UHF	18	RMT104-11	139	STG-168	22	TMA-883	126
ACP-425	118	CCS-175	143	FDH-215	145	MVR-600	128	RMT104-14	139	STG-190	25	TMA-884	126
AFI-840	41	CCS-178	143	FIS-950	151	MZB-119	32	RMT104-17	139	STG-230	25	TMA-886	126
AMA-111	11	CCS-190	143	FIT-501	148	MZB-128	32	RMT104-20	139	STG-301	23	TMC-102	126
AMA-112	11	CCT-125	144	FJU-100	97	MZB-129	32	RMT104-23	139	STG-303	23	TMP-880	126
AMX-400	75	CCT-126	144	FKH-104	97	MZB-139	32	RMT104-26	139	STG-304	23	TMP-890	126
APB-524	19	CCT-171	144	FKH-208	97	MZB-141	32	RMT108-11	139	STG-306	23	TNS-100	90
ARF-100	145	CCT-650	144	FKH-312	97	MZB-168	32	RMT108-14	139	STG-307	23	TPC-510	49
ART-630	147	CCTB125	144	FKR-104	97	MZB-182	32	RMT108-17	139	STG-310	23	TPC-110	49
ART-642	147	CDB-200	45,79	FPB-2137	149	MZB-184	32	RMT108-20	139	STG-311	23	TRF-011	51
ARTU000	140	CDC-V200	67	FPB-3869	149	MZB-185	32	RMT108-23	139	STG-330	23	TRF-014	51
ARTU001	140	CDP-102	45,79	FRB-203	150	MZB-209	33	RMT108-26	139	STG-331	23	TRF-051	51
ARTU002	140	CFA-075	149	FRD-350	94	MZB-119	34	RPA-060	12	STG-340	23	TRF-111	51
ARTU009	141	CFK-700	79	FRH-081	145	MZB-128	34	RPA-060C	12	STG-341	23	TRF-112	51
ARTU050	140	CFP-500	46	FRR-310	96	MZ6-129	34	RPA-060T	12	STG-504	22	TRF-114	51
ARTU051	140	CFP-700	46	FSP-302	93	MZ6-139	34	RPA-080	12	STG-505	22	TRF-121	51
ARTU052V	140	CFR-680	145	FSP-303	93	MZ6-141	34	RPA-080D	12	STG-820	24	TSI-500	127
ARTU059	141	CGT-100	71	FTD-314	93	MZ6-168	34	RPA-080T	12	STG-825	24	TTF-090	145
ARTU201	140	CHD-950	145	FTR-301	95	MZ6-182	34	RPA-100	12	SZB-119	27	UCF-013	8
ARTU251	140	CIS-110	134	GMA-400	11	MZ6-183	34	RPA-100T	12	SZB-128	27	UCF-015	8
ARTU900	141	CIS-116	134	GRT-602	147	MZ6-184	34	RPI-100	136	SZB-129	27	UCF-170	145
ARTU901	141	CLP-125	145	GS16DGV	137	MZ6-185	34	RS-A504	110	SZB-139	27	UCF-175	145
ARTU902	141	CLP-540	145	HMS-120	47	MZ6-709	35	RS-A508	110	SZB-141	27	UDL-110	131
ARTU903	141	CMC-650	145	HMS-130	47	OCR-100	87	RS-A512	110	SZB-148	27	UDL-115	131
ARTU950	141	CMK-600	87	HPA-120	46	OLS-200	87	RS-A516	110	SZB-168	27	UDL-120	131
ARTU951	141	CMM-580	145	HPA-125	46	OMF-520	148	RSI5904	106	SZB-182	27	UDL-125	131
ARTU952	141	COF-120	26	HPA-920	74	OMF-530	148	RVR-066	149	SZB-183	27	UDL-210	131
ARTU-50	142	COF-700	45	IAR-300	150	OMF-540	148	SAE-820	117	SZB-184	27	UDL-215	131
ARTU-S1	142	COF-806	31,33,35	IEF-024	149	OMH-110	151	SAE-912	116	SZB-185	27	UDL-220	131
ARTU-U0	142	COF-809	31,33,35	IFC-215	151	OMR-300	79	SAE-916	116	SZB-190	29	UDL-225	131
ATB-121	122	COF-812	31,33,35	IIS-100	134	OMR-600	45	SAE-920	117	SZB-211	31	UDL-410	132
ATB-122	122	COF-818	31,33,35	IKP-3E/3	7	OST-200	87	SAI-311	145	SZB-212	31	UDL-415	132
ATB-124	122	COF-836	31,33,35	IKS-1E/FM	7	PA-2169/14	8	SAW-200	87	SZB-351	28	UDL-420	132
ATB-181	122	COR-220	45,79	IKS-3E/FM	7	PBT-100	140	SAW-201	87	SZB-353	28	UDL-425	132
ATP-302	121	CPF-650	145	INT-070	7	PBT-200	141	SAW-203	87	SZB-355	28	UDL-816	132
ATP-322	121	CRC-011	69	INT-110	7	PLC-650	145	SBA-100	15	SZB-410	30	UDL-820	132
ATP-332	121	CRC-121	69	INU-B09	8	PMR-600	45	SBA-110	15	SZB-430	30	UDL-825	132
ATP-931	120	CRF-111	65	INU-B11	8	PRG-300	44,78	SBA-210	15	SZB-440	30	UDV-205	133
ATP-961	120	CRF-121	65	INU-F09	8	PRT-030	147	SBA-211	15	SZB-549	28	UDV-307	133
AV-020	149	CRT-119	147	INU-F11	8	PRT-042	147	SBA-212	15	TAC-400	148	UDV-408	133
BAP-200	12	CTF-075	145	JMBS210	19	PSU-015	100,105	SBA-220	15	TAC-401	148	UDV-612	133
BAS-120	26	CTF-125	145	JSBA100	19	PVS-100	158	SBA-353	15	TAC-402	148	UDV-813	133
BAS-700	45	CTF-175	149,151	JSBA110	19	PZB-453	31	SBA-373	15	TAC-403	148	UEU-121K	13
BAS-900	45	CTF-190	145	JSBA210	19	PZB-465	33,35	SCA-150	161	TAE-208	115	UEU-124K	13
BAS-916	31	CTP-125	145	JSBA353	19	PZB-969	31,33,35	SCF-085	12	TAE-316	119	V-2T	149
BAS-919	31	CTP-200	159	KSG-120	9	RAC-510	148	SDC-C100	59	TAE-323	119	VEQ-860	149
BAS-956	33,35	CVA-002	153	KSG-140	9	RAC-520	148	SDC-C400	59	TAE-324	119	VRT-602	147
BAS-959	33,35	DAB-030	7	KSG-160	9	RAC-530	148	SDC-C600	59	TAE-326	119		
BCF-060	149,151	DH-13	149	MAW-180	153	RC-9410	101	SDC-G106	59	TAE-581	111		
BEC-400	148	DLS-204	129	MB-01	17	RC-9415	101	SDC-M100	59	TAE-582	111		
BGM-016	36	DLS-208	129	MB-220	17	RC-9420	101	SDC-V100	59	TAE-583	111		
BTA-225	11	DLS-211	129	MB-222	17	RC-9425	101	SDC-V200	59	TAE-584	111		
BUS-013	45,79	DLS-214	129	MB-245	17	RC-9810	102	SDC-V300	59	TAE-586	111		
CAD	145	DLS-217	129	MB-255	17	RC-9815	102	SDC-V400	59	TAE-587	111		
CAU-B12	9	DLS-220	129	MB-321	17	RC-9820	102	SDE-C00	85	TAE-588	111		
CAU-F12	9	DLS-223	129	MB-322	17	RC-9825	102	SDE-C00R	85	TAE-589	111		
CBA-201	39	DLS-408	129	MBA-410	17	RC17410	103	SDE-G06R	85	TAE-733	114		
CBA-204S	39	DLS-411	129	MBA-510	17	RC17415	103	SDE-M00	85	TAE-736	114		
CBG-136	36	DLS-414	129	MBA-545	17	RC17420	103	SDE-V00	85	TAE-733AR	112		
CBG-937	37	DLS-417	129	MBS-200	16	RC17425	103	SDF-102	83	TAE-734AR	112		
CBM-113	40	DLS-420	129	MBS-210	16	RC17810	104	SGF-012	8	TAE-736AR	112		
CBM-115	40	DLS-423	129	MBS-300	16	RC17815	104	SGF-014	8	TAE-933	113		
CBM-125	40	DLS-812	130	MBS-2310	16	RC17820	104	SGF-016	8	TAE-935	113		
CBM-175	40	DLS-814	130	MCP-411	73	RC17825	104	SGF-114	8	TAL-883	124		
CBM-184	40	DLS-817	130	MCP-412	73	RD1910	106	SIS-102	134	TAL-884	124		
CBM-185	40	DLS-820	130	MCP-414	73	RD1915	106	SMR-120	26	TAL-886	124		
CBM-193	40	DLS-823	130	MCP-421	73	RD1920	106	SMR-300	79	TAL-888	124		
CBM-685	40	DMS-200	151	MCP-422	73	RD1925	106	SMR-600	45	TAL-893	124		
CBS-501	38	DMS-300	151	MCP-431	73	RFM-040	149	SNS-100	91	TAL-894	124		
CBS-534	38	DRT-600	147	MDI-810	63	RH-8200	100	SNS-101	91	TAL-896	124		
CBS-702	38	DSA-100	154	MDI-900	63	RL-9100	105	SPA-240	12	TBF-101	145		
CBS-734	38	DSA-500	154	MDI-910	63	RL-9200	105	SPI-300	26,30,44,78,128	TDC-580	145		
CBS-734DK	38	DTP-200	161	MMS-UHF	18	RLDC10-08	135	SRC-011	61	TDC-C400	53		
CBS-744	38	DVS-204	133	MMU	20	RLDC10-12	135	SRC-051	61	TDC-V100	53		
CBS-761	38	DVS-408	133	MM V-U	20	RLDC10-16	135	SRC-111	61	TDC-V200	53		
CBS-901	38	DVS-610	133	MS-0504	109	RLS10-2	136	SRF-011	57	TDC-V400	53		
CBS-934	38	ECC	145	MS-0508	109	RLS10-3	136	SRF-051	57	TDE-100	136		
CBS-944	38	EHP-162	145	MS-0512	109	RMT102-4	138	SRF-111	57	TDE-102	131		
CCH-175	143	EIF-025	149	MS-0516	109	RMT102-8	138	SRF-112	57	TDI-900	55		
CCI-174	143	FAM-006	149	MS-0904	109	RMT102-11	138	SRF-121	57	TER-803	150		
CCI-175	143	FAM-012	149	MS-0908	109	RMT102-14	138	SRF-122	57	TER-805	150		
CCI-176	143	FAM-020	149	MS-0912	109	RMT102-17	138	SRF-131	57	TER-806	150		
CCI-179	143	FAR-900	145	MS-0916	109	RMT102-20	138	STG-110	22				
CCI-190	143	FAV-020	149	MS-1708	109	RMT102-23	138	STG-130	22				

Reference List

Ref.	Page	Ref.	Page	Ref.	Page	Ref.	Page	Ref.	Page	Ref.	Page	Ref.	Page
1023	109	1596	34	2221	145	2655	138	3181	113	3451	38	4074	71
1024	109	1597	34	2224	31,33,35	2656	138	3182	113	3452	38	4076	59
1025	109	1598	34	2225	31	2657	138	3183	113	3453	38	4084	57
1026	109	1600	35	2226	31,33,35	2658	138	3184	113	3455	38	4085	51
1027	109	1601	33,35	2228	31	2659	138	3192	114	3456	38	4086	65
1028	109	1602	33,35	2229	31	2663	139	3201	111	3457	38	4087	65
1029	109	1603	34	2231	31,33,35	2664	139	3202	111	3458	38	4088	51
1030	109	1604	34	2232	31,33,35	2665	139	3203	111	3464	38	4089	57
1031	109	1605	34	2233	31,33,35	2666	139	3204	111	3465	38	4091	63
1032	109	1640	145	2237	30	2667	139	3207	111	3466	38	4092	61
1033	109	1674	149	2238	30	2668	139	3208	111	3488	121	4094	63
1067	12	1692	8	2239	30	2669	139	3210	112	3489	121	4095	61
1107	151	1695	9	2240	27	2673	139	3226	131	3490	120	4096	61
1113	13	1696	9	2241	27	2674	139	3227	131	3491	120	4097	69
1114	13	1697	9	2242	27	2675	139	3228	131	3500	116	4401	46
1120	100	1706	7	2244	27	2676	139	3229	131	3503	116	4402	45
1121	105	1715	7	2245	153	2677	139	3232	131	3507	117	4403	45
1122	105	1720	7	2246	27	2678	139	3233	131	3509	121	4407	45
1123	100,105	1725	7	2247	31	2682	135	3235	132	3515	117	4411	45
1124	101	1729	7	2293	27	2683	135	3236	132	3540	40	4412	59
1125	101	1730	7	2294	27	2684	135	3237	132	3541	40	4413	59
1126	101	1731	8	2297	28	2685	136	3238	132	3542	40	4416	45
1127	101	1732	8	2298	28	2686	136	3241	151	3543	40	4417	45
1128	102	1733	8	2299	28	2687	136	3242	151	3544	40	4418	59
1129	102	1734	8	2310	31,33,35	2689	145	3244	131	3545	40	4419	51
1130	102	1735	8	2350	145	2719	142	3245	131	3546	40	4420	51
1131	102	1736	8	2351	145	2720	142	3251	32	3547	40	4421	51
1132	103	1737	8	2353	149	2734	140	3252	32	3616	45,79	4424	59
1133	103	1738	8	2355	149	2735	140	3253	32	3618	148	4425	59
1134	103	1739	8	2357	149	2736	140	3254	32	3620	148	4426	46
1135	103	1740	8	2360	145	2737	140	3256	33	3622	148	4427	46
1136	104	1847	145	2364	145	2750	140	3257	32	3626	148	4429	46
1137	104	1851	145	2365	145	2763	140	3258	32	3640	147	4430	45,79
1138	104	1874	11	2366	145	2766	140	3259	32	3641	147	4431	53
1139	104	1875	11	2368	145	2801	22	3260	32	3642	147	4433	75
1140	106	1876	11	2370	145	2802	22	3261	32	3643	147	4435	47
1141	106	1880	10	2371	145	2803	22	3307	133	3644	147	4436	47
1142	106	1881	10	2376	149	2804	25	3308	133	3645	147	4437	74
1143	106	1885	10	2377	145	2808	26	3309	133	3646	147	4440	67
1144	106	1911	11	2378	149	2810	26	3310	133	3800	148	4441	69
1145	110	1912	11	2379	149,151	2811	22	3334	133	3802	148	4450	53
1146	110	1913	11	2469	141	2813	23	3335	133	3804	148	4451	53
1147	110	1915	11	2470	140	2815	23	3336	133	3805	147	4452	53
1148	110	1916	11	2472	141	2816	23	3340	129	3826	73	4453	53
1163	118	1917	11	2473	141	2820	23	3341	129	3827	73	4461	51
1164	41	1918	11	2474	141	2821	23	3342	129	3828	73	4463	51
1181	122	1919	11	2475	141	2822	23	3343	129	3829	73	4501	79
1182	122	1920	11	2476	141	2823	23	3344	129	3830	73	4507	87
1183	122	1921	11	2477	141	2825	23	3348	129	3831	73	4509	87
1184	122	1923	11	2478	141	2828	23	3349	129	3832	85	4510	87
1195	17	1934	10	2479	141	2829	23	3350	129	3833	85	4511	79
1202	16	1935	10	2480	141	2830	22	3351	129	3838	81	4512	79
1208	19	1936	10	2501	143	2831	22	3352	129	3842	49	4516	87
1209	19	1937	10	2505	144	2832	22	3353	129	3843	49	4700	161
1210	19	1938	10	2506	143	2833	25	3355	129	3931	114	4701	159
1211	19	1940	11	2507	144	2834	23	3356	129	3948	124	4704	45,79
1212	19	1941	10	2510	145	2835	26	3357	130	3949	124	4705	161
1218	15	1942	11	2511	145	2836	24	3358	130	3950	124	4706	45,79
1219	15	1943	11	2512	145	2837	24	3359	130	3951	126	4716	158
1270	20	1944	11	2513	145	2838	37	3360	130	3952	126	4814	154
1276	20	1945	11	2514	144	2840	36	3361	130	3953	126	4815	154
1287	18	1946	11	2515	144	2841	36	3365	133	3954	126	4902	93
1340	31,33,35	1948	11	2516	143	2878	11	3366	132	3963	119	4903	94
1346	29	1949	12	2517	145	2898	126	3367	132	3964	119	4904	93
1353	148	1950	11	2520	143	2974	136	3368	132	3965	119	4905	93
1382	145	2012	143	2521	143	3028	153	3371	151	3966	119	4906	95
1383	145	2013	144	2522	143	3065	12	3372	151	3969	112	4907	96
1407	149	2014	143	2545	140	3066	12	3374	134	3971	126	4908	97
1408	149	2015	143	2548	142	3067	12	3375	134	3973	124	4909	97
1423	31	2016	143	2562	128	3068	12	3376	134	3974	124	4910	97
1429	18	2017	143	2593	150	3069	12	3377	134	3975	124	4911	97
1433	18	2018	143	2594	150	3070	12	3378	151	3976	112	4912	97
1460	142	2023	17	2605	148	3071	12	3391	15	4021	55	4913	97
1502	145	2024	17	2606	148	3072	12	3392	15	4022	85	5100	91
1503	145	2100	149	2607	148	3073	12	3393	15	4023	59	5101	91
1516	145	2101	149	2608	150	3105	149	3394	15	4025	59	5102	90
1519	149,151	2137	149	2609	150	3107	149	3395	16	4027	85	9602	44,78
1521	145	2139	115	2614	148	3122	149	3396	16	4059	57		
1538	145	2140	39	2622	87	3127	149	3397	16	4060	57		
1560	111	2141	39	2623	87	3129	149	3398	15	4061	57		
1561	111	2179	127	2625	87	3130	149	3399	15	4062	57		
1579	33,35	2180	17	2628	150	3151	27	3407	17	4063	57		
1590	34	2184	17	2651	137	3152	27	3409	17	4067	59		
1591	34	2185	17	2652	138	3159	28	3428	19	4068	83		
1593	34	2186	17	2653	138	3160	27	3430	9	4069	85		
1595	34	2190	17	2654	138	3161	27	3431	9	4070	26,30,44,78,128		



▶ ANTENNAS – TERRESTRIAL RECEPTION

TV and Radio Antennas – VHF Band

- Elements and support square-bars made of aluminium.
- Pre-assembled. Clamping system for masts of $\varnothing 25$ to 50 mm. Variable clamp tilt: $+23^\circ$ to -10° (BI and FM antennas), $\pm 30^\circ$ (BIII) and 0° to $+30^\circ$ (DAB).
- Terminal-clamp connection.
- Polystyrene connecting-box with weatherproofing IP55 grade.
- Impedance: 75Ω . Specified gain is relative to a dipole; add 2.18 dB to obtain the isotropic gain.

TV antennas - BI

Model	Ref.	Channel	Type	Gain dB	Front-to-back ratio dB	Beamwidth		Windload for velocities 130/150 km/h N	Connection	Quantity boxed
						H°	V°			
IKP-3E/3	1706	E3	YAGI (3 elements)	6	≥ 19	68	110	68 / 93	Terminal-clamp	6

- Vibration-proof elements.

Radio antennas - FM (BII) and DAB

Model	Ref.	Frequency range MHz	Type	Gain dB	Front-to-back ratio dB	Beamwidth		Windload for velocities 130/150 km/h N	Connection	Quantity boxed
						H°	V°			
IKS-1E/FM	1725	87.5 - 108	CIRCULAR	0	0	-	-	28 / 38	Terminal-clamp	10
IKS-3E/FM	1729	87.5 - 108	YAGI (3 elements)	6	≥ 15	70	110	70 / 96	Terminal-clamp	6
DAB-030	1730	174 - 240	YAGI (3 elements)	5	10	150	65	15 / 20	Terminal-clamp	10

TV antennas - BIII

Model	Ref.	Channels	Type	Gain dB	Front-to-back ratio dB	Beamwidth		Windload for velocities 130/150 km/h N	Connection	Quantity boxed
						H°	V°			
INT-070	1715	E5 - E12	YAGI (7 elements)	8.5	≥ 15	45	70	31 / 42	Terminal-clamp	10
INT-110	1720	E5 - E12	YAGI (11 elements)	10.5	≥ 20	35	65	79 / 108	Terminal-clamp	10

- For vertical polarization use the straight bracket Ref. 1912 (page 11).



IKP-3E/3



IKS-1E/FM



IKS-3E/FM



DAB-030



INT-070



INT-110

▶ ANTENNAS – TERRESTRIAL RECEPTION

TV Antennas – UHF Band

- Elements and support square-bars made of aluminium.
- Pre-assembled (except KSG models). Clamping system for masts of $\varnothing 25$ to 50 mm. Variable clamp tilt: 0° to $+30^\circ$.
- Cable connection: F connector or terminal-clamp.
- Polystyrene connecting-box with weatherproofing IP55 grade. The box is detachable for easy connection of the coaxial cable. Preamplifiers available (see next page).
- Impedance: 75Ω . Specified gain is relative to a dipole; add 2.18 dB to obtain the isotropic gain.

Model	Ref.	Channels	Type	Nominal gain ⁽¹⁾ dB	Front-to-back ratio dB	Beamwidth		Windload for velocities 130/150 km/h N	Connection	Quantity boxed
						H°	V°			
SGF-012	1731	21 - 69	COLLINEAR λ (1 dihedral reflector)	12	≥ 20	44	35	59 / 80	F connector	10
SGF-014	1732	21 - 69		14	≥ 25	30	29	85 / 116	F connector	5
SGF-114	1733	21 - 69		14	≥ 25	30	29	85 / 116	F connector	1
SGF-016	1734	21 - 69		16	≥ 25	23	22	133 / 182	F connector	4
UCF-013	1735	21 - 69	COLLINEAR λ (1 dihedral reflector)	13	≥ 20	38	43	56 / 77	F connector	5
UCF-015	1736	21 - 69		15	≥ 25	35	42	83 / 113	F connector	5
INU-F09	1739	21 - 69	YAGI (1 dihedral reflector)	9	≥ 20	55	57	44 / 60	F connector	10
INU-F11	1740	21 - 69		11	≥ 20	40	50	52 / 71	F connector	10
INU-B09	1737	21 - 69		9	≥ 20	55	57	44 / 60	Terminal-clamp	10
INU-B11	1738	21 - 69		11	≥ 20	40	50	52 / 71	Terminal-clamp	10
PA-2169/14	1692	21 - 69	4 COL. DIPOLES (1 panel reflector)	14	≥ 25	39	26	102 / 140	Terminal-clamp	4

● Usable for horizontal or vertical polarization (only horizontal in model SGF-016).

● Models with F type connection are supplied with 1 screw-on F plug and 1 rubber protection cap.

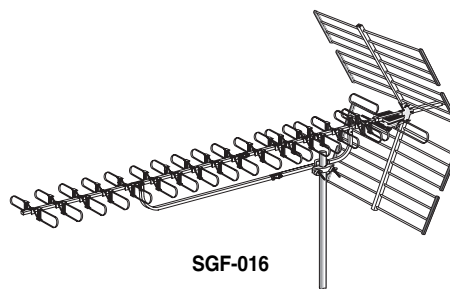
⁽¹⁾ See *Gain Graphs* on next page.



SGF-012



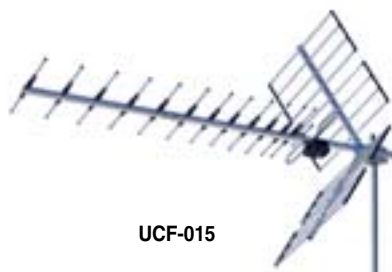
SGF-014
SGF-114



SGF-016



UCF-013



UCF-015



INU - F09
INU - B09



INU-F11
INU-B11



PA-2169/14

▶ ANTENNAS — TERRESTRIAL RECEPTION

TV Antennas — UHF Band

(cont'd)

TV-UHF antenna KITS

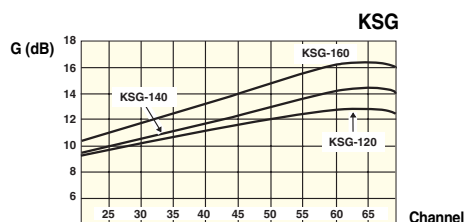
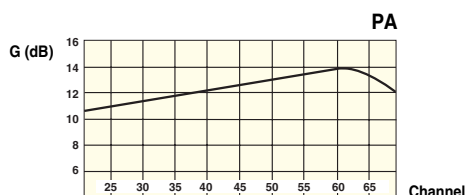
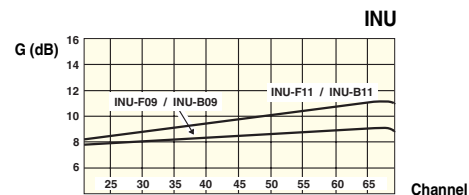
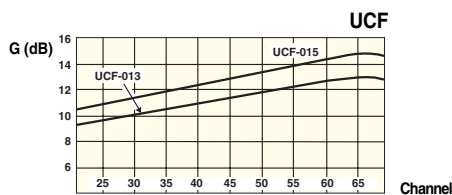
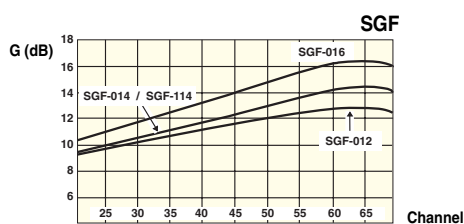
Model	Ref.	Channels	Type	Nominal gain ⁽¹⁾ dB	Front-to-back ratio dB	Beamwidth		Windload for velocities 130/150 km/h N	Connection	Quantity boxed
						H°	V°			
KSG-120	1696	21 - 69	COLLINEAR λ (1 dihedral reflector)	12	≥ 25	44	35	59 / 80	Terminal-clamp	10
KSG-140	1695	21 - 69		14	≥ 25	30	29	85 / 116	Terminal-clamp	7
KSG-160	1697	21 - 69		16	≥ 25	23	22	133 / 182	Terminal-clamp	4

● Economical. The antennas are supplied wholly disassembled.

⁽¹⁾ See Gain Graphs below.



Gain Graphs of UHF Antennas



Antenna Connecting-Box UHF Preampifiers

● Two models, for F type or terminal-clamp connection. Model with F-type connection is fitted in the connecting-box of SGF, UCF and INU antennas. Model with terminal-clamp connection may be fitted in the connecting-box of any UHF antenna —IKUSI and other brands— that have this type of connection.

Model	Ref.	Connection	Bandwidth MHz	Gain dB	Noise figure dB	Operating voltage ⁽¹⁾ VDC	Consumption mA	Output level ⁽²⁾ dB μ V	Dimensions mm
CAU-F12	3431	F connector	470 - 862	12	3.5	+24	7	90	40 x 30 x 25
CAU-B12	3430	Terminal-clamp							40 x 30 x 12

⁽¹⁾ Line powering via coaxial cable, from the APB-524 power supply unit (see page 19) or from a compact amplifier fitted with +24 VDC feed-through facility.

⁽²⁾ IMD3 -60dB, DIN 45004B.



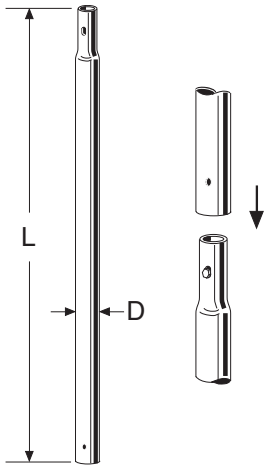
CAU-F12



CAU-B12

▶ ANTENNAS – TERRESTRIAL RECEPTION

Masts



Plug-in Masts

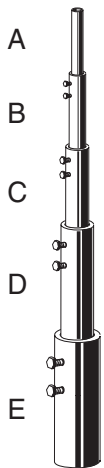
Ref.	Length m	Diameter mm	Thickness mm	Max permissible Bending Moment N-m	Intrinsic Moment * for wind velocities 130/150 km/h N-m	Useful Bending Moment * for wind velocities 130/150 km/h N-m
1941	3	40	1.5	395	60 / 82	335 / 313
1880	2.5	35	1.5	298	46 / 63	252 / 235
1881	1.5	35	1.5	298	13 / 18	285 / 280
1885	2.5	30	1	150	31 / 42	119 / 108

* A clamped-in length equals $1/6 L$ is taken on.

- Pluggable for double configurations.
- Material: zincd, quality S235JR (EN 10025) steel.
- For anchorage on $\varnothing 30$ and 35 mm use the rope-bracing Ref. 1916 (next page).

Double configurations	Intrinsic Moment * v = 130/150 km/h
1941 + 1941	235 / 321 N-m
1880 + 1880	180 / 246 N-m
1885 + 1885	121 / 164 N-m
1880 + 1881	109 / 149 N-m

Telescopic Masts



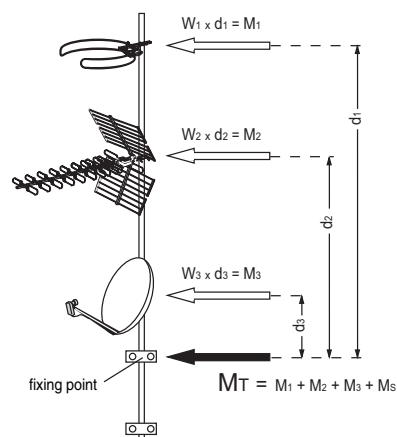
Ref.	Section	Length m	Diameter mm	Thickness mm	Max permissible Bending Moment N-m	Intrinsic Moment for wind velocities 130/150 km/h N-m
1934	A	3	25	1.5	144	54 / 74
1935	B	3	30	1.5	213	64 / 88
1936	C	3	35	1.5	298	75 / 103
1937	D	3	40	1.5	395	86 / 118
1938	E	3	45	1.5	505	97 / 133

- Easy mounting. Heights of up to 14.2 m.
- Material: zincd, quality S235JR (EN 10025) steel.
- For anchorage on $\varnothing 30$ and 35 mm use the rope-bracing Ref. 1916 (next page).

Configurations possible

Max useful length	14.2 m	11.4 m	8.6 m	5.8 m	3 m
Sections to be used	A+B+C+D+E	A+B+C+D	A+B+C	A+B	A

- Calculation of the MT Bending Moment at the fixing point of a mast with several antennas

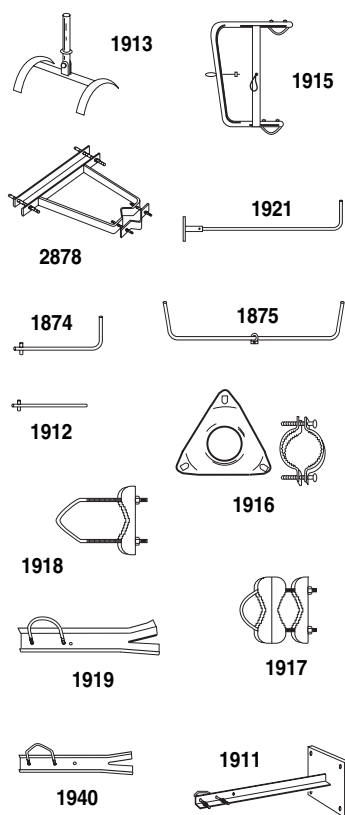


$W_{1,2,3}$ = Windloads of the antennas
 $M_{1,2,3}$ = Bending Moments because each antenna
 MS = Intrinsic Moment of the mast
 MT = Total Bending Moment at the fixing point

▶ ANTENNAS – TERRESTRIAL RECEPTION

Supports

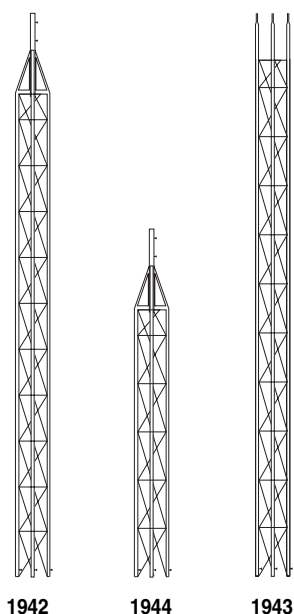
- General material: zincd, quality S235JR (EN 10025) steel.



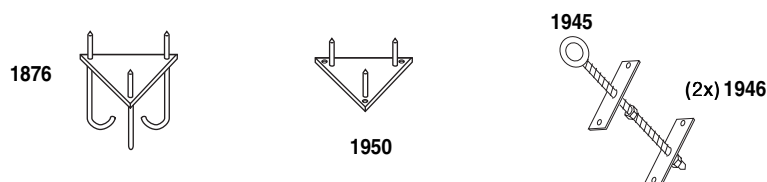
Ref.	Description
1913	Tiltable ridge-tale base for $\varnothing 30$ to 35 mm masts.
1915	Chimney support for $\varnothing \leq 45$ mm masts.
2878	Bracket set for distant wall-mounting of $\varnothing \leq 45$ mm masts.
1921	Window angled bracket. Length: 85 cm; $\varnothing 25$ mm.
1874	Off-centre single-angled bracket for $\varnothing \leq 45$ mm masts. Pipe: $\varnothing 25/22$ mm. Hor. length: 80 cm; Vert. length: 25 cm.
1875	Off-centre double-angled bracket for $\varnothing \leq 45$ mm masts. Pipe: $\varnothing 25/22$ mm. Hor. length: 120 cm; Vert. length: 25 cm.
1912	Off-centre straight bracket for $\varnothing \leq 45$ mm masts. Pipe: $\varnothing 25/22$ mm. Length: 50 cm.
1916	Rope-bracing set for $\varnothing 30$ to 35 mm masts.
1918	Rail clamp for $\varnothing \leq 45$ mm masts.
1917	Double rail clamp for $\varnothing \leq 45$ mm masts.
1919	Wall reinforced clamp, length 40 cm. For $\varnothing \leq 45$ mm masts.
1940	Wall 26P clamp, length 25 cm. For $\varnothing \leq 40$ mm masts.
1911	GMA-400 . Wall-screwing clamp, length 40 cm. For $\varnothing \leq 45$ mm masts.
1920	Tensioner 1/4". Adjustable length: 16 to 22 cm.
1923	Enclosed cable clip.

Pylons

- Made from $\varnothing 20$ mm pipe and $\varnothing 6$ mm lattice-rod. Three available sections with joining ends to facilitate coupling when building high towers.
- Material for pylons and accessories: zincd, quality S235JR (EN 10025) steel.



Ref.	Description
1942	Trestle-tower or upper section, 2.5 m. Top end adapted for housing the Ref. 1941 point mast (see previous page).
1944	Trestle-tower or upper section, 1.5 m. Top end adapted for housing the Ref. 1941 point mast (see previous page).
1943	Lower section, 2.5 m. To be coupled to an upper section or to be used as intermediate section. Resulting trestle-tower requires rope-bracing.
1876	Hooked, triangular fixed base, side 225 mm. Three bolts for securing the trestle-tower.
1950	BTA-225 . Screwed, triangular fixed base, side 225 mm. Three bolts for securing the trestle-tower.
1945	AMA-112 . M14 rod for rope-brace anchoring. Length: 380 mm. Ring: $\varnothing 48$ mm.
1946	AMA-111 . Plate 200 x 50 mm for rope-brace anchoring.
1948	Steel wire $\varnothing 3$ mm for rope-bracing use.



▶ ANTENNAS – SATELLITE RECEPTION

Satellite Dishes – Offset Type

- Made up of: a) Dish made of powder-coated steel, b) LNB arm made of aluminium, c) LNB holder made of polypropylene and fibre glass, and d) Az-El holder made of galvanized steel, with 2 U-bolts and 2 mast clamps.
- Precision mechanical construction.
- Supplied in individual box or industrial packings of 30, 200 or 400 units.



RPA-060



RPA-100

Supplied in individual box		Model	RPA-060	RPA-080	RPA-100
		Reference	3065	3067	3069
Supplied in 30-unit packings		Model	RPA-060T	RPA-080T	RPA-100T
		Reference	3066	3068	3070
Supplied in 200-unit packings		Model		RPA-080D	
		Reference		3073	
Supplied in 400-unit packings		Model	RPA-060C		
		Reference	3072		
Diameter / Colour		cm	60 / light grey	80 / light grey	100 / light grey
Gain	10.75 GHz	dBi	34.7	36.8	39.8
	11.75 GHz		35.2	37.8	40.5
	12.75 GHz		36.1	38.5	40.9
Offset angle		°	25	25	25
Beamwidth (at 12.75 GHz)		°	< 3.1	< 2.2	< 1.8
Cross-polar discrimination		dB	> 27	> 27	> 27
Pointing range	Elevation	°	15 - 48	10 - 56	5 - 90
	Azimuth	°	0 - 360	0 - 360	0 - 360
Feed bracket diameter		mm	23 / 40	23 / 40	23 / 40
Dish dimensions (external)		mm	574 x 644	745 x 845	991 x 1090
Mast clamp for		mm	32 - 60	32 - 76	32 - 76
Windload (130/150 km/h)		N	320 / 435	520 / 710	800 / 1095

Supports for Satellite Dishes



SCF-085



BAP-200



SPA-240



Model	Ref.	Description
SCF-085	1067	Ground-fixing. "Column" type. Height: 90 cm. For antennas RPA-080/T/D and RPA-100/T. Pipe of $\varnothing 50$ mm and quadrangular base of 200x200 mm, all made of zinc steel.
BAP-200	1949	Hooked-support for SCF-085. Plate 200x200x2 mm and four M12 threaded hooks.
SPA-240	3071	Wall-fixing. "U" type. Width of the arm: 24 cm. For antennas RPA-060/T/C and RPA-080/T/D. Pipe of $\varnothing 40$ mm made of galvanized steel.

▶ ANTENNAS – SATELLITE RECEPTION

LNB 'Quattro' for Offset Antennas

CE

- Includes LNB, feed-horn and orthomode transducer.
- 4 IF output ports (H-low, H-high, V-low and V-high). F connection.


UEU-124K

Model		UEU-124K	
Reference		1114	
Installing in antenna		offset	
Frequency range	GHz	10.7 - 12.75	
No. of IF outputs		4 2H - 2V	
IF bands in the two H outputs (Input bands related)	MHz	950 - 1950 (10.7 - 11.7 GHz)	/ 1100 - 2150 (11.7 - 12.75 GHz)
IF bands in the two V outputs (Input bands related)	MHz	950 - 1950 (10.7 - 11.7 GHz)	/ 1100 - 2150 (11.7 - 12.75 GHz)
Gain	dB	56 (±6)	
Noise figure (typ)	dB	0.2	
Cross polarization isolation	dB	≥ 25	
Local oscillator frequencies	GHz	9.75 / 10.6	
Max phase noise	dBc/Hz	1 kHz: -50	„ 10 kHz: -75 „ 100 kHz: -95
Output return loss	dB	≥ 7.5	
Operating voltage ⁽¹⁾	V _{dc}	+11.5 ... +19	
Max consumption	mA	230	
Arm clamp diameter	mm	40	

⁽¹⁾ Via any output port.

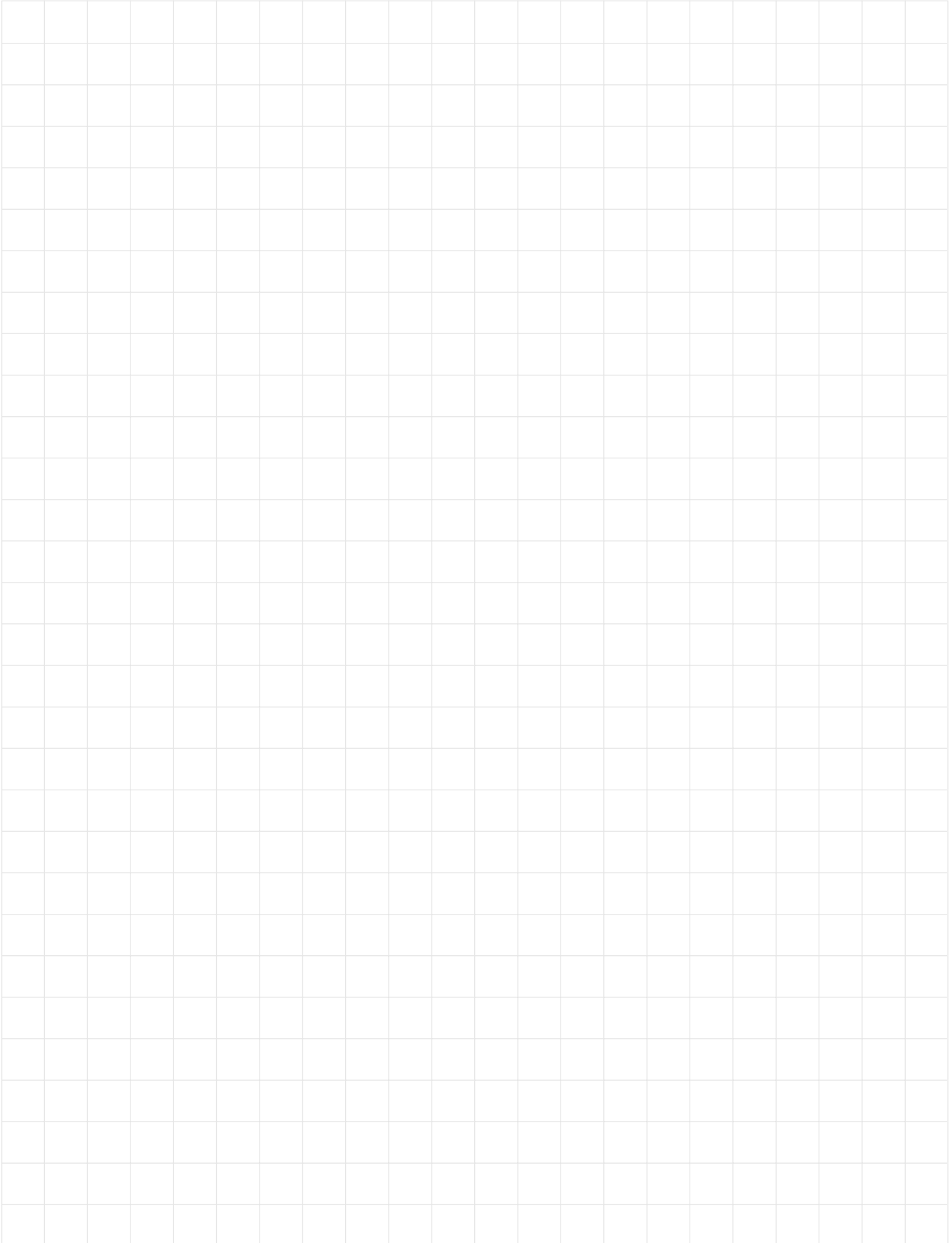
Universal LNB for Offset Antennas

CE

- Includes LNB, feed-horn and polarizer.
- Low/High band switching by tone. H/V polarization switching by voltage.
- 1 IF output port. F connection.


UEU-121K

Model		UEU-121K	
Reference		1113	
Installing in antenna		offset	
Frequency range	GHz	10.7 - 12.75	
Output IF bands (Input bands related)	MHz	950 - 1950 (10.7 - 11.7 GHz)	/ 1100 - 2150 (11.7 - 12.75 GHz)
Low/High band switching		by tone 0 / 22 kHz	
H/V polarization switching		by voltage +16.0 ... +19.0 V / +11.5 ... +14.0 V	
Gain	dB	56 (±6)	
Noise figure (typ)	dB	0.2	
Cross polarization isolation	dB	≥ 30	
Local oscillator frequencies	GHz	9.75 / 10.6	
Max phase noise	dBc/Hz	1 kHz: -60	„ 10 kHz: -80 „ 100 kHz: -100
Output return loss	dB	≥ 7.5	
Operating voltage	V _{dc}	+11.5 ... +19	
Max consumption	mA	100	
Arm clamp diameter	mm	40	



► MAST-HEAD PREAMPLIFIERS

Shielded Multiband SBA Series Preamplifiers - F Connectors

CE

- Very high UHF gain.
- Interstage variable attenuators. Optimum design for very low operative noise figure.
- Internal injection-moulded zinc alloy housing (tin-plated sheet chassis for SBA-353 and SBA-373 models) with F type ports.
- External polystyrene box, with fixing plastic clamp for 20-50mm diameter masts. IP55 weatherproofing grade.
- Protection against lightning.

Model		SBA-110	SBA-100	SBA-220	SBA-210	SBA-211	SBA-212	SBA-353	SBA-373
Reference		3391	3398	3394	3399	3392	3393	1218	1219
RF inputs		1 (BI/BIII/UHF)	1 UHF	2 FM UHF	2 (BI/BIII) UHF	2 (54-88 / 174-216 MHz) UHF	2 (47-100 / 174-230 MHz) UHF	3 (BI/BIII) UHF - UHF	3 (BI/BIII) BIV - BV
Nominal gain ¹	dB	At BI and BIII: 30 [^] At UHF: 40 [^]	UHF: 40 [^]	FM: 22 [^] UHF: 40 [^]	BI/BIII: 30 [^] UHF: 40 [^]	Bands VHF: 30 [^] UHF: 40 [^]	Bands VHF: 30 [^] UHF: 40 [^]	BI/BIII: 30 [^] UHF1: 35 [^] UHF2: 35 [^]	BI/BIII: 30 [^] BIV: 36 ^{^ 2} BV: 36 ^{^ 2}
Noise figure	dB	BI/BIII: ≤ 3 UHF: ≤ 2	≤ 2	FM: ≤ 5 UHF: ≤ 2	BI/BIII: ≤ 3.5 UHF: ≤ 2	Bands VHF: ≤ 3 UHF: ≤ 2	Bands VHF: ≤ 3 UHF: ≤ 2	BI/BIII: ≤ 3 UHF: ≤ 5	BI/BIII: ≤ 3 BIV, BV: ≤ 4
Output level (DIN-B, -60 dB)	dBμV	105	105	105	105	105	105	103	103
Rejection to BII (FM)	dB	≥ 25	—	—	≥ 25	—	—	≥ 30	≥ 30
Input isolation	dB	—	—	≥ 26	≥ 26	≥ 26	≥ 26	≥ 18	≥ 18
Operating voltage ³	Vdc	+24	+24	+24	+24	+24	+24	+24	+24
Consumption	mA	30	30	30	30	30	30	80	80
Dimensions	mm	112 x 112 x 48						150 x 112 x 68	

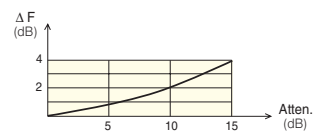
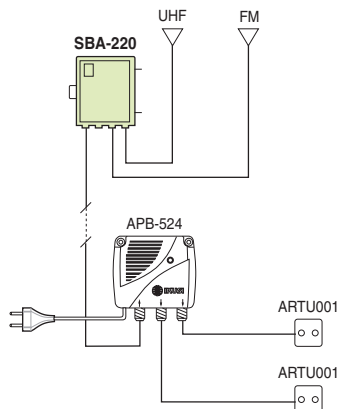

SBA-210

SBA-353
Notes

¹ Gain values with ^ sign can be lowered 0-15 dB. Interstage variable attenuators : maintenance of low noise figure (see graph below).

² Consult for other splits different to BIV and BV.

³ Line powering via down-lead coax cable, from the APB-524 power supply (see page 19) or from a compact amplifier fitted with +24 VDC feed-through facility.

Application example

- Variation of Noise Figure (F) vs. Attenuation

▶ MAST-HEAD PREAMPLIFIERS

Shielded Multiband MBS Series Preamplifiers - F Connectors

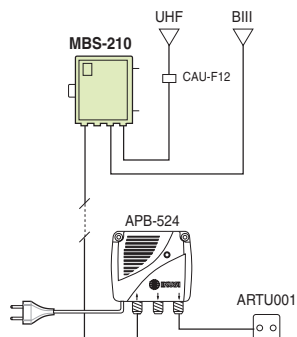
CE

- Variable input attenuators and DC feed-through switches.
- Internal zinc alloy housing with F type ports.
- External polystyrene box with fixing plastic clamp for 20-50mm diameter masts. Dimensions: 112x112x48 mm. IP55 weatherproofing grade.
- Protection against lightning.


MBS-300

Model		MBS-200	MBS-210	MBS-300	MBS2310
Reference		3397	3395	3396	1202
RF inputs ¹		2 VHF UHF ⁺	2 B/BIII UHF ⁺	3 B/BIII UHF ⁺ - UHF ⁺	3 FM - DAB UHF ⁺
Nominal gain ²	dB	VHF: -1 UHF: 30 [^]	B/BIII: 30 [^] UHF: 30 [^]	B/BIII: 30 [^] UHF1: 26 [^] UHF2: 26 [^]	FM: 30 [^] DAB: 30 [^] UHF: 30 [^]
Noise figure	dB	≤ 4	≤ 4.5	B/BIII: ≤ 5 UHF: ≤ 9	≤ 4.5
Output level (DIN-B, -60 dB)	dBμV	106	106	106	106
Rejection to BII (FM)	dB	—	≥ 25	≥ 25	—
Input isolation	dB	≥ 26	≥ 26	≥ 18	≥ 26
Operating voltage ³	Vdc	+24	+24	+24	+24 / +12
Consumption	mA	40	40	40	40

Application example



Notes

¹ Inputs with + sign have an ON/OFF switch for +24 Vdc passing.

² Gain values with ^ sign can be lowered 0-15 dB. Input variable attenuator.

³ Line powering via down-lead coax cable, from the APB-524 power supply (see page 19) or from a compact amplifier fitted with +24 VDC feed-through facility.

► MAST-HEAD PREAMPLIFIERS

Multiband MB and MBA Series Preamplifiers - Terminal-Clamp Connection

- Variable input attenuators and DC feed-through switches.
- Polystyrene box with fixing plastic clamp for 20-50mm diameter masts. Dimensions: 109x84x57 mm (models with 1 and 2 inputs) or 150x112x68 mm (models with 4 and 5 inputs). IP55 weatherproofing grade.
- Protection against lightning.

«MB» Series - 1 and 2 Inputs



MB-222

Model		MB-01	MB-321	MB-220	MB-222	MB-245	MB-322	MB-255
Reference		2180	3409	2190	2185	2184	3407	2186
RF inputs ¹		1 BI/BIII/UHF +	1 UHF +	2 BI/BIII UHF	2 BI/BIII UHF +	2 VHF UHF +	2 FM UHF +	2 UHF + UHF +
Nominal gain ²	dB	26	32 [^]	BI/BIII: -0.5 [^] * UHF: 20 [^]	BI/BIII: 32 [^] UHF: 32 [^]	VHF: -0.5 UHF: 32	FM: 32 [^] UHF: 32 [^]	UHF1: 26 [^] UHF2: 26 [^]
Noise figure	dB	≤ 3	≤ 3	≤ 3	≤ 3	≤ 2.5	≤ 3	≤ 7
Output level (DIN-B, -60 dB)	dBμV	106	106	106	106	106	106	106
Rejection to BII (FM)	dB	≥ 30	—	≥ 30	≥ 30	—	—	—
Input isolation	dB	—	—	≥ 26	≥ 26	≥ 26	≥ 26	≥ 18
Operating voltage ³	V _{DC}	+24	+24	+24	+24	+24	+24	+24
Consumption	mA	45	45	45	45	45	45	45

* The MB-220 (Ref. 2190) features interstage variable attenuation in UHF path (maintenance of low noise figure).

«MBA» Series - 4 and 5 Inputs



MBA-510

Model		MBA-410	MBA-510	MBA-545
Reference		2024	2023	1195
RF inputs ¹		4 FM - DAB BIV + - BV +	5 FM - BI/BIII - BIII UHF + - UHF +	5 FM - BI - BIII BIV + - BV +
Nominal gain ²	dB	FM: 20 [^] DAB: 30 [^] BIV: 31 [^] ⁴ BV: 31 [^] ⁴	FM: 20 [^] BI/BIII: 26 [^] BIII: 26 [^] UHF1: 27 [^] UHF2: 27 [^]	FM: 20 [^] BI: 30 [^] BIII: 30 [^] BIV: 31 [^] ⁴ BV: 31 [^] ⁴
Noise figure	dB	5 (6 in DAB)	8.5 (6 in FM)	5 (6 in BIII)
Output level (DIN-B, -60 dB)	dBμV	104	104	104
Input isolation	dB	≥ 26	≥ 18	≥ 26
Operating voltage ³	V _{DC}	+24	+24	+24
Consumption	mA	40	40	40

Notes

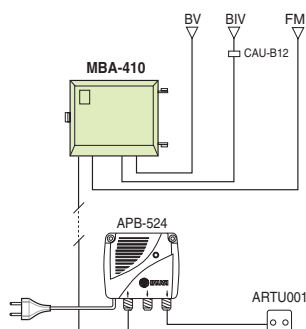
¹ Inputs with + sign have an ON/OFF switch for +24 Vdc passing.

² Gain values with [^] sign can be lowered 0-15 dB. Input variable attenuator.

³ Line powering via down-lead coax cable, from the APB-524 power supply unit (see page 19) or from a compact amplifier fitted with feed-through facility.

⁴ Consult for other splits different to BIV and BV.

Application example



► MAST-HEAD PREAMPLIFIERS

UHF Selective Preamplifiers - Terminal-Clamp Connection

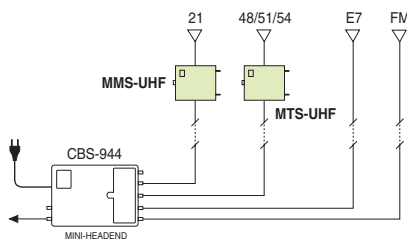
- Amplification of 1 or 7 UHF channels.
- Polystyrene box with fixing plastic clamp for 20-50mm diameter masts. Dimensions: 150x112x68 mm. IP55 weatherproofing grade.
- On request, DC passing to power antenna connecting-box preamplifiers.
- Protection against lightning.



MMS-UHF

Model		MMS-UHF	MTS-UHF
Reference		1429	1433
Bandwidth		1 UHF channel	7 UHF channels
Nominal gain	dB	21	23
Selectivity	dB	>20 (± 12 MHz) ³ >30 (± 20 MHz) ³	>10 (± 16 MHz) ⁴
Noise figure	dB	5	3.5
Output level	dB μ V	105 ⁵ (analog) 100 ⁶ (digital)	95 ⁷
Operating voltage ^{1,2}	Vdc	+24	+24
Consumption	mA	20	20

Application example



Notes

- ¹ Line powering via down-lead coax cable, from the APB-524 power supply (see next page) or from a compact amplifier fitted with feed-through facility.
- ² On request, DC passing (+24 Vdc) to the input port.
- ³ From the centre of the channel.
- ⁴ From the ends of the bandwidth.
- ⁵ DIN-K, -54 dB
- ⁶ EN-50083-3, -35 dB
- ⁷ DIN-B, -60 dB

Ordering instructions

- Specify channel or channel group. If DC passing is desired, include "Ref. 1287".

Examples:

- 1) 1 MMS-UHF (Ref. 1429) channel 61
- 2) 1 MTS-UHF (Ref. 1433) channels 58-64
1 DC Passing Ref. 1287

► MAST-HEAD PREAMPLIFIERS

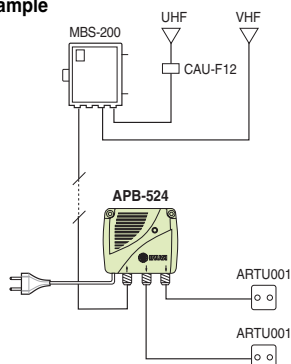
+24 Vdc Power Supply for Mast-Head Preamplifiers - F Connectors

CE

- 1 «RF input + DC output» port — 2 «RF output» ports.
- Electrical safety protection level: Class II. Mains lead with bipolar plug. LED indicator.
- External plastic box, dimensions 80x80x45 mm. F connectors. Wall fixing by 2 screws supplied.


APB-524

Model		APB-524
Reference		3428
Mains voltage (50 Hz)	V _{AC}	230 (-10%, +15%)
Output voltage	V _{DC}	+24 (±5%)
Max output current	mA	100
Frequency range	MHz	40 - 862
RF insertion loss	dB	≤ 5
Max consumption	W	5.5

Application example


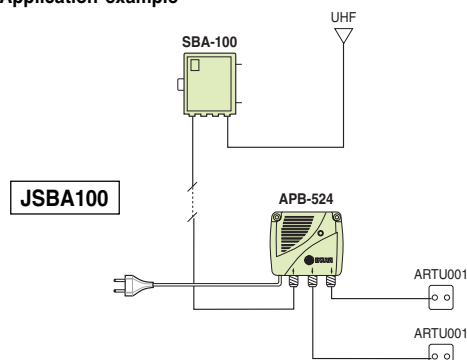
«Preamplifier + Power Supply» SETS

- Presented in blister packings. Dimensions: 165x250x70 mm.


JSBA353

Model	Ref.	Contents
JSBA100	1208	Preamplif. SBA-100 (page 15) + P.Supply APB-524 + 5 screw-on F connectors
JSBA110	1209	Preamplif. SBA-110 (page 15) + P.Supply APB-524 + 5 screw-on F connectors
JSBA210	1210	Preamplif. SBA-210 (page 15) + P.Supply APB-524 + 6 screw-on F connectors
JSBA353	1211	Preamplif. SBA-353 (page 15) + P.Supply APB-524 + 7 screw-on F connectors
JMBS210	1212	Preamplif. MBS-210 (page 16) + P.Supply APB-524 + 6 screw-on F connectors

- The specifications of the preamplifiers are shown in the indicated pages and those of the power supply in this page above.

Application example


▶ MAST-HEAD PREAMPLIFIERS

2-input Band Multiplexers

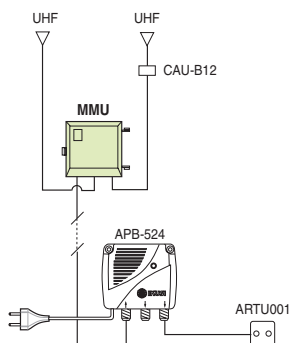
- Polystyrene box with fixing plastic clamp for 20-50mm diameter masts. Dimensions: 109x84x57 mm. IP55 weatherproofing grade.
- Coaxial cable connections by terminal and clamp.



MMU

Model		MMU	MM V-U
Reference		1270	1276
RF inputs		2 40-862 MHz 40-862 MHz	2 VHF UHF
DC passing		Yes ¹	No
Insertion loss	dB	In VHF: 3.5 In UHF: 5	VHF: 0.5 UHF: 1
Input isolation	dB	≥ 18	≥ 26

Application example



Note

¹ To both inputs. ON/OFF switch at each one.

► MULTICHANNEL HEADENDS

«STG» — Agile Multichannel Equipment

CE

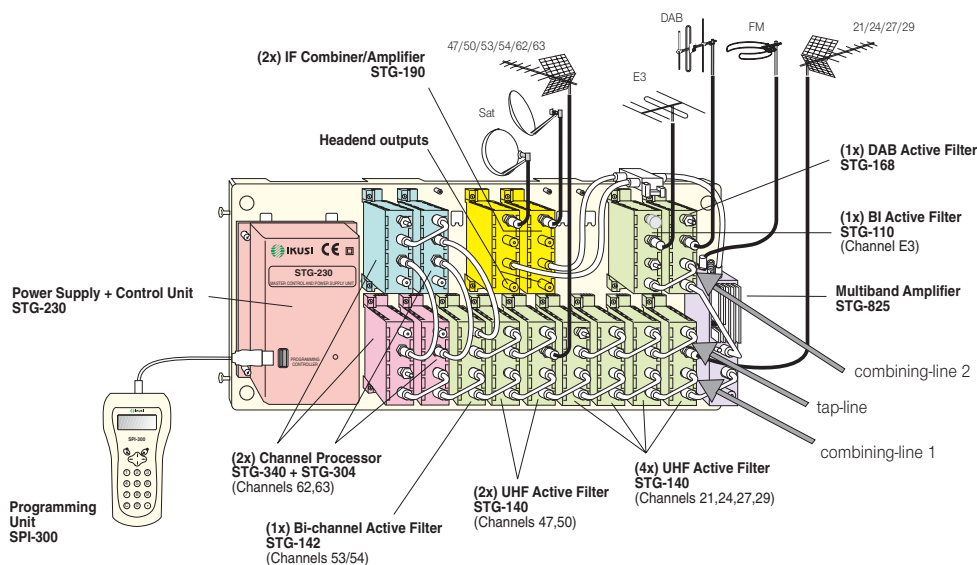
The STG Headend System is a totally new concept aimed at medium sized SMATV installations. Its super compact design, frequency agility and simplicity make this product a real winner with the installer, as it allows for total flexibility and expandability. An STG Headend can be configured precisely to the exact requirements of the installation and can be further expanded at a later date by simply adding "stock" modules. The whole system is easily assembled and instantly "tuned" on site by the technician as required.

Based on a small wall mounting baseplate, which can be mounted in a very confined space, the STG utilizes 'Agile Active Filter' preamplification modules and 'Agile Channel Processor' conversion modules for Terrestrial TV reception. Dependent on the final requirement of the system a choice of 2 final drive 'Multiband Amplifier' modules has been created. The installer can therefore configure the final output driver by using either the Push-Pull or the higher powered GaAs FET Multiband Amplifier Module. The channel processors, each one composed of 2 independent modules (down-converter and up-converter), have main application for areas which have adjacent channels requirements; for this application the choice of multi-channel modules have also been made available. For Satellite IF Distribution requirements, the system offers a 'Sat-IF Combiner/Amplifier' module.

With the exception of the manual gain control on the Multiband Amplifier, the remaining adjustments of the STG headend can be carried out through an SPI-300 Programming-Unit which is connected through an USB port on the 'Power Supply + Control Unit' module. These functions include:

- Required channel or frequency settings & alignment,
- Gain of the active filter modules and channel processors,
- Gain of the Satellite IF combiner/amplifier,
- LNB voltage & tone settings.

The address of each module is simply determined by its location on the baseplate. The parameters set are controlled by microprocessor and remain unalterable, unless they are modified through an SPI-300. For additional ease of use, the SPI-300 allows a bank of 500 preset memorized settings to be stored on board. This for example could include all the Terrestrial TV channels of the area, which in turn, allows the technician to quickly load repetitive information on several headend installations.



— Example of STG headend for 1 x BI channel, FM band, DAB band, 10 x UHF channels (2 are adjacent analogs and 2 are adjacent analog+digital) and 2 x Sat-IF signals.

- The control signals and operating voltages provided by the 'power supply + control unit' module are transferred through the bus integrated in the baseplate.
- The agile active filter and channel processor modules feature two directionally coupled input and output ports. 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 combining. The sum of the combined channels is then connected in the same way to the final drive amplifier, which then feeds the distribution network.
- The output of the final drive amplifier can alternatively be fed through the Sat-IF combiner/amplifier module if the requirement calls for a combined Satellite/Terrestrial SMATV distribution. Two separate trunks can also be launched if the need for separate Sat IF feeds are called for.
Important: In a headend with 2 outputs the terrestrial signal is identical in both trunks, but the Sat IF signal is different and corresponds to the respective satellite signal or the polarization selected in each of the 2 Sat-IF combiner/amplifier modules installed.
- An *extension input* port on the STG-825 Multiband Amplifier module is available to allow the coupling of an external RF signal from an IKUSI «TRF», «SAI», «SRF» or «MDI» headend.
- Operating temperature range: 0° to +45° C.
- The following components form part of the STG system:

Baseplate	BAS-120
Rack-frame	SMR-120
Power Supply + Control Unit	STG-230
Agile Active Filter — BI, BIII, UHF single-channel	STG-1x0
Agile Active Filter — UHF 2-channel	STG-142
Agile Active Filter — UHF 4-channel	STG-50x
Active Filter — DAB	STG-168
Down-Converter (TV channel to IF)	STG-3xx
Up-Converter (IF to TV channel)	STG-30x
45-862 MHz Multiband Amplifier, 120 dB μ V	STG-820
45-862 MHz Multiband Amplifier, 125 dB μ V	STG-825
Sat-IF Combiner/Amplifier	STG-190
Housing	COF-120
Programming-Unit	SPI-300

—There is no need for an FM active filter module. The FM radio reception signal can be directly connected to the multiband amplifier.

—When a headend is configured with 2 x STG-190 modules (as shown in the above diagram), an additional 2-way splitter is required, such as a DVS-204 (page 133), to share out the output terrestrial signal from the final drive amplifier to each of the two Sat IF modules.

MULTICHANNEL HEADENDS

«STG» — Agile Active Filters

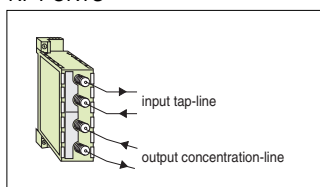
- Reception of terrestrial TV (bands I, III and UHF) and DAB Radio.
- Zinc alloy housing, measuring 90x82x30 mm. F type connection. Fixed on the BAS-120 baseplate with 2 built-in screws.
- Two directionally coupled input ports to easily distribute the incoming signal, and two similar output ports to combine the various outputs, without the need of additional external passive devices.
- TV channel frequency and gain adjustments easily carried out on site using the SPI-300 programming-unit. Automatic level equalization of the VHF and UHF wideband signals fed into the final drive amplifier STG-82x.
- Two F plug bridges are supplied with each module, for input and output linking.

Model		STG-110	STG-130	STG-168	STG-140	STG-142	STG-504	STG-505
Reference		2801	2802	2832	2803	2811	2830	2831
Bandwidth		1 BI channel (44 ... 70 MHz)	1 BI+II channel (162 ... 230 MHz)	DAB (195-223 MHz)	1 UHF channel (470 ... 862 MHz)	2 UHF channels (470 ... 862 MHz)	4 UHF channels 21-24 to 44-47	4 UHF channels 42-45 to 66-69
Optimum input level	dB μ V	61 to 81	61 to 81	51 to 71	61 to 81	61 to 81 (analog) 51 to 71 (digital)	61 to 81 (analog) 51 to 71 (digital)	61 to 81 (analog) 51 to 71 (digital)
Gain	dB	19	19	19	19	19	19	19
Continuous gain adjustment	dB	-20	-20	-20	-20	-20	-20	-20
Input loop-through gain	dB	-2.5	0.5 (\pm 0.5)	0.5 (\pm 0.5)	0.5 (\pm 0.5)	0.5 (\pm 0.5)	0.5 (\pm 0.5)	0.5 (\pm 0.5)
Noise figure	dB	\leq 7	\leq 4	\leq 4	\leq 4	\leq 4	\leq 4	\leq 4
Selectivity	dB	> 25 (fc \pm 18 MHz)	> 25 (fc \pm 18 MHz)	> 20 (fc \pm 25 MHz)	> 25 (fc \pm 20 MHz)	> 22 (fc \pm 24 MHz)	> 18 (fc \pm 40 MHz)	> 18 (fc \pm 40 MHz)
Output loop-through loss	dB	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Consumption at +12 VDC	mA	20	40	45	45	45	45	45



STG-140

RF PORTS



► MULTICHANNEL HEADENDS

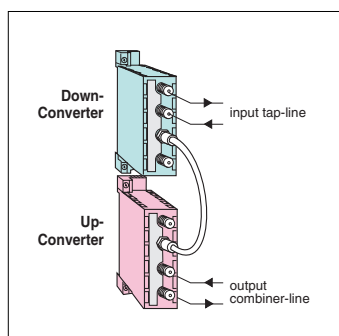
«STG» — Agile Channel Processors

- Heterodyne, SAW filtered double conversion, for reception of terrestrial programmes in bands I, III and UHF. Application as Channel Converters (output channel is different to input channel) or Channel Processors (output channel is the same as input channel), the last ones operating as high-selectivity single-channel amplifiers appropriate for areas which have adjacent digital and/or analog channel requirements.
- Two independent modules required, one STG-3xx down-converter (conversion from input channel to IF) and one STG-30x up-converter (conversion from IF to output channel), interconnected by a coaxial link. Zinc alloy housings, measuring 90x82x30 mm. F type connection. Each module is fixed on the BAS-120 baseplate with 2 built-in screws.
- Two input ports in the down-converter and two output ports in the up-converter, with directional couplings to easily distribute the incoming signals and combine the various outputs, without the need of additional external passive devices.
- TV channel frequencies, tuning offset and gain adjustments easily carried out on site using the SPI-300 programming-unit. Automatic level equalization of the VHF and UHF wideband signals fed into the final drive amplifier module STG-82x.
- One F plug bridge is supplied with each module, for input and output linking.



STG-340

RF PORTS



STG-304

Down-Converters (Conversion from Input Channel to IF)

Model		STG-311	STG-310	STG-331	STG-330	STG-341	STG-340
Reference		2823	2822	2825	2815	2829	2816
Input TV channel located between:	MHz	44 - 122	44 - 122	174 - 230	174 - 230	470 - 862	470 - 862
Bandwidth	MHz	7	8	7	8	7	8
Optimum input level	dBμV	61 to 81 (analog channel) ,, 50 to 70 (digital channel)					
Input tuning offset	kHz	(±) 125 / 250 / 375 / 500					
Gain	dB	12	12	12	12	12	12
Continuous gain adjustment	dB	-21	-21	-21	-21	-21	-21
Input loop-through gain	dB	0.5 (± 0.5)	0.5 (± 0.5)	0.5 (± 0.5)	0.5 (± 0.5)	0.5 (± 0.5)	0.5 (± 0.5)
Noise figure (down- plus up- converters)	dB	< 9	< 9	< 9	< 9	< 9	< 9
Consumption at +12 Vdc	mA	130	130	130	130	190	190

Up-Converters (Conversion from IF to Output Channel)

Model		STG-301	STG-306	STG-303	STG-307	STG-304
Reference		2820	2821	2813	2834	2828
Output TV channel located between:	MHz	44 - 122	118 - 174	174 - 230	230 - 446	470 - 862
Gain	dB	10	10	10	10	10
Phase noise (down-converter plus up-converter)	dBc/Hz	1 kHz : -77 ,, 10 kHz : -80				
Output loop-through loss	dB	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Consumption at +12 Vdc	mA	90	90	90	100	90

ADJACENT CHANNEL RECEPTION	STG SOLUTIONS
2 Analog Channels	2 Channel Processors or 1 STG-142 Active Filter (if reception levels are levelled)
2 Digital Channels	2 Channel Processors or 1 STG-142 Active Filter (if reception levels are levelled)
1 Analog Channel plus 1 Digital Channel	2 Channel Processors or 1 STG-142 Active Filter (if digital level is ~10 dB lower than analog level)
4 Analog or Digital Channels	1 STG-504/505 Active Filter (if digital levels are ~10 dB lower than analog levels, these last being levelled)

MULTICHANNEL HEADENDS

«STG» — 45-862 MHz Multiband Amplifiers

- Final Drive Amplifiers to launch the TV and DAB signals from the agile active filters and processors. Feature a direct input for the FM Radio signal from the antenna. Two models are available using two types of amplification technology and output levels. STG-820 with push-pull technology (120 dB μ V) and STG-825 with advanced GaAs FET Drivers delivering a maximum of 125 dB μ V.
- Manual gain adjustment.
- Zinc alloy housing. F type connection. Fixed on the BAS-120 baseplate with 2 built-in screws.
- The STG-825 features an *extension input* port which allows the coupling of a further RF signal source from an existing «TRF», «SAI», «SRF», «MDI» or «TDI» headend.
- Two F plug-bridges are supplied for connection to combining lines 1 and 2 of the STG headend.



Model		STG-820	STG-825
Reference		2836	2837
RF inputs	TV : 45-862 MHz FM : 87.5-108 MHz EXT : 45-862 MHz	3 TV - TV - FM	4 TV - TV - FM - EXTENSION
Gain	dB	TV: 38 TV: 38 FM: 35	TV: 43 TV: 43 FM: 35 EXT: 33
Continuous gain adjustment	dB	(2 regulation controls) FM: -20 TV/FM: -12	(3 regulation controls) FM: -25 EXT: -18 TV/EXT: -12
Output level	dB μ V	120 ¹	125 ¹ 110 ²
Output test	dB	—	-30 (± 3)
Consumption at +12 VDC	mA	400	850
Dimensions	mm	90 x 82 x 30	150 x 82 x 30

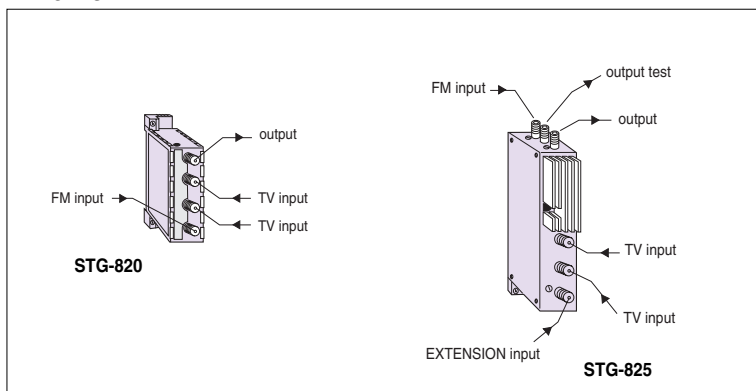
Notes

¹ Output level for BI, BIII and UHF signals, IMD3= -60 dB (DIN 45004B), applicable for amplification of 2 TV-channels. If more than 2 channels are used, see Reduction Table on page 168 (Technical Annex).

DIGITAL TV SIGNALS: If output levels of digital TV channels and DAB and FM radios are set 10 dB or more below those of the analog TV signals, they can be ignored when calculating the output reduction level. On the other hand, if these levels are set at the same level as those of the analog TV channels, they must count as normal channels and the amplifier's output level must be de-rated accordingly.

² Output level for Radio FM signals, IMD3= -50 dB (2 carriers).

RF PORTS



► MULTICHANNEL HEADENDS

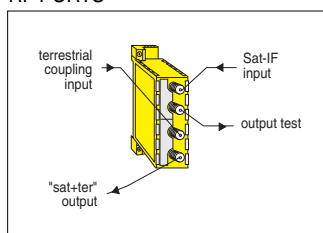
«STG» — Sat-IF Combiner/Amplifier

- Reception of satellite TV programmes.
- Zinc alloy housing, measuring 90x82x30 mm. F type connection. Fixed on the BAS-120 baseplate with 2 built-in screws.
- 1 x Satellite 950-2150 MHz input port, with adjustable gain and pre-emphasized response to compensate for cable losses; 1 x Terrestrial coupling 44-862 MHz input port; 1 x Combined Satellite+Terrestrial output port; 1 output test port.
- Able to power the LNB attached. Generates the required voltage/tone signals for the selection of the H/V polarisation and high/low frequency sub-band.
- Gain and voltage/tone settings through the SPI-300 programming-unit.



STG-190

RF PORTS



Model		STG-190
Reference		2804
Sat-IF band	MHz	950 - 2150
Gain (6 dB fixed slope)	dB	33 (950 MHz) 39 (2150 MHz)
Continuous gain adjustment	dB	11
Output level (IMD3 -35 dB, EN 50083-3)	dB μ V	120
Satellite input return loss	dB	≥ 6
Noise figure	dB	< 8
Terrestrial band	MHz	44 - 862
Terrestrial coupling loss	dB	< 1
Output test (terrestrial+satellite)	dB	-30 (± 3)
Consumption at +12 VDC	mA	160
Insertable Voltage/Tone to Sat-IF input port		+14 / +18 Vdc 0 / 22 kHz
Max LNB power current (consumption from +24 VDC)	mA	200 (at +14 Vdc) „ 300 (at +18 Vdc)

«STG» — Power Supply + Control Unit

- Powers the amplifiers, filters and processors and controls the adjustment settings. It also provides power for the LNB's and mast-/head preamplifiers attached to the system.
- Dimensions: 80x148x106 mm. USB socket for connection of the SPI-300 programming-unit. Installed on the BAS-120 baseplate with 4 built-in screws.
- Electrical safety protection level: Class II. Mains lead 1.5 m in length.



STG-230

Model		STG-230
Reference		2833
Regulation type		switch mode
Mains voltage (50/60 Hz)	VAC	230 - 240 ($\pm 10\%$)
Voltage/Current for STG modules		+12 VDC / 3.6 A
Current for LNB's	mA	600
Auxiliary outputs for mast preamplifiers		+24 VDC / 45 mA +12 VDC / 100 mA
Max consumption	W	80

► MULTICHANNEL HEADENDS

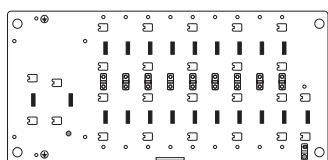
«STG» — Programming Unit



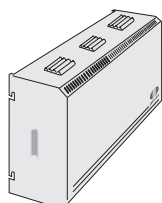
SPI-300

Model	SPI-300
Reference	4070
<ul style="list-style-type: none"> • For setting and controlling the «STG» modules. Cable connection to the USB front panel socket of the STG-230 module. • LCD display. Microprocessor controlled. Simple and easy to use software. Firmware of the SPI-300 can be updated. • Capacity of 500 pre-set memory allocations for just as many different «STG» installations. • 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. 	

«STG» — Others

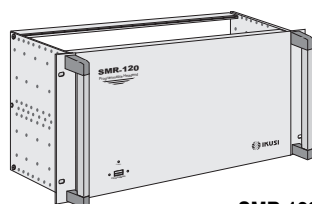


BAS-120

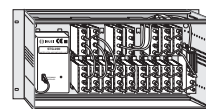


COF-120

Model	Ref.	Description
BAS-120	2808	Baseplate. Capacity: 20 modules (1 power supply+control unit, 1 multiband amplifier and maximum 18 active filters or converters —17 or 16 when 1 or 2 IF combiner/ amplifier are installed). Includes a 12-line bus and 21 DIL sockets for transporting and connecting the power and control signals. Dimensions: 450 x 210 mm. Wall fixing.
COF-120	2810	Housing for 1 BAS-120 base-plate. Dimensions: 438x280x150 mm. Indoor mounting. Metallic. Closing system.
SMR-120	2835	Rack-frame with built-in BAS-120 baseplate. 6U height. Overlay included to finish the assembly. Easy integration in standard 19" racks.
DVS-204	3336	Two-way 1000 MHz splitter (see specifications on page 133). Required when two STG-190 are installed.
CTF-175	1519	75Ω F load plug. To terminate spare input and output ports on the active filters and processors.



SMR-120



STG headend mounted in the SMR-120 rack-frame (rear view)

ORDERING INFORMATION

When ordering an STG headend please note the following :

ALWAYS...

- 1 x BAS-120 Base-plate or SMR-120 Rack-frame
- 1 x STG-230 Power Supply & Control Unit
- 1 x STG-820 or STG-825 Multiband Amplifier
- 1 x SPI-300 Programming-Unit
- 1 x COF-120 Housing (optional)

FOR TERRESTRIAL RECEPTION...

- 1 x STG-110 Active Filter for each BI channel.
- 1 x STG-130 Active Filter for each BIII channel.
- 1 x STG-140 Active Filter for each UHF channel.
- 1 x STG-168 Active Filter for DAB band.

If adjacent channels are received, use either processors or multichannel filters in accordance with criteria pointed in the table at the bottom of page 23.

FOR IF SATELLITE RECEPTION...

- 1 x STG-190 Combiner/Amplifier for each LNB output.
- 1 x Two-way splitter (DVS-204), only required if 2 x STG-190 modules are installed.

AND THE FOLLOWING ACCESSORIES...

- F bridges. 2 are supplied with each active filter, each multiband amplifier. 1 is supplied with each converter.
- 1 or 3 F coax links (approx 25 cm), depending on whether 1 or 2 STG-190 modules are required.
- 1 coax link (or F bridge, depending on the arrangement of the conversion modules) per processor installed.
- 75Ω F terminations.

MULTICHANNEL HEADENDS

«SZB» — Amplification, Conversion and Modulation Equipment

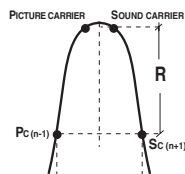
CE

- Amplification, Conversion and Modulation modules, dimensions: 190x38x87 mm. F connection. Easy to assemble onto the wall mounting base plates, without the need of any tools.
- TV single-channel and multichannel amplifiers, the last ones especially created for amplification of combined analog and digital channels. Z input demultiplexing and Z output multiplexing. Adjacent channel operation allowed in UHF band.
- FM Radio and DAB Amplifiers.
- PLL-controlled converters. Z input demultiplexing. Within a headend, each converter module must be complemented with an amplifier module.
- Sat-IF Combiner/Amplifier.
- Double Side Band programmable TV modulators.
- Power Supply modules, dimensions: 215x35x140 mm. Output voltage +24 VDC is automatically connected to the RF modules through a connecting bar at the base-plate.
- It is advisable to place the amplifiers on the base-plate following an increasing order of number of channel (frequency). The RF output of the headend will be taken from the last one of the modules ordered in this way (see application example below).

3



«SZB» Headend



TV System	G	K, L	I	B (Australia)	
R (dB)	SZB-148	> 15	> 8	> 12	> 8
	SZB-141	> 18	> 10	> 14	> 10

Amplitude vs. Frequency response of SZB-148 and SZB-141 Amplifiers

TV Single-channel, FM Radio and DAB Amplifiers

Model	SZB-119	SZB-129	SZB-128	SZB-168	SZB-139	SZB-148 *	SZB-141 **
Reference	3151	2294	2293	3160	3152	2246	2244
Bandwidth	1 ch. BI	FM	FM	DAB (195-223 MHz)	1 ch. Bill ¹	1 ch. UHF ² (analog or dig)	1 ch. UHF (analog)
Gain ^{3,4}	57	57	30	53	56	52	52
Noise figure	4	4	7.5	8	7	9	9
Output level (Analog: DIN-K, -54dB; Dig.: EN 50083-3, -35dB)	(2x) 126 (analog) (2x) 121 (digital)	(2x) 113 (-50dB IMD3)	(2x) 113 (-50dB IMD3)	(2x) 113 (-50dB IMD3)	(2x) 126 (analog) (2x) 121 (digital)	(2x) 126 (analog) (2x) 121 (digital)	(2x) 126 (analog)
Z output return loss	≥ 6	≥ 6	≥ 6	≥ 6	≥ 6	≥ 6	≥ 6
Consumption	100	100	80	100	100	100	100

* The SZB-148 is for general use. High Selectivity. Amplification of one analog or digital UHF channel, either non-adjacent or adjacent.

** The SZB-141 is a Very High Selectivity amplifier especially created to amplify one ANALOG channel which is adjacent to another channel (analog or digital) whose reception level is ≥14dB higher.

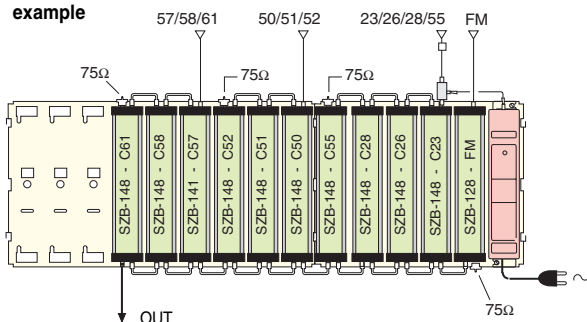
• Each amplifier is packed with 1 Z bridge Ref. 2247.

Multichannel UHF Amplifiers

Model	SZB-182	SZB-183	SZB-184	SZB-185
Reference	2242	3161	2240	2241
Bandwidth	2 UHF channels (analog and digital)	3 UHF channels (analog and digital)	4 UHF channels (analog and digital)	Channels 65 to 69 (65: analog or dig, 66-69: digital)
Gain ^{3,4}	59	59	60	60
Noise figure	5	5	5	5
Output level	(2x) 111 2 ana (2x) 118 2 dig (2x) 123 / 113 ⁵ 1 ana / 1 dig	(2x) 116 3 dig (2x) 121 / 111 1 ana / 2 dig (2x) 111 / 101 ⁵ 2 ana / 1 dig	(2x) 115 4 dig (2x) 121 / 111 1 ana / 3 dig (2x) 111 / 101 ⁵ 2 ana / 2 dig	(2x) 120 + (2x) 110 ⁵ Ch 65 (ana) Ch 66-69 (dig) (2x) 114 Ch 65-69 (dig)
Z output return loss	≥ 6	≥ 6	≥ 6	≥ 6
Consumption	100	100	100	100

• Each amplifier is packed with 1 Z bridge Ref. 2247.

Application example



Notes

- ¹ Also 1 channel S3 to S18.
- ² Also 1 channel S19 to S38.
- ³ Adjustable -20 dB. Interstage attenuator in all models —maintenance of low noise figure—, except in SZB-128 model (input attenuator).
- ⁴ Subtract 3.5 dB if Z input demultiplexing is used.
- ⁵ Max output levels when input level of digital signals is 10 dB lower than that of analog signals.

Particular ordering instruction

- Specify the TV channel for single-channel amplifiers. Idem, the two channels for SZB-182 model, the three channels for SZB-183 model and the four channels for SZB-184 model.

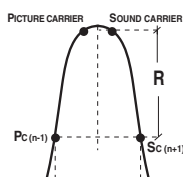
► MULTICHANNEL HEADENDS

«SZB» — Amplification, Conversion and Modulation Equipment

(cont'd)



SZB-549



TV System	G	K, L	I	B (Australia)
R (dB)	> 15	> 8	> 12	> 8

Amplitude vs. Frequency response

AGC Amplifier

Model	SZB-549	
Reference	3159	
Bandwidth	1 channel UHF	
Gain ^{1, 2}	dB	52
AGC range	dB	> 30
Noise figure ²	dB	9
Output level ³ (Analog : DIN-K, -54dB Digital : EN 50083-3, -35dB)	dB μ V	(2x) 126 (analog) (2x) 121 (digital)
Z output return loss	dB	\geq 6
Consumption	mA	100

General use. High selectivity. Amplification of one analog or digital UHF channel, either non-adjacent or adjacent.

● The amplifier is packed with 1 Z bridge Ref. 2247.

Converters - PLL Controlled



SZB-351

Model		SZB-351	SZB-353	SZB-355
Reference		2297	2298	2299
Channel conversion		UHF \rightarrow BI	UHF \rightarrow BIII	UHF \rightarrow UHF
Gain ^{1, 4}	dB	6 \pm 2	6 \pm 2	6 \pm 2
Noise figure	dB	9	9	9
Output level (Analog : DIN-K, -54dB Digital : EN 50083-3, -35dB)	dB μ V	80 (analog) 75 (digital)	80 (analog) 75 (digital)	80 (analog) 75 (digital)
Consumption	mA	110	110	110

Notes

¹ Subtract 3.5 dB if Z input demultiplexing is used

² AGC disabled

³ Adjustable -8 dB

⁴ Adjustable -20 dB

Particular ordering instructions

- Specify TV channel for the AGC amplifier.
- Specify input channel and output channel for the converters.

MULTICHANNEL HEADENDS

«SZB» — Amplification, Conversion and Modulation Equipment

(cont'd)

Sat-IF Combiner/Amplifier

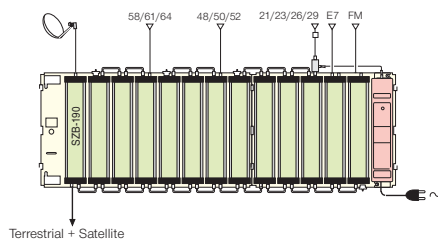


SZB-190

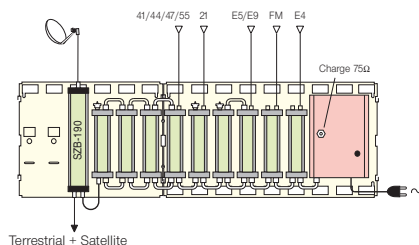
Model		SZB-190
Reference		1346
Sat-IF Band	MHz	950 - 2150
Gain (7 dB fixed slope)	dB	33 (950 MHz) 40 (2150 MHz)
Gain adjustment	dB	18
Output level (IMD3 -35 dB, EN 50083-3)	dBμV	120
Noise figure (max. gain)	dB	< 8
Terrestrial band	MHz	5 - 862
Terrestrial coupling loss	dB	< 1
Operating voltage	Vdc	+24
Consumption	mA	120 ¹
Insertable Voltage/Tone to Sat-IF input port		+13 / +18 Vdc ² 0 / 22 kHz
Max LNB power current	mA	350 (at +18 VDC) „ 250 (at +13 VDC)
Dimensions	mm	190 x 38 x 87

- Preferential use with the «SZB», «MZB» and «MZ6» terrestrial single-channel processing headends. Mounting as any other module on the BAS-916, BAS-919, BAS-956 and BAS-959 base-plates.
- 1 satellite input 950-2150 MHz with adjustable gain and sloped response to compensate for cable loss; 1 terrestrial coupling input 5-862 MHz; 1 satellite-terrestrial output.
- Automatic power connection, either via contact terminal (SZB application) or via terrestrial coupling input port (MZB and MZ6 applications).
- LNB coax line powering. The SZB-190 generates the required voltage/tone signals for the selection of H/V polarisation and high/low frequency sub-band.
- F connection. 1 Z bridge Ref. 2247 supplied.

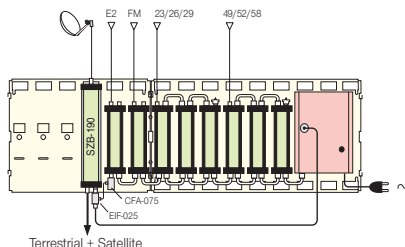
Example of application with «SZB» Headend



Example of application with «MZB» Headend



Example of application with «MZ6» Headend



Notes

- ¹ LNB power current must be added up.
- ² Programmable values by micro-switches.

► MULTICHANNEL HEADENDS

«SZB» — Amplification, Conversion and Modulation Equipment

(cont'd)

Programmable TV Modulators

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

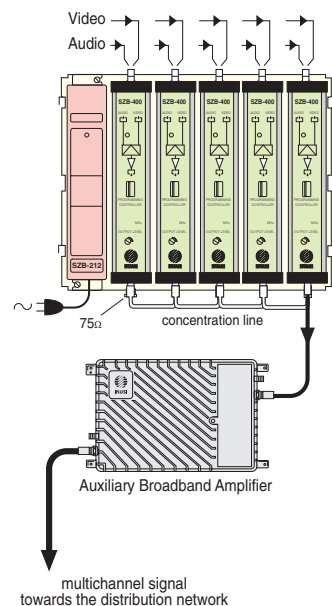


SZB-400



SPI-300

Application example



Model		SZB-410	SZB-430	SZB-440
Reference		2237	2238	2239
Selectable TV channel located between :	MHz	45 - 146	146 - 470	470 - 890
Selectable TV System (DSB)		B , G , D , K , I , L , M , N		
Audio mode		MONO		
Output level (adjustment potentiometer)	dBμV	65 to 75		
Adjustable carrier level ratio	dB	10 to 18		
Video input level	Vpp	0.7 ... 1.4		
Video input impedance	Ω	75		
Adjustable video modulation depth	%	75 to 85		
Audio input level	Vpp	0.4 ... 4		
Audio input impedance	Ω	600		
Adjustable audio peak deviation	kHz	±10 to ±50 (except System L)		
Adjustable audio modulation depth	%	10 to 80 (System L)		
Applicable group delay precorrection		complying with B and G standards		
Weighted S/N ratio	dB	> 60		
Spurious in band	dBc	< -60		
Broadband noise (ΔB = 5 MHz)	dBc	< -60		
Output loop-through loss	dB	≤ 0.8		
Consumption at +24 VDC	mA	110		
Video connector		(1x) female F		
Audio connector		(1x) female RCA		
RF output connector (TV channel)		(2x) female F		
Programming-Unit connector		USB type		

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

Programming Unit

Model	SPI-300
Reference	4070
<ul style="list-style-type: none"> ● For setting the TV channel parameters of the «SZB-400» modulators : video carrier frequency, TV system, video modulation depth, carrier level ratio and audio modulation index. Also for applying precorrection of the group delay characteristics of receiver, and generating a test pattern. Cable connection to the USB front panel socket. ● LCD display. Microprocessor controlled. Simple and easy to use software. Firmware of the SPI-300 can be updated. ● Capacity of 20 pre-set memory allocations for repetitive «SZB-400» installations. ● 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. 	

► MULTICHANNEL HEADENDS

«SZB» — Amplification, Conversion and Modulation Equipment

(cont'd)



SZB-212

Power Supplies

Model		SZB-212	SZB-211
Reference		2228	1423
Regulation type		switch mode	switch mode
Mains supply voltage (50/60 Hz)	V _{Ac}	185 - 264	185 - 264
Output voltage	V _{Dc}	+24 (±5%)	+24 (±5%)
Max output current	A	2	1

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

Others

Model	Ref.	Description
BAS-916	2229	Base-plate with power connecting bar. Capacity: 1 p. supply + 5 RF modules; or 6 RF mod.
BAS-919	2225	Base-plate with power connecting bar. Capacity: 1 p. supply + 8 RF modules; or 9 RF mod.
COF-806	2231	Housing for 1 BAS-916 base-plate. Dimensions: 294x346x180 mm.
COF-809	2224	Housing for 1 BAS-919 base-plate. Dimensions: 420x346x180 mm.
COF-812	2233	Housing for 2 horizontally joined BAS-916 base-plates. Dimensions: 546x346x180 mm.
COF-818	2226	Housing for 2 horizontally joined BAS-919 base-plates. Dimensions: 798x346x180 mm.
COF-836	2232	Big housing to protect voluminous SZB headends built on 3 or 4 base-plates. Wall fixing. Two doors. Dimensions: 850x655x180 mm. (All housings: indoor mounting, metallic, lock/key closing system).
PZB-453	2247	Z plug-bridge, F connectors. Length: 45.3mm.
PZB-969	2310	Z plug-bridge, IEC / F adapter. Length: 42mm. (For adding one F-connection module to an old SZB headend with IEC connections).
IEF-024	3130	Power inserter. "Banana" jumper for connection.
CTF-175	1519	75Ω F load plug.
ABR-906	1340	Mechanical adaptor to mount the BAS-919 base-plate on 19" cabinets. Height: 6U. Material: galvanized steel. Four screws attached.



BAS-919



COF-806



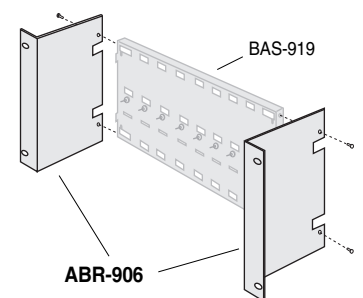
PZB-453



COF-812



COF-836



3

MULTICHANNEL HEADENDS

«MZB» — Amplification Equipment

CE

- Single-channel and multichannel amplifiers, the last ones especially created for amplification of combined analog and digital channels. Adjacent channel operation allowed in UHF band. Also FM Radio and DAB amplifiers. Dimensions: 140x37x70 mm. F connection. Easy to assemble onto the wall mounting base plates, without the need of any tools. Z input demultiplexing and Z output multiplexing.
- Power supply/Power inserter module, dimensions: 80x148x106 mm. 1 «RF input + DC output» port and «1 RF output» port. Output voltage +24 VDC is automatically connected to the amplifiers through the Z concentration line.
- It is advisable to place the amplifiers on the base-plate following a decreasing order of number of channel (frequency) starting from the power supply module. The RF output of the headend will be taken from this aforementioned module (see application example below).
- Easy incorporation —to a new or existing «MZB» headend— of the SZB-190 Sat IF Combiner/Amplifier (see page 29).

TV Single-channel, FM Radio and DAB Amplifiers

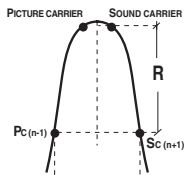
Model	MZB-119	MZB-129	MZB-128	MZB-168	MZB-139	MZB-141 *
Reference	3251	3253	3252	3261	3254	3260
Bandwidth	1 channel BI	FM	FM	DAB (195-223 MHz)	1 channel BI ¹	1 channel UHF (analog or dig)
Gain ^{2,3}	44 dB	42 dB	29 dB	44 dB	43 dB	40 / 36 ⁴ dB
Noise figure	7.5 dB	7.5 dB	7.5 dB	8 dB	7 dB	11 dB
Output level (Analog: DIN-K, -54dB Dig.: EN 50083-3, -35dB)	117 (analog) 112 (digital)	104 (-50dB IMD3)	104 (-50dB IMD3)	104 (-50dB IMD3)	117 (analog) 112 (digital)	117 (analog) 112 (digital)
Z output return loss	≥ 6 dB	≥ 6 dB	≥ 6 dB	≥ 6 dB	≥ 6 dB	≥ 6 dB
Consumption	30 mA	30 mA	30 mA	35 mA	30 mA	35 mA

* The MZB-141 is a high-selectivity amplifier especially created to amplify one ADJACENT channel (analog or digital). It can also be used to amplify non-adjacent channels.

- Each amplifier is packed with 1 Z bridge Ref. 1579.



«MZB» Headend



TV System	G	K, L	I	B (Australia)
R (dB)	> 12	> 5	> 9	> 6

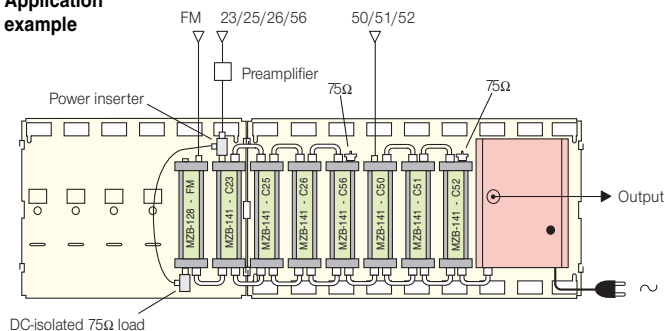
Amplitude vs. Frequency response of MZB-141 Amplifier

Multichannel UHF Amplifiers

Model	MZB-182	MZB-184	MZB-185
Reference	3259	3257	3258
Bandwidth	2 UHF channels (analog and digital)	Channels 66 to 69 (all digital)	Channels 65 to 69 (65: analog or dig., 66-69: digital)
Gain ^{2,3}	48 dB	44 dB	44 dB
Noise figure	7 dB	7 dB	7 dB
Output level	102 (2x ana) 114 / 104 (2x 1 ana / 1 dig)	109 (2x dig) 106 (2x)	111 + 101 (2x) Ch 65 (ana) Ch 66-69 (dig) 105 (2x) Ch 65-69 (dig)
Z output return loss	≥ 6 dB	≥ 6 dB	≥ 6 dB
Consumption	35 mA	35 mA	35 mA

- Each amplifier is packed with 1 Z bridge Ref. 1579.

Application example



Notes

- ¹ Also 1 channel S3 to S18.
- ² Adjustable -20 dB. Input attenuator.
- ³ Subtract 3.5 dB if Z input demultiplexing is used.
- ⁴ BIV / BV.
- ⁵ Max output levels when input level of digital signal is 10 dB lower than that of analog signal.

Particular ordering instructions

- Specify the TV channel for single-channel amplifiers. Idem, the two channels for MZB-182 model.

► MULTICHANNEL HEADENDS

«MZB» — Amplification Equipment

(cont'd)



MZB-209

Power supply/Power inserter

Model		MZB-209
Reference		3256
Mains supply voltage (50/60 Hz)	VAC	230 (±10%)
Injection voltage	VDC	+24 (±5%)
Max output current	mA	600
Thru loss of built-in inserter	dB	0.5

● The module is packed with 1 DC-isolated 75Ω load Ref. 3127.

3

Others

Model	Ref.	Description
BAS-956	1601	Base-plate. Capacity: 1 power supply/power inserter + 3 amplifiers, or 6 amplifiers.
BAS-959	1602	Base-plate. Capacity: 1 power supply/power inserter + 6 amplifiers, or 9 amplifiers.
COF-806	2231	Housing for 1 BAS-956 base-plate. Dimensions: 294x346x180 mm.
COF-809	2224	Housing for 1 BAS-959 base-plate. Dimensions: 420x346x180 mm.
COF-812	2233	Housing for 2 horizontally joined BAS-956 base-plates. Dimensions: 546x346x180 mm.
COF-818	2226	Housing for 2 horizontally joined BAS-959 base-plates. Dimensions: 798x346x180 mm.
COF-836	2232	Big housing to protect voluminous MZB headends built on 3 or 4 base-plates. Wall fixing. Two doors. Dimensions: 850x655x180 mm. (All housings: indoor mounting, metallic, lock/key closing system).
PZB-465	1579	Z plug bridge, F connectors. Length 46.5mm.
PZB-969	2310	Z plug-bridge, IEC / F adapter. Length: 42mm. (For adding one F-connection module to an old MZB headend with IEC connections).
IEF-024	3130	Power inserter. "Banana" jumper for connection.
CTF-175	1519	75Ω F load plug.
ABR-906	1340	Mechanical adaptor to mount the BAS-959 base-plate on 19" cabinets. Height: 6U. Material: galvanized steel. Four screws attached.



BAS-959



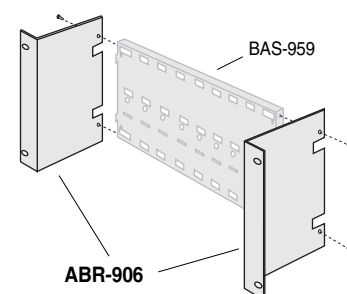
PZB-465



COF-809



COF-836



► MULTICHANNEL HEADENDS

«MZ6» — Amplification Equipment

(cont'd)



MZ6-709

Amplifier/Power supply/Power inserter

Model		MZ6-709
Reference		1600
Frequency range	MHz	40 - 862
Gain	dB	32
RF output level	dBμV	119 ¹
Mains supply voltage (50/60 Hz)	V _{AC}	230 (±10%)
Injection voltage	V _{DC}	+24 (±5%)
Max output current	mA	600

• The module is packed with 1 DC-isolated 75Ω load Ref. 3127.

Note

¹ Output level stated for IMD3=-60 dB (DIN 45004 B), applicable for amplification of 2 TV-channels. If more than 2 channels are used, see Reduction Table on page 168 (Technical Annex).

Others



BAS-959

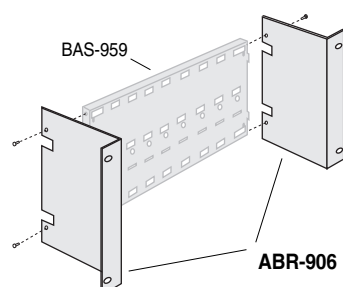


PZB-465

Model	Ref.	Description
BAS-956	1601	Base-plate. Capacity: 1 amplifier/power supply/power inserter + 3 filters, or 6 filters.
BAS-959	1602	Base-plate. Capacity: 1 amplifier/power supply/power inserter + 6 filters, or 9 filters.
COF-806	2231	Housing for 1 BAS-956 base-plate. Dimensions: 294x346x180 mm.
COF-809	2224	Housing for 1 BAS-959 base-plate. Dimensions: 420x346x180 mm.
COF-812	2233	Housing for 2 horizontally joined BAS-956 base-plates. Dimensions: 546x346x180 mm.
COF-818	2226	Housing for 2 horizontally joined BAS-959 base-plates. Dimensions: 798x346x180 mm.
COF-836	2232	Big housing to protect voluminous MZ6 headends built on 3 or 4 base-plates. Wall fixing. Two doors. Dimensions: 850x655x180 mm. (All housings: indoor mounting, metallic, lock/key closing system).
PZB-465	1579	Z plug bridge, F connectors. Length 46.5mm.
PZB-969	2310	Z plug-bridge, IEC / F adapter. Length: 42mm. (For adding one F-connection module to an old MZ6 headend with IEC connections).
IEF-024	3130	Power inserter. "Banana" jumper for connection.
CTF-175	1519	75Ω F load plug.
ABR-906	1340	Mechanical adaptor to mount the BAS-959 base-plate on 19" cabinets. Height: 6U. Material: galvanized steel. Four screws attached.



COF-818



COF-836

MULTIBAND HEADENDS

«CBG» — Programmable Terrestrial Amplification Mini-Headend

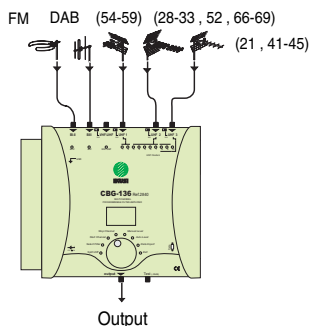
CE

- 6 Inputs (BI/FM - BIII - VHF/UHF - 3x UHF). Programmable frequency response for the three UHF inputs.
- Amplification of up to 10 UHF clusters of 1 to 7 channels bandwidth each. High selectivity of input filtering.
- VHF and UHF frequencies are amplified separately, with option of bridging the first amplification stage (20 dB) in the UHF paths. Gain adjustment in 1 dB steps. Possibility of automatic leveling of UHF cluster signals.
- Easy programming by using one rotary/push button viewed on 2-digit display and LEDs for each cluster and each input. Settings done can be protected against intrusion by using a password to accede the programming process.
- "COPY" function in order to transfer all settlements from one CBG to another reducing time of installation. Similarly, setting data can be transferred from a "memory module" available for that purpose (see below).
- Feed-through facility on VHF/UHF and UHF inputs (switchable +24 VDC) for remote powering of mast-head preamplifiers.
- Output test port.
- Mains powered, 50/60 Hz. Insertable mains lead, with bipolar plug. Electrical safety protection level: Class II.
- Wall fixing. F type connection. Indoor mounting. Grounding terminal.



CBG-136

Application example



Model		CBG-136					
Reference		2840					
Input		BI / FM	BIII	VHF / UHF	UHF 1	UHF 2	UHF 3
Frequency range	MHz	47 - 108	174 - 240	47 - 240 and 470 - 862	470 - 862	470 - 862	470 - 862
Number of UHF programmable clusters 1 cluster = 1 to 7 ch (8 to 56 MHz)		-	-	-	2	8	0
					2	7	1
					2	5	3
Gain	dB	35	40	40	35 / 55 (switchable)		
Interstage variable attenuat.	dB	20	20	20	30		
General UHF level adjustm.	dB	-	-	-	-10 dB to +9 dB on the automatic adj. level		
Noise figure	dB	5	5	5	6		
Max input level	dBμV	80	80	80	105 / 80 (switchable)		
Output level	dBμV	118 ¹	118 ¹	VHF : 118 ¹ UHF : 123 ¹	123 ¹		
Selectivity		-	-	-	10 dB / 10 MHz		
Input/output return losses	dB	> 10	> 10	> 10	> 10	> 10	> 10
Remote powering of mast-head preamplifiers		-	-	+24 Vdc	+24 Vdc	+24 Vdc	+24 Vdc (100 mA total max)
Output test	dB	-30					
Data transfer interface		DB-9					
Mains voltage	Vac	230					
Consumption	W	35					
Operating temperature	°C	-5 ... +50					
Dimensions	mm	265 x 220 x95					

Note

¹ -60dB IMD3 (DIN 45004B). See Reduction Table on page 168.

16-Memory Module



BGM-016

Model	BGM-016
Reference	2841
<ul style="list-style-type: none"> ● Very useful to put quickly into service repetitive CBG installations. ● Capacity of 16 memory allocations to store all the settings data of up to sixteen CBG mini-headends. ● Simple and easy use. The module is plugged in the CBG unit either to import or to export data. ● Data transfer interface: DB-9. ● Three colours led for import data status. ● No battery required. ● Dimensions: 78x41x25 mm 	

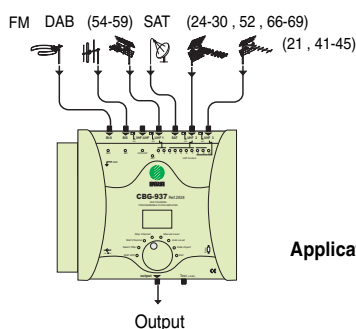
► MULTIBAND HEADENDS

«CBG» — Programmable Terrestrial and Satellite Amplification Mini-Headend **CE**

- 1 Satellite input + 6 Terrestrial inputs (BI/FM - BIII - VHF/UHF - 3x UHF). Programmable frequency response of UHF inputs.
- Amplification of up to 10 UHF clusters of 1 to 7 channels bandwidth each. High selectivity of input filtering.
- Sat-IF, UHF and VHF frequencies amplified separately. Gain adjustment (all inputs) and slope adjustment (only Sat-IF input) in 1 dB steps. Possibility of automatic leveling of UHF cluster signals.
- Easy programming by using one rotary/push button viewed on 2-digit display and LEDs for each cluster and each input.
- "COPY" function in order to transfer all settlements from one CBG to another reducing time of installation. Similarly, setting data can be transferred from a "memory module" available for that purpose (*BGM-016*, see previous page).
- Feed-through facility on VHF/UHF and UHF inputs (switchable +24 VDC) for remote powering of mast-head preamplifiers.
- Generation of voltage/tone signals (0 - 13 - 18V / 0 - 22kHz) for LNB.
- Output test port.
- Mains powered, 50/60 Hz. Insertable mains lead, with bipolar plug. Electrical safety protection level: Class II.
- Wall fixing. F type connection. Indoor mounting. Grounding terminal.

3

Model		CBG-937						
Reference		2838						
Input		BI / FM	BIII	VHF / UHF	UHF 1	UHF 2	UHF 3	Sat-IF
Frequency range *	MHz	47 - 108	174 - 240	47 - 240 and 470 - 862	470 - 862	470 - 862	470 - 862	950 - 2300
Number of UHF programmable clusters 1 cluster = 1 to 7 channels (8 to 56 MHz)		-	-	-	2	8	0	-
					2	7	1	
					2	5	3	
Gain	dB	35	40	40	55			40
Interstage variable attenuation	dB	20	20	20	30			20
Slope adjustment	dB	-	-	-	-	-	-	9
General UHF level adjustment	dB	-	-	-	-10 dB to +9 dB on the automatic adjustment level			-
Noise figure	dB	5	5	5	6			9
Max input level	dBμV	80	80	80	80			90
Output level	dBμV	118 ¹	118 ¹	VHF : 118 ¹ UHF : 123 ¹	123 ¹			116 ²
Selectivity		-	-	-	10 dB / 10 MHz			SAT-TER : > 30 dB TER-SAT : > 25 dB
Input/output return losses	dB	> 10	> 10	> 10	> 10	> 10	> 10	> 10
Remote powering of mast-head preamplifiers and LNB		-	-	+24 Vdc	+24 Vdc	+24 Vdc	+24 Vdc	0-13-18 V / 300 mA and 0-22 kHz
Output test	dB	-30						
Data transfer interface		DB-9						
Mains voltage	VAC	230						
Consumption	W	45						
Operating temperature	°C	-5 ... +50						
Dimensions	mm	265 x 220 x95						


CBG-937

Application example
Notes
¹ -60dB IMD3 (DIN 45004B). See Reduction Table on page 168.

² -35dB IMD3 (EN 50083-3). See Reduction Table on page 168.

MULTIBAND HEADENDS

«CBS» — Terrestrial Amplification Mini-Headends

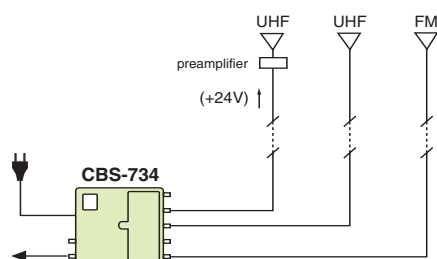
CE

- Three series: a) CBS-900 : 120 dB μ V; b) CBS-700 : 117 dB μ V; c) CBS-500 : 112 dB μ V
- 1, 2 or 5 RF inputs — 1 RF output.
- Push-pull technology for 900 and 700 Series. Very low 2nd order intermodulation distortion.
- Variable input attenuators.
- External RF output test F port.
- In 900 and 700 Series, feed-through facility (switchable +24 VDC) on every RF input, except FM, to provide line powering to preamplifiers.
- Mains powered, 50/60 Hz. Electrical safety protection level: Class II. Mains lead with bipolar plug.
- Injection-moulded zinc alloy housing. Access to internal variable attenuators through an easy-to-open frontal panel. F type connection. Wall-fixing.
- Indoor mounting. Grounding terminal.

Model		CBS-934	CBS-944	CBS-901	CBS-734	CBS-734DK	CBS-744	CBS-702	CBS-761	CBS-534	CBS-501
Reference		3451	3452	3453	3457	3465	3458	3464	3466	3456	3455
RF inputs		5 BI/BIII - FM BIII - (2x) UHF	5 BI/BIII - FM (3x) UHF	1 47-300 MHz 470-862 MHz	5 BI/BIII - FM BIII - (2x) UHF	5 ¹ BI - FM BIII - (2x) UHF	5 BI/BIII - FM (3x) UHF	2 FM - UHF	1 47-862 MHz	5 BI/BIII - FM BIII - (2x) UHF	1 47-300 MHz 470-862 MHz
Gain	dB	BI/BIII: 46 FM: 27 BIII: 46 UHF1: 45 UHF2: 45	BI/BIII: 45/42 FM: 27 UHF1: 44 UHF2: 44 UHF3: 34	40	BI/BIII: 43 FM: 19 BIII: 43 UHF1: 44 UHF2: 44	BI: 30 FM: 20 BIII: 42 UHF1: 44 UHF2: 44	BI/BIII: 39 FM: 19 UHF1: 41 UHF2: 41 UHF3: 30	FM: 19 UHF: 44	36	BI/BIII: 34 FM: 12 BIII: 35 UHF1: 34 UHF2: 34	34
Variable attenuator at each RF input	dB	0-18	0-18 (0-10 at UHF3)	0-18 ²	0-18	0-18	0-18 (0-10 at UHF3)	0-18	0-18	0-18	0-18 ²
Noise figure	dB	BI/BIII: ≤ 7 FM: ≤ 7 BIII: ≤ 7 UHF1: ≤ 9 UHF2: ≤ 9	BI/BIII: ≤ 7 FM: ≤ 7 UHF1: ≤ 9 UHF2: ≤ 9	VHF: ≤ 5.0 UHF: ≤ 5.5	BI/BIII: ≤ 9 FM: ≤ 7 BIII: ≤ 9 UHF1: ≤ 10 UHF2: ≤ 10	BI: ≤ 7 FM: ≤ 7 BIII: ≤ 9 UHF1: ≤ 10 UHF2: ≤ 10	BI/BIII: ≤ 9 FM: ≤ 9 UHF1: ≤ 10 UHF2: ≤ 10	FM: ≤ 7 UHF: ≤ 7	≤ 7	BI/BIII: ≤ 9 FM: ≤ 7 BIII: ≤ 9 UHF1: ≤ 10 UHF2: ≤ 10	VHF: ≤ 6 UHF: ≤ 7
Feed-through facility on inputs :		YES except FM			YES except FM				NO		
Spare current at +24V for preampl.	mA	90			80				—		
RF output level	dB μ V	120 ³			117 ³				112 ³		
Output test	dB	-30			-30				-30		
Mains supply voltage	V _{ac}	230 (-10%, +15%)			230 (-10%, +15%)				230 (-10%, +15%)		
Consumption	W	18			8				4		
Dimensions	mm	220 x 150 x 55			150 x 150 x 55				150 x 150 x 55		


CBS-934

CBS-734

CBS-501
Application example

Notes
¹ In the CBS-734DK model, the bandwidth of BI input is 47-100 MHz (channels R1 to R5) and the bandwidth of FM input is 100-108 MHz.

² Two independent variable attenuators for VHF (47-300 MHz) and UHF (470-862 MHz).

³ IMD3= -60 dB (DIN 45004B). The indicated level refers to amplification of 2 TV channels. If more than 2 channels are used, see Reduction Table on page 168 (Technical Annex).

MULTIBAND HEADENDS

«CBA» — Terrestrial Amplification Mini-Headends

- 1 or 4 RF inputs — 1 RF output.
- Variable input attenuators.
- Mains powered, 50/60 Hz. LED indicator.
- External box made of ABS plastic, dimensions: 159x125x55 mm. Indoor mounting. F type connection. Packed with 2 screws for wall-fixing.



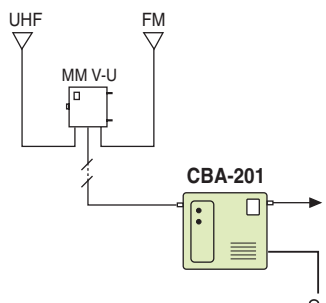
CBA-204S



CBA-201

Model		CBA-204S	CBA-201
Reference		2141	2140
RF inputs		4 BI - FM BIII - UHF	1 BI to BV
Gain	dB	BI: 30 FM: 30 BIII: 30 UHF: 32	At VHF: 31 At UHF: 33
Variable attenuator at each RF input	dB	0-18	0-18 ¹
Noise figure	dB	BI: ≤ 4.5 FM: ≤ 4.5 BIII: ≤ 4.5 UHF: ≤ 5	At VHF: ≤ 4 At UHF: ≤ 5
RF output level	dBμV	106 ²	106 ²
Mains supply voltage	VAC	230 (-10%, +15%)	230 (-10%, +15%)
Consumption	W	3.3	3.3

Application example



Notes

¹ Two independent variable attenuators for VHF (BI, FM, BIII) and UHF (BIV, BV).

² IMD3= -60 dB (DIN 45004B). The indicated level refers to amplification of 2 TV channels. If more than 2 channels are used, see Reduction Table on page 168 (Technical Annex).

MULTIBAND HEADENDS

«CBM» — Terrestrial and Satellite Amplification Micro-Headends

CE

- Designed especially for single-family homes (chalets, villas). Also for small-size collective installations, in cases of only-terrestrial reception.
- Complete range to meet all terrestrial and satellite configuration requirements. Available models with 45-862 MHz "extension" input for combining video/ audio modulated sources (surveillance cameras, for example).
- In models with IF input, independent amplification paths for satellite (950-2150 MHz) and terrestrial signals. Sloped response (5 dB) for IF. Direct transit of the LNB remote power coming from the user receiver.
- Adjustment potentiometers on the inputs. Interstage position in UHF amplification for maintenance of low noise figure.
- AC (mains) or DC (+12V / +24V) powering. In the first case (models CBM-1xx), mains lead with bipolar plug. In the case of DC powering (model CBM-685), connection socket at the rear side of the micro-headend.
- Remote powering of mast-head preamplifiers. Insertion of DC voltage by the small plug-in bridges provided.
- Small plastic box, with protective cover. Internal zinc alloy chassis. F type connection.
- Indoor mounting. Wall- fixing.

Model		CBM-175	CBM-185	CBM-125	CBM-115	CBM-184	CBM-193	CBM-113	CBM-685
Reference		3547	3541	3546	3544	3540	3542	3543	3545
RF inputs		5 IF UHF - UHF DAB/BIII - BI/FM	5 IF UHF1* - UHF2* DAB/BIII - BI/FM	5 UHF - UHF DAB/BIII - BI/FM Ext (45-862MHz)	5 UHF1* - UHF2* DAB/BIII - BI/FM Ext (45-862MHz)	4 IF UHF DAB/BIII - BI/FM	3 IF TV (BI to BV) Ext (45-862MHz)	3 UHF VHF Ext (45-862MHz)	5 IF UHF1* - UHF2* DAB/BIII - BI/FM
Nominal gain	dB	IF: 27-32 UHF: 29 UHF: 29 DAB/BIII: 30 BI/FM: 29	IF: 27-32 UHF1: 31 UHF2: 32 DAB/BIII: 30 BI/FM: 29	UHF: 29 UHF: 29 DAB/BIII: 30 BI/FM: 29 Ext: 17-20	UHF1: 31 UHF2: 32 DAB/BIII: 30 BI/FM: 29 Ext: 17-20	IF: 27-32 UHF: 31 DAB/BIII: 30 BI/FM: 29	IF: 27-32 TV: 29-32 Ext: 17-20	UHF: 31 VHF: 30 Ext: 17-20	IF: 27-32 UHF1: 31 UHF2: 32 DAB/BIII: 30 BI/FM: 29
Attenuation adjustment on the inputs	dB	IF: 0-18 UHF's: 0-15 VHF's: 0-18	IF: 0-18 UHF's: 0-15 VHF's: 0-18	UHF's: 0-15 VHF's: 0-18 Ext: 0-10	UHF's: 0-15 VHF's: 0-18 Ext: 0-10	IF: 0-18 UHF: 0-15 VHF's: 0-18	IF: 0-18 TV: 0-15 Ext: 0-10	UHF: 0-15 VHF: 0-18 Ext: 0-10	IF: 0-18 UHF's: 0-15 VHF's: 0-18
Noise figure	dB	IF, UHF: ≤ 9 Rest: ≤ 7	IF: ≤ 9 Rest: ≤ 7	UHF: ≤ 9 Rest: ≤ 7 (except Ext)	≤ 7 (except Ext)	IF: ≤ 9 Rest: ≤ 7	IF: ≤ 9 TV: ≤ 7	≤ 7 (except Ext)	IF: ≤ 9 Rest: ≤ 7

* UHF1 and UHF2 inputs cover respectively low and high sub-bands of UHF. Six available splits, see table below.

Common specifications

Input return loss	: IF : ≥ 6dB Rest : ≥ 10dB
IF signal output level	: 106 dBμV ¹
Terrestrial signal output level	: 106 dBμV ²
Powering voltage	: 100 - 240 VAC
Consumption	: 4 W
Voltage/Current for preamplifiers	: +24Vdc / 60mA (UHF and TV inputs)
Dimensions	: 120 x 85 x 50 mm

+12Vdc or +24Vdc
90mA (+12Vdc)
70mA (+24Vdc)
(depending on the power supply being utilized)
CBM-685 model

¹ IMD3= -35 dB (EN 50083-3)
² IMD3= -60 dB (DIN 45004B)

UHF SPLITS (only CBM-115, -185 and -685 models)

Split	UHF1 (channels)	UHF2 (channels)
28 / 31	21-28	31-69
34 / 37	21-34	37-69
41 / 44	21-41	44-69
44 / 47	21-44	47-69
47 / 50	21-47	50-69
54 / 57	21-54	57-69

Particular ordering instructions

- The orders for CBM-115, CBM-185 and CBM-685 models must specify the desired UHF splits.

Examples:

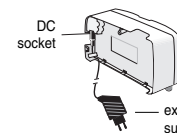
- 1) 1 CBM-115 (Ref. 3544) — 34/37 split
- 2) 1 CBM-185 (Ref. 3541) — 47/50 split
- 3) 1 CBM-685 (Ref. 3545) — 41/44 split

CBM-185



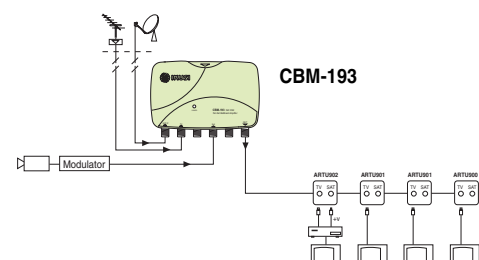
- Interior panel with the adjustment controls.

CBM-685



- Rear view.

Application example



MULTIBAND HEADENDS

«AFI» — Sat-IF Combiner/Amplifier

CE

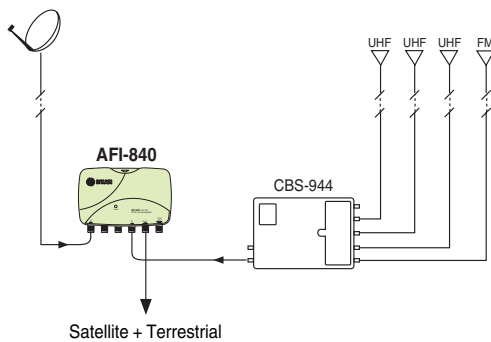
- 1 Satellite 950-2150 MHz input port, with adjustable gain and pre-emphasized response to compensate for cable losses; 1 Terrestrial coupling 5-862 MHz input port; 1 Combined Satellite+Terrestrial output port; 1 output test port. F type connection.
- Mains powered 50/60 Hz. Electrical safety protection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



AFI-840

Model		AFI-840
Reference		1164
Sat-IF band	MHz	950 - 2150
Response flatness	dB	± 1.5
Gain	dB	34 - 40 (6 dB fixed slope)
Continuous gain adjustment	dB	0 - 18
Output level (-35 dB IMD3, EN 50083-3)	dBμV	120 ¹
Input/output return loss	dB	≥ 6
Noise figure	dB	< 9
TV band	MHz	5 - 862
TV coupling loss	dB	≤ 1.5
Output test (TV+IF)	dB	-30 ±1.5
Mains voltage	Vac	100 - 240
Consumption	W	6
Insertable voltage/tone to Sat-IF input port		+13 VDC / +18 VDC ² 0 / 22 kHz ²
Max LNB power current	mA	200 (at +13 VDC) ,, 100 (at +18 VDC)
Dimensions	mm	120 x 85 x 50

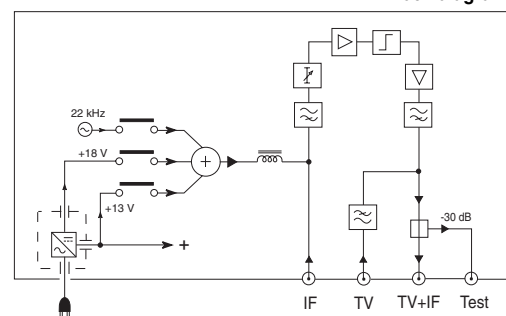
Application example

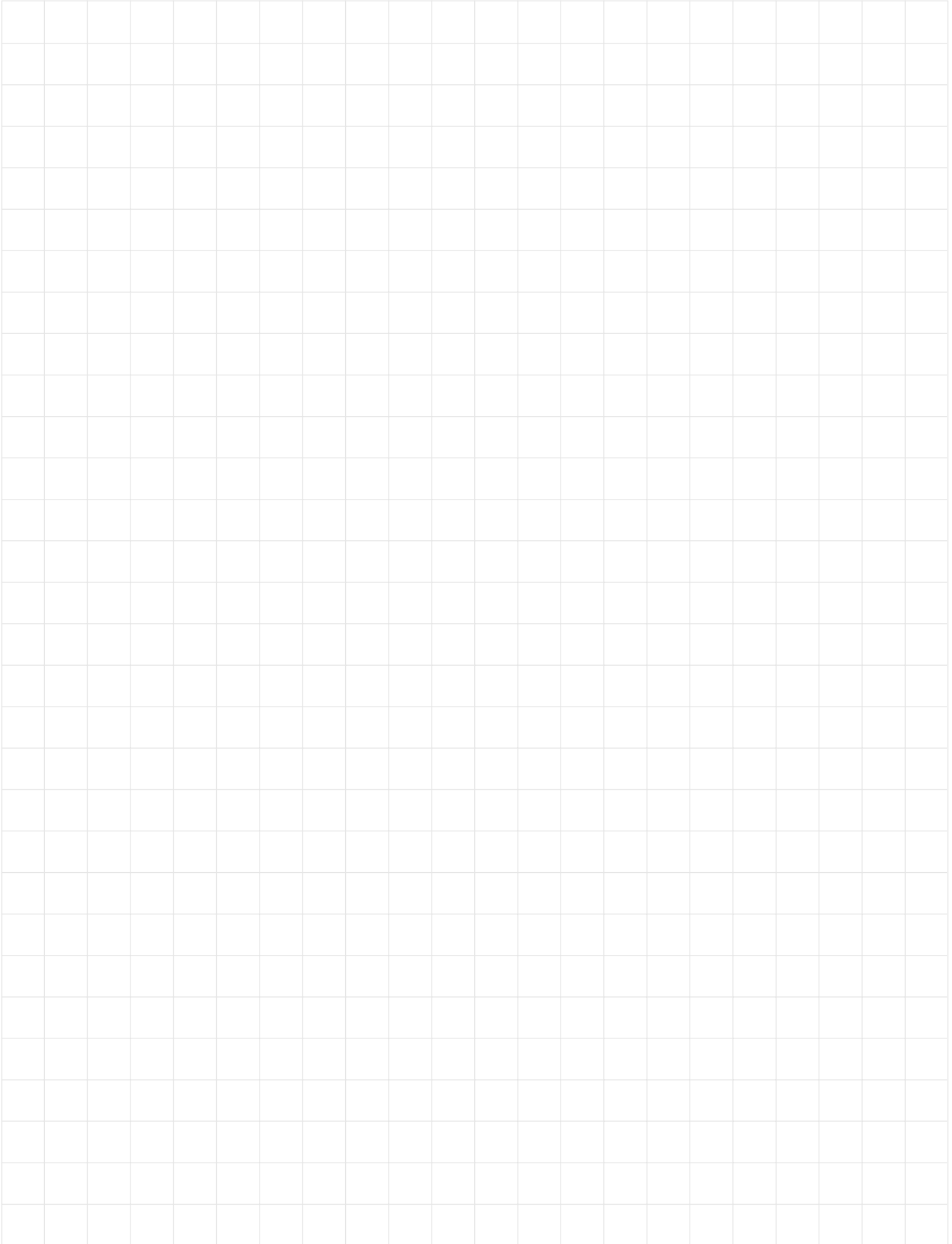


Notes

- ¹ See Reduction Table on page 168 (Technical Annex)
- ² Selection by plug-in bridges

Block diagram





► ClassA HEADENDS

ClassA Modules — Range and General Features

Wall-fixing ClassA Headend



Rack-mountable ClassA Headend



ClassA is a complete range of functional modules for processing of analog and digital terrestrial, satellite, cable and baseband signals. Optical transmitters and receivers. Also IP streamers. All modules have identical format and are simply to place on a wall-fixing baseplate or in a 6RU rack-frame. Connection and control ports are disposed on the front panel.

The range includes the following types of modules:

- «TPC» : Terrestrial/Cable TV-Channel Processors (pages 48/49).
- «TRF» : Free-To-Air DVB-T Receivers (pages 50/51).
- «TDC» : DVB-T Receivers with Embedded Conditional Access (pages 52/53).
- «TDI» : COFDM-QAM Transmodulators (pages 54/55).
- «SRF» : Free-To-Air DVB-S Receivers (pages 56/57).
- «SDC» : DVB-S Receivers with Embedded Conditional Access (pages 58/59).
- «SRC» : DVB-S Receivers with Common Interface (pages 60/61).
- «MDI» : QPSK-QAM Transmodulators (pages 62/63).
- «CRF» : Free-To-Air DVB-C Receivers (pages 64/65).
- «CDC» : DVB-C Receivers with Embedded Conditional Access (pages 66/67).
- «CRC» : DVB-C Receivers with Common Interface (pages 68/69).
- «CGT» : QAM-QAM Regenerators (pages 70/71).
- «MCP» : Vestigial Side Band TV Modulators (pages 72/73).
- «HPA» : 47-862 MHz and 950-2150 RF Power Amplifiers (pages 46 and 74).
- «AMX» : 4-way 47-862 MHz Active Combiner (page 75).
- «HMS» : Control Units (page 47).
- «CFP» : Power Supplies (page 46).
- «xNS» : DVB to IP Streamers (pages 89-91).
- «FTD» : Optical Transmitters (page 93).
- «FSP» : Optical Splitters (page 93).
- «FRR» : Optical Receivers —return path (page 96).
- «CTP» : Video Scrambler (page 157).

The family is complemented with accessories for programming and installation (next pages 44 and 45).

PROGRAMMING AND FIRMWARE UPDATE

ClassA modules are locally programmed and adjusted either with the SPI-300 programming unit from IKUSI or with a PC with the PRG-300 software installed. In this second case, a communication bus (IKUSUP) must be installed along the modules using interconnection jumpers. Programming with PC can also be done remotely, through modems, using either the PRG-300 software or simply a web browser if an HMS control unit is installed in the headend. The parameters 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 the modules and programming unit can be updated. The corresponding files are downloaded from <http://www.ikus.com>.

AGILITY AND ADJACENT CHANNELS

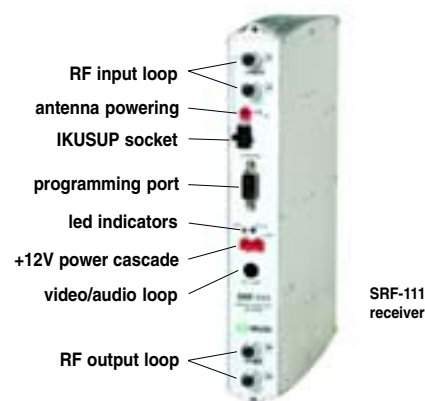
ClassA modules feature frequency agility handled by a high-performance PLL heterodyne double conversion. The broadband noise floor generated is exceptionally low, so multiple modules can be installed in the headend with very little deterioration of the CNR. The use of SAW filters provides, on the other hand, a true vestigial sideband response that enables frequency planning using adjacent channels.

These characteristics mean the installations are highly flexible and the maintenance problems are simplified.

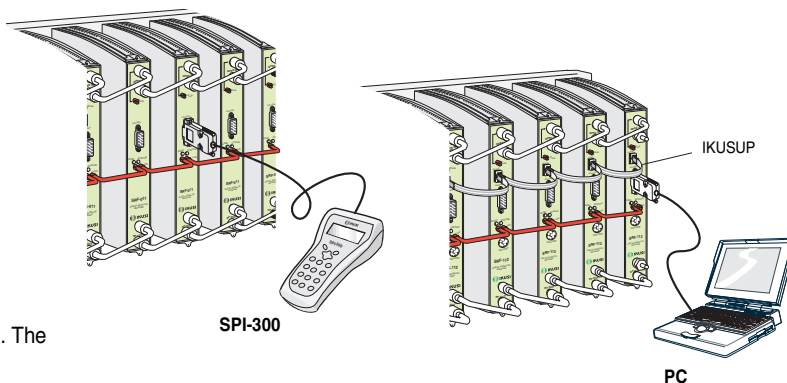
VIDEO/AUDIO LOOP AND BISS OPERATION

ClassA receivers have an external video/audio loop that is switchable under control software. So, these receivers can be used in scrambling systems (vHOTEL from IKUSI, for example).

The receivers can also operate in BISS systems (Basic Interoperable Scrambling Systems).



SRF-111 receiver



SPI-300

PC

► ClassA HEADENDS

Programming Accessories

Programming Unit



SPI-300

Model	SPI-300
Reference	4070
<ul style="list-style-type: none"> • For programming the ClassA 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 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. 	

PC Software for Local and Remote Programming

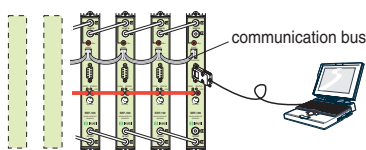


PRG-300

Model	PRG-300
Reference	9602
<ul style="list-style-type: none"> • For programming and monitoring the ClassA headends from a PC, either locally or remotely via modem. • Operation language (spanish, english) is automatically established in concordance with that used in Windows. • Windows-based graphical interface. • Use of preset memory allocations for repetitive ClassA assemblies. • Stores complete headend information allowing reports to be printed. • Shipped in CD-ROM. 	

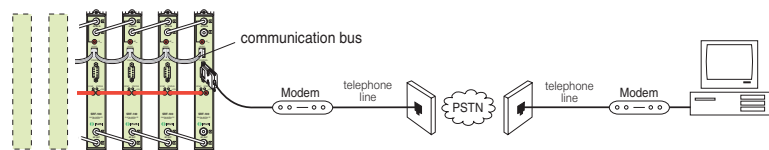
Minimum Requirements for the Computer

Computer	INTEL Pentium III 600MHz IBM PC or similar
Telephone line	Installed (for remote operation)
Modem at the headend location	Installed (for remote operation) — RS-232C port
Modem at the computer location	Installed (for remote operation)
Computer configuration	
Hard disc	100 MB free space
CD-ROM Drive	Installed
Parallel Port	IBM PC compatible printer port
Serial Port	COM1 port, RS-232C
Mouse	Installed
RAM	256 MB
Display	SVGA monitor, 15" or 17"
Operating System	Windows 95/98/ME/NT/2000/XP
Screen Properties' Configuration	800x600 pixels or 1024x768 pixels 256 colours Small size fonts



• Local Programming with PC + PRG-300

It is advisable to interconnect by means of BUS-013 jumpers the IKUSUP front panel sockets of the modules. The established communication bus enables to set the complete headend through a unique connection to the DB-9 socket of the last module on the right of the cascade.



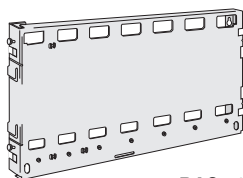
• Remote Programming with PC + PRG-300

Communication with the PC is accomplished through modems and telephone lines. In the headend, a communication bus must be built using BUS-013 jumpers. The modem at the headend side is connected to the DB-9 socket of the last module on the right of the cascade.

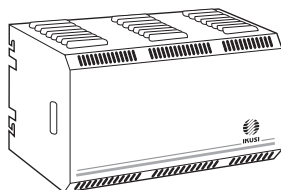
NOTE: These diagrams are not applicable for the so-called *economical models* of the ClassA modules, which do not include IKUSUP sockets.

► ClassA HEADENDS

Installation Accessories



BAS-700



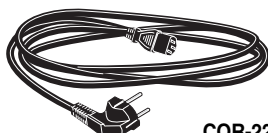
COF-700



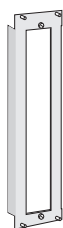
BUS-013



CDP-102



COR-220

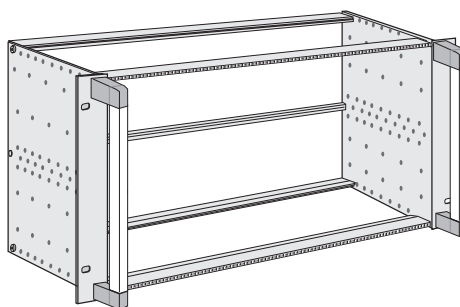


PMR-600

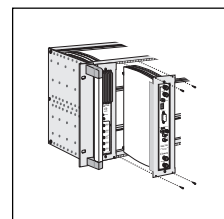


OMR-600

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 base-plate. 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 jumpers for IKUSUP communication bus between ClassA modules (PC programming application).
CDB-200	4706	Two DB-9 female connectors to assemble the PC↔headend connecting cable.
CDP-102	4704	2-pair shielded, twisted cable (1 m) to assemble the PC↔headend connecting cable.
COR-220	3616	Europe Schuko power cord. Cordset consist of 1.5 m of harmonised cable with a CEE 22 moulded socket on one end and a moulded plug on the other.
PMR-600	4416	Fixing-plate to fasten a ClassA module to the SMR-600 rack-frame.
OMR-600	4417	6U - 12E (260x60mm) blank panel to fill the unoccupied places on the SMR-600 rack-frame.
SMR-600	4407	Rack-frame for ClassA assemblies, 6U height. Easy integration in standard 19" racks. Capacity: 7 modules.



SMR-600



▶ ClassA HEADENDS

Common Modules

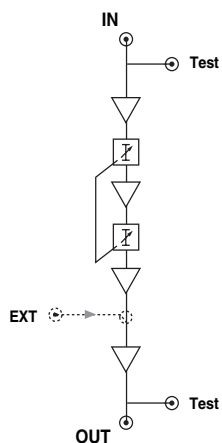
CE

47-862 MHz RF Power Amplifiers



HPA-125

Block diagram



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

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

Note

¹ The indicated level refers to amplification of 2 TV channels. If more than 2 TV channels (included those fed into the extension input) are used, see Reduction Table on page 168 (Technical Annex).



CFP-700



CFP-500

Power Supplies

Model		CFP-700	CFP-500
Reference		4401	4429
Regulation type		switch mode	switch mode
Mains supply voltage (50/60 Hz)	VAC	100 - 240 (± 10%)	230 / 240 (± 10%)
Outputs		+12 V (5 A) <small>(for ClassA modules)</small> +24 V (60 mA) <small>(for mast-head preamplifiers)</small> +18 V (300 mA) +18 V / 22 kHz (300 mA) +13 V (300 mA) +13 V / 22 kHz (300 mA)	+12 V (5.3 A) <small>(for ClassA modules and LNB)</small> +24 V (60 mA) <small>(for mast-head preamplifiers)</small>
Max total current for +24, +18 and +13 V	mA	700	—
Efficiency	%	75	75
Mains lead		No *	Yes (bipolar plug)
Dimensions	mm	230 x 195 x 48	230 x 195 x 48

* Mains lead not included. The module has a 3-pin european standard inlet, so the mains lead to be used must have a mating CEE 22 socket (see COR-220 power cord on previous page).

- Electrical safety protection level: Class II.
- 2 "banana" jumpers, 50 cm length, are supplied to connect the appropriate outputs of the power supply to 1 or 2 ClassA receivers for line powering a terrestrial preamplifier or LNB.

► ClassA HEADENDS

«HMS» — Headend Control Units

CE

APPLICATION

The HMS-120 and HMS-130 units 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, apparition of OSD messages and firmware updates. The HMS-130 also generates an INFO Channel which can display images and sounds previously entered as JPEG and MP3 files. 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

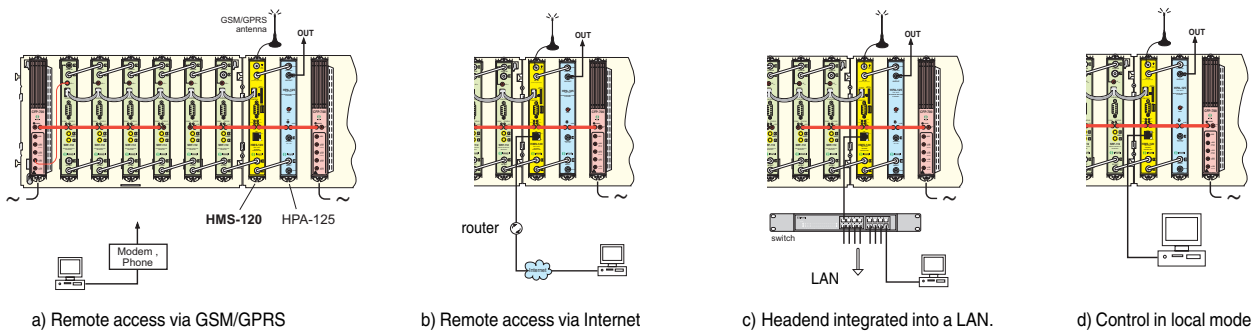
The HMS control units have two interfaces for remote communication:

- 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.



HMS-120

4



a) Remote access via GSM/GPRS

b) Remote access via Internet

c) Headend integrated into a LAN.
Control from any PC of the LAN.

d) Control in local mode
with a PC

		Being developed
Model	HMS-120	HMS-130
Ref.	4435	4436
INFO Channel	No	Yes

FEATURES

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
Only HMS-130 : Insertion of JPEG and MP3 files for INFO Channel

READING OF MODULES' RF OUTPUT LEVELS

Frequency range : 45-862 MHz
Range of levels : 55-90 dB μ V
Accuracy of the reading : ± 1.5 dB μ V

GSM/GPRS MODEM

Frequency range:
GSM900 \rightarrow Tx: 880-915MHz, Rx: 925-960MHz
GSM1800 \rightarrow 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 dB μ V
Accuracy of the reading : ± 1.5 dB μ V

MONITORING ETHERNET PORT

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

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 : PAL B/G
Adjustable output level : 70-80 dB μ V

CONNECTORS

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

INDICATOR LEDS

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

GENERAL

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

► ClassA HEADENDS

«TPC» — Terrestrial/Cable TV-Channel Processing Equipment

CE

TPC HEADENDS

- Double heterodyne conversion in the 45-862 MHz frequency range. IF SAW filtering. B/G, D/K, I, L systems and DVB-T, DVB-C standards.
- 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.
- A TPC headend includes:
 - As many TPC Processing Modules as channels to be converted or processed.
 - One HPA Amplifier that amplifies the sum of the combined output TV channels from the processors.
 - One or more CFP Power Supplies.
 - One or more Rack-Frames or wall-fixing Base-Plates. The base-plates can be joined horizontally.
 - Usually, housing units for the base-plates.
 - If the headend is voluminous, one or more AMX-400 combiners.

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

FUNCTIONAL DESCRIPTION OF THE TPC PROCESSORS

In a TPC module can be distinguished three main sections:

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

Range includes two models: the **TPC-110**, which can be programmed remotely with a PC using either the PRG-300 software or a standard web browser if the HMS control unit is installed in the headend, and the economical **TPC-010** model, which can be programmed just locally with the SPI-300 programming unit or a PC + PRG-300.

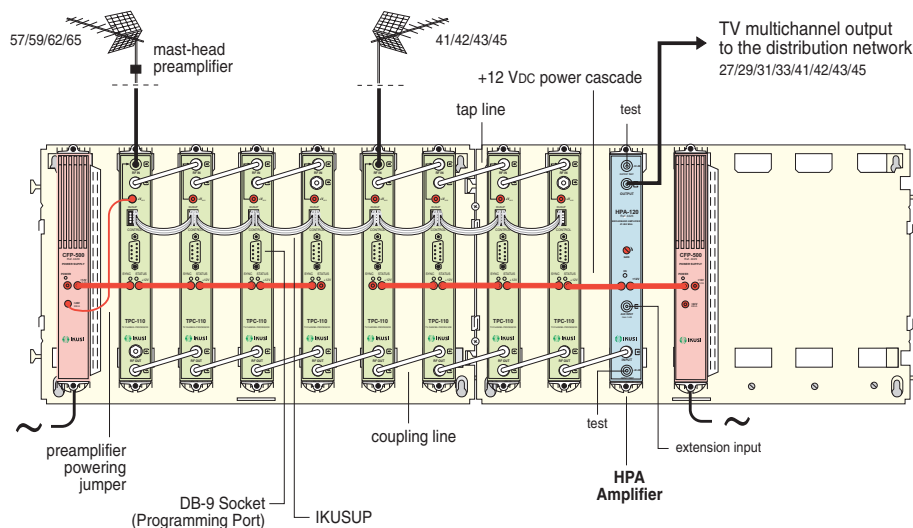
Programming of a TPC processor involves the following selections and settings:

- 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.

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

Simple cabling of TPC headends

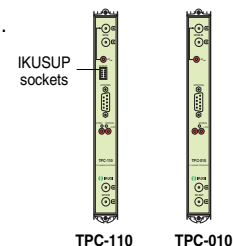
The TPC modules feature two directionally coupled input and output ports. Antenna or cable network signal can therefore be directly fed into the input port of the first module, which in turn passes it through the coupler to the next and so forth. On the output side, the same procedure is repeated which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



- Example of «TPC» headend for conversion of four channels and processing of other four ones. Contains 8 Processors TPC-110, 1 Amplifier and 2 Power Supplies, all fixed on 2 horizontally joined Base-plates.



TPC-110



TPC-010

► ClassA HEADENDS

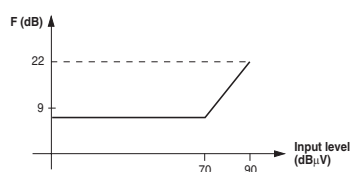
«TPC» — Terrestrial/Cable TV-Channel Processing Equipment

(cont'd)

Channel Processors

Model		TPC-110	TPC-010
Reference		3843	3842
Remote Programming Function		Yes	No
TV System / Standard		B/G ,, D/K ,, I ,, L ,, DVB-T ,, DVB-C	
Frequency band of input TV channel	MHz	45 - 862	
Selectable output channel located between :	MHz	45 - 862	
Frequency selection steps	MHz	0.250 (analog) 0.500 (digital)	
Selectable tuning offset	kHz	(±) 125 / 250 / 375 / 500	—
Input level (AGC: 40 dB ; manual adjustment for L-system channels)	dBμV	50 - 90 (analog) 40 - 80 (digital)	
Input loop-through gain	dB	1 (±3)	
Noise figure (see graph below)	dB	< 9 (input level: <70 dBμV)	
Input loop's noise figure	dB	6	
Bandwidth of SAW filtering (at -3 dB)	MHz	6.875 (for 7 MHz channels) 7.850 (for 8 MHz channels)	
Selectivity for 7 MHz channels	dB	> 9 (fc ± 3.75 MHz) ,, > 70 (fc ± 4.75 MHz)	
Selectivity for 8 MHz channels	dB	> 18 (fc ± 4.25 MHz) ,, > 70 (fc ± 5.25 MHz)	
Image rejection	dB	> 70	
Adjustable output level	dBμV	65 to 80 (analog) ,, 55 to 70 (digital)	
Output loop-through loss	dB	1.1 (typ) , 1.4 (max)	
Group delay	ns	< ±40	
Spurious in band	dBc	< -58	
Phase noise of output channel (@ 1kHz)	dBc/Hz	< -92 (processor) ,, < -80 (converter)	< -73 (processor and converter)
Broadband noise (ΔB=5MHz)	dBc	< -75	
Supply voltage	Vdc	+12	
Consumption	mA	590	780
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	

- Each 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.



- Noise Figure vs. Input Level

4

▶ ClassA HEADENDS

«TRF» — Free-To-Air Digital Terrestrial TV Reception Equipment



TRF HEADENDS

- 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).
- A TRF headend includes:
 - As many TRF Receiving Modules as free-to-air TV programmes to be distributed.
 - One HPA Amplifier that amplifies the sum of the combined output TV channels from the receivers.
 - One or more CFP Power Supplies.
 - One or more Rack-Frames or wall-fixing Base-Plates. The base-plates can be joined horizontally.
 - Usually, housing units for the base-plates.
 - If the headend is voluminous, one or more AMX-400 combiners.

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

FUNCTIONAL DESCRIPTION OF THE TRF RECEIVERS

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

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

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

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.



TRF-111

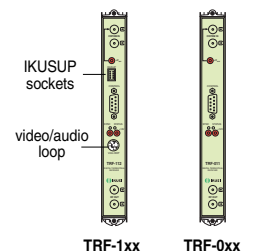
Models featuring VSB output are utilizable for adjacent channel operation. If this operation is not required, existing models featuring DSB output may be used without problems. The first ones present, on the other hand, a very low broadband noise floor (< -75 dBc) that permit to use multiple modules in the headend with very little deterioration of the CNR.

Simple cabling of TRF headends

The TRF receiving modules feature two directionally coupled input and output ports. Antenna signal can therefore be directly fed into the input port of the first module, which in turn passes 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 then connected in the same way to the drive amplifier—the HPA module or an external wideband amplifier—which then feeds the distribution network. For power connection, each module has two DC banana sockets that allow to build a +12 VDC cascade. A third banana socket is available to connect the power for an optional mast-head preamplifier.

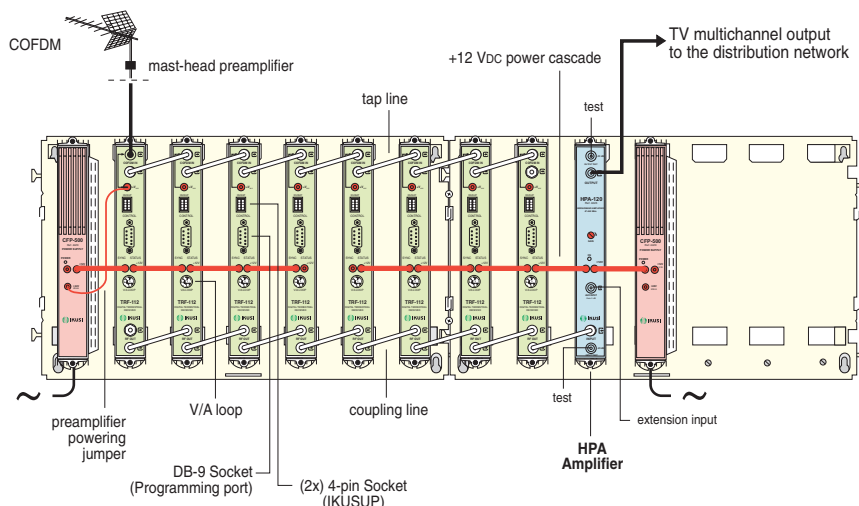
An external video/audio loop, which is switched under control software, is available on models TRF-1xx. The loop is not available in the so called **economical models** (TRF-0xx).

Local programming is carried out either with the SPI-300 unit, which is connected to each module individually, or with a PC + PRG-300 software. Remote programming is carried out through modems, with a PC using either the PRG-300 software or a standard web browser if the HMS control unit is installed in the headend. The TRF-0xx economical models do not have IKUSUP sockets and cannot therefore be programmed remotely.



TRF-1xx

TRF-0xx



— Example of «TRF» headend for eight clear digital terrestrial TV programmes. Contains 8 Receivers, 1 Amplifier and 2 Power Supplies, all fixed on 2 horizontally joined Base-plates.

► ClassA HEADENDS

«TRF» — Free-To-Air Digital Terrestrial TV Reception Equipment

(cont'd)

COFDM Receivers

OUTPUT TV-CHANNEL SPECTRUM • VSB — Vestigial Side Band •		Model	TRF-011	TRF-014	TRF-111	TRF-112	TRF-114	TRF-121
		Reference	4085	4461	4419	4420	4463	4421
OUTPUT TV-CHANNEL SPECTRUM • DSB — Double Side Band •		Model	TRF-051					
		Reference	4088					
Output channel TV System			B/G/D/K/I/L (also M/N in TRF-051 model)	B/G/D/K/I/L	B / G	B / G	B / G	D / K / I / L
Output channel Audio System			Mono ⁽¹⁾	Nicam	Mono ⁽¹⁾	A2	Nicam	Mono ⁽¹⁾
Output channel Colour System			PAL , SECAM , NTSC					
Selectable output channel located between:		MHz	45 - 862					
Input Section (COFDM)	Input frequency	MHz	174 - 230 and 470 - 862					
	Bandwidth	MHz	7 ,, 8					
	Mode (automatic detection)		2K ,, 8K					
	Constellation (automatic detection)		QPSK ,, 16QAM ,, 64QAM					
	Hierarchy		High Priority ,, Low Priority					
	Input level (constell. 64QAM / code r. 2/3)	dBμV	35 ... 100					
	Input loop-through gain	dB	0.5 (±1)					
Guard interval (automatic detection)		1/4 ,, 1/8 ,, 1/16 ,, 1/32						
MPEG-2 Decoding Section	Video decoding		Main Profile @ Main Level					
	Audio decoding		Layer II					
	Teletext — Subtitles insertion		Yes					
	Image Format Conversion		16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box					
External Video/Audio Loop	Video and L/R audio output levels	Vpp	—	—	1.0 (video) ,, 0 ... 2.0 (audio)			
	Video and L/R audio input levels	Vpp	—	—	0.9...1.1 (video) ,, 0.5...1.0 (audio)			
Video & Audio Re-modulation Section	Adjustable video modulation depth	%	80 to 90					
	Adjustable audio peak deviation	kHz	±10 to ±50 (except System L)					
	Adjustable audio modulation depth	%	10 to 80 (System L)					
Output Section (TV Channel)	Adjustable output level	dBμV	65 to 80 (62 to 77 in TRF-051 model)					
	Output loop-through loss	dB	1.1 (typ) , 1.4 (max)					
	Adjustable carrier level ratio	dB	10 to 20 (Mono-Audio1/A2) ,,		20 (Audio2/A2) ,,		18 to 27 (Nicam)	
	Group delay precorrection		—	—	Yes	Yes	Yes	—
	Weighted SNR	dB	> 60					
	Spurious in band	dBc	< -58	< -58	< -60	< -60	< -60	< -58
	Broadband noise (ΔB=5MHz)	dBc	< -75 (< -66 in TRF-051 model)					
General	Supply voltage	Vdc	+12					
	Consumption	mA	720 (TRF-011) 630 (TRF-051)	800	590	640	670	590
	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					
	Video/Audio loop connector type		mini-DIN (6-way)					
	IKUSUP bus connector		(2x) 4-pin socket					
	Dimensions	mm	230 x 195 x 32					

⁽¹⁾ When selecting a stereo audio service, the output channel sound carrier is modulated with the "L+R" sum. If the audio service selected is dual, the carrier can be modulated with any of the "audio1", "audio2" or "audio1+audio2" signals.

- Each 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.

► ClassA HEADENDS

«TDC» — Digital Terrestrial TV Reception Equipment with Embedded CA



TDC HEADENDS

- Terrestrial TV reception, standard DVB-T / MPEG-2 (EN 300 744).
- De-encryption and Digital-to-Analogue Transmodulation Process (Encrypted COFDM → Clear AM). The encrypted TV programmes transmitted in COFDM Terrestrial-TV channels are de-encrypted and presented on conventional vestigial side band VHF/UHF channels (any TV system and Colour system).
- A TDC headend includes:
 - As many appropriate Embedded CA (Conditional Access) Receiving Modules as de-encrypted 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 voluminous, one or more AMX-400 combiners.

The TDC headends provide a TV multichannel signal whose level is appropriate to feed the distribution network. With a TDC 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.

FUNCTIONAL DESCRIPTION OF THE TDC RECEIVERS

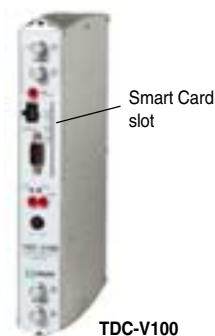
A TDC embedded CA receiving module carries out a complete channel processing from the input to the output:

- tunes a COFDM digital channel within the Bill or UHF bands,
- selects an encrypted TV programme from the multiplex being received, and
- de-encrypts and presents it on a conventional TV channel which is selectable throughout the 45-862 MHz band.

Range includes different models in terms of the embedded conditional access, as well as the TV System and the Audio System for the single-channel output signal. A front slot allows to insert the operator's smart card.

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.

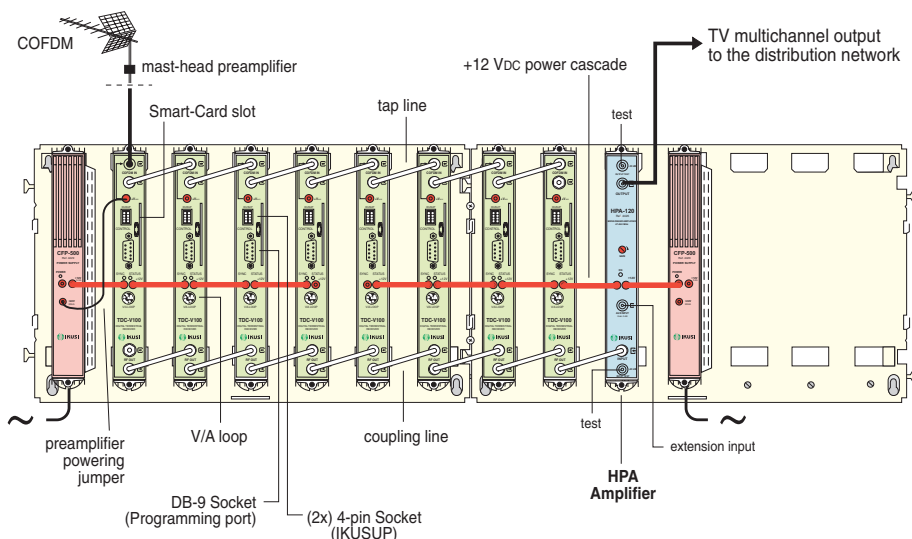


Simple cabling of TDC headends

The TDC receiving modules feature two directionally coupled input and output ports. Antenna signal can therefore be directly fed into the input port of the first module, which in turn passes 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 then connected in the same way to the drive amplifier—the HPA module or an external wideband amplifier—which then feeds the distribution network. For power connection, each module has two DC banana sockets that allow to build a +12 Vdc cascade. A third banana socket is available to connect the power for an optional mast-head preamplifier.

The TDC receivers have video/audio loop-through capacity. The external loop is switched under control software.

Local programming is carried out either with the SPI-300 unit, which is connected to each module individually, or with a PC + PRG-300 software. Remote programming is carried out through modems, with a PC using either the PRG-300 software or a standard web browser if the HMS control unit is installed in the headend.



- Example of «TDC» headend for eight encrypted digital TV programmes. Contains 8 Receivers, 1 Amplifier and 2 Power Supplies, all fixed on 2 horizontally joined Base-plates.

► **ClassA HEADENDS**

«TDC» — Digital Terrestrial TV Reception Equipment with Embedded CA

(cont'd)

COFDM Receivers with Embedded Conditional Access

Model		TDC-V100	TDC-V200	TDC-V400	TDC-V500	TDC-C400	
Reference		4450	4451	4452	4453	4431	
Embedded Conditional Access ^(*)		Viaccess™	Viaccess™	Viaccess™	Viaccess™	Conax™	
Output channel TV System — VSB		B / G	D / K / I / L	B / G	D / K	B / G	
Output channel Audio System		Mono ⁽¹⁾	Mono ⁽¹⁾	A2	A2	A2	
Output channel Colour System		PAL , SECAM , NTSC					
Selectable output channel located between:		MHz	45 - 862				
Input Section (COFDM)	Input frequency	MHz	174 - 230 and 470 - 862				
	Bandwidth	MHz	7 ,, 8				
	Mode (automatic detection)		2K ,, 8K				
	Constellation (automatic detection)		QPSK ,, 16QAM ,, 64QAM				
	Hierarchy		High Priority ,, Low Priority				
	Input level (constell. 64QAM and code rate 2/3)	dBμV	35 ... 100				
	Input loop-through gain	dB	0.5 (±1)				
MPEG-2 Decoding Section	Video decoding		Main Profile @ Main Level				
	Audio decoding		Layer II				
	Teletext — Subtitles Insertion		Yes				
	Image Format Conversion		16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box				
External Video/Audio Loop	Video and L/R audio output levels	Vpp	1.0 (video) ,, 0 ... 2.0 (audio)				
	Video and L/R audio input levels	Vpp	0.9...1.1 (video) ,, 0.5...1.0 (audio)				
Video & Audio Re-modulation Section	Adjustable video modulation depth	%	80 to 90				
	Adjustable audio peak deviation	kHz	±10 to ±50 (except System L)				
	Adjustable audio modulation depth	%	10 to 80 (System L)				
Output Section (TV Channel)	Adjustable output level	dBμV	65 to 80				
	Output loop-through loss	dB	1.1 (typ.) , 1.4 (max)				
	Adjustable carrier level ratio	dB	10 to 20 (Mono-Audio1/A2) ,, 20 (Audio2/A2)				
	Group delay precorrection		Yes	—	Yes	—	Yes
	Weighted SNR	dB	> 60				
	Spurious in band	dBc	< -60	< -58	< -60	< -58	< -60
	Broadband noise (ΔB=5MHz)	dBc	< -75				
General	Supply voltage	VDC	+12				
	Consumption	mA	620	620	670	670	670
	Operating temperature	°C	0 ... +45				
	Input RF connector type		2x) female F				
	Output RF connector type		2x) female F				
	DC connector type		"banana" socket				
	Video/Audio loop connector type		mini-DIN (6-way)				
	Smart card entrance		slot				
	Programming Interface		RS-232 / DB-9				
	IKUSUP bus connector		(2x) 4-pin socket				
	Dimensions	mm	230 x 195 x 32				

^(*) Contact IKUSI for other Conditional Access systems.

⁽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.

- Each 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.

► ClassA HEADENDS

«TDI» — Digital Terrestrial COFDM-QAM Transmodulation Equipment



TDI HEADENDS

- 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 voluminous, 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 Digital Set Top 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 programs.

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



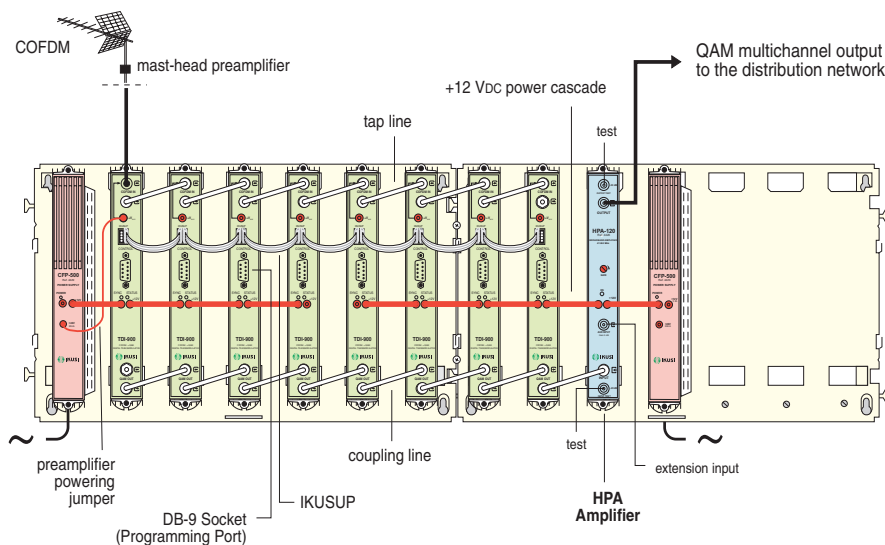
TDI-900

Simple cabling of TDI headends

The TDI transmodulators feature two directionally coupled input and output ports. Antenna signal can therefore be directly fed into the input port of the first module, which in turn passes 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 then connected in the same way to the drive amplifier—the HPA module or an external wideband amplifier—which then feeds the distribution network. For power connection, each module has two DC banana sockets that allow to build a +12 Vdc cascade.

Local programming is carried out either with the SPI-300 unit, which is connected to each module individually, or with a PC + PRG-300 software. Remote programming is carried out through modems, with a PC + PRG-300 software.

The IKUSUP bus must be installed in order to perform NIT adaptation. The last module at the right end of the IKUSUP cascade carries out the control function.



- Example of «TDI» headend for eight digital terrestrial channels. Contains 8 Transmodulators, 1 Amplifier and 2 Power Supplies, all fixed on 2 horizontally joined baseplates.

► ClassA HEADENDS

«TDI» — Digital Terrestrial COFDM-QAM Transmodulation Equipment

(cont'd)

COFDM-QAM Transmodulator

Model		TDI-900	
Reference		4021	
TS processing		Yes (see ADVANCED FEATURES 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
	Constellation (automatic detection)		QPSK ,, 16QAM ,, 64QAM
	Hierarchy		High Priority ,, Low Priority
	Input level (constellation: 64QAM / code rate: 2/3)	dB μ V	35 ... 100
	Input loop-through gain	dB	0.5 (\pm 1)
	Guard interval (automatic detection)		1/4 ,, 1/8 ,, 1/16 ,, 1/32
QAM Re-modulation Section	Data processing	EN 300 429	
	Selectable Modulation Scheme of output signal	16QAM ,, 32QAM ,, 64QAM ,, 128QAM ,, 256QAM	
	MER (Modulation Error Ratio)	dB	38 (typ) ,, 36 (min)
	Output symbol rate	MS/s	3 ... 8
	Selectable Roll-Off factor	%	12 ,, 13 ,, 15
RF Output Section (QAM)	Selectable output channel located between:	MHz	47 - 862
	Adjustable output level	dB μ V	65 to 80
	Output loop-through loss	dB	1.1
	Spurious in band	dBc	< -55
	Broadband noise (Δ B=5MHz)	dBc	< -75
General	Supply voltage	VDC	+12
	Consumption	mA	590
	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	

ADVANCED FEATURES

- 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

- 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.

► ClassA HEADENDS

«SRF» — Free-To-Air Digital Satellite TV Reception Equipment



SRF HEADENDS

- Satellite TV reception, standard DVB-S / MPEG-2 (EN 300 421).
- Digital-to-Analogue Transmutation 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 voluminous, one or more AMX-400 combiners.

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

FUNCTIONAL DESCRIPTION OF THE SRF RECEIVERS

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.

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

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.

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.

Simple cabling of SRF headends

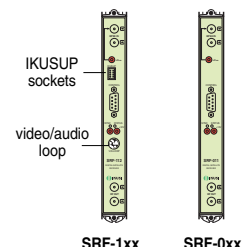
The SRF receiving modules feature two directionally coupled input and output ports. Sat-IF signal can therefore be directly fed into the input port of the first module, which in turn passes it through the coupler to the next and so forth. On the output side, the same procedure is repeated which forms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

An external video/audio loop, which is switched under control software, is available on models SRF-1xx. The loop is not available in the so called **economical models** (SRF-0xx).

Local programming is carried out either with the SPI-300 unit, which is connected to each module individually, or with a PC + PRG-300 software. Remote programming is carried out through modems, with a PC using either the PRG-300 software or a standard web browser if the HMS control unit is installed in the headend. The SRF-0xx economical models do not have IKUSUP sockets and cannot therefore be programmed remotely.

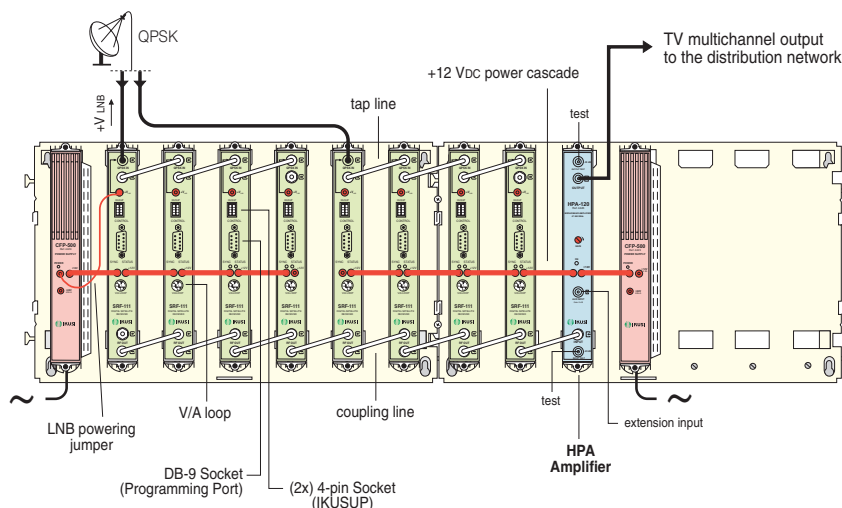


SRF-111



SRF-1xx

SRF-0xx



- Example of «SRF» headend for eight clear digital satellite TV programmes; four programmes arrive via a down lead cable and other four ones via another. Contains 8 Receivers, 1 Amplifier and 2 Power Supplies, all fixed on 2 horizontally joined baseplates.

► ClassA HEADENDS

«SRF» — Free-To-Air Digital Satellite TV Reception Equipment

(cont'd)

QPSK Receivers

OUTPUT TV-CHANNEL SPECTRUM • VSB — Vestigial Side Band •		Model	SRF-011	SRF-111	SRF-112	SRF-121	SRF-122	SRF-131	
		Reference	4084	4059	4062	4060	4063	4061	
OUTPUT TV-CHANNEL SPECTRUM • DSB — Double Side Band •		Model	SRF-051						
		Reference	4089						
Output channel TV System			B/G/D/K/I/L <small>(also M/N in SRF-051 model)</small>	B / G	B / G	D / K / I / L	D / K	M / N	
Output channel Audio System			Mono ⁽¹⁾	Mono ⁽¹⁾	A2	Mono ⁽¹⁾	A2	Mono ⁽¹⁾	
Output channel Colour System			PAL , SECAM , NTSC						
Selectable output channel located between:			MHz	45 - 862					
Input Section (QPSK)	Input frequency	MHz	950 - 2150						
	Input level	dBm	-65 ... -25						
	Input loop-through gain	dB	0 (±1)						
	AFC pull-in range	MHz	±5						
	Input symbol rate	MS/s	2 ... 45						
MPEG-2 Decoding Section	Video decoding		Main Profile @ Main Level						
	Audio decoding		Layer II						
	Teletext — Subtitles Insertion		Yes						
	Image Format Conversion		16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box						
External Video/Audio Loop	Video and L/R audio output levels	Vpp	—	1.0 (video) ,, 0 ... 2.0 (audio)					
	Video and L/R audio input levels	Vpp	—	0.9 ... 1.1 (video) ,, 0.5 ... 1.0 (audio)					
Video & Audio Re-modulation Section	Adjustable video modulation depth	%	80 to 90						
	Adjustable audio peak deviation	kHz	±10 to ±50 (except System L)						
	Adjustable audio modulation depth	%	10 to 80 (System L)						
Output Section (TV Channel)	Adjustable output level	dBμV	65 to 80 (62 to 77 in SRF-051 model)						
	Output loop-through loss	dB	1.1						
	Adjustable carrier level ratio	dB	10 to 20 (Mono-Audio1/A2) ,, 20 (Audio2/A2)						
	Group delay precorrection		—	Yes	Yes	—	—	—	
	Weighted SNR	dB	> 60						
	Spurious in band	dBc	< -58	< -60	< -60	< -58	< -58	< -58	
	Broadband noise (ΔB=5MHz)	dBc	< -75 (< -66 in SRF-051 model)						
General	Supply voltage	VDC	+12						
	Consumption	mA	540 (SRF-011) 450 (SRF-051)	540	590	540	590	540	
	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						
	Video/Audio loop connector type		—	mini-DIN (6-way)					
	IKUSUP bus connector		—	(2x) 4-pin socket					
	Dimensions	mm	230 x 195 x 32						

⁽¹⁾ When selecting a stereo audio service, the output channel sound carrier is modulated with the "L+R" sum. If the audio service selected is dual, the carrier can be modulated with any of the "audio1", "audio2" or "audio1+audio2" signals.

- Each 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.

► ClassA HEADENDS

«SDC» — Digital SAT-TV Reception Equipment with Embedded CA



SDC HEADENDS

- 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).
- An SDC headend includes:
 - As many appropriate Embedded CA (Conditional Access) Receiving Modules as de-encrypted 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 voluminous, one or more AMX-400 combiners.

The SDC headends provide a TV multichannel signal whose level is appropriate to feed the distribution network. With a SDC 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.

FUNCTIONAL DESCRIPTION OF THE SDC RECEIVERS

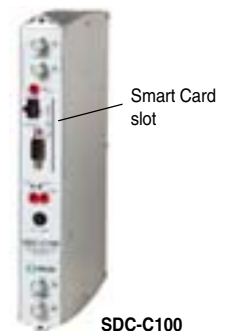
An SDC embedded CA receiving module carries out a complete channel processing from the input to the output:

- 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-encrypts and presents it on a conventional TV channel which is selectable throughout the 45-862 MHz band.

Range includes different models in terms of the embedded conditional access, as well as the TV System and the Audio System for the single-channel output signal. A front slot allows to insert the operator's smart card.

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.

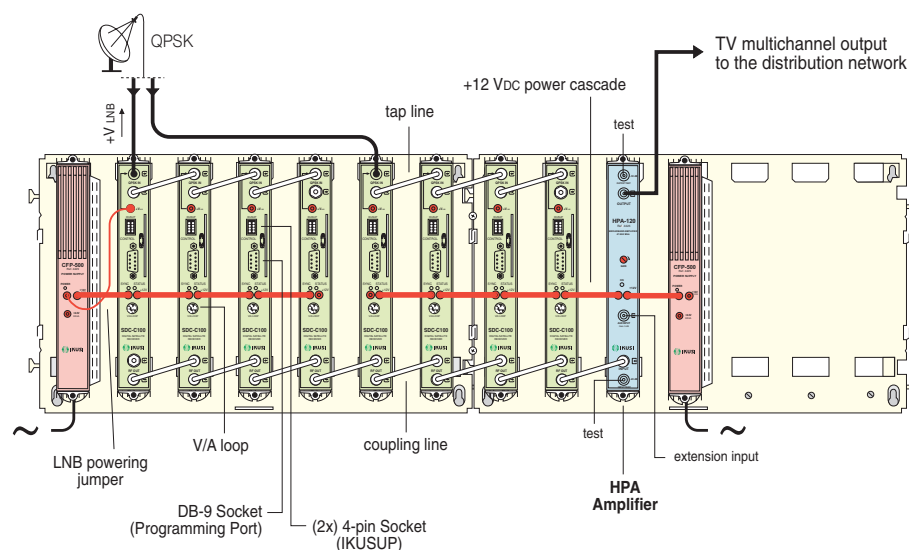


Simple cabling of SDC headends

The SDC 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 then connected in the same way to the drive amplifier—the HPA module or an external wideband amplifier—which then feeds the distribution network. For power connection, each module has two DC banana sockets that allow to build a +12 VDC cascade. A third banana socket is available to connect the power for the attached LNB.

The SDC receivers have video/audio loop-through capacity. The external loop is switched under control software.

Local programming is carried out either with the SPI-300 unit, which is connected to each module individually, or with a PC + PRG-300 software. Remote programming is carried out through modems, with a PC using either the PRG-300 software or a standard web browser if the HMS control unit is installed in the headend.



- Example of «SDC» headend for eight encrypted digital TV programmes; four programmes arrive via a down lead cable and other four ones via another. Contains 8 Receivers, 1 Amplifier and 2 Power Supplies, all fixed on 2 horizontally joined Base-plates.

► ClassA HEADENDS

“SDC” — Digital SAT-TV Reception Equipment with Embedded CA

(cont'd)

QPSK Receivers with Embedded Conditional Access

Model		SDC-G106	SDC-M100	SDC-V100	SDC-V200	SDC-V300	SDC-V400	SDC-C100	SDC-C400	SDC-C600	
Reference		4023	4424	4412	4067	4076	4418	4413	4425	4025	
Embedded Conditional Access (*)		Videoguard™ (Viasat)	Mediaguard™	Viaccess™	Viaccess™	Viaccess™	Viaccess™	Conax™	Conax™	Conax™	
Output channel TV System — VSB		B / G	B / G	B / G	D / K / I / L	M / N	B / G	B / G	B / G	B / G	
Output channel Audio System		Mono ⁽¹⁾	Mono ⁽¹⁾	Mono ⁽¹⁾	Mono ⁽¹⁾	Mono ⁽¹⁾	A2	Mono ⁽¹⁾	A2	Nicam	
Output channel Colour System		PAL , SECAM , NTSC									
Select. output ch located between:		MHz	45 - 862								
Input Section (QPSK)	Input frequency	MHz	950 - 2150								
	Input level	dBm	-65 ... -25								
	Input loop-through gain	dB	0 (±1)								
	AFC pull-in range	MHz	±5								
	Input symbol rate	MS/s	2 ... 45								
MPEG-2 Decoding Section	Video decoding		Main Profile @ Main Level								
	Audio decoding		Layer II								
	Teletext — Subtitles Insertion		Yes								
	Image Format Conversion		16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box								
External V/A Loop	Video and L/R audio output levels	Vpp	1.0 (video) ,, 0 ... 2.0 (audio)								
	Video and L/R audio input levels	Vpp	0.9 ... 1.1 (video) ,, 0.5 ... 1.0 (audio)								
Re-modulation Section	Adjustable video modulation depth	%	80 to 90								
	Adjustable audio peak deviation	kHz	±10 to ±50 (except System L)								
	Adjustable audio modulation depth	%	10 to 80 (System L)								
Output Section (TV Channel)	Adjustable output level	dB _μ V	65 to 80								
	Output loop-through loss	dB	1.1								
	Adjustable carrier level ratio	dB	10 to 20 (Mono-Audio1/A2) ,, 20 (Audio2/A2) ,, 18 to 27 (Nicam)								
	Group delay precorrection		Yes	Yes	Yes	—	—	Yes	Yes	Yes	Yes
	Weighted SNR	dB	> 60								
	Spurious in band	dBc	< -60	< -60	< -60	< -58	< -58	< -60	< -60	< -60	< -60
	Broadband noise (ΔB=5MHz)	dBc	< -75								
General	Supply voltage	Vdc	+12								
	Consumption	mA	570	570	570	570	570	620	570	620	650
	Operating temperature	°C	0 ... +45								
	Input RF connector type		(2x) female F								
	Output RF connector type		(2x) female F								
	DC connector type		“banana” socket								
	Video/Audio loop connector type		mini-DIN (6-way)								
	Smart card entrance		slot								
	Programming Interface		RS 232 / DB-9								
	IKUSUP bus connector	mm	(2x) 4-pin socket								
	Dimensions		230 x 195 x 32								

(*) Contact IKUSI for other Conditional Access systems.

(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.

- Each 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.

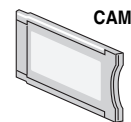
► ClassA HEADENDS

«SRC» — Digital Sat TV MultiCrypt Reception Equipment



SRC HEADENDS

- Reception of encrypted Sat-TV programs. Standard DVB-S / MPEG-2 (EN 300 421).
- Receiving Modules with Common Interface. The encrypted TV programmes transmitted on QPSK channels are de-encrypted and presented on conventional 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 voluminous, one or more AMX-400 combiners.



Conax, Cryptoworks, Irdeto, KeyFly, Mediaguard, Nagravision, Viaccess, ...

● CAM modules are not supplied by IKUSI

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.

FUNCTIONAL DESCRIPTION OF SRC RECEIVERS

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

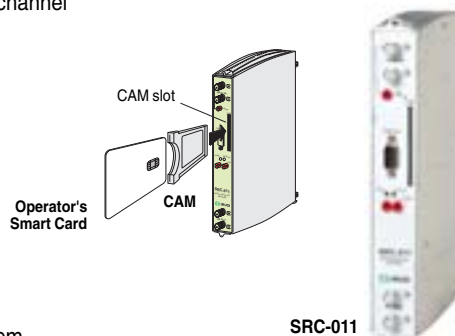
Models featuring VSB output are utilizable for adjacent channel operation. If this operation is not required, existing model featuring DSB output may be used without problems. The first ones present, on the other hand, a very low broadband noise floor (< -75 dBc) that permits the use of multiple modules in a headend with very little deterioration of the CNR.

Simple cabling of SRC headends

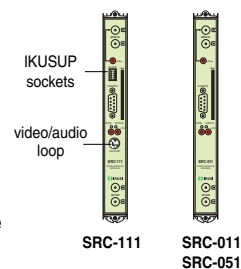
The SRC receiving modules feature two directionally coupled input and output ports. Sat-IF signal can therefore be directly fed into the input port of the first module, which in turn passes it through the coupler to the next and so forth. On the output side, the same procedure is repeated which forms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

An external video/audio loop, which is switched under control software, is available on model SRC-111. The loop is not available in the so called **economical models** (SRC-011 and SRC-051).

Local programming is carried out either with the SPI-300 unit, which is connected to each module individually, or with a PC + PRG-300 software. Remote programming is carried out through modems, with a PC using either the PRG-300 software or a standard web browser if the HMS control unit is installed in the headend. The SRC-0xx economical models do not have IKUSUP sockets and cannot therefore be programmed remotely.

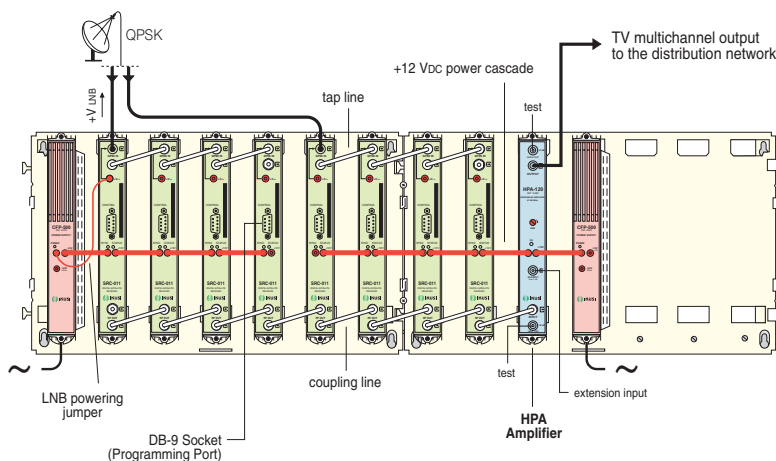


SRC-011



SRC-111

SRC-011
SRC-051



- Example of «SRC» headend for eight encrypted digital TV programmes; four programmes arrive via a down lead cable and other four ones via another. Contains 8 SRC-011 Receivers, 1 Amplifier and 2 Power Supplies, all fixed on 2 horizontally joined Base-plates.

► ClassA HEADENDS

«SRC» — Digital Sat TV MultiCrypt Reception Equipment

(cont'd)

QPSK Receivers with Common Interface

(Conax, Cryptoworks, Irdeto, KeyFly, Mediaguard, Nagravision, Viaccess, ...)

OUTPUT TV-CHANNEL SPECTRUM • VSB — Vestigial Side Band •		Model	SRC-011	SRC-111	
		Reference	4092	4096	
OUTPUT TV-CHANNEL SPECTRUM • DSB — Double Side Band •		Model	SRC-051		
		Reference	4095		
Output channel TV System			B / G / D / K / I / L (also M/N in SRC-051 model)	B / G	
Audio Operation Mode			Mono ⁽¹⁾	Mono ⁽¹⁾	
Output channel Colour System			PAL , SECAM , NTSC	PAL , SECAM , NTSC	
Selectable output channel located between:		MHz	45 - 862	45 - 862	
Input Section (QPSK)	Input frequency	MHz	950 - 2150		
	Input level	dBm	-65 ... -25		
	Input loop-through gain	dB	0 (±1)		
	AFC pull-in range	MHz	±5		
	Input symbol rate	MS/s	2 ... 45		
MPEG-2 Decoding Section	Video decoding		Main Profile @ Main Level		
	Audio decoding		Layer II		
	Teletext — Subtitles Insertion		Yes		
	Image Format Conversion		16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box		
External Video/Audio Loop	Video and L/R audio output levels	Vpp	—	1.0 (video) ,, 0 ... 2.0 (audio)	
	Video and L/R audio input levels	Vpp	—	0.9...1.1 (video) ,, 0.5...1.0 (audio)	
Video & Audio Re-modulation Section	Adjustable video modulation depth	%	80 to 90		
	Adjustable audio peak deviation	kHz	±10 to ±50 (except System L)		
	Adjustable audio modulation depth	%	10 to 80 (System L)		
Output Section (TV Channel)	Adjustable output level	dBμV	65 to 80 (63 to 78 in SRC-051 model)		
	Output loop-through loss	dB	1.1		
	Adjustable carrier level ratio	dB	10 to 20		
	Group delay precorrection		—	Yes	
	Weighted SNR	dB	> 60	> 60	
	Spurious in band	dBc	< -58	< -60	
	Broadband noise (ΔB=5MHz)	dBc	< -75 (< -66 in SRC-051 model)		
General	Supply voltage	Vdc	+12		
	Max consumption (CAM included)	mA	680 (SRC-011) 590 (SRC-051)	680	
	Operating temperature	°C	0 ... +45		
	Input RF connector type		(2x) female F		
	Output RF connector type		(2x) female F		
	DC connector type		“banana” socket		
	CAM entrance		slot		
	Programming Interface		RS 232 / DB-9		
	Video/Audio loop connector type		—	mini-DIN (6-way)	
	IKUSUP bus connector		—	(2x) 4-pin socket	
	Dimensions	mm	230 x 195 x 32		

⁽¹⁾ When selecting a stereo audio service, the output channel sound carrier is modulated with the "L+R" sum. If the audio service selected is dual, the carrier can be modulated with any of the "audio1", "audio2" or "audio1+audio2" signals.

- Each 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.

► ClassA HEADENDS

«MDI» — Digital Satellite xPSK-QAM Transmodulation Equipment



MDI HEADENDS

- 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 three models of transmodulators: MDI-900 and MDI-810 for DVB-S standard and MDI-910 for DVB-S2. The MDI-900 and MDI-910 can perform Transport Stream Processing.
- An MDI headend includes:
 - As many MDI Transmodulators as QAM channels to be distributed.
 - One HPA Amplifier that amplifies the sum of the combined output QAM channels from the transmodulators.
 - One or more CFP Power Supplies.
 - Wall-fixing Base-Plate or Rack-frame. Additional base-plates can be joined horizontally.
 - Usually, one Housing unit.
 - If the headend is voluminous, one or more AMX-400 combiners.

The MDI 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 Digital Set Top Box 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 programs.

FUNCTIONAL DESCRIPTION OF THE MDI TRANSMODULATORS

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

- tunes a Sat-IF digital channel,
- demodulates the signal being received,
- processes the transport stream (only for MDI-900 and MDI-910), 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.

Module programming involves the following selections and settings:

- Central Input Frequency (1 MHz increments)
- 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
- Only for MDI-900 and MDI-910: Output Symbol Rate and Service and CA Blockade



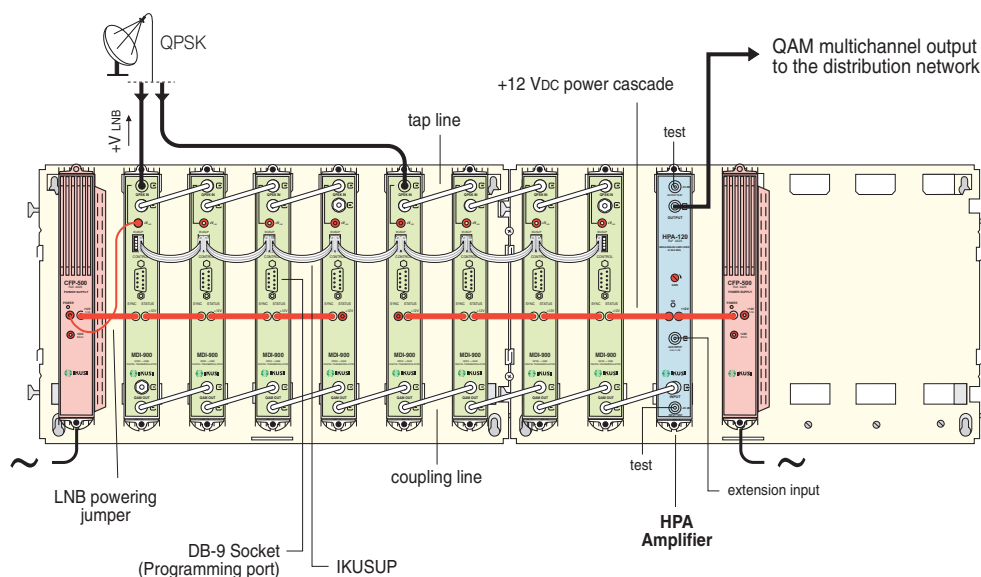
MDI-900

Simple cabling of MDI headends

The MDI transmodulators feature two directionally coupled input and output ports. Sat-IF signal can therefore be directly fed into the input port of the first module, which in turn passes 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 then connected in the same way to the drive amplifier—the HPA module or an external wideband amplifier—which then feeds the distribution network. For power connection, each module has two DC banana sockets that allow to build a +12 VDC cascade. A third banana socket is available to connect the power for the attached LNB.

Local programming is carried out either with the SPI-300 unit, which is connected to each module individually, or with a PC + PRG-300 software. Remote programming is carried out through modems, with a PC + PRG-300 software.

In order to perform NIT adaptation (possible only in headends with MDI-900 or MDI-910 models), the IKUSUP bus must be installed. The last module at the right end of the IKUSUP cascade carries out the control function.



— Example of «MDI» headend for eight transponders. Contains 8 MDI-900 Transmodulators, 1 Amplifier and 2 Power Supplies, all fixed on 2 horizontally joined baseplates.

► ClassA HEADENDS

«MDI» — Digital Satellite xPSK-QAM Transmodulation Equipment

(cont'd)

xPSK-QAM Transmodulators

Model		Being developed			
		MDI-910	MDI-900	MDI-810	
Reference			4094	4091	
Reception		DVB-S2	DVB-S	DVB-S	
TS processing		Yes <small>(see ADVANCED FEATURES below)</small>	Yes <small>(see ADVANCED FEATURES below)</small>	No	
Input Section (QPSK / 8PSK)	Standard		EN 302 307	EN 300 421	
	Input frequency	MHz	950 - 2150	950 - 2150	
	Input level	dBm	-65 ... -25	-65 ... -25	
	Input loop-through gain	dB	0 (±3)	0 (±3)	
	AFC pull-in range	MHz	± 5	± 5	
	Input symbol rate	MS/s	10 ... 30 (DVB-S2) 2 ... 45 (DVB-S)	2 ... 45	6 ... 45
QAM Re-modulation Section	Data processing		EN 300 429		
	Selectable Modulation Scheme		16QAM ,, 32QAM ,, 64QAM ,, 128QAM ,, 256QAM		
	MER (Modulation Error Ratio)	dB	38 (typ) ,, 36 (min)		
	Output symbol rate	MS/s	3 ... 8		
	Selectable Roll-Off factor	%	12 ,, 13 ,, 15		
RF Output Section (QAM)	Selectable output channel located between:	MHz	45 - 862		
	Adjustable output level	dBμV	65 to 80		
	Output loop-through loss	dB	1.1		
	Spurious in band	dBc	< -55		
	Broadband noise (ΔB=5MHz)	dBc	< -75		
General	Supply voltage	Vdc	+12		
	Consumption	mA	to be defined	540	620
	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		

ADVANCED FEATURES of MDI-910 and MDI-900

- 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

- Each 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.

► ClassA HEADENDS

«CRF» — Free-To-Air Digital Cable TV Reception Equipment



CRF HEADENDS

- Cable TV reception, standard DVB-C / MPEG-2 (EN 300 429).
- Digital-to-Analogue Transmodulation Process (QAM → AM) that presents the clear TV programmes transmitted in QAM Cable-TV channels on conventional vestigial side band VHF/UHF channels (any TV system and Colour system).
- A CRF headend includes:
 - As many CRF 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 voluminous, one or more AMX-400 combiners.

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

FUNCTIONAL DESCRIPTION OF THE CRF RECEIVERS

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

- tunes a QAM modulated RF carrier in the 51-858 MHz band,
- selects a TV programme from the multiplex being received, and
- directs it on a conventional TV channel which is selectable throughout the 45-862 MHz band.

Range includes two mono sound models for B/G and D/K/I/L systems.

Programming of each 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)
- 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.



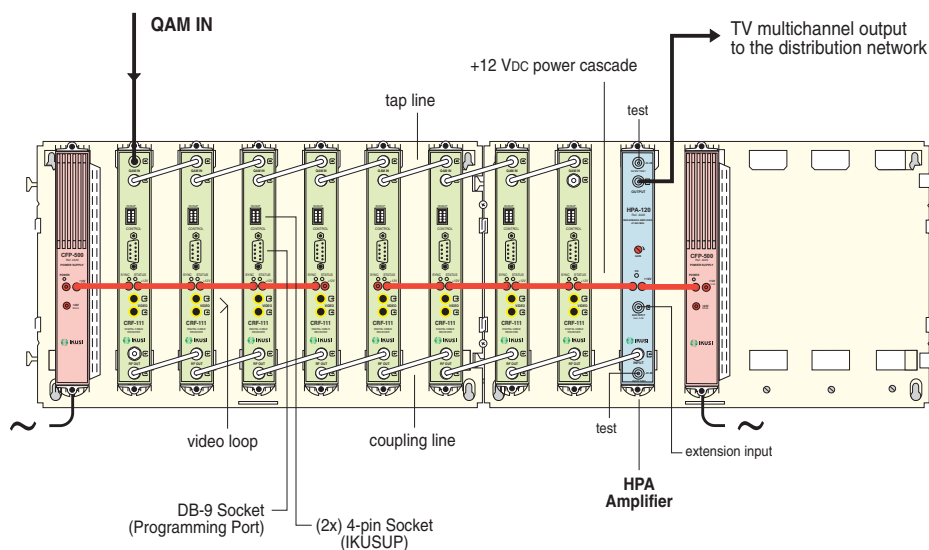
CRF-111

Simple cabling of CRF headends

The CRF receiving modules feature two directionally coupled input and output ports. Incoming QAM 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 then connected in the same way to the drive amplifier—the HPA module or an external wideband amplifier—which then feeds the distribution network. For power connection, each module has two DC banana sockets that allow to build a +12 VDC cascade.

The CRF receivers have video loop-through capacity. The external loop is switched under control software.

Local programming is carried out with the SPI-300 unit, which is connected to each module individually. Remote programming may be carried out only if the HMS control unit is installed in the headend, through modems and a PC using a standard web browser.



- Example of «CRF» headend for eight clear digital cable TV programmes. Contains 8 Receivers, 1 Amplifier and 2 Power Supplies, all fixed on 2 horizontally joined baseplates.

► ClassA HEADENDS

«CRF» — Free-To-Air Digital Cable TV Reception Equipment

(cont'd)

QAM Receivers

Model		CRF-111	CRF-121	
Reference		4086	4087	
Output channel TV System — VSB		B / G	D / K / I / L	
Audio Mode		Mono ⁽¹⁾	Mono ⁽¹⁾	
Output channel Colour System		PAL , SECAM , NTSC		
Selectable output channel located between:		MHz		
		45 - 862		
Input Section (QAM)	Standard	EN 300 429		
	Input channel located between	MHz	51 - 858	
	Bandwidth	MHz	8	
	Input level	dBm	-64 ... -20 (64QAM modulation)	
	Modulation Scheme of input signal		16QAM ,, 32QAM ,, 64QAM ,, 128QAM ,, 256QAM	
	Input symbol rate	MS/s	0.87 ... 6.9	
	Input loop-through gain	dB	0.5 (±1)	
MPEG-2 Decoding Section	Video decoding	Main Profile @ Main Level		
	Audio decoding	Layer II		
	Teletext — Subtitles Insertion	Yes		
	Image Format Conversion	16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box		
External Video-Loop	Output level (clear video signal)	Vpp	1.0	
	Input level (scrambled video signal)	Vpp	0.9 ... 1.1	
Video & Audio Re-modulation Section	Adjustable video modulation depth	%	80 to 90	
	Adjustable audio peak deviation	kHz	±10 to ±50 (except System L)	
	Adjustable audio modulation depth	%	10 to 80 (System L)	
Output Section (TV Channel)	Adjustable output level	dBμV	65 to 80	
	Output loop-through loss	dB	1.1	
	Adjustable carrier level ratio	dB	10 to 20	
	Group delay precorrection		Yes	—
	Weighted SNR	dB	> 60	> 60
	Spurious in band	dBc	< -60	< -58
	Broadband noise (ΔB=5MHz)	dBc	< -75	
General	Supply voltage	VDC	+12	
	Consumption	mA	690	
	Operating temperature	°C	0 ... +45	
	Input RF connector type		(2x) female F	
	Output RF connector type		(2x) female F	
	DC connector type		“banana” socket	
	Video-loop connector type		(2x) female RCA	
	Programming Interface		RS 232 / DB-9	
	IKUSUP bus connector		(2x) 4-pin socket	
Dimensions	mm	230 x 195 x 32		

⁽¹⁾ When selecting a stereo audio service, the output channel sound carrier is modulated with the "L+R" sum. If the audio service selected is dual, the carrier can be modulated with any of the "audio1", "audio2" or "audio1+audio2" signals.

- Each 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.

▶ ClassA HEADENDS

«CDC» — Digital Cable-TV Reception Equipment with Embedded CA



CDC HEADENDS

- Cable TV reception, standard DVB-C / MPEG-2 (EN 300 429).
- De-encryption and Digital-to-Analogue Transmodulation Process (Encrypted QAM → Clear AM). The encrypted TV programmes transmitted in QAM Cable-TV channels are de-encrypted and presented on conventional vestigial side band VHF/UHF channels.
- A CDC headend includes:
 - As many appropriate Embedded CA (Conditional Access) Receiving Modules as de-encrypted 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 voluminous, one or more AMX-400 combiners.

The CDC headends provide a TV multichannel signal whose level is appropriate to feed the distribution network. With a CDC 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.

FUNCTIONAL DESCRIPTION OF THE CDC RECEIVERS

A CDC embedded CA receiving module 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-encrypts and presents it on a conventional TV channel which is selectable throughout the 45-862 MHz band.

Range includes a unique model —CDC-V200— with Viaccess conditional access embedded. A front slot allows to insert the operator's smart card.

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).
- TV Programme and Audio Service.
- Parameters of the output TV channel (video carrier frequency, TV system, colour system, video modulation depth, audio modulation index, carrier level ratio, output level).
- Image Format. Possible conversions are 16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box.

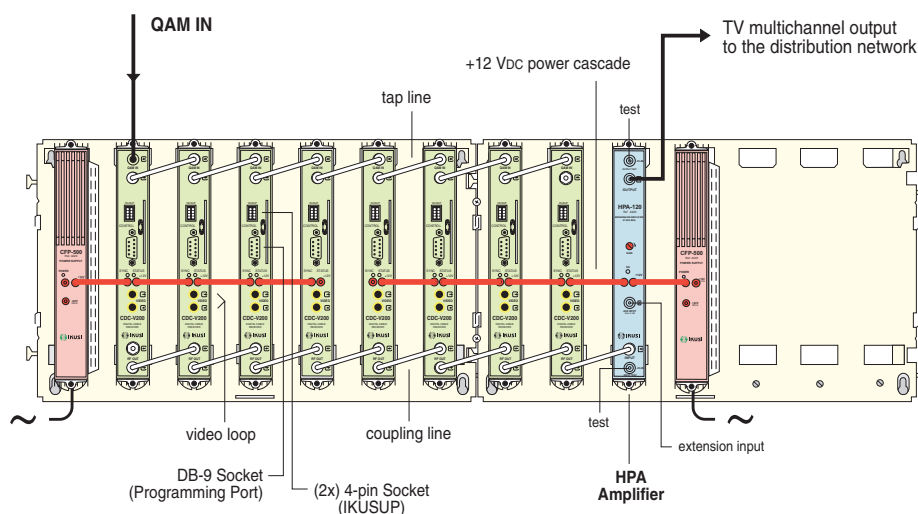


Simple cabling of CDC headends

The CDC receiving modules feature two directionally coupled input and output ports. Incoming QAM 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 then connected in the same way to the drive amplifier—the HPA module or an external wideband amplifier—which then feeds the distribution network. For power connection, each module has two DC banana sockets that allow to build a +12 Vdc cascade.

The CDC receivers have video loop-through capacity. The external loop is switched under control software.

Local programming is carried out with the SPI-300 unit, which is connected to each module individually. Remote programming may be carried out only if the HMS control unit is installed in the headend, through modems and a PC using a standard web browser.



- Example of «CDC» headend for eight Viaccess-encrypted digital cable TV programmes. Contains 8 Receivers, 1 Amplifier and 2 Power Supplies, all fixed on 2 horizontally joined Base-plates.

► ClassA HEADENDS

«CDC» — Digital Cable-TV Reception Equipment with Embedded CA

(cont'd)

QAM Receiver with Embedded Conditional Access

Model		CDC-V200	
Reference		4440	
Embedded Conditional Access ^(*)		Viaccess™	
Output channel TV System — VSB		D / K / I / L	
Audio Mode		Mono ⁽¹⁾	
Output channel Colour System		PAL , SECAM , NTSC	
Selectable output channel located between:		MHz	45 - 862
Input Section (QAM)	Standard		EN 300 429
	Input channel located between	MHz	51 - 858
	Bandwidth	MHz	8
	Input level	dBm	-64 ... -20 (64QAM modulation)
	Modulation Scheme of input signal		16QAM ,, 32QAM ,, 64QAM ,, 128QAM ,, 256QAM
	Input symbol rate	MS/s	0.87 ... 6.9
	Input loop-through gain	dB	0.5 (±1)
MPEG-2 Decoding Section	Video decoding		Main Profile @ Main Level
	Audio decoding		Layer II
	Teletext — Subtitles Insertion		Yes
	Image Format Conversion		16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box
External Video-Loop	Output level (clear video signal)	Vpp	1.0
	Input level (scrambled video signal)	Vpp	0.9 ... 1.1
Video & Audio Re-modulation Section	Adjustable video modulation depth	%	80 to 90
	Adjustable audio peak deviation	kHz	±10 to ±50 (except System L)
	Adjustable audio modulation depth	%	10 to 80 (System L)
Output Section (TV Channel)	Adjustable output level	dBμV	65 to 80
	Output loop-through loss	dB	1.1
	Adjustable carrier level ratio	dB	10 to 20
	Weighted SNR	dB	> 60
	Spurious in band	dBc	< -58
	Broadband noise (ΔB=5MHz)	dBc	< -75
General	Supply voltage	VDC	+12
	Consumption	mA	720
	Operating temperature	°C	0 ... +45
	Input RF connector type		(2x) female F
	Output RF connector type		(2x) female F
	DC connector type		“banana” socket
	Video-loop connector type		(2x) female RCA
	Smart card entrance		slot
	Programming Interface		RS-232 / DB-9
	IKUSUP bus connector		(2x) 4-pin socket
	Dimensions	mm	230 x 195 x 32

^(*) Contact IKUSI for other Conditional Access systems.

⁽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.

- 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.

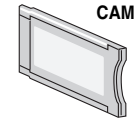
► ClassA HEADENDS

«CRC» — Digital Cable-TV MultiCrypt Reception Equipment



CRC HEADENDS

- Reception of encrypted Cable TV programs. Standard DVB-C / MPEG-2 (EN 300 429).
- Receiving Modules with Common Interface. 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 voluminous, one or more AMX-400 combiners.



Conax, Cryptoworks, Irdeto, KeyFly, Mediaguard, Nagravision, Viaccess, ...

● CAM modules are not supplied by IKUSI

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.

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-encrypts and presents it on a conventional TV channel that is selectable throughout the 45-862 MHz band.

Range includes two mono-sound models, both featuring VSB output spectrum.

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).
- 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.

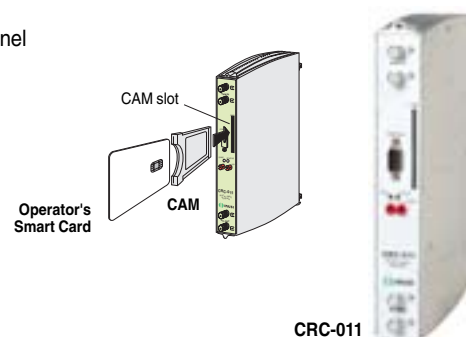
The two available CRC receivers are utilizable for adjacent channel operation. Both present, on the other hand, a very low broadband noise floor (< -75 dBc) that permits the use of multiple modules in a headend with very little deterioration of the CNR.

Simple cabling of CRC headends

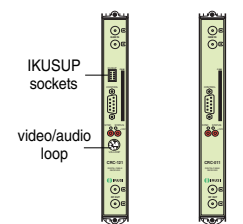
The CRC receiving modules feature two directionally coupled input and output ports. Incoming QAM signal can therefore be directly fed into the input port of the first module, which in turn passes it through the coupler to the next and so forth. On the output side, the same procedure is repeated which forms the channel coupling. The sum of the combined channels is then connected in the same way to the drive amplifier—the HPA module or an external wideband amplifier—which then feeds the distribution network. For power connection, each module has two DC banana sockets that allow to build a +12 VDC cascade.

An external video/audio loop, which is switched under control software, is available on model CRC-121. The loop is not available in the so called **economical model** (CRC-011).

Local programming is carried out with the SPI-300 unit, which is connected to each module individually. Remote programming may be carried out only if the HMS control unit is installed in the headend, through modems and a PC using a standard web browser. The CRC-011 economical model does not have IKUSUP sockets and cannot therefore be programmed remotely.

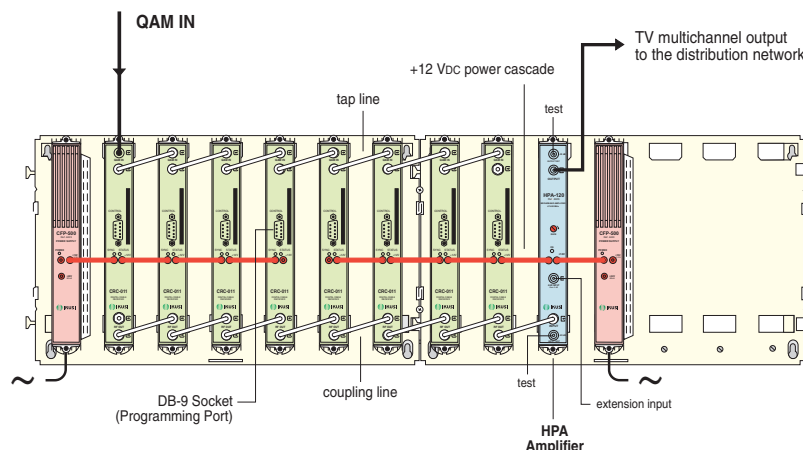


CRC-011



CRC-121

CRC-011



— Example of «CRC» headend for eight encrypted digital cable TV programmes. Contains 8 CRC-011 Receivers, 1 Amplifier and 2 Power Supplies, all fixed on 2 horizontally joined Base-plates.

► **ClassA HEADENDS**

«**CRC**» — **Digital Cable-TV MultiCrypt Reception Equipment**

(cont'd)

QAM Receivers with Common Interface

(Conax, Cryptoworks, Irdeto, KeyFly, Mediaguard, Nagravision, Viaccess, ...)

Model		CRC-011	CRC-121
Reference		4097	4441
Output channel TV System — VSB		B / G / D / K / I / L	D / K / I / L
Audio Operation Mode		Mono ⁽¹⁾	Mono ⁽¹⁾
Output channel Colour System		PAL , SECAM , NTSC	PAL , SECAM , NTSC
Selectable output channel located between:		MHz	45 - 862
Input Section (QAM)	Standard		EN 300 429
	Input channel located between	MHz	51 - 858
	Bandwidth	MHz	8
	Input level	dBm	-64 ... -20 (64QAM modulation)
	Modulation Scheme of input signal		16QAM ,, 32QAM ,, 64QAM ,, 128QAM ,, 256QAM
	Input symbol rate	MS/s	0.87 ... 6.9
	Input loop-through gain	dB	0.5 (±1)
MPEG-2 Decoding Section	Video decoding		Main Profile @ Main Level
	Audio decoding		Layer II
	Teletext — Subtitles Insertion		Yes
	Image Format Conversion		16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box
External Video/Audio Loop	Video and L/R audio output levels	Vpp	— , 1.0 (video) ,, 0 ... 2.0 (audio)
	Video and L/R audio input levels	Vpp	— , 0.9...1.1 (video) ,, 0.5...1.0 (audio)
Video & Audio Re-modulation Section	Adjustable video modulation depth	%	80 to 90
	Adjustable audio peak deviation	kHz	±10 to ±50 (except System L)
	Adjustable audio modulation depth	%	10 to 80 (System L)
Output Section (TV Channel)	Adjustable output level	dBμV	65 to 80
	Output loop-through loss	dB	1.1
	Adjustable carrier level ratio	dB	10 to 20
	Group delay precorrection		No
	Weighted SNR	dB	> 60
	Spurious in band	dBc	< -58
	Broadband noise (ΔB=5MHz)	dBc	< -75
General	Supply voltage	VDC	+12
	Max consumption (CAM included)	mA	700
	Operating temperature	°C	0 ... +45
	Input RF connector type		(2x) female F
	Output RF connector type		(2x) female F
	DC connector type		“banana” socket
	CAM entrance		slot
	Programming Interface		RS 232 / DB-9
	Video/Audio loop connector type		— , mini-DIN (6-way)
	IKUSUP bus connector		— , (2x) 4-pin socket
	Dimensions	mm	230 x 195 x 32

⁽¹⁾ When selecting a stereo audio service, the output channel sound carrier is modulated with the "L+R" sum. If the audio service selected is dual, the carrier can be modulated with any of the "audio1", "audio2" or "audio1+audio2" signals.

- Each 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.

4

▶ ClassA HEADENDS

«CGT» — Cable TV QAM-QAM Regeneration Equipment



CGT HEADENDS

- TV Standard : DVB-C / MPEG-2 (EN 300 429).
- Transparent Digital Transmutation 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 voluminous, 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.

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

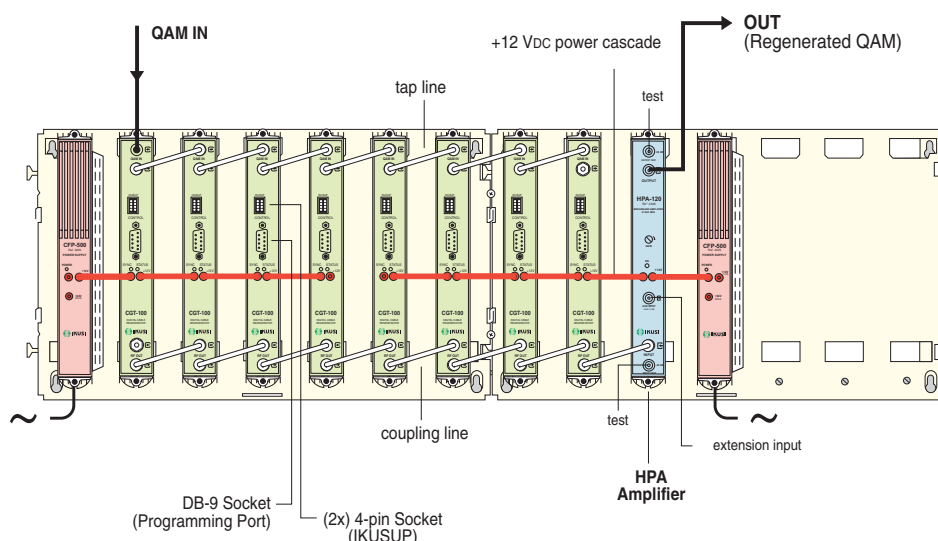


CGT-100

Simple cabling of CGT headends

The CGT regenerators feature two directionally coupled input and output ports. Incoming QAM 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 then connected in the same way to the drive amplifier—the HPA module or an external wideband amplifier—which then feeds the distribution network. For power connection, each module has two DC banana sockets that allow to build a +12 VDC cascade.

Local programming is carried out with the SPI-300 unit, which is connected to each module individually.



— Example of «CGT» headend for eight QAM modulated channels. Contains 8 Regenerators, 1 Amplifier and 2 Power Supplies, all fixed on 2 horizontally joined baseplates.

► **ClassA HEADENDS**

«CGT» — Cable TV QAM-QAM Regeneration Equipment

(cont'd)

QAM-QAM Regenerator

Model			CGT-100
Reference			4074
Input Section (QAM)	Standard		EN 300 429
	Input channel located between:	MHz	51 - 858
	Bandwidth	MHz	8
	Input level	dBm	-64 ... -20 (64QAM modulation)
	Modulation Scheme of input signal		16QAM ,, 32QAM ,, 64QAM ,, 128QAM ,, 256QAM
	Input symbol rate	MS/s	1.5 ... 6.9
	Input loop-through gain	dB	3 (±3)
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	38 (typ) ,, 36 (min)
	Output symbol rate	MS/s	3 ... 8
	Selectable Roll-Off factor	%	12 ,, 13 ,, 15
RF Output Section (QAM)	Selectable output channel located between:	MHz	51 - 858
	Frequency accuracy	ppm	± 25
	Adjustable output level	dBμV	65 to 80
	Output loop-through loss	dB	1.1
	Spurious in band	dBc	< -55
	Broadband noise (ΔB=5MHz)	dBc	< -75
General	Supply voltage	VDC	+12
	Consumption	mA	620
	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.

4

▶ ClassA HEADENDS

«MCP» — Vestigial Side Band TV Modulators

CE

MCP MODULATORS

- Vestigial Side Band TV Modulators. Mono and A2 or Nicam Stereo/Dual Sounds. TV Systems: B/G, D/K, I, L, M/N.
- 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.
- An MCP headend includes:
 - MCP Modulators, one per TV channel.
 - One HPA amplifier that amplifies the sum of the combined output TV channels from the modulators.
 - One or more CFP Power Supplies.
 - One or more Rack-Frames or wall-fixing Base-Plates. The base-plates can be joined horizontally.
 - Usually, housing units for the base-plates.
 - If the headend is voluminous, one or more AMX-400 combiners.

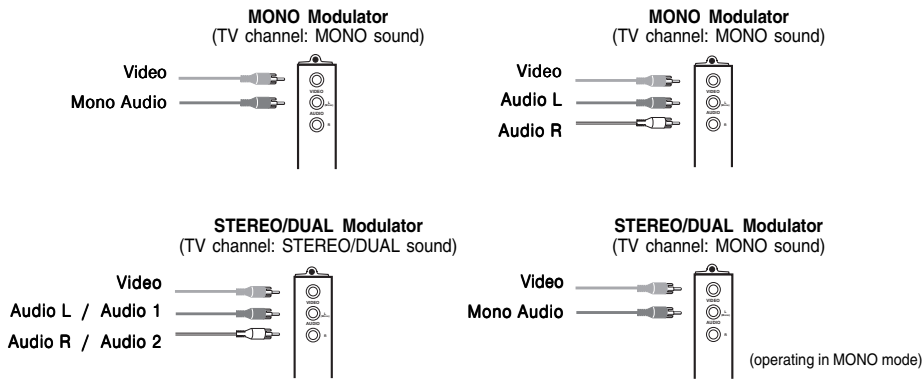


MCP-421

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.

Audio functionality

The MCP modulators family includes different models for mono and stereo/dual operation. Audio connection functionality on each model is not limited to the basic one—use of 1 signal source for mono models and 2 signal sources for stereo/dual models—, but it allows the reciprocal one, that is to say, use of 2 sources, L and R, for mono models and 1 source for stereo/dual models. Therefore, it is possible to use a mono model with a stereo/dual source (L and R signals are summed by the modulator itself) and a stereo/dual model with a mono source—the output TV channel will be, obviously, a mono sound channel. The following diagrams show the mentioned possibilities of use :

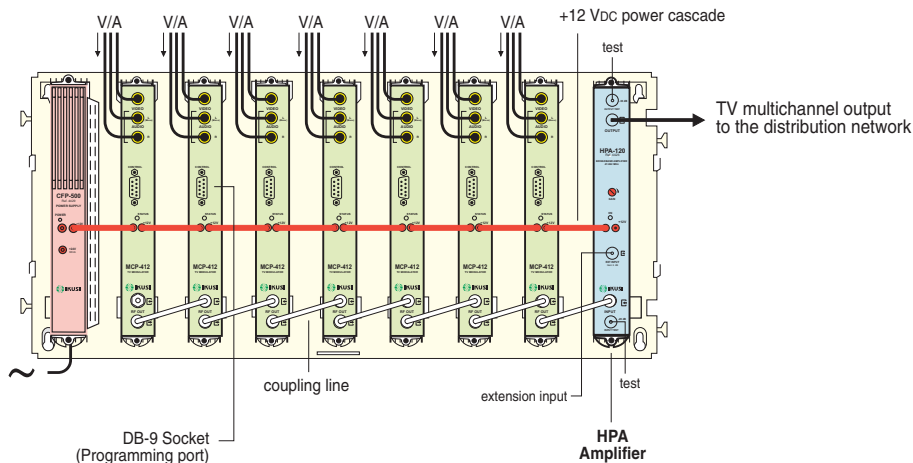


Simple cabling of MCP headends

Video and audio input ports of the modulators are disposed at the top of the front panels. The RF output of each module is presented at the bottom on two directionally coupled F ports, so a channel coupling line may be formed along the MCP assembly by using the supplied plug bridges. The sum of the combined channels is connected to the drive amplifier—the HPA module or an external wideband amplifier—. For power connection, each module has two DC banana sockets to perform a +12 VDC cascade.

Programming connection using the SPI-300 or PC is individual—module by module. The process involves the following selections and settings:

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



— Example of «MCP» headend with 7 Modulators, 1 Amplifier and 1 Power Supply, all fixed on 1 baseplate.

► ClassA HEADENDS

«MCP» — Vestigial Side Band TV Modulators

(cont'd)

TV Modulators - Vestigial Side Band

Model		MCP-411	MCP-412	MCP-414	MCP-421	MCP-422	MCP-431
Reference		3826	3829	3831	3827	3830	3828
TV System		B / G	B / G	B / G	D / K / I / L	D / K	M / N
Audio System		Mono	A2	Nicam	Mono	A2	Mono
Selectable Ch located between:		MHz	45 - 862	45 - 862	45 - 862	45 - 862	45 - 862 ⁽¹⁾
Adjustable output level		dBμV	70 to 80	70 to 80	70 to 80	70 to 80	70 to 80
Intercarrier frequency	Sound 1	MHz	5.5	5.5	5.5	6.5 (D,K,L) ,, 6 (I)	4.5
	Sound 2	MHz	—	5.742	5.85	—	5.742 / 6.258 / 6.742
Adjustable carrier level ratio		dB	10 to 20 (Mono-Audio1/A2) ,, 20 (Audio2/A2) ,, 18 to 27 (Nicam)				
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				
Adjustable audio peak deviation		kHz	±40 to ±50 (except System L)				
Adjustable audio modulation depth		%	60 to 80 (System L)				
Audio pre-emphasis		μs	50	50	50	50 (D,K,I)	75
Group delay precorrection			Yes	Yes	Yes	—	—
Weighted SNR		dB	> 60				
Differential gain		%	< 3				
Differential phase		°	< 2				
K-factor (2T pulse)		%	< 2				
Spurious in band		dBc	< -60	< -60	< -60	< -58	< -58
Broadband noise (ΔB=5 MHz)		dBc	< -77				
Output loop-through loss		dB	0.7 (typ) , 1.2 (max)				
Supply voltage		VDC	+12				
Consumption		mA	370	460	530	370	460
Operating temperature		°C	-10 ... +55				
Video connector type			(1x) female RCA				
Audio connector type			(2x) female RCA				
Output RF connector type			(2x) female F				
DC connector type			"banana" socket				
Programming interface			RS-232 / DB-9				
Dimensions		mm	230 x 195 x 32				

⁽¹⁾ - The MCP-431 model supports IRC (Incrementally Related Carriers) and HRC (Harmonically Related Carriers) assignments.

- Offset applicable on standard video carrier frequencies : 0 ,, +12.5 kHz ,, +25 kHz

- Each 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.

(RCA plugs for video and audio input connections are not supplied)

► ClassA HEADENDS

HPA-920 — Sat-IF Combiner/Amplifier

CE

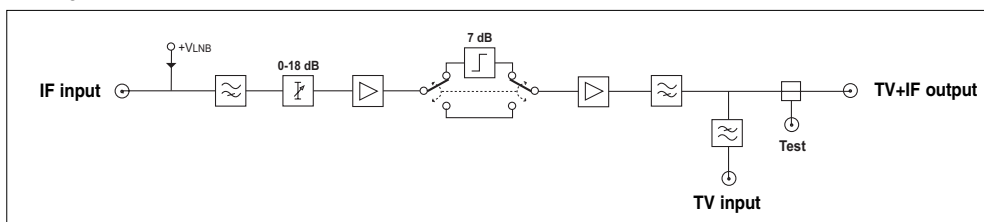
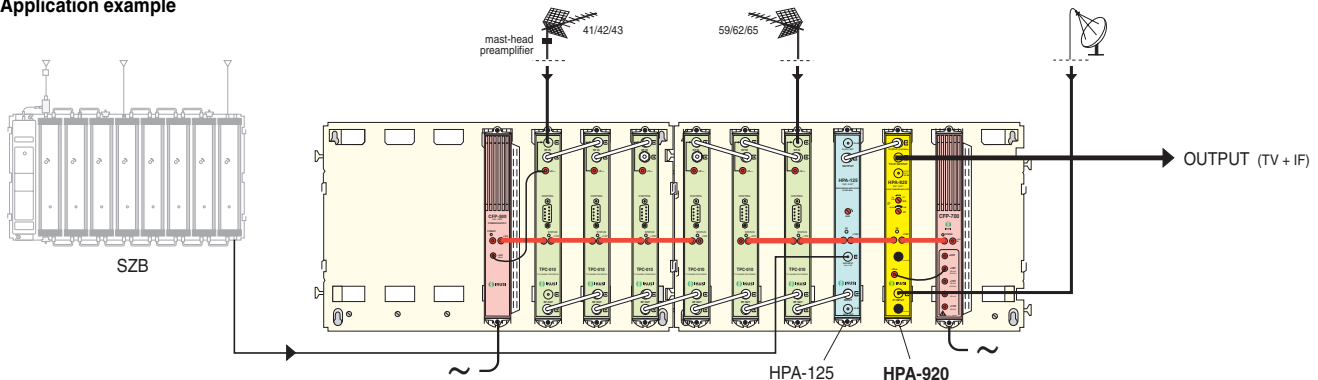
- Application in ClassA headends to drive Sat-IF distribution lines. One HPA-920 per polarity or IF signal being distributed.
- 1 satellite IF input port, with adjustable gain and 0 / 7 dB switchable slope to compensate for cable losses ; 1 terrestrial TV coupling port ; 1 combined TV+IF output port;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


HPA-920

Model		HPA-920
Reference		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 ¹
Input/output return loss	dB	≥ 10
Noise figure	dB	< 7
TV band	MHz	5 - 862
TV coupling loss	dB	≤ 1.5
Output test (TV+IF)	dB	TV : -30 ±1 ,, IF : -30 ±1.5
Supply voltage	Vdc	+12
Consumption	mA	250
RF and test connector type		female F
DC connector type		"banana" socket
Dimensions	mm	230 x 195 x 32

- The module is packed with 1 F plug bridge, 64 mm length, and 1 DC plug bridge, 53 mm length.

Note
¹ See Reduction Table on page 168 (Technical Annex)

Block diagram

Application example


- Application of 1 HPA-920 within a ClassA headend which process 6 terrestrial TV channels and amplifies one satellite polarity. The other modules are 6 TPC-010 processors, 1 HPA-125 amplifier and 2 power supplies (CFP-500 and CFP-700). All the modules are fixed on 2 horizontally joined BAS-700 Base-plates.

A TV multichannel signal supplied for an SZB headend is fed to the ClassA headend through the extension input port of the HPA-125 amplifier.

► ClassA HEADENDS

AMX-400 — 4-way 47-862 MHz Active Combiner

CE

- Application in voluminous 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 enlargeable, 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 launch amplifier used (HPA-120 or HPA-125).
- Total isolation between inputs.
- Net combining gain. Push-pull amplification technology.
- Adjustable output level.
- 75Ω output test port.

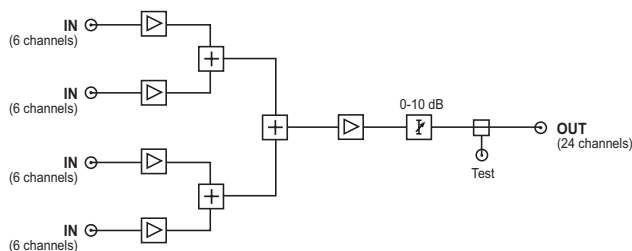


AMX-400

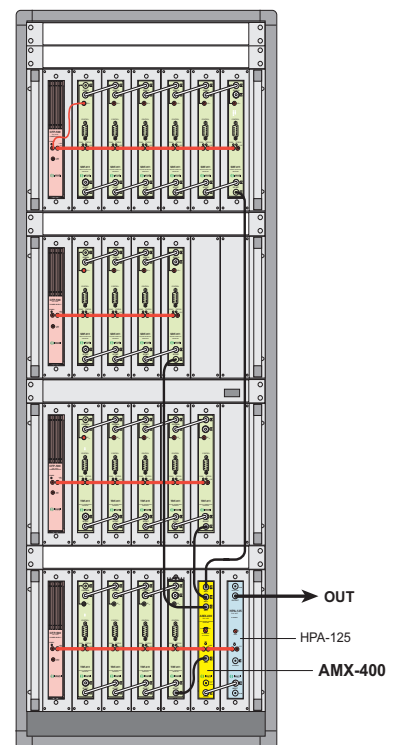
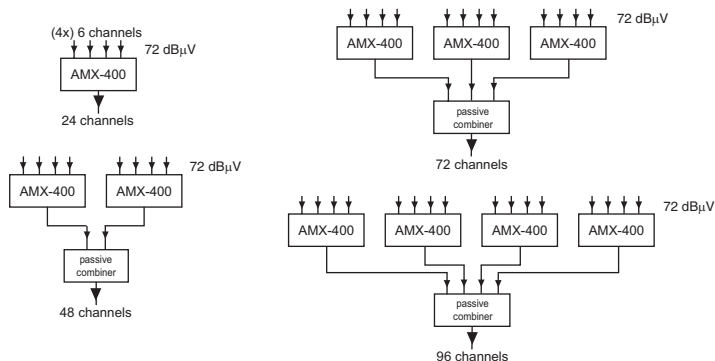
Model		AMX-400
Reference		4433
No. of inputs		4
Frequency range	MHz	47 - 862
Response flatness	dB	± 1.5
Gain	dB	7
IMD for 4x 6 channels, 72 dBμV input level	dB	- 75
Output variable attenuator	dB	0 - 10
Input and output return loss	dB	≥ 10
Output test	dB	-20 ±1
Supply voltage	VDC	+12
Consumption	mA	470
RF and test connectors		female F
DC connectors		"banana" socket
Dimensions	mm	230 x 195 x 32

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

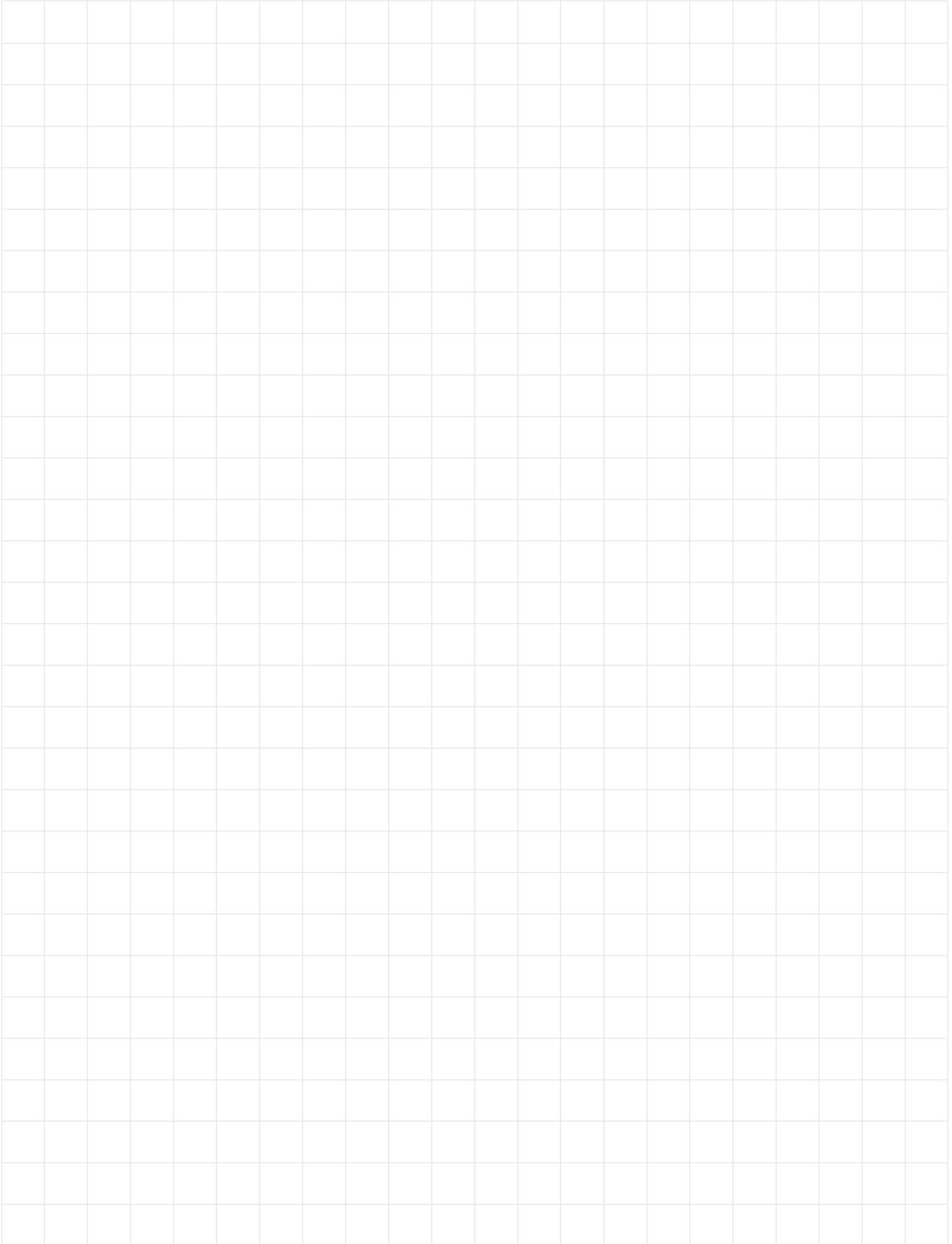
Block diagram



Applications



ClassA Headend
1 AMX-400 for 19 (6+4+5+4) channels



► ClassB HEADENDS

ClassB Modules — Range and General Features



ClassB range includes programmable, space-efficient satellite and terrestrial DVB demodulators and VSB TV modulators. All modules have identical format and are simply to place into a 3RU subrack. Connection ports for video, audio, RF and power are located on the rear panel.

The range includes the following types of modules:

- «TDF» : Free-To-Air DVB-T Demodulators (pages 80/81).
- «SDF» : Free-To-Air DVB-S Demodulators (pages 82/83).
- «SDE» : DVB-S Demodulators with Embedded Conditional Access (pages 84/85).
- «CMK» : Vestigial Side Band TV Modulators (pages 86-88).
- «CFK» : Power Supply (page 79).

The family is complemented with accessories for programming and installation (next pages 78 and 79).

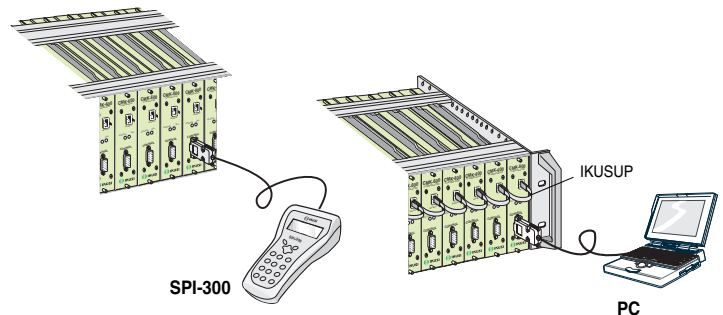


SDF-102 demodulator

PROGRAMMING AND FIRMWARE UPDATE

ClassB modules are locally programmed and adjusted either with the SPI-300 programming unit from IKUSI or with a PC with the PRG-300 software installed. In this second case, a communication bus (IKUSUP) must be installed along the modules using interconnection jumpers. Programming with PC can also be done remotely through modems by using the PRG-300 software. The 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.

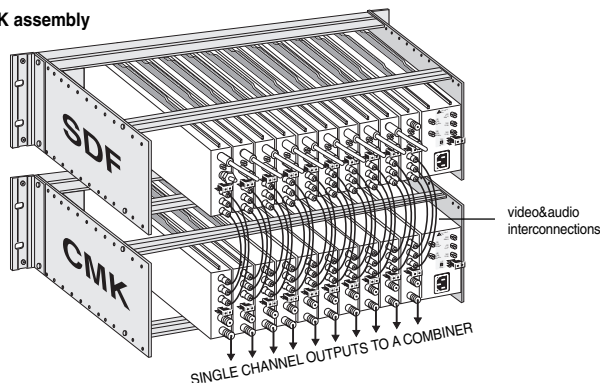
Firmwares of the modules and programming unit can be updated. The corresponding files are downloaded from <http://www.ikusi.com>.



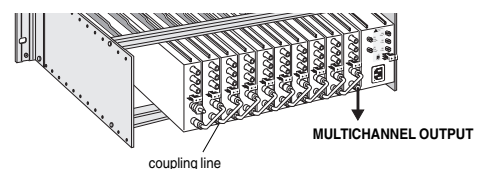
SEPARATE SINGLE-CHANNEL OUTPUTS OR ONE MULTICHANNEL OUTPUT IN CMK HEADENDS

CMK modulators can feature single RF output port or, on request, two "looped" RF ports. In the first case, the CMK headend provides separate single channel signals to be connected to an RF combiner. In the second case, a coupling line may be installed along the headend, using the plug bridges supplied, in such a way that no combiner is required.

SDF + CMK assembly



Modulators with loop-through facility :

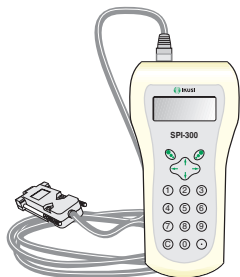


BISS OPERATION

The **ClassB** demodulators can operate in BISS systems (BISS: Basic Interoperable Scrambling Systems).

► ClassB HEADENDS

Programming Accessories



SPI-300

Programming Unit

Model	SPI-300
Reference	4070
<ul style="list-style-type: none"> • For programming the ClassB 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 (except CMK modulators). Firmware of the SPI-300 can also be updated through a PC. • Capacity of 500 preset memory allocations for repetitive ClassB 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. 	

PC Software for Local and Remote Programming

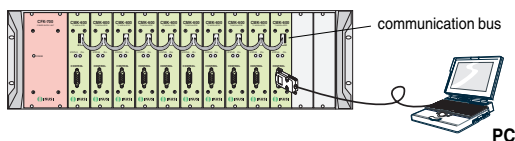


PRG-300

Model	PRG-300
Reference	9602
<ul style="list-style-type: none"> • For programming and monitoring the ClassB headends from a PC, either locally or remotely via modem. • Operation language (spanish, english) is automatically established in concordance with that used in Windows. • Windows-based graphical interface. • Use of preset memory allocations for repetitive ClassB assemblies. • Stores complete headend information allowing reports to be printed. • Shipped in CD-ROM. 	

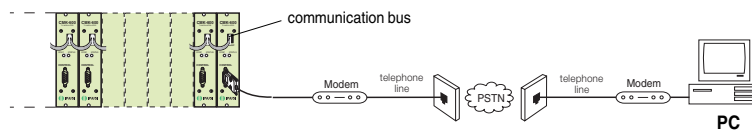
Minimum Requirements for the Computer

Computer	INTEL Pentium III 600MHz IBM PC or similar
Telephone line	Installed (for remote operation)
Modem at the headend location	Installed (for remote operation) — RS-232C port
Modem at the computer location	Installed (for remote operation)
Computer configuration	
Hard disc	100 MB free space
CD-ROM Drive	Installed
Parallel Port	IBM PC compatible printer port
Serial Port	COM1 port, RS-232C
Mouse	Installed
RAM	256 MB
Display	SVGA monitor, 15" or 17"
Operating System	Windows 95/98/ME/NT/2000/XP
Screen Properties' Configuration	800x600 pixels or 1024x768 pixels 256 colours Small size fonts



• Local Programming with PC + PRG-300

It is advisable to interconnect by means of BUS-013 jumpers the IKUSUP front panel sockets of the modules. The established communication bus enables to set the complete headend through a unique connection to the DB-9 socket of the last module on the right of the cascade.



• Remote Programming with PC + PRG-300

Communication with the PC is accomplished through modems and telephone lines. In the headend, a communication bus must be built using BUS-013 jumpers. The modem at the headend side is connected to the DB-9 socket of the last module on the right of the cascade.

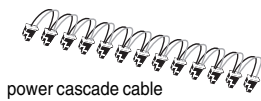
► ClassB HEADENDS

Power Supply

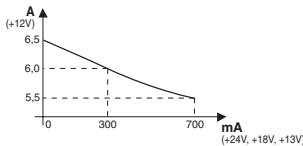
CE



CFK-700



power cascade cable



Model	CFK-700	
Reference	4501	
Regulation type	switch mode	
Mains supply voltage (50/60 Hz)	VAC	100 - 240 ($\pm 10\%$)
Outputs		+12 V (6.5A) (*) → For ClassB 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) } LNB remote powering
Max total currents of +24, +18 and +13 V	mA	700
Efficiency	%	75
Dimensions	mm	130 x 60 x 290

(*) The +12 VDC output can supply up to 6.5 A if there is not any load on the rest of the outputs. If there is load, the available current from +12 VDC falls as shown in the left graph.

- Mains lead NOT INCLUDED. The module has a 3-pin european standard inlet, so the mains lead to be used must have a mating CEE 22 socket (see COR-220 power cord below).
- Electrical safety protection level: Class II.
- 1 power cascade cable is supplied to connect the +12 VDC voltage to all the ClassB modules mounted in the SMR-300 subrack.
- 2 "banana" jumpers, 50 cm length, are supplied to connect the appropriate outputs of the power supply to 1 or 2 ClassB demodulators for line powering of preamplifiers or LNB's.

Installation Accessories

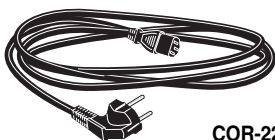


BUS-013



CDB-200

CDP-102

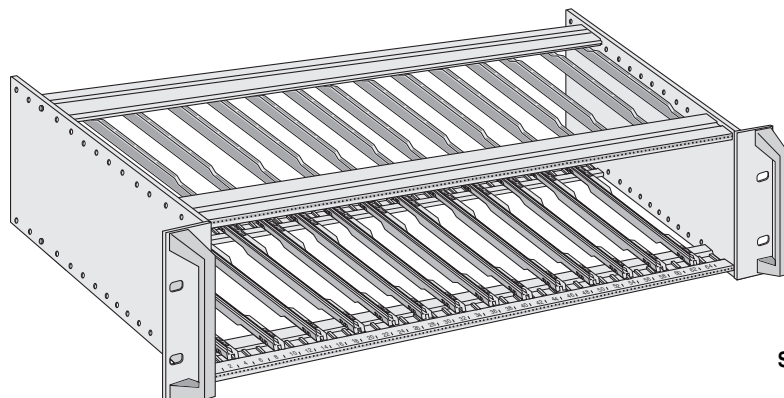


COR-220



OMR-300

Model	Ref.	Description
BUS-013	4430	Pack containing 11 jumpers for IKUSUP communication bus between ClassB modules (PC programming application).
CDB-200	4706	Two DB-9 female connectors to assemble the PC↔headend connecting cable.
CDP-102	4704	2-pair shielded, twisted cable (1 m) to assemble the PC↔headend connecting cable.
COR-220	3616	Europe Schuko power cord. Cordset consist of 1.5 m of harmonised cable with a CEE 22 moulded socket on one end and a moulded plug on the other.
OMR-300	4512	3U - 6E (130x30mm) blank panel to fill the unoccupied places on the SMR-300 subrack.
SMR-300	4511	19" Subrack Kit for ClassB assemblies, 3U height and 275 mm depth. Capacity: 1 power supply plus 12 modulators or demodulators. Includes 28 module guides.



SMR-300

5

▶ ClassB HEADENDS

«TDF» — Free-To-Air Digital Terrestrial TV Demodulation Equipment



TDF HEADENDS

- Digital-to-Baseband Demodulation Process (COFDM → Video & Stereo/Dual Audio). Input signal: Standard EN 300 744.
- Selectable colour system (PAL, SECAM, NTSC) and line, raster and subcarrier frequencies for the video baseband output signal.
- A TDF headend includes as many demodulators as free-to-air TV stations to be treated.

FUNCTIONAL DESCRIPTION OF THE TDF DEMODULATORS

A TDF demodulator carries out a complete demodulation process:

- tunes a COFDM digital channel,
- selects a clear TV programme from the multiplex received, and
- delivers the corresponding baseband video and audio signals.

Programming of the module involves the following settings:

- Central Input Frequency (125 kHz increments).
- Bandwidth (6, 7 or 8 MHz).
- Hierarchy Level (high or low priority).
- TV Programme and Audio Service.
- Colour System, Colour Subcarrier Frequency and Line and Raster Frequencies for the Video Baseband Signal.
- Level of the Output Audio Signal.
- Image Format, if the original format is 16:9. The possible conversions are 16:9 to 4:3 Pan&Scan or 16:9 to 4:3 Letter-Box.



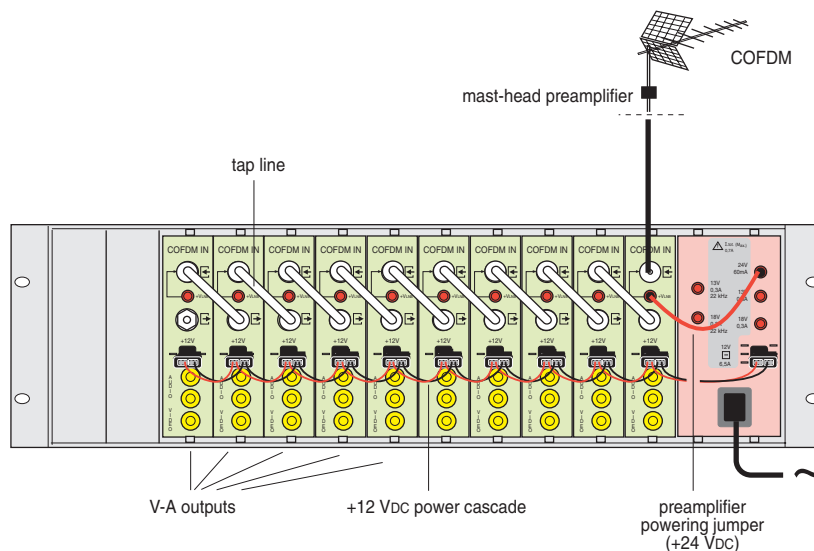
TDF-102

Simple cabling of TDF headends

All connections are made at the rear side of the headend. The TDF demodulators feature two directionally coupled input ports. Antenna 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. Video and audio outputs are available on RCA connectors (1 video and 2 audio).

For power connection each module has two blade terminals that allow to build a +12 VDC cascade using the power cascade cable furnished with the CFK-700 power supply. A banana socket located between the two input connectors is available to connect the feedline voltage for an optional mast-head preamplifier.

Local programming is carried out either with the SPI-300 unit, which is connected to each module individually, or with a PC + PRG-300 software. Remote programming is carried out through modems, with a PC + PRG-300 software.



— Rear view of a «TDF» headend for ten clear digital TV stations. Contains 10 Demodulators and 1 Power Supply, all fixed in the SMR-300 Subrack.

► ClassB HEADENDS

«TDF» — Free-To-Air Digital Terrestrial TV Demodulation Equipment

(cont'd)

COFDM Demodulator

Model		TDF-102	
Reference		3838	
Selectable Colour System for the output video signal		PAL , SECAM , NTSC	
Audio Operation Mode		Mono , Stereo/Dual	
Selectable Frequencies of Line, Raster and Colour Subcarrier for the output video signal		Compatible with every "TV System - Colour System" combination <small>(B-G-D-K-I-L-M-N)</small> <small>(PAL-SECAM-NTSC)</small>	
Input Section (COFDM)	Input frequency	MHz	47 - 862
	Bandwidth	MHz	6 ,, 7 ,, 8
	Mode (automatic detection)		2K ,, 8K
	Constellation (automatic detection)		QPSK ,, 16QAM ,, 64QAM
	Hierarchy		High Priority ,, Low Priority
	Input level (constellation: 64QAM / code rate: 2/3)	dBμV	35 ... 100
	Input loop-through gain	dB	0 (±2)
Guard interval (automatic detection)		1/4 ,, 1/8 ,, 1/16 ,, 1/32	
MPEG-2 Decoding Section	Video decoding	Main Profile @ Main Level	
	Audio decoding	Layer II	
	Teletext — Subtitles insertion	Yes	
	Image Format Conversion	16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box	
Baseband Outputs	Frequency range of the video signal	20 Hz - 5 MHz	
	Video output level	Vpp	1.0 (±0.1)
	Video output impedance	Ω	75
	Video output return loss	dB	≥ 26
	Frequency range of the audio signal	20 Hz - 15 kHz	
	Adjustable audio output level	Vpp	0 ... 2.0
	Audio output impedance	Ω	600
General	Supply voltage	Vdc	+12
	Consumption	mA	270
	Operating temperature	°C	0 ... +45
	Input RF connector type	(2x) female F	
	Video output connector	female RCA	
	Audio output connectors (L - R) ⁽¹⁾	(2x) female RCA	
	DC connector type	(2x) 4.8 mm blade terminal	
	Preamplifier remote powering connector type	"banana" socket	
	Programming Interface	RS 232 / DB-9	
	IKUSUP bus connector	(2x) 4-pin socket	
Dimensions	mm	130 x 30 x 290	

⁽¹⁾ When selecting mono audio services, the audio output baseband signal is available on each one of the two audio connectors (L and R).

- The module is packed with 1 F plug bridge, 38 mm length, for input tap line.

(RCA plugs for video and audio output connections are not supplied)

► ClassB HEADENDS

«SDF» — Free-To-Air Digital Satellite TV Demodulation Equipment



SDF HEADENDS

- Digital-to-Baseband Demodulation Process (QPSK → Video & Stereo/Dual Audio). Input signal: Standard 300 421.
- Selectable colour system (PAL, SECAM, NTSC) and line, raster and subcarrier frequencies for the video baseband output signal.
- An SDF headend includes as many demodulators as free-to-air TV stations to be treated.

FUNCTIONAL DESCRIPTION OF THE SDF DEMODULATORS

An SDF demodulator carries out a complete demodulation process:

- tunes a QPSK Sat-IF digital channel,
- selects a clear TV programme from the multiplex received, and
- delivers the corresponding baseband video and audio signals.

Programming of the module involves the following 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).
- Colour System, Colour Subcarrier Frequency and Line and Raster Frequencies for the Video Baseband Signal.
- Level of the Output Audio Signal.
- Image Format, if the original format is 16:9. The possible conversions are 16:9 to 4:3 Pan&Scan or 16:9 to 4:3 Letter-Box.



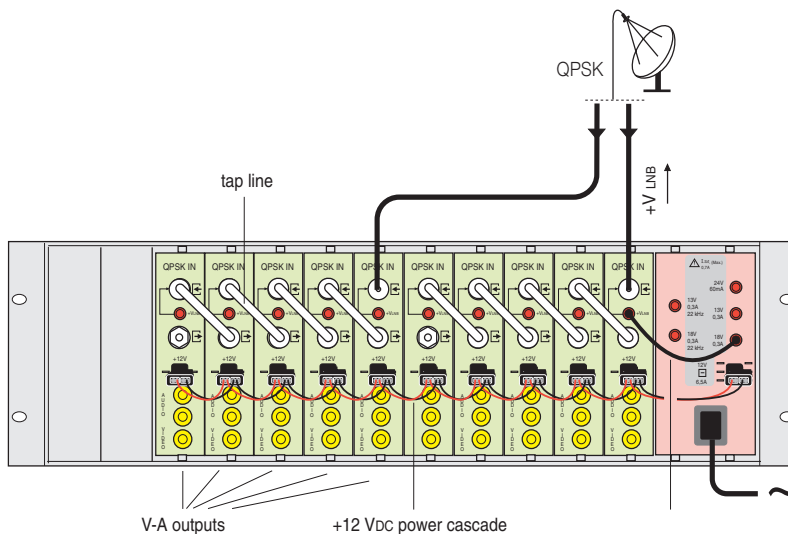
SDF-102

Simple cabling of SDF headends

All connections are made at the rear side of the headend. The SDF demodulators feature two directionally coupled input 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. Video and audio outputs are available on RCA connectors (1 video and 2 audio).

For power connection each module has two blade terminals that allow to build a +12 VDC cascade using the power cascade cable furnished with the CFK-700 power supply. A banana socket located between the two input connectors is available to connect the feedline voltage for the attached LNB.

Local programming is carried out either with the SPI-300 unit, which is connected to each module individually, or with a PC + PRG-300 software. Remote programming is carried out through modems, with a PC + PRG-300 software.



- Rear view of a «SDF» headend for ten clear digital TV stations; five stations arrive via a down lead cable and the other five ones via another. Contains 10 Demodulators and 1 Power Supply, all fixed in the SMR-300 Subrack.

► ClassB HEADENDS

«SDF» — Free-To-Air Digital Satellite TV Demodulation Equipment

(cont'd)

QPSK Demodulator

Model			SDF-102
Reference			4068
Selectable Colour System for the output video signal			PAL , SECAM , NTSC
Audio Operation Mode			Mono , Stereo/Dual
Selectable Frequencies of Line, Raster and Colour Subcarrier for the output video signal			Compatible with every "TV System - Colour System" (B-G-D-K-I-L-M-N) (PAL-SECAM-NTSC)
Input Section (QPSK)	Input frequency	MHz	910 - 2150
	Input level	dBm	-65 ... -25
	Input loop-through gain	dB	0 (±1)
	AFC pull-in range	MHz	±5
	Input symbol rate	MS/s	2 ... 45
MPEG-2 Decoding Section	Video decoding		Main Profile @ Main Level
	Audio decoding		Layer II
	Teletext — Subtitles Insertion		Yes
	Image Format Conversion		16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box
Baseband Outputs	Frequency range of the video signal		20 Hz - 5 MHz
	Video output level	Vpp	1.0 (±0.1)
	Video output impedance	Ω	75
	Video output return loss	dB	≥ 26
	Frequency range of the audio signal		20 Hz - 15 kHz
	Adjustable audio output level	Vpp	0 ... 2.0
	Audio output impedance	Ω	600
General	Supply voltage	Vdc	+12
	Consumption	mA	370
	Operating temperature	°C	0 ... +45
	Input RF connector type		(2x) female F
	Video output connector		female RCA
	Audio output connectors (L - R) ⁽¹⁾		(2x) female RCA
	DC connector type		(2x) 4.8 mm blade terminal
	LNB remote powering connector type		"banana" socket
	Programming Interface		RS 232 / DB-9
	IKUSUP bus connector		(2x) 4-pin socket
	Dimensions	mm	130 x 30 x 290

⁽¹⁾ When selecting mono audio services, the audio output baseband signal is available on each one of the two audio connectors (L and R).

- The module is packed with 1 F plug bridge, 38 mm length, for input tap line.
(RCA plugs for video and audio output connections are not supplied)

► ClassB HEADENDS

«SDE» — Demodulation Equipment with Embedded CA for Digital Sat TV

SDE HEADENDS

- Satellite TV reception, standard DVB-S / MPEG-2 (EN 300 421).
- De-encryption and Digital-to-Baseband Demodulation Process (Encrypted QPSK → Video & Stereo/Dual Audio)..
- Selectable colour system (PAL, SECAM, NTSC) and line, raster and subcarrier frequencies for the video baseband output signal.
- An SDE headend includes as many Embedded CA (Conditional Access) demodulators as there are encrypted TV stations.

FUNCTIONAL DESCRIPTION OF THE SDE DEMODULATORS

An SDE embedded CA demodulator carries out a complete demodulation process:

- tunes a QPSK Sat-IF digital channel,
- selects an encrypted TV programme from the multiplex received, and
- de-encrypts it and delivers the corresponding baseband video and audio signals.

A lateral slot is available to insert the operator's smart card.

Programming of the module involves the following settings:

- Central Input Frequency (1 MHz increments).
- Input Symbol Rate (0.001 MS/s).
- TV Programme and Audio Service. (Or a Radio Programme. Image will be black).
- Colour System, Colour Subcarrier Frequency and Line and Raster Frequencies for the Video Baseband Signal.
- Level of the Output Audio Signal.
- Image Format, if the original format is 16:9. The possible conversions are 16:9 to 4:3 Pan&Scan or 16:9 to 4:3 Letter-Box.

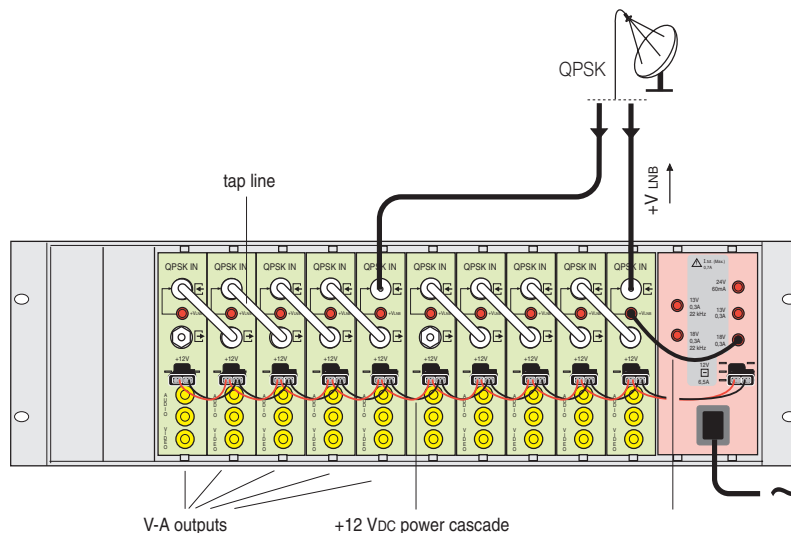


Simple cabling of SDE headends

All connections are made at the rear side of the headend. The SDE demodulators feature two directionally coupled input 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. Video and audio outputs are available on RCA connectors (1 video and 2 audio).

For power connection each module has two blade terminals that allow to build a +12 VDC cascade using the power cascade cable furnished with the CFK-700 power supply. A banana socket located between the two input connectors is available to connect the feedline voltage for the attached LNB.

Local programming is carried out either with the SPI-300 unit, which is connected to each module individually, or with a PC + PRG-300 software. Remote programming is carried out through modems, with a PC + PRG-300 software.



- Rear view of a «SDE» headend for ten encrypted digital TV stations. Five stations arrive via a down-lead cable and the other five ones via another. Contains 10 Demodulators and 1 Power Supply, all fixed in the SMR-300 Subrack.

► ClassB HEADENDS

«SDE» — Demodulation Equipment with Embedded CA for Digital Sat TV

(cont'd)

QPSK Demodulators with Embedded Conditional Access

Model		SDE-M00	SDE-V00	SDE-C00
Reference		4069	3832	3833
Embedded Conditional Access (*)		Mediaguard™	Viaccess™	Conax™
Selectable Colour System for the output video signal		PAL , SECAM , NTSC		
Audio Operation Mode		Mono , Stereo/Dual		
Selectable Frequencies of Line, Raster and Colour Subcarrier for the output video signal		Compatible with every "TV System - Colour System" combination (B-G-D-K-I-L-M-N) (PAL-SECAM-NTSC)		
Input Section (QPSK)	Input frequency	MHz	910 - 2150	
	Input level	dBm	-65 ... -25	
	Input loop-through gain	dB	0 (±1)	
	AFC pull-in range	MHz	±5	
	Input symbol rate	MS/s	2 ... 45	
MPEG-2 Decoding Section	Video decoding		Main Profile @ Main Level	
	Audio decoding		Layer II	
	Teletext — Subtitles Insertion		Yes	
	Image Format Conversion		16:9 to 4:3 Pan&Scan and 16:9 to 4:3 Letter-Box	
Baseband Outputs	Frequency range of the video signal		20 Hz - 5 MHz	
	Video output level	Vpp	1.0 (±0.1)	
	Video output impedance	Ω	75	
	Video output return loss	dB	≥ 26	
	Frequency range of the audio signal		20 Hz - 15 kHz	
	Adjustable audio output level	Vpp	0 ... 2.0	
	Audio output impedance	Ω	600	
General	Supply voltage	VDC	+12	
	Consumption	mA	400	
	Operating temperature	°C	0 ... +45	
	Input RF connector type		(2x) female F	
	Video output connector		female RCA	
	Audio output connectors (L - R) ⁽¹⁾		(2x) female RCA	
	DC connector type		(2x) 4.8 mm blade terminal	
	LNB remote powering connector type		"banana" socket	
	Smart card entrance		slot	
	Programming Interface		RS 232 / DB-9	
	IKUSUP bus connector		(2x) 4-pin socket	
	Dimensions	mm	130 x 30 x 290	

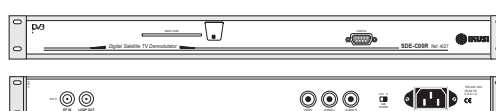
(*) Contact IKUSI for other Conditional Access systems.

(1) When selecting mono audio services, the audio output baseband signal is available on each one of the two audio connectors (L and R).

- Each module is packed with 1 F plug bridge, 38 mm length, for input tap line. (RCA plugs for video and audio output connections are not supplied).

VERSION :

SDE-C00R (Ref. 4027)

 Rack-mountable version of the SDE-C00 (Ref. 3833).
 Height: 1U. Power requirements: 100-240 VAC, 10 W


front panel

rear panel

AVAILABLE ALSO :

SDE-G06R (Ref. 4022)

 Rack-mountable demodulator with Videoguard™ (Viasat) embedded conditional access.
 Height: 1U. Power requirements: 100-240 VAC, 10 W

► **ClassB HEADENDS**

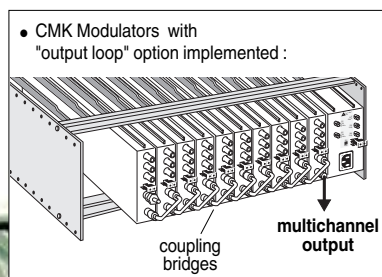
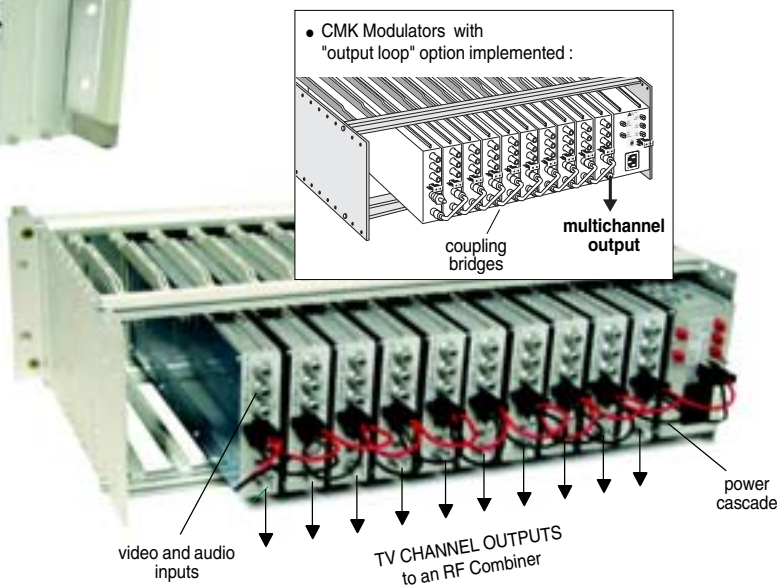
«**CMK**» — Vestigial Side Band TV Modulators

CE

- VSB TV Modulators. Mono and A2 Stereo/Dual Sounds. TV Systems: B/G, D/K, I, L, M/N.
- IF modulation and SAW filtering. Adjacent channel operation. Double SAW filter, for a very high VSB selectivity.
- Frequency agility. Any selectable TV channel within the 45-862 MHz band. PLL frequency synthesized.
- TV-channel output either through an only port (level: 104 dBμV) or, on request, through two "looped" ports (level: 92 dBμV).
- Built-in test pattern generator.
- Stand-by function that allows to establish a low-consumption status for the spare modulators in "remote programming" application.
- Operation shown by LEDs.



● **CMK Headend with 10 Modulators**
(front- and rear side views)



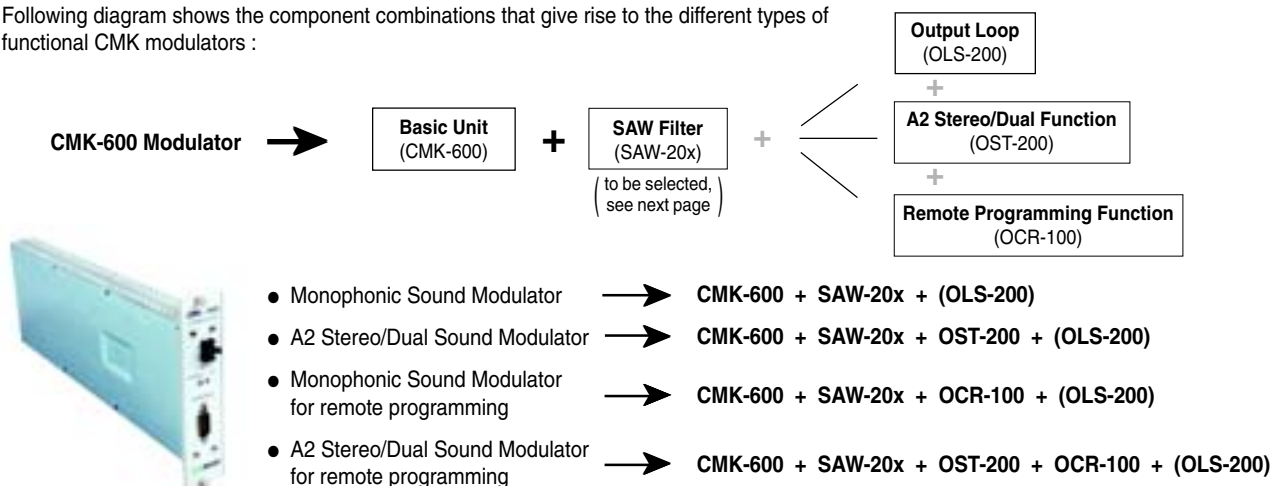
The CMK family — Composition of the CMK Modulators

The CMK family includes five different components to make up **CMK** modulators :

- The Basic Unit,
- the SAW Filter,
- the Output Loop,
- the A2 Stereo/Dual Function, and
- the Remote Programming Function.

The **Basic Unit** is the main component of the family. Inside it a factory-installable **SAW Filter** must be compulsorily installed. The other three components —**Output Loop**, **A2 Stereo/Dual** function and **Remote Programming** function— are optional and factory-installable too. So, the order for a CMK modulator must specify the basic unit and the other appropriate components that are required for the desired functionality (see ordering examples on next page).

Following diagram shows the component combinations that give rise to the different types of functional CMK modulators :



► ClassB HEADENDS

«CMK» — Vestigial Side Band TV Modulators

(cont'd)

COMPONENTS

Modulator Basic Unit	CMK-600 Ref. 4507
<ul style="list-style-type: none"> Main component. Is not functional by itself. 	

Double SAW Filters	3 Models (see down here)
<ul style="list-style-type: none"> Indispensable complement for the basic unit. The filter chosen determines the operating TV System. Factory-installable into the basic unit. 	
TV System	SAW Filter
B / G	SAW-200 (Ref. 2622)
D / K / I / L	SAW-201 (Ref. 2623)
M / N	SAW-203 (Ref. 2625)

Output Loop	OLS-200 Ref. 4516
<ul style="list-style-type: none"> Factory-installable into the basic unit. Characterizes the CMK modulator with two directionally coupled RF output ports, so an RF coupling line can be installed in the CMK headend. 	

A2 Stereo/Dual Function	OST-200 Ref. 4510
<ul style="list-style-type: none"> Factory-installable into the basic unit. Provides stereo/dual functionality (A2 system). Only applicable for B/G and D/K systems. 	

Remote Programming Function	OCR-100 Ref. 4509
<ul style="list-style-type: none"> Factory-installable into the basic unit. With this function implemented, the modulator becomes remote-controlled. Also required in modulators to be locally PC-programmed. 	

MODULATORS' ORDERING EXAMPLES

a) B/G System, Mono Sound Modulator :

- 1 CMK-600 (Ref. 4507)
- 1 SAW-200 (Ref. 2622)

b) B/G System, A2 Stereo/Dual Sound Modulator, with Output Loop :

- 1 CMK-600 (Ref. 4507)
- 1 SAW-200 (Ref. 2622)
- 1 OST-200 (Ref. 4510)
- 1 OLS-200 (Ref. 4516)

c) D/K System, A2 Stereo/Dual Sound Modulator, with Remote Programming Function and Output Loop :

- 1 CMK-600 (Ref. 4507)
- 1 SAW-201 (Ref. 2623)
- 1 OST-200 (Ref. 4510)
- 1 OCR-100 (Ref. 4509)
- 1 OLS-200 (Ref. 4516)

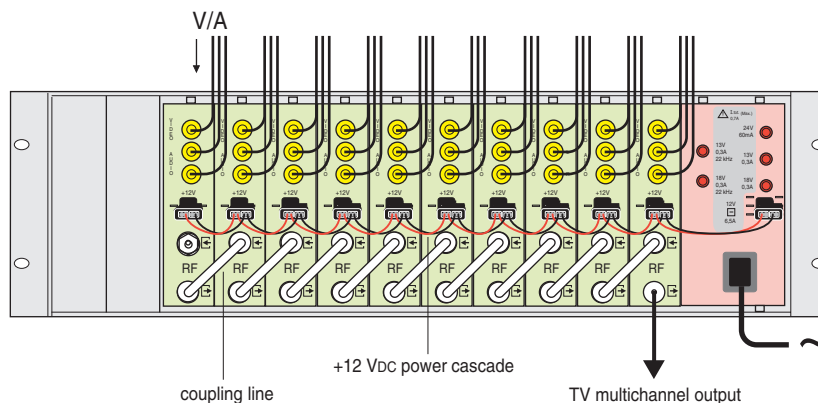
Connections on the CMK headend

Video and audio input ports are RCA type. The TV channel output is disposed in each modulator either on two "looped" F ports or on a unique F port, depending on the Output Loop option is or not implemented. For power connection, each module has two blade terminals that allow to build a +12 VDC cascade using the power cascade cable supplied with the CFK-700 power supply.

Local programming is carried out either with the SPI-300 unit, which is connected to each module individually, or with a PC + PRG-300 software. Remote programming is carried out through modems, with a PC + PRG-300 software.

The process involves the following selections and settings:

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



— Rear view of a «CMK» headend with 10 Modulators and 1 Power Supply, all fixed in the SMR-300 Subrack. (All the modulators have the Output Loop option implemented).

5

► ClassB HEADENDS

«CMK» — Vestigial Side Band TV Modulators

(cont'd)

TECHNICAL DATA

CMK-600 Modulator made up of :		CMK-600 Basic Unit + OLS-200 Output Loop (OPTION) + SAW-20x Double SAW Filter + OST-200 A2 Stereo/Dual Function (OPTION) + OCR-100 Remote Programming Function (OPTION)	
TV System (determined by the built-in SAW Filter)		B / G ,, D / K / I / L ,, M / N	
Audio System	if OST-200 function is not built in	Mono	
	if OST-200 function is built in	A2 Stereo/Dual (only B/G and D/K Systems)	
Selectable TV channel located between		45 - 862	
Adjustable output level		dBμV	
		89 to 104 (modulator with 1 RF port) 77 to 92 (modulator with 2 looped RF ports)	
Intercarrier frequency	Sound 1	MHz	
	Sound 2 (only if the OST-200 function is built in)	MHz	
		5.5 (B,G) ,, 6.5 (D,K,L) ,, 6 (I) ,, 4.5 (M,N)	
		5.742 (B,G) ,, 5.742 / 6.258 / 6.742 (D,K)	
Adjustable carrier level ratio		dB	
		10 to 20 (Mono-Audio1/A2) ,, 20 (Audio2/A2)	
VSB response	Fv - 1.5 MHz ; (Fv - 2.0 MHz in I/L Systems)	dB	
	Fv - 4.4 MHz ; (Fv - 3.5 MHz in M/N Systems)	dB	
		> 65	
		> 65	
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 ... 2.0	
Audio input impedance		Ω	
		> 600	
Adjustable audio peak deviation (all TV systems, except System L)		kHz	
		± 40 to ± 50	
Adjustable audio modulation depth (only System L)		%	
		60 to 80	
Audio pre-emphasis		μs	
		50 (B, G, D, K and I Systems) ,, 75 (M and N Systems)	
Group delay precorrection		complying with B / G and M / N standards	
Differential gain		%	
		< 2.5	
Differential phase		°	
		< 1.5	
K-factor (2T pulse)		%	
		< 2	
Weighted S/N ratio		dB	
		> 61	
Spurious in band		dBc	
		< -60 (B and G Systems) ,, < -58 (D, K, I, L, M and N Systems)	
Broadband noise ($\Delta B = 5$ MHz)		dBc	
		< -90	
Output loop-through loss (OLS-200 built-in)		dB	
		0.7 (typ) , 1.2 (max)	
Supply voltage		Vdc	
		+12	
Consumption	without OST-200 and OCR-100 optional functions	mA	
	if OST-200 function is built in, add :	mA	
	if OCR-100 function is built in, add :	mA	
		590	
		+ 60	
		+ 30	
Consumption in stand-by status (remote programming application)		mA	
		180 (add up 60 if OST-200 is built in)	
Video/Audio connectors		(3x) female RCA	
RF output connector/s (TV channel)		female F	
DC connector type		(2x) 4.8 mm blade terminal	
Programming interface		RS-232 - DB-9	
IKUSUP bus connector		(2x) 4-pin socket	
Dimensions (h x w x d)		mm	
		130 x 30 x 290	

- RCA plugs for video and audio input connections are not supplied.
- Modulators with "output loop" are supplied with 1 F plug bridge, 38 mm length.

► LANTV™ (Television on IP Networks)

DVB→IP Streamers — Range and General Features

Streaming Modules for ClassA Headends

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

The streamers have IKUSI ClassA mechanical format. As such, they are fixed on the BAS-700 / BAS-900 baseplates or in the SMR-600 rack frame, and they are +12 VDC powered from a CFP module (see pages 45 and 46).

Range includes the following models:

- **TNS-100**. Free-to-air DVB-T reception.
- **SNS-100**. Free-to-air DVB-S reception.
- **SNS-101**. MultiCrypt DVB-S reception. Common Interface.
- **CNS-100**. Free-to-air DVB-C reception. (Being developed).
- **ANS-100**. DVB-ASI to IP conversion. (Being developed).
- **BNS-200**. Input: Video/Audio baseband. Double. (Being developed).

Features

- Input: 1 DVB transport stream (MPTS). Output: up to 8 simultaneous IP-encapsulated programmes with individual multicast addresses.
- Filtering of information contained in the MPEG-2 tables.
- UDP and RTP transmission protocols.
- Web interface for module configuration.
- SAP and SDP protocols to facilitate automatic programme selection in the set-top box and to provide programme information to external servers.

ADVANCED FEATURES

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

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

Abbreviations

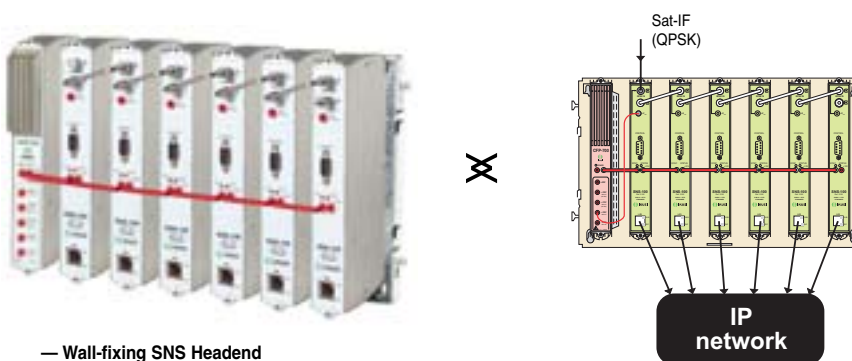
ASI : Asynchronous Serial Interface. Serial transmission method for MPEG-2 streams.
CAT : Conditional Access Table
ECM : Entitlement Control Messages
EIT : Event Information Table
EMM : Entitlement Management Messages
IPTV : Internet Protocol Television
MPTS : Multiple Program Transport Stream
NIT :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

Simple assembly and cabling of ClassA Streaming Headends

A ClassA Streaming Headend includes as many streaming modules as there are DVB channels whose services (TV or Radio programmes) you want to broadcast on the IP network, and one or more power supplies. The modules are simple to place on the wall-fixing baseplates or rack-frames available for ClassA headends.

The loop-through input configuration of the streamers allows to build a tap line by using the F plug bridges supplied. It suffices therefore to feed the DVB signal into the first module of the headend. Two DC sockets at each module facilitate, on the other hand, the constitution of the +12 VDC power cascade by using the DC plug bridges supplied as well.

The RJ-45 output ports of the headend —one port per streamer— feed the IP network with up to $8 \times n$ IP-encapsulated programmes, being n the number of streaming modules installed in the headend.



► LANTV[®] (Television on IP Networks)

«TNS» — DVB-T to IP Streaming Equipment

DVB-T → IP Streamer



TNS-100

Model		TNS-100	
Reference		5102	
Reception		FTA DVB-T	
Input Section (COFDM)	Frequency range	MHz	174 - 230 and 470 - 862
	Frequency step	kHz	125
	Input level	dB μ V	35 ... 100
	Input loop-through gain	dB	0.5 (\pm 1)
Output Section (IP)	Standard		IEEE 802.3 10/100 BaseT
	Bit rate	Mbps	up to 100
	Transmission protocols		UDP / RTP
	No. of simultaneous streams		up to 8
	Multicast		Yes
Connectors	RF input (loop-through)		(2x) female F
	DC connection		"banana" socket
	Configuration		RS 232 / DB-9
	Ethernet output		RJ-45
General	Supply voltage	Vdc	+12
	Consumption	mA	420
	Indicator leds		ON - STATUS - LINK - ACT
	Operating temperature	$^{\circ}$ C	0 ... +45
	Dimensions	mm	230 x 195 x 32

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

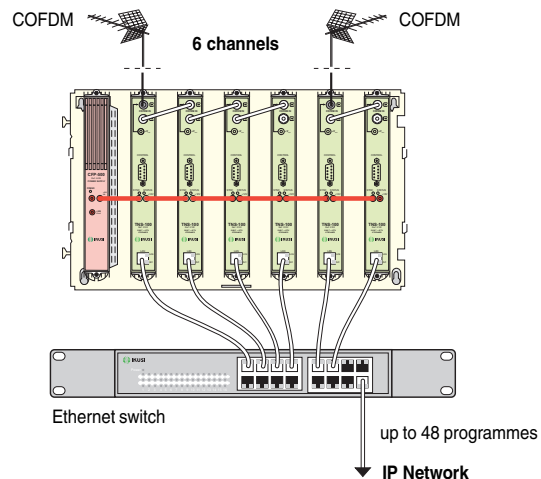
TNS Headends

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

- As many TNS-100 Streamers as there are DVB-T channels (transport streams) whose programmes you want to broadcast on the IP network.
- One or more CFP Power Supplies.
- One or more Rack-frames or Baseplates. The baseplates can be horizontally joined.
- Usually, one housing unit.

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

- Example of TNS headend for six digital terrestrial TV channels. Contains 6 TNS-100 streamers and 1 CFP-500 power supply, all fixed on 1 BAS-700 baseplate.



► LANTV® (Television on IP Networks)

«SNS» — DVB-S to IP Streaming Equipment

DVB CE
Digital Video Broadcasting

DVB-S → IP Streamers



SNS-100



SNS-101

Model		SNS-100	SNS-101	
Reference		5100	5101	
Reception		FTA DVB-S	MultiCrypt DVB-S (Common Interface)	
CAMs supported		—	Conax, Cryptoworks, Irdeto, KeyFly, Mediaguard, Nagravision, Viaccess, ...	
Input Section (QPSK)	Frequency range	MHz	950 - 2150	
	Frequency step	MHz	1	
	Input level	dBm	-65 ... -25	
	Input loop-through gain	dB	0 (±3)	
	Input symbol rate	MS/s	2 ... 45	
Output Section (IP)	Standard		IEEE 802.3 10/100 BaseT	
	Bit rate	Mbps	up to 100	
	Transmission protocols		UDP / RTP	
	No. of simultaneous streams		up to 8	
	Multicast		Yes	
Connectors	RF input (loop-through)		(2x) female F	
	DC connection		"banana" socket	
	CAM entrance	—	slot	
	Configuration		RS 232 / DB-9	
	Ethernet output		RJ-45	
General	Supply voltage	VDC	+12	
	Consumption	mA	260	480 (CAM included)
	Indicator leds		ON - STATUS - LINK - ACT	
	Operating temperature	°C	0 ... +45	
	Dimensions	mm	230 x 195 x 32	

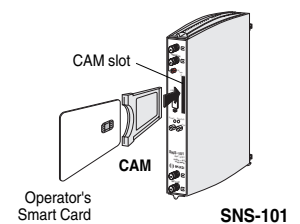
- Each module is packed with:
 - 1 F plug bridge, 64 mm length, for input tap line.
 - 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage.

SNS Headends

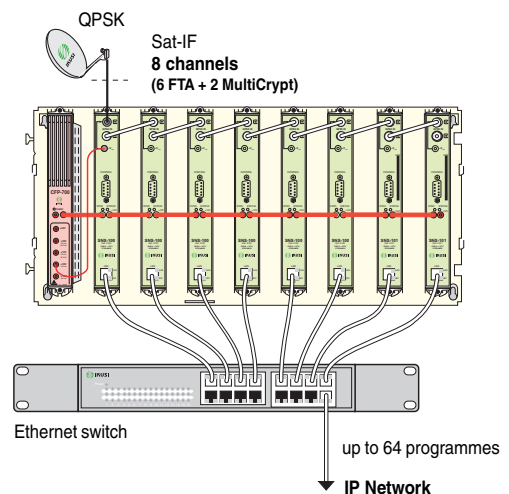
An SNS headend for DVB-S to IP streaming includes:

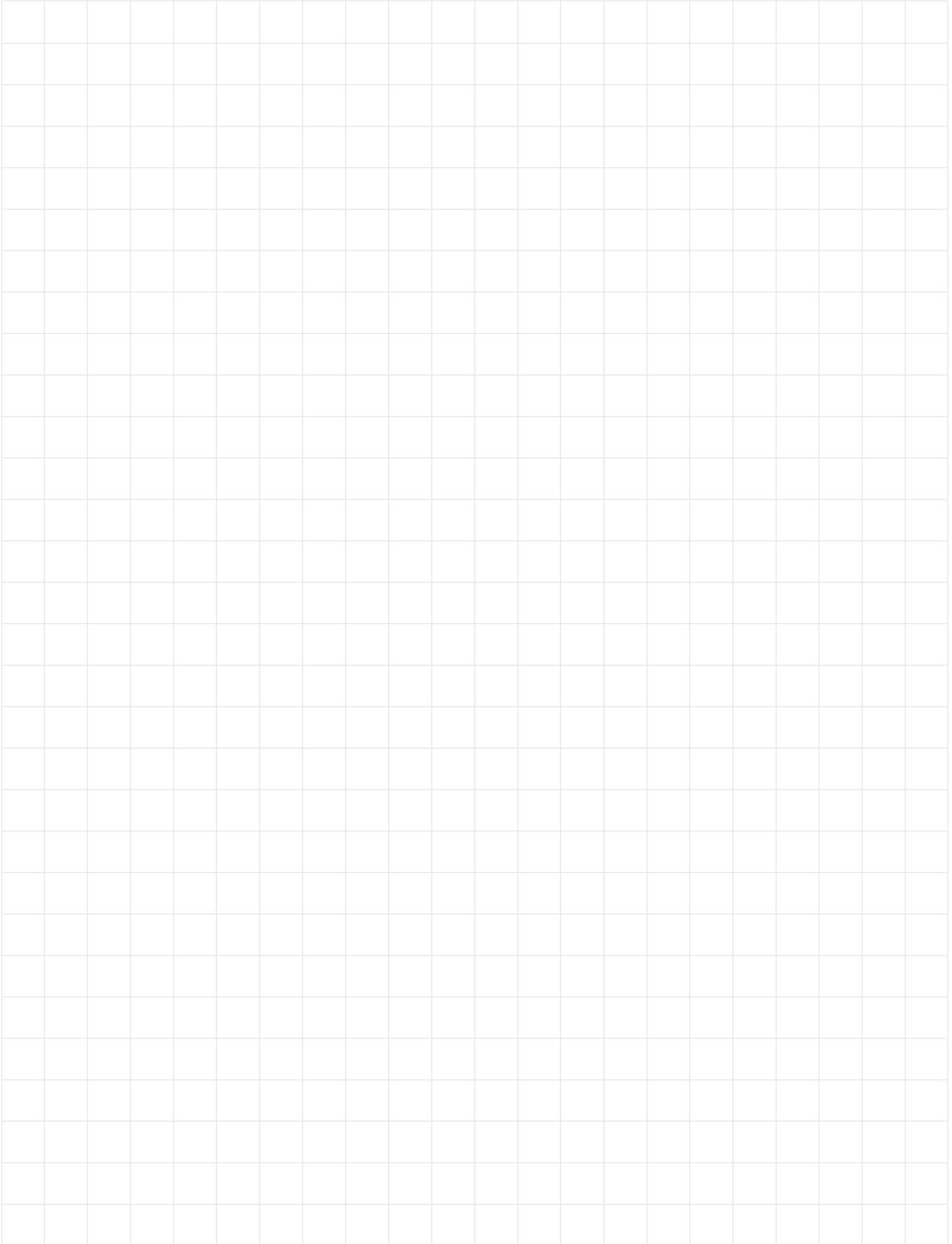
- As many SNS-100 or SNS-101 streamers as there are DVB-S channels (transport streams) whose programmes you want to broadcast on the IP network. The SNS-101 features Common Interface and must be utilized when the input DVB-S channel includes one or more encrypted programmes that you want to de-encrypt. A CAM (Conditional Access Module) containing the *Operator's Smart Card* must fit the front panel slot. CAM modules are not supplied by IKUSI.
- One or more CFP Power Supplies.
- One or more Rack-frames or Baseplates. The baseplates can be horizontally joined.
- Usually, one housing unit.

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



— Example of SNS headend for eight digital satellite TV channels (six FTA's and two Multicrypt's). Contains 6 SNS-100, 2 SNS-101 and 1 CFP-700 power supply, all fixed on 1 BAS-900 baseplate.





► FIBRE OPTICS

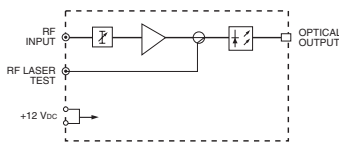
«FTD» — TV+SAT-IF Optical Transmitting Modules

- 1 RF input (45-2150 MHz) — 1 Optical output (1310 nm). Connection of singlemode type optical fibre.
- Solution for distribution of terrestrial TV and satellite IF signals (analog and digital) over large collective installations: residential districts, hotels, hospitals.
- Ultralinear, APC-controlled, 4 mW DFB (Distributed Feedback) Laser. Fully compatible with PAL, SECAM, NTSC, FM, DVB-S, DVB-T, DVB-C and other standards.
- An optical budget of 6 dB is available between the transmitter and the related FRD receivers. This equates to approximately 1 km where we are feeding three optical receive sites or up to 12 km for point to point links.
- DC powered by the CFP-500 or CFP-700 power supply modules. Mountable on baseplates or rack-frame of ClassA headend.



FTD-314

Block diagram



Model		FTD-314	
Reference		4902	
Optical output power		mW	4 (= 6 dBm)
RF input frequency		MHz	45 - 2150
Optical section	Optical wavelength	nm	1310 (± 20)
	Relative intensity noise (RIN) of laser	dB/Hz	< -150
	Optical output return loss	dB	> 55
	Optical output connector		SC / APC 8°
RF section	RF input level	dBμV	94 ... 104
	RF flatness	dB	± 0.75
	Optical Modulation Index (OMI) control	dB	-10 ... 0
	Test of RF input to laser	dB	- 20
	RF input impedance	Ω	75
	RF input return loss	dB	> 12 (45-862 MHz) ,, > 10 (950-2150 MHz)
	RF input connector type		F
General	Test connector type		F
	Supply voltage	Vdc	+12
	Consumption	mA	160
	Operating temperature	°C	-10 ... +55
	DC connector type		"banana" socket
	Dimensions	mm	230 x 195 x 32

• The module is packed with 1 DC plug bridge for +12 Vdc power cascade.

«FSP» — Optical Splitting Modules

- 2- and 3-way optical splitters for singlemode fibre applications. 1310 nm / 1550 nm wideband operation.
- Mountable on baseplates or rack-frame of ClassA headend. The splitters share out the optical power of FTD transmitters to feed multiple field nodes, hence maximizing the use of optical transmission equipment.
- The units are reciprocal and can also be used to combine multiple return path fibres to feed one FRR return path receiving module.



ClassA Headend with 4 FTD-314 and 2 FSP-302, plus 1 CFP-700 Power Supply

Model		FSP-302	FSP-303
Reference		4904	4905
No. of optical outputs		2	3
Wavelength	nm	1290 - 1600	1290 - 1600
Insertion loss	dB	3.7	5.5
Return loss	dB	> 55	> 55
Output isolation	dB	> 55	> 55
Input/output connectors		SC / APC 8°	SC / APC 8°
Dimensions	mm	230 x 195 x 32	230 x 195 x 32

• Each module is packed with 1 DC plug bridge for +12 Vdc power cascade along the headend.

7

FIBRE OPTICS

«FRD» — Compact TV+SAT-IF Optical Receiver

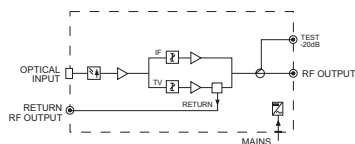
CE

- 1 optical input (1290-1600 nm) — 1 RF output (45-2150 MHz). Connection of singlemode type optical fibre.
- Passive return path: 5-30 MHz. Return signal output port to be connected to a return optical transmitter.
- Especially designed for the delivery of terrestrial TV and satellite IF signals (analog and digital) in one- or two-way networks.
- Low-noise PIN photodiode operating in the linear section of the "optical power - electrical current" transfer function. Excellent response to the PAL, SECAM, NTSC, FM, DVB-S, DVB-T, DVB-C and other standards.
- Mains powered, 50/60 Hz. Electrical safety protection level: Class II. Insertable power cord with bipolar plug.
- Injection-moulded zinc alloy housing. Wall-fixing.
- Indoor mounting. Grounding terminal.



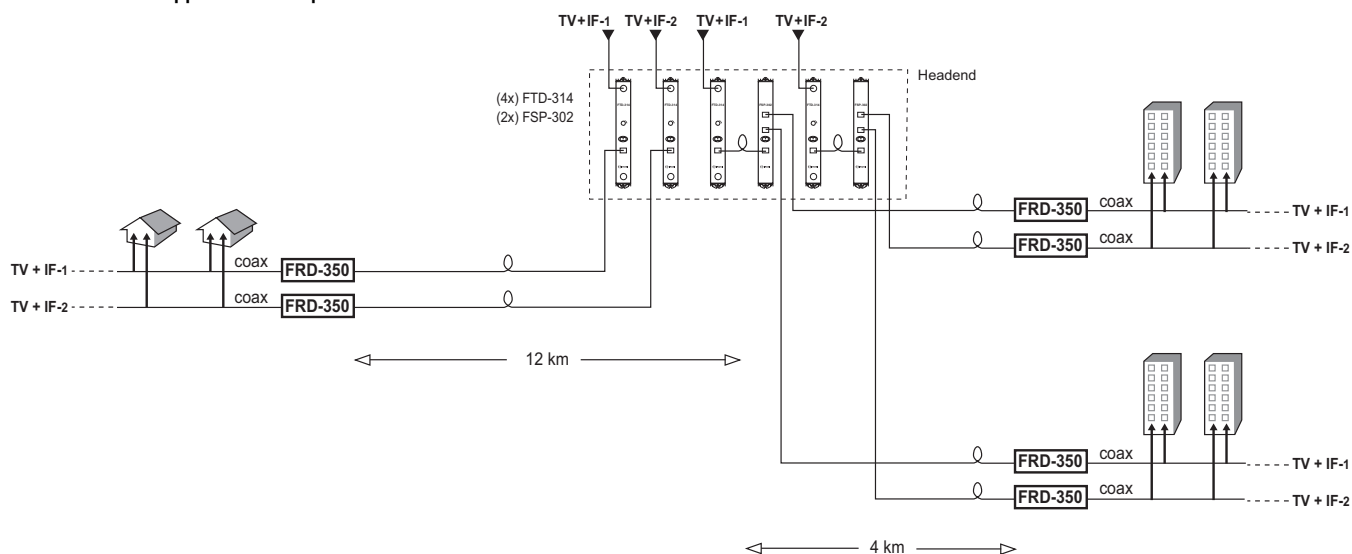
FRD-350

Block diagram



Model		FRD-350	
Reference		4903	
Optical window		dBm	-1 ... +1
Forward RF output frequency		MHz	45-862 (TV) and 950-2150 (IF)
Optical section	Optical wavelength	nm	1290 - 1600
	Optical input return loss	dB	> 50
	Optical input connector type		SC / APC 8°
RF section	RF output level (opt. input: 0 dBm ; OMI: 4%)	dBμV	94
	RF flatness	dB	± 0.75
	Independent variable attenuators for TV and IF	dB	0 - 10
	RF output impedance	Ω	75
	RF output return loss	dB	> 12 (45-862 MHz) „ > 10 (950-2150 MHz)
	RF output test port	dB	-20
	Return bandwidth	MHz	5 - 30
	Return path through loss	dB	2
	Forward RF output connector type		F
	Return RF output connector type		F
General	Mains voltage	VAC	230 / 240 (±10%)
	Consumption	W	5
	Operating temperature	°C	-10 ... +55
	Dimensions	mm	150 x 150 x 55

Application example

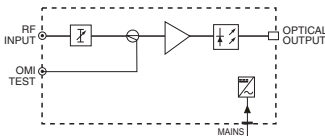


► FIBRE OPTICS

«FTR» — Compact Return Path Optical Transmitter

CE

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


FTR-301
Block diagram


Model		FTR-301	
Reference		4906	
Optical output power	mW	1 (= 0 dBm)	
RF input frequency	MHz	5 - 300	
Optical section	Optical wavelength	nm	1310 (± 20)
	Relative intensity noise (RIN) of laser	dB/Hz	< -140
	Optical output return loss	dB	> 55
	Optical output connector		SC / APC 8°
RF Section	RF input level	dBμV	75 ... 90
	RF flatness	dB	± 0.5
	Optical Modulation Index (OMI) control	dB	-15 ... 0
	RF input impedance	Ω	75
	RF input return loss	dB	> 15
	RF input connector type		F
	Connector type of OMI adjustment test port		F
General	Mains voltage	VAC	230 / 240 (±10%)
	Consumption	W	5
	Operating temperature	°C	-10 ... +55
	Dimensions	mm	150 x 50 x 55

FIBRE OPTICS

«FRR» — Return Path Optical Receiving Modules

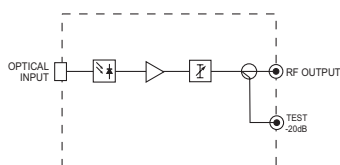
CE

- 1 optical input 1290-1600 nm — 1 RF output 5-300 MHz. Connection of singlemode type optical fibre.
- Application in two-way HFC networks. The RF signal at the output of the receiver module is used in the headend to deliver data services to the subscribers (broadband internet access, VOD, IPTV, VoIP, etc.). On an alternating application, such a signal could bring to the headend, as TV channels, events and images originated in particular sites of the network and transmitted via optical node.
- Low-noise PIN photodiode operating in the linear section of the "optical power - electrical current" transfer function.
- DC powered by the CFP-500 or CFP-700 power supply modules. Mountable on baseplates or rack-frame of the ClassA headend.



FRR-310

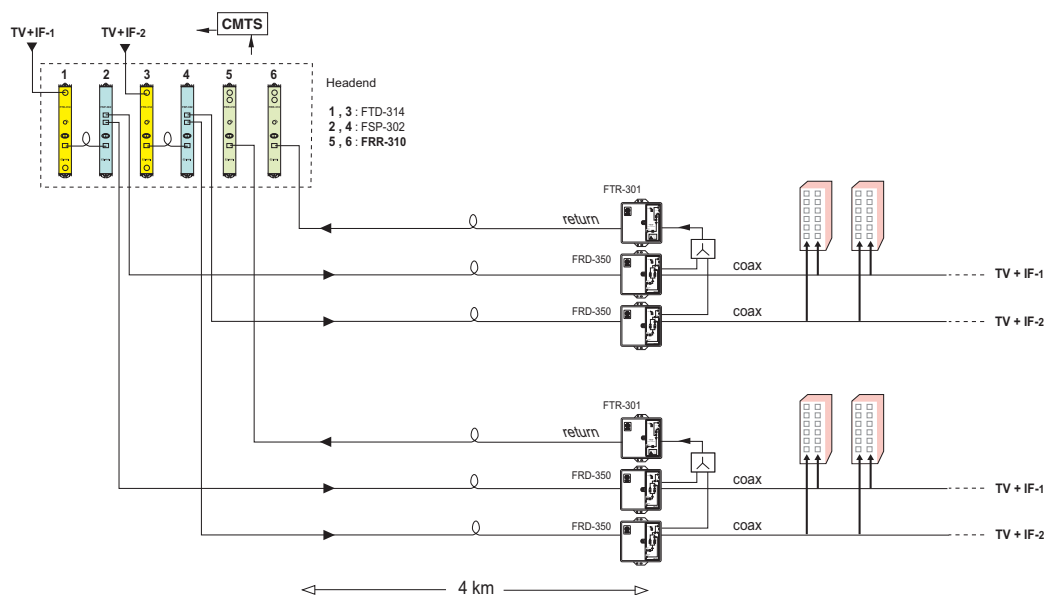
Block diagram



Model		FRR-310	
Reference		4907	
Optical window		dBm	
		-6 ... +1	
RF output frequency		MHz	
		5 - 300	
Optical section	Optical wavelength	nm	
	Optical input return loss	dB	
	Optical input connector type		
		SC / APC 8°	
RF Section	RF output level (opt. input: -5 dBm ; OMI: 6%)	dBμV	
			75
	RF flatness	dB	
			± 0.5
	Output variable attenuator	dB	
			0 - 15
	RF output impedance	Ω	
			75
RF output return loss	dB		
		> 15	
RF output test	dB		
		-20	
RF output connector type	MHz		
		F	
Test port connector type	dB		
		F	
General	Supply voltage	VDC	
			+12
	Consumption	mA	
			85
	Operating temperature	°C	
		-10 ... +55	
DC connector type			
		"banana" socket	
Dimensions	mm		
		230 x 195 x 32	

• The module is packed with 1 DC plug bridge for +12 VDC power cascade

Application example

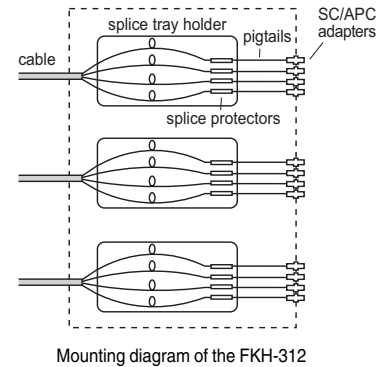


FIBRE OPTICS

«FKH» — Distribution and Splice KITS - "Headend" Site

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

Model	FKH-104	FKH-208	FKH-312
Reference	4909	4910	4911
CAPACITY (SPLICES)	4	8	12
Cabinet 19" - 1U - 250mm, with slide-out tray. Material: epoxy painted, 1.5mm thickness steel.	1	1	1
Splice protectors	4	8	12
SC/APC pigtails - 1 metre, 900 microns	4	8	12
SC/APC adapters	4	8	12
Stoppers	20	16	12

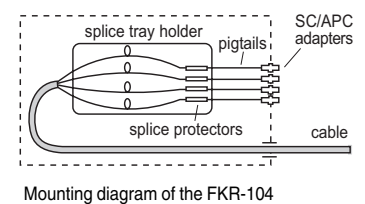


«FKR» — Distribution and Splice KIT - "Node" Site

- Constitution of optical splice and fibre distribution centres at the optical node site.
- The kit includes a wall-mount cabinet with a slide-out tray where the splice tray holder is fixed, and a complete set of loose accessories required for the application: splice protectors, pigtails, SC/APC adapters and stoppers. It is especially indicated to work with 1 four-fibre cable.



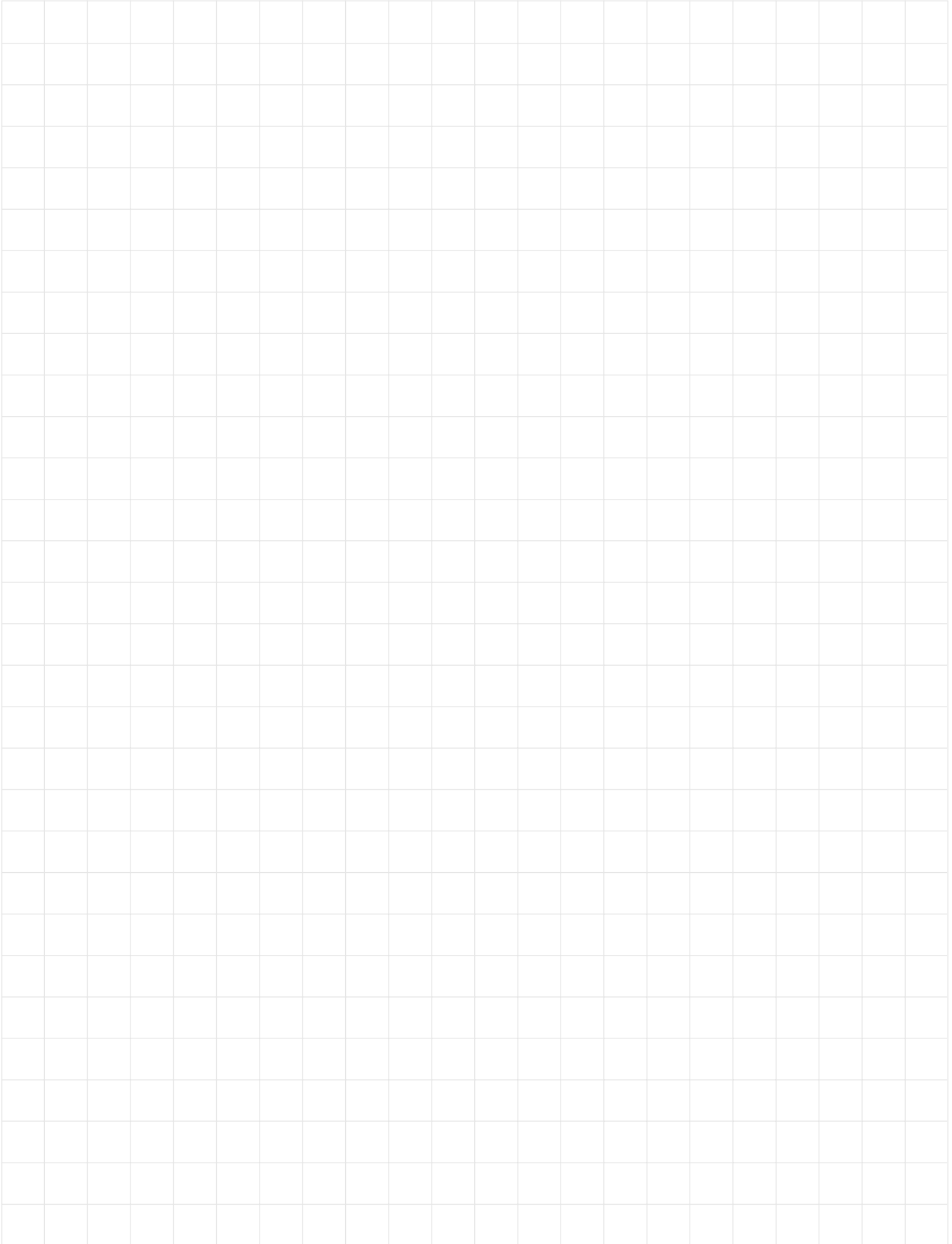
Model	FKR-104
Reference	4908
CAPACITY (SPLICES)	4
Cabinet 175x145x44mm - autoextinguishable plastic. Feed-through cable entry.	1
Splice protectors	4
SC/APC pigtails - 1 metre, 900 microns	4
SC/APC adapters	4



Optical Fibre Cables and Jumpers



Model	Ref.	Description
FCA-400	4912	OPTICAL FIBRE CABLE All dielectric cable (1m) with 4 optical singlemode fibres. Loose tube with anti-moisture filling gel. PE wrapping. Aramide spinning reinforcement. Black PE sheath. Diameter: 11 mm. Weight: 83 kg/km. Minimum bending radius: 222 mm. Attenuation @ 1310 nm : ≤0.38 dB/km. Attenuation @ 1550 nm : ≤0.23 dB/km.
FJU-100	4913	OPTICAL FIBRE JUMPER Singlemode fibre jumper, SC/APC to SC/APC. Diameter: 3 mm, length: 1.5 m.



► SAT-IF MULTISWITCHES

Application and Range

Just one cable for many satellite signals

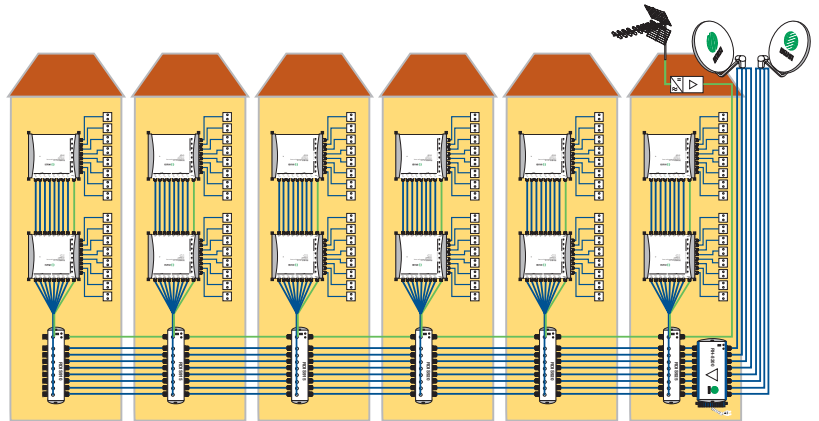
The most rational way of distributing satellite signals to the subscribers of collective TV installations is to use systems based on multiswitches. These systems can be installed anywhere, afterwards the necessary LNBs (the number of which depends on how many satellites one wants to receive) will be connected to the equipment installed. A single coaxial cable directly connected to a multiswitch will go to every home (or room) to be equipped with satellite receiver. This enables the users to choose a satellite/polarization independently one from another.

The family of IKUSI's multiswitches includes cascadeable and stand-alone versions to distribute 1 to 4 satellites to few or many users. Models for 8 and 16 polarizations support DiSEqC 2.0 commands.

«RC» - Cascadeable Multiswitches

«RC» is a cascadeable equipment intended for medium- and big-size collective installations (up to 1000 users) distributing 2 or 4 satellites plus terrestrial. Besides a complete range of multiswitches, which offer 4 tap levels that allow to maintain balance of the signal throughout the distribution backbone, the equipment includes launch and line amplifiers as well as multi-taps and multi-splitters.

(Pages 100-108)



«MS» - Stand-Alone Multiswitches

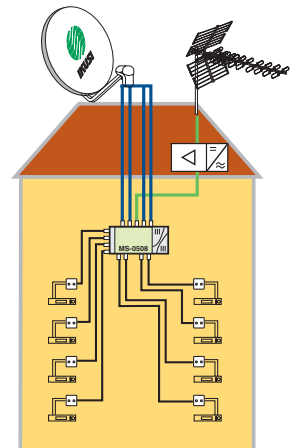
The «MS» stand-alone multiswitches are intended for star distribution of 1, 2 or 4 satellites plus terrestrial to 4, 8, 12 or 16 users. The wide range—eleven models—assures an optimal solution for each particular installation attending to the number of satellites to be distributed and users to be served.

(Page 109)

«RS» - Stand-Alone Multiswitches

This version includes four multiswitches for star distribution of 1 satellite plus terrestrial to 4, 8, 12 or 16 users. All feature high SAT input isolation.

(Page 110)



What is DiSEqC?

DiSEqC (Digital Satellite Equipment Control) was invented to make it possible to use more than one LNB (4 polarizations) with using just one cable. Basically, the DiSEqC uses the existing 22 kHz signal to send, via the coaxial cable, digital controlled signals from the receiver to the multiswitch. In order to implement the selection of a determined satellite polarization, the 22 kHz signal is modulated with the appropriate digital information. This information is sent very fast between the standard 22 kHz signal, what enables the compatibility with non-DiSEqC receivers which can in this way control the multiswitch, at least partially.

These are the main DiSEqC levels:

- *Mini-DiSEqC* or *ToneBurst*. It allows switching between 2 LNBs. The ToneBurst is out of the DiSEqC standard, but it is compatible with DiSEqC 1.0 and 2.0.
- *DiSEqC 1.0*. It allows switching between up to 4 LNBs. Therefore the user can watch programmes emitted by up to four satellites, whose signals can be received by up to four antennas.
- *DiSEqC 1.2*. As level 1.0 above plus the capability of controlling rotor-based dishes.
- *DiSEqC 2.0*. Adds bi-directional communication. This version enables easy installing of a satellite system.

DiSEqC is backwards-compatible, so a DiSEqC 2.0 receiver can work just fine with a DiSEqC 1.0 multiswitch.

SAT-IF MULTISWITCHES

«RC» — Cascadeable Multiswitches Equipment

CE

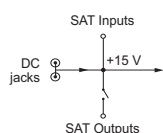
Launch Amplifier for 8 SAT-IF Polarizations

- Amplification of 8 SAT-IF polarizations for compensating distribution losses in 9-cable distribution systems. Two launch amplifiers can be used to amplify 16 SAT-IF polarizations in 17-cable systems.
- Cascadeable with multiswitches RC-9000 and other 9-cable system components.
- Continuous attenuation and equalization adjustments.
- Local DC powering using the PSU-015 power supply (see below). Power voltage stands on the 8 SAT input ports for line-powering LNBs and may be inserted on the 8 SAT output ports for line-powering possible RL-9100/9200 line amplifiers. Three LEDs inform about power connection and +15 VDC presence at the input and output ports.
- Indoor mounting. Wall fixing.



RH-8200

DC transit



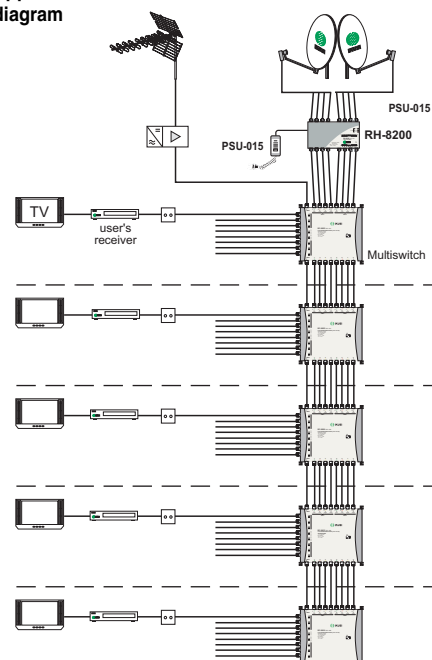
Model	RH-8200	
Reference	1120	
Powering mode	Local (DC)	
Line inputs	8 SAT	
Line outputs	8 SAT	
Frequency range	MHz	950 - 2200
Gain	dB	30 (±1)
Variable attenuation	dB	0 - 15
Variable equalization	dB	0 - 8
Noise figure	dB	≤ 8
Line isolation	dB	≥ 65
Input/output return loss	dB	≥ 10
Output level (-35dB IMD3, EN 50083-3)	dBμV	114
Output level (-35dB IMD2, EN 50083-3)	dBμV	111
Power requirements	+15VDC / 730mA ¹	
Max current for LNBs	A	1
Max current toward output lines	A	1 ²
Max total current for LNBs and outputs	A	1.270
Input and output RF connector type	female F	
DC connector type	(2x) DC socket	
Operating temperature	°C	-20 ... +50
Dimensions	mm	200 x 140 x 85

Notes

- ¹ LNB power current must be added up.
- ² Passing switch.

ALSO AVAILABLE :
Modular Launch Amplifier (page 107)

Application diagram



PSU-015

Power Supply Unit

Model PSU-015
Ref. 1123

- Mains voltage : 100-240 VAC
- Output voltage/current : +15 VDC / 3.3 A
- Dimensions : 40 x 65 x 130 mm

► SAT-IF MULTISWITCHES

«RC» — Cascadeable Multiswitches Equipment

CE

Cascadeable 9x4 Multiswitches

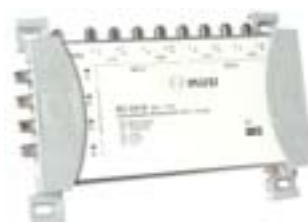
- Cascadeable multiswitches for 9-cable systems. Distribution of 8 Sat-IF polarizations and 1 Terrestrial-TV signal. Four tap lines per multiswitch.
- Remote powering from users' receivers. Active SAT and passive TERR.
- 4 models for 4 levels of tap loss. Sloped response for satellite frequencies.
- All models support DiSEqC 2.0 commands and are compatible with voltage/tone/ToneBurst switching signals.
- High isolation between polarizations by using multilayer technique.
- DC passing between input and output SAT lines.
- Indoor mounting. Wall fixing.
- SEE APPLICATION DIAGRAM ON PAGE 108.

Model			RC-9410	RC-9415	RC-9420	RC-9425
Reference			1124	1125	1126	1127
Line inputs			8 SAT + 1 TERR	8 SAT + 1 TERR	8 SAT + 1 TERR	8 SAT + 1 TERR
Tap outputs			4	4	4	4
Line outputs			—	8 SAT + 1 TERR	8 SAT + 1 TERR	8 SAT + 1 TERR
Frequency range	Sat	MHz	950 - 2200	950 - 2200	950 - 2200	950 - 2200
	Terr	MHz	10 - 862	10 - 862	10 - 862	10 - 862
Tap loss	Sat	dB	6...2 (±2) (4 dB fixed slope)	10...6 (±2) (4 dB fixed slope)	14...10 (±2) (4 dB fixed slope)	21...17 (±2) (4 dB fixed slope)
	Terr	dB	8 (±2)	14 (±2)	16 (±2)	21 (±2)
Through loss	Sat	dB	—	3 (±1)	2.5 (±1)	2 (±1)
	Terr	dB	—	3 (±1)	2 (±1)	1.5 (±1)
Input and output isolation	Sat-Sat	dB	≥ 30	≥ 30	≥ 30	≥ 30
	Sat-Terr	dB	≥ 25	≥ 25	≥ 25	≥ 25
Line input/output return loss	Sat	dB	≥ 12	≥ 12	≥ 12	≥ 12
	Terr	dB	≥ 12	≥ 12	≥ 12	≥ 12
Tap output return loss	Sat	dB	≥ 10	≥ 10	≥ 10	≥ 10
	Terr	dB	≥ 10	≥ 10	≥ 10	≥ 10
Tap output level (-35dB IMD3, EN 50083-3)		dBμV	103 (Sat)	103 (Sat)	103 (Sat)	(passive product)
Tap output level (-35dB IMD2, EN 50083-3)		dBμV	104 (Sat)	104 (Sat)	104 (Sat)	(passive product)
Current consumption per tap *		mA	< 60	< 60	< 60	< 30
Max line input↔output pass current		A	2	2	2	2
Line and Tap connector type			female F	female F	female F	female F
Operating temperature		°C	-20 ... +50	-20 ... +50	-20 ... +50	-20 ... +50
Dimensions		mm	208 x 112 x 40	208 x 112 x 40	208 x 112 x 40	208 x 112 x 40

* Current supplied by the users' receivers.



RC-9420



RC-9410

SAT-IF MULTISWITCHES

«RC» — Cascadeable Multiswitches Equipment

CE

Cascadeable 9x8 Multiswitches

- Cascadeable multiswitches for 9-cable systems. Distribution of 8 Sat-IF polarizations and 1 Terrestrial-TV signal. Eight tap lines per multiswitch.
- Remote powering from users' receivers. Active SAT and passive TERR.
- 4 models for 4 levels of tap loss. Sloped response for satellite frequencies.
- All models support DiSEqC 2.0 commands and are compatible with voltage/tone/ToneBurst switching signals.
- High isolation between polarizations by using multilayer technique.
- DC passing between input and output SAT lines.
- Indoor mounting. Wall fixing.
- SEE APPLICATION DIAGRAM ON PAGE 108.

Model			RC-9810	RC-9815	RC-9820	RC-9825
Reference			1128	1129	1130	1131
Line inputs			8 SAT + 1 TERR	8 SAT + 1 TERR	8 SAT + 1 TERR	8 SAT + 1 TERR
Tap outputs			8	8	8	8
Line outputs			—	8 SAT + 1 TERR	8 SAT + 1 TERR	8 SAT + 1 TERR
Frequency range	Sat	MHz	950 - 2200	950 - 2200	950 - 2200	950 - 2200
	Terr	MHz	10 - 862	10 - 862	10 - 862	10 - 862
Tap loss	Sat	dB	6...2 (±2) (4 dB fixed slope)	10...6 (±2) (4 dB fixed slope)	14...10 (±2) (4 dB fixed slope)	21...17 (±2) (4 dB fixed slope)
	Terr	dB	12 (±2)	15 (±2)	18 (±2)	23 (±2)
Through loss	Sat	dB	—	4.5 (±1)	4.5 (±1)	3.5 (±1)
	Terr	dB	—	4.5 (±1.5)	2.5 (±1.5)	2 (±1)
Input and output isolation	Sat-Sat	dB	≥ 30	≥ 30	≥ 30	≥ 30
	Sat-Terr	dB	≥ 25	≥ 25	≥ 25	≥ 25
Line input/output return loss	Sat	dB	≥ 12	≥ 12	≥ 12	≥ 12
	Terr	dB	≥ 12	≥ 12	≥ 12	≥ 12
Tap output return loss	Sat	dB	≥ 10	≥ 10	≥ 10	≥ 10
	Terr	dB	≥ 10	≥ 10	≥ 10	≥ 10
Tap output level (-35dB IMD3, EN 50083-3)		dBμV	103 (Sat)	103 (Sat)	103 (Sat)	(passive product)
Tap output level (-35dB IMD2, EN 50083-3)		dBμV	104 (Sat)	104 (Sat)	104 (Sat)	(passive product)
Current consumption per tap *		mA	< 60	< 60	< 60	< 30
Max line input↔output pass current		A	2	2	2	2
Line and Tap connector type			female F	female F	female F	female F
Operating temperature		°C	-20 ... +50	-20 ... +50	-20 ... +50	-20 ... +50
Dimensions		mm	208 x 185 x 40	208 x 185 x 40	208 x 185 x 40	208 x 185 x 40

* Current supplied by the users' receivers.



RC-9815



RC-9810

► SAT-IF MULTISWITCHES

«RC» — Cascadeable Multiswitches Equipment

CE

Cascadeable 17x4 Multiswitches

- Cascadeable multiswitches for 17-cable systems. Distribution of 16 Sat-IF polarizations and 1 Terrestrial-TV signal. Four tap lines per multiswitch.
- Remote powering from users' receivers. Active SAT and passive TERR.
- 4 models for 4 levels of tap loss. Sloped response for satellite frequencies.
- All models support DiSEqC 2.0 commands and are compatible with voltage/tone/ToneBurst switching signals.
- High isolation between polarizations by using multilayer technique.
- DC passing between input and output SAT lines.
- Indoor mounting. Wall fixing.
- SEE APPLICATION DIAGRAM ON PAGE 108.

Model			RC17410	RC17415	RC17420	RC17425
Reference			1132	1133	1134	1135
Line inputs			16 SAT + 1 TERR	16 SAT + 1 TERR	16 SAT + 1 TERR	16 SAT + 1 TERR
Tap outputs			4	4	4	4
Line outputs			—	16 SAT + 1 TERR	16 SAT + 1 TERR	16 SAT + 1 TERR
Frequency range	Sat	MHz	950 - 2200	950 - 2200	950 - 2200	950 - 2200
	Terr	MHz	10 - 862	10 - 862	10 - 862	10 - 862
Tap loss	Sat	dB	7...3 (±2) (4 dB fixed slope)	11...7 (±2) (4 dB fixed slope)	15...11 (±2) (4 dB fixed slope)	21...17 (±2) (4 dB fixed slope)
	Terr	dB	12 (±2)	15 (±2)	18 (±2)	23 (±2)
Through loss	Sat	dB	—	3 (±1)	3 (±1)	3 (±1)
	Terr	dB	—	3 (±1.5)	2 (±1.5)	1.5 (±1)
Input and output isolation	Sat-Sat	dB	≥ 30	≥ 30	≥ 30	≥ 30
	Sat-Terr	dB	≥ 25	≥ 25	≥ 25	≥ 25
Line input/output return loss	Sat	dB	≥ 12	≥ 12	≥ 12	≥ 12
	Terr	dB	≥ 12	≥ 12	≥ 12	≥ 12
Tap output return loss	Sat	dB	≥ 10	≥ 10	≥ 10	≥ 10
	Terr	dB	≥ 10	≥ 10	≥ 10	≥ 10
Tap output level (-35dB IMD3, EN 50083-3)		dBμV	103 (Sat)	103 (Sat)	103 (Sat)	(passive product)
Tap output level (-35dB IMD2, EN 50083-3)		dBμV	104 (Sat)	104 (Sat)	104 (Sat)	(passive product)
Current consumption per tap *		mA	< 60	< 60	< 60	< 30
Max line input↔output pass current		A	2	2	2	2
Line and Tap connector type			female F	female F	female F	female F
Operating temperature		°C	-20 ... +50	-20 ... +50	-20 ... +50	-20 ... +50
Dimensions		mm	350 x 112 x 40	350 x 112 x 40	350 x 112 x 40	350 x 112 x 40

* Current supplied by the users' receivers.



RC17420



RC17410

► SAT-IF MULTISWITCHES

«RC» — Cascadeable Multiswitches Equipment

CE

Cascadeable 17x8 Multiswitches

- Cascadeable multiswitches for 17-cable systems. Distribution of 16 Sat-IF polarizations and 1 Terrestrial-TV signal. Eight tap lines per multiswitch.
- Remote powering from users' receivers. Active SAT and passive TERR.
- 4 models for 4 levels of tap loss. Sloped response for satellite frequencies.
- All models support DiSEqC 2.0 commands and are compatible with voltage/tone/ToneBurst switching signals.
- High isolation between polarizations by using multilayer technique.
- DC passing between input and output SAT lines.
- Indoor mounting. Wall fixing.
- SEE APPLICATION DIAGRAM ON PAGE 108.

Model			RC17810	RC17815	RC17820	RC17825
Reference			1136	1137	1138	1139
Line inputs			16 SAT + 1 TERR	16 SAT + 1 TERR	16 SAT + 1 TERR	16 SAT + 1 TERR
Tap outputs			8	8	8	8
Line outputs			—	16 SAT + 1 TERR	16 SAT + 1 TERR	16 SAT + 1 TERR
Frequency range	Sat	MHz	950 - 2200	950 - 2200	950 - 2200	950 - 2200
	Terr	MHz	10 - 862	10 - 862	10 - 862	10 - 862
Tap loss	Sat	dB	7...3 (±2) (4 dB fixed slope)	11...7 (±2) (4 dB fixed slope)	15...11 (±2) (4 dB fixed slope)	21...17 (±2) (4 dB fixed slope)
	Terr	dB	12 (±2)	15 (±2)	18 (±2)	23 (±2)
Through loss	Sat	dB	—	4.5 (±1)	4.5 (±1)	4.5 (±1)
	Terr	dB	—	4.5 (±1.5)	2.5 (±1.5)	2 (±1)
Input and output isolation	Sat-Sat	dB	≥ 30	≥ 30	≥ 30	≥ 30
	Sat-Terr	dB	≥ 25	≥ 25	≥ 25	≥ 25
Line input/output return loss	Sat	dB	≥ 12	≥ 12	≥ 12	≥ 12
	Terr	dB	≥ 12	≥ 12	≥ 12	≥ 12
Tap output return loss	Sat	dB	≥ 10	≥ 10	≥ 10	≥ 10
	Terr	dB	≥ 10	≥ 10	≥ 10	≥ 10
Tap output level (-35dB IMD3, EN 50083-3)		dBμV	103 (Sat)	103 (Sat)	103 (Sat)	(passive product)
Tap output level (-35dB IMD2, EN 50083-3)		dBμV	104 (Sat)	104 (Sat)	104 (Sat)	(passive product)
Current consumption per tap *		mA	< 60	< 60	< 60	< 30
Max line input→output pass current		A	2	2	2	2
Line and Tap connector type			female F	female F	female F	female F
Operating temperature		°C	-20 ... +50	-20 ... +50	-20 ... +50	-20 ... +50
Dimensions		mm	350 x 185 x 40	350 x 185 x 40	350 x 185 x 40	350 x 185 x 40

* Current supplied by the users' receivers.



RC17825



RC17810

► SAT-IF MULTISWITCHES

«RC» — Cascadeable Multiswitches Equipment

CE

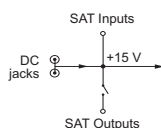
Line Amplifiers for 8 SAT-IF Polarizations and 1 Terrestrial Signal

- Amplification of 8 SAT-IF polarizations and 1 Terrestrial-TV signal for compensating through losses of multiswitches, taps, splitters and interconnection cables in 9-cable distribution systems. Two line amplifiers can be used to amplify 16 IF and 1 TV signals in 17-cable systems.
- Cascadeable with multiswitches RC-9000 and other 9-cable system components.
- Two models for two levels of gain and RF power.
- Continuous attenuation adjustment. Fixed or adjustable slope response for satellite frequencies, depending on model.
- Line powering (+15 VDC) through input or output SAT lines, with passing switch. Also local powering using the PSU-015 power supply (see below). Three LEDs inform about power connection and +15 VDC presence at the input and output SAT ports.
- Indoor mounting. Wall fixing.
- SEE APPLICATION DIAGRAM ON PAGE 108.


RL-9200

RL-9100

DC transit



Model			RL-9200	RL-9100
Reference			1121	1122
Powering mode			Remote/Local (DC)	Remote/Local (DC)
Line inputs			8 SAT + 1 TERR	8 SAT + 1 TERR
Line outputs			8 SAT + 1 TERR	8 SAT + 1 TERR
Sat output level	-35dB IMD3, EN 50083-3	dBμV	114	110
	-35dB IMD2, EN 50083-3	dBμV	111	104
Terr output level	-60dB IMD3, DIN 45004B	dBμV	116	112
	-60dB IMD2, EN 50083-3	dBμV	110	106
Frequency range	Sat	MHz	950 - 2200	950 - 2200
	Terr	MHz	47 - 862	10 - 862
Gain	Sat	dB	30 (± 1)	15...18 (± 1) (3 dB fixed slope)
	Terr	dB	25 (± 1)	18 (± 1)
Variable attenuation	Sat	dB	0 - 15	0 - 15
	Terr	dB	0 - 15	0 - 15
Variable equalization	Sat	dB	0 - 8	—
	Terr	dB	0 - 8	—
Noise figure	Sat	dB	≤ 8	≤ 5
	Terr	dB	≤ 8	≤ 5
Line isolation		dB	≥ 65	≥ 65
Input/output return loss		dB	≥ 10	≥ 12
Remote/Local Powering ¹			+15Vdc / 850mA	+15Vdc / 670mA
Max current through SAT inputs		A	1	1
Max current through SAT outputs		A	1 ²	1 ²
Max total current through SAT in/out			1.150	1.330
Input and output RF connector type			female F	female F
DC connector type		°C	(2x) DC socket	(2x) DC socket
Operating temperature		mm	-20 ... +50	-20 ... +50
Dimensions			200 x 140 x 85	220 x 70 x 35

Notes

¹ Remote powering through SAT input or output ports. DC jacks for local powering.

² Passing switch.


PSU-015

Power Supply Unit

Model	PSU-015
Ref.	1123

- Mains voltage : 100-240 VAC
- Output voltage/current : +15 VDC / 3.3 A
- Dimensions : 40 x 65 x 130 mm

SAT-IF MULTISWITCHES

«RC» — Cascadeable Multiswitches Equipment

CE

Multi-Taps and Multi-Splitters

- One-way multi-taps and two-way multi-splitters of 8 SAT-IF polarizations and 1 Terrestrial-TV signal. Application in 9-cable systems as well as in 17-cable systems by using two units per level.
- Sloped response for satellite frequencies.
- DC passing between SAT inputs and outputs. DC jack for optional connection of a power supply (see "DC transit" diagrams below).
- L style case. Indoor mounting. Wall fixing.
- SEE APPLICATION DIAGRAM ON PAGE 108.

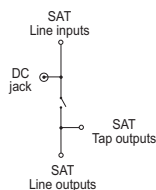
One-way Multi-Taps of 8 SAT and 1 TERR

Model			RDIS910	RDIS915	RDIS920	RDIS925
Reference			1140	1141	1142	1143
Line inputs/outputs			8 SAT + 1 TERR	8 SAT + 1 TERR	8 SAT + 1 TERR	8 SAT + 1 TERR
Tap outputs			8 SAT + 1 TERR	8 SAT + 1 TERR	8 SAT + 1 TERR	8 SAT + 1 TERR
Frequency range	Sat	MHz	950 - 2200	950 - 2200	950 - 2200	950 - 2200
	Terr	MHz	10 - 862	10 - 862	10 - 862	10 - 862
Tap loss	Sat	dB	15...10 (±1) (5 dB fixed slope)	20...15 (±1) (5 dB fixed slope)	25...20 (±1) (5 dB fixed slope)	30...25 (±1) (5 dB fixed slope)
	Terr	dB	10 (±1)	15 (±1)	20 (±1)	25 (±1)
Through loss	Sat	dB	1.5 (±1)	1.4 (±1)	1.3 (±1)	1.2 (±1)
	Terr	dB	2 (±1)	1.6 (±1)	1.2 (±1)	1 (±1)
Input and output isolation	Sat-Sat	dB	≥ 30	≥ 30	≥ 30	≥ 30
	Sat-Terr	dB	≥ 30	≥ 30	≥ 30	≥ 30
Return loss (all ports)		dB	≥ 12	≥ 12	≥ 12	≥ 12
Green control LEDs			Presence of DC voltage on SAT line inputs and on line/tap SAT outputs			
Max through DC current *			A	1	1	1
Line and Tap connector type			female F	female F	female F	female F
Operating temperature range			°C	-20 ... +50	-20 ... +50	-20 ... +50
Dimensions			mm	220 x 70 x 45	220 x 70 x 45	220 x 70 x 45

* Specified value is the max current through SAT line inputs and outputs.


RDIS920

DC transit



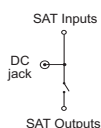
Two-way Multi-Splitter of 8 SAT and 1 TERR

Model			RSIS904
Reference			1144
Inputs			8 SAT + 1 TERR
Outputs			(2x) 8 SAT + 1 TERR
Frequency range	Sat	MHz	950 - 2200
	Terr	MHz	10 - 862
Insertion loss	Sat	dB	6 (±1)
	Terr	dB	4 (±1)
Input and output isolation	Sat-Sat	dB	≥ 30
	Sat-Terr	dB	≥ 30
Return loss (all ports)		dB	≥ 12
Green control LEDs			Presence of DC voltage on SAT inputs and on SAT outputs
Max through DC current *			A
Input and output connectors			female F
Operating temperature range			°C
Dimensions			mm

* Specified value is the max current through SAT inputs and outputs.


RSIS904

DC transit



► SAT-IF MULTISWITCHES

«RC» — Cascadeable Multiswitches Equipment

CE

Modular Launch SAT Amplification Equipment - 120 dB μ V

- Amplification of as many SAT-IF polarizations as required. One module SZB-190 per polarization. Application in 5-, 9- or 17-cable distribution systems for compensating distribution losses. SEE APPLICATION DIAGRAM OVERLEAF.
- Easy to assemble onto wall mounting baseplates with capacity for 6 or 9 modules. Two baseplates can be joined horizontally.
- Continuous attenuation adjustment. Fixed slope.
- Generation of voltage/tone signals for selection of H/V polarisation and high/low frequency sub-band.
- Power supply module. +24 VDC power voltage is automatically connected to the amplification modules through a connecting bar built in the baseplate.

Sat-IF Amplifier


SZB-190

Model		SZB-190
Reference		1346
Frequency range	MHz	950 - 2150
Gain (7 dB fixed slope)	dB	33 ... 40
Variable attenuation	dB	0 - 18
Noise figure (max. gain)	dB	< 8
Output level (-35 dB IMD3, EN 50083-3)	dB μ V	120
Insertable Voltage/Tone to Sat-IF input port		+13 / +18 Vdc * 0 / 22 kHz
Power requirements		+24 Vdc / 120 mA**
Max LNB power current	mA	350 (on +18 Vdc) ,, 250 (on +13 Vdc)
Dimensions	mm	190 x 38 x 87

* Values programmable through microswitches

** LNB consumption must be added up


SZB-212

Power Supplies

Model		SZB-212	SZB-211
Reference		2228	1423
Mains supply voltage (50/60 Hz)	VAC	185 - 264	185 - 264
Output voltage	Vdc	+24 (\pm 5%)	+24 (\pm 5%)
Max output current	A	2	1
Dimensions	mm	215 x 35 x 140	215 x 35 x 140


BAS-919

Baseplates - Housings

Model	Ref.	Description
BAS-916	2229	Baseplate with power connecting bar. Capacity: 1 power supply + 5 amplifiers; or 6 amplifiers.
BAS-919	2225	Baseplate with power connecting bar. Capacity: 1 power supply + 8 amplifiers; or 9 amplifiers.
COF-806	2231	Housing for 1 baseplate BAS-916. Dimensions: 294x346x180 mm.
COF-809	2224	Housing for 1 baseplate BAS-919. Dimensions: 420x346x180 mm.
COF-812	2233	Housing for 2 horizontally joined baseplates BAS-916. Dimensions: 546x346x180 mm.
COF-818	2226	Housing for 2 horizontally joined baseplates BAS-919. Dimensions: 798x346x180 mm. (All housings: indoor mounting, metallic, lock/key closing system).


BAS-919

COF-818

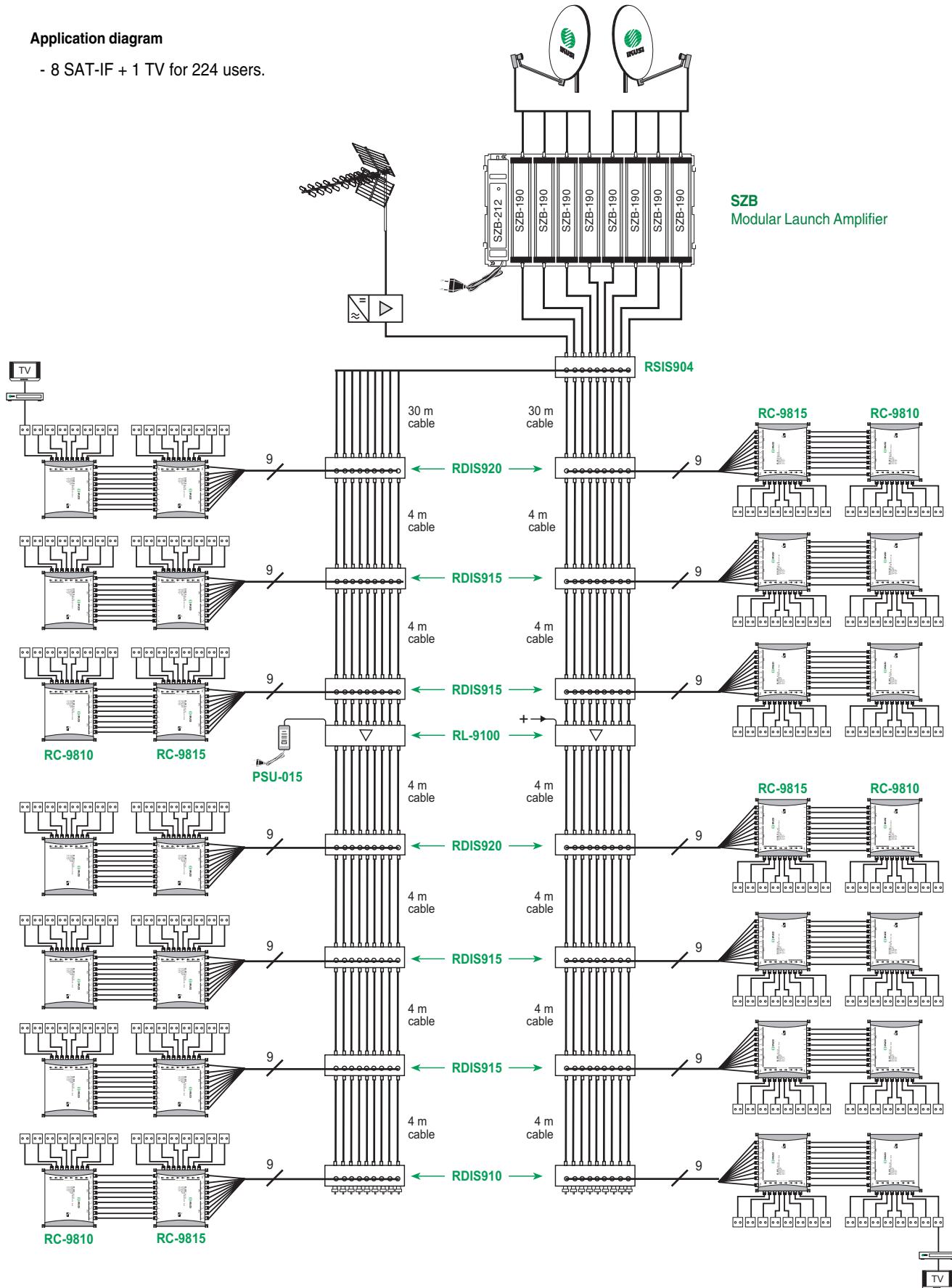
SAT-IF MULTISWITCHES

«RC» — Cascadeable Multiswitches Equipment

Modular Launch SAT Amplification Equipment - 120 dB μ V (cont'd)

Application diagram

- 8 SAT-IF + 1 TV for 224 users.



► SAT-IF MULTISWITCHES

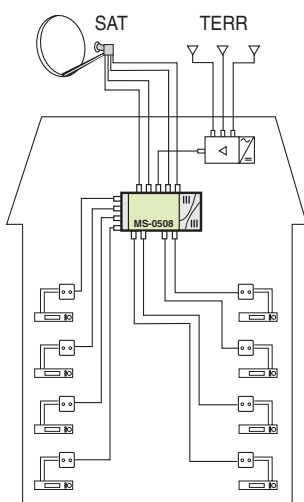
«MS» — Stand-Alone Multiswitches

CE

- Star distribution of 4, 8 or 16 SAT-IF polarizations plus terrestrial to 4, 8, 12 or 16 users.
- Eleven models; those for 8 and 16 polarizations support DiSEqC 2.0 commands.
- Mains powered. F type connection. Indoor mounting. Wall fixing.

Model		MS-0504	MS-0508	MS-0512	MS-0516	MS-0904	MS-0908	MS-0912	MS-0916	MS-1708	MS-1712	MS-1716
Reference		1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033
Number of SAT Inputs		4	4	4	4	8	8	8	8	16	16	16
Number of Outputs (Users)		4	8	12	16	4	8	12	16	8	12	16
Terrestrial TV coupling		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SAT frequency band	MHz	950-2300	950-2300	950-2300	950-2300	950-2300	950-2300	950-2300	950-2300	950-2300	950-2300	950-2300
TERR frequency band	MHz	5-862	5-862	5-862	5-862	5-862	5-862	5-862	5-862	5-862	5-862	5-862
SAT insertion loss (typ)	dB	0	3	5	5	2	5	5	5	0	3	5
TERR insertion loss (typ)	dB	14	17	20	22	10	16	20	22	16	19	22
Variable attenuator at SAT inputs	dB	0-15	0-15	0-15	0-15	0-15	0-15	0-15	0-15	0-15	0-15	0-15
SAT output level (-35dB IMD3, EN 50083-3)	dBμV	80	80	80	80	80	80	80	80	80	80	80
SAT input isolation	dB	> 20	> 20	> 30	> 30	> 30	> 30	> 30	> 30	> 30	> 30	> 30
Control by 10-14.5 / 15.5-20 V + 0 / 22 kHz + ToneBurst		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes (partial control)	Yes (partial control)	Yes (partial control)
DiSEqC 2.0 support		—	—	—	—	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mains voltage	VAC	230 ±10%	230 ±10%	110-250	110-250	110-250	110-250	110-250	110-250	110-250	110-250	110-250
Max consumption (incl.LNBs connected)	VA	22	22	22	22	45	45	45	45	45	45	45
Max LNBs current	mA	600	600	600	600	1400	1400	1600	1600	1600	1600	1600
Dimensions	mm	235x150x80	235x150x80	315x150x80	315x150x80	315x150x80	315x150x80	435x150x80	435x150x80	435x150x80	435x150x80	435x150x80

Application example


MS-0504

MS-0908

MS-1712

► SAT-IF MULTISWITCHES

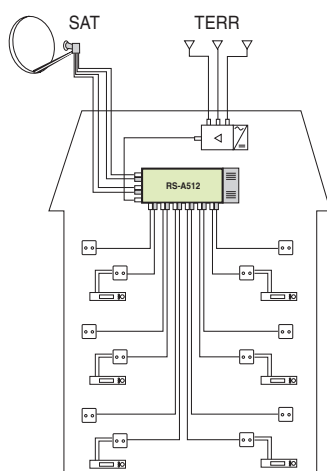
«RS» — Stand-Alone Multiswitches

CE

- Star distribution of 4 SAT-IF polarizations plus terrestrial to 4, 8, 12 or 16 users. High SAT input isolation.
- Control by voltage/tone from the users' receivers.
- Mains powered. F type connection. Indoor mounting. Wall fixing.

Model		RS-A504	RS-A508	RS-A512	RS-A516
Reference		1145	1146	1147	1148
Number of SAT Inputs		4	4	4	4
Number of Outputs (Users)		4	8	12	16
Terrestrial TV coupling		Yes	Yes	Yes	Yes
SAT frequency band	MHz	950 - 2200	950 - 2200	950 - 2200	950 - 2200
TERR frequency band	MHz	47 - 862	47 - 862	47 - 862	47 - 862
SAT insertion loss (typ)	dB	3 (±2.5)	5 (±2.5)	2 (±2)	2 (±2)
TERR insertion loss (typ)	dB	13 (±2.5)	17 (±2)	6 (±2)	6 (±2)
SAT output level (-35dB IMD3, EN 50083-3)	dBμV	90	90	90	90
SAT input isolation	dB	> 30	> 30	> 30	> 30
SAT-Terr isolation	dB	> 25	> 25	> 25	> 25
Control by 14 / 18 V 0 / 22 kHz		Yes	Yes	Yes	Yes
Mains voltage	VAC	100 - 240	100 - 240	100 - 240	100 - 240
Current supplied by the users' receivers	mA	< 25	< 25	< 65	< 65
Max LNB current	mA	500	500	600	600
Dimensions	mm	225x60x110	315x60x110	315x60x100	315x60x100

Application example



► EXTENSION AMPLIFIERS

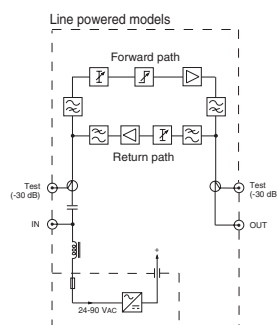
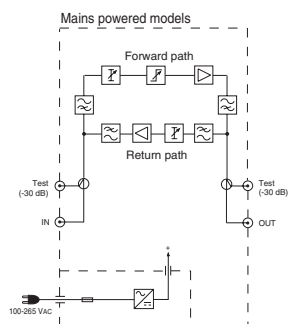
«TAE-500» — Active Return Path, 862 MHz Amplifiers

CE

- Distribution of television, sound and interactive multimedia signals.
- Ideal for hotels and dense multiple dwelling units.
- Forward path extends to 862 MHz. Active return path. Three available splits: 30/47 MHz, 42/54 MHz or 66/86 MHz.
- Output level: 124 dB μ V (DIN-B). Power Doubling technology.
- Continuous attenuation and equalization adjustments.
- Mains or line powering, 50/60 Hz. Electrical safety protection level: Class II. Switch-mode power supply.
- External 75 Ω output test F ports —forward and reverse.
- Injection-moulded zinc alloy housing. Access to the adjustment elements through an easy-to-open frontal panel. F type connection. Wall-fixing. Outdoor mounting for the remote powered models (weatherproofing IP55 grade).
- Grounding terminal.


TAE-586

Block diagrams



Model		TAE-581	TAE-582	TAE-583	TAE-586	TAE-587	TAE-588
Reference		3201	3202	3207	3203	3204	3208
Powering mode		Mains	Mains	Mains	Line	Line	Line
Bandwidth - Forward way	MHz	47 - 862	54 - 862	86 - 862	47 - 862	54 - 862	86 - 862
Bandwidth - Reverse way	MHz	5 - 30	5 - 42	5 - 66	5 - 30	5 - 42	5 - 66
Forward way	Response flatness	dB	± 0.75		± 0.75		
	Nominal gain	dB	35		35		
	Input variable attenuator	dB	0 - 18		0 - 18		
	Slope control range	dB	0 - 18		0 - 18		
	Noise figure	dB	≤ 7.5		≤ 7.5		
	Output level (-60 dB, DIN 45004B)	dB μ V	124		124		
	Output level (-60 dB IMD2, EN 50083-3)	dB μ V	115		115		
	Output level (-60 dB CTB 42 ch, EN)	dB μ V	110		110		
	Output level (-60 dB CSO 42 ch, EN)	dB μ V	114		114		
	Output test	dB	-30		-30		
Reverse way	Gain	dB	25.5		25.5		
	Input variable attenuator	dB	0 - 18		0 - 18		
	Noise figure	dB	≤ 6.5		≤ 6.5		
	Output level (-60 dB, DIN 45004B)	dB μ V	115		115		
	Output level (-60 dB IMD2, EN 50083-3)	dB μ V	108		108		
	Output test	dB	-30		-30		
General	Operating supply voltage	V _{Ac}	100 - 264 ¹		24 - 90 ²		
	Consumption	W	19		19		
	Dimensions	mm	220 x 150 x 55		220 x 150 x 55		

Notes

¹ Mains lead with bipolar plug

² Line powering via RF input port

VERSIONS :

TAE-584 (Ref. 1560) : Features are those of the TAE-583 (Ref. 3207) plus slope adjustment control (0-16 dB) for return signal.

TAE-589 (Ref. 1561) : Features are those of the TAE-588 (Ref. 3208) plus slope adjustment control (0-16 dB) for return signal.

► EXTENSION AMPLIFIERS

«TAE-700AR» — Active Return Path, 862 MHz Amplifiers

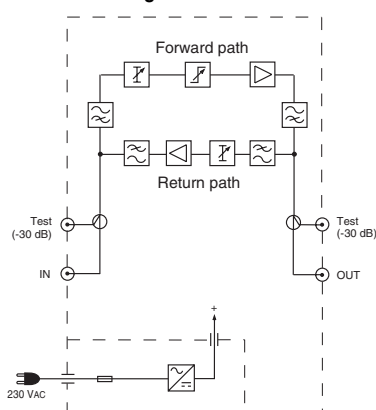
CE

- Forward path extends to 862 MHz. Active return path. Three available splits: 30/47 MHz, 42/54 MHz or 66/86 MHz.
- Output level: 118 dB μ V (DIN-B). Push-pull technology.
- Continuous attenuation and equalization adjustments.
- Mains powering, 50/60 Hz. Electrical safety protection level: Class II. Mains lead and plug included.
- External 75 Ω output test F ports —forward and reverse.
- Injection-moulded zinc alloy housing. Access to the adjustment elements through an easy-to-open frontal panel. F type connection. Indoor mounting. Wall-fixing.
- Grounding terminal.


TAE-736AR

Model		TAE-733AR	TAE-734AR	TAE-736AR
Reference		3976	3969	3210
Powering mode		Mains	Mains	Mains
Bandwidth - Forward way	MHz	47 - 862	54 - 862	86 - 862
Bandwidth - Reverse way	MHz	5 - 30	5 - 42	5 - 66
Forward way	Response flatness	dB	± 1.5	± 1.5
	Nominal gain	dB	30	30
	Input variable attenuator	dB	0 - 18	0 - 18
	Slope control range	dB	0 - 15	0 - 15
	Noise figure	dB	≤ 7	≤ 7
	Output level (-60 dB, DIN 45004B)	dB μ V	118	118
	Output level (-60 dB IMD2, EN 50083-3)	dB μ V	115	115
	Output level (-60 dB CTB 42 ch, EN)	dB μ V	103	103
	Output level (-60 dB CSO 42 ch, EN)	dB μ V	106	106
	Output test	dB	-30	-30
Reverse way	Gain	dB	12	12
	Input variable attenuator	dB	0 - 18	0 - 18
	Noise figure	dB	≤ 6	≤ 6
	Output level (-60 dB, DIN 45004B)	dB μ V	116	116
	Output level (-60 dB IMD2, EN 50083-3)	dB μ V	109	109
Output test	dB	-30	-30	
General	Operating supply voltage	V _{AC}	230 (-10%, +15%)	230 (-10%, +15%)
	Consumption	W	6	6
	Dimensions	mm	150 x 150 x 55	150 x 150 x 55

Block diagram



► EXTENSION AMPLIFIERS

«TAE-900» — Passive Return Path, 862 MHz Amplifiers

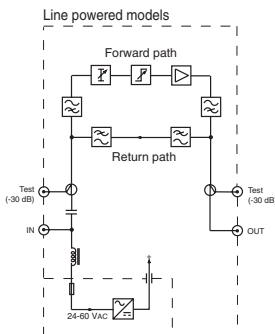
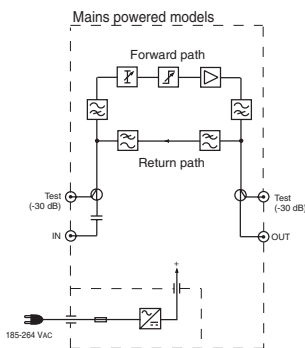
CE

- Distribution of television, sound and interactive multimedia signals.
- Forward path extends to 862 MHz. Passive return path. Two available splits: 30/47 MHz or 55/86 MHz.
- Output level: 120 dB μ V (DIN-B). Push-pull technology.
- Continuous attenuation and equalization adjustments.
- Mains or line powering, 50/60 Hz. Electrical safety protection level: Class II. Switch-mode power supply.
- External 75 Ω output test F ports —forward and reverse.
- Injection-moulded zinc alloy housing. Access to the adjustment elements through an easy-to-open frontal panel. F type connection. Wall-fixing. Outdoor mounting for the remote powered models (weatherproofing IP55 grade).
- Grounding terminal.



TAE-925

Block diagrams



Model		TAE-933	TAE-935	TAE-923	TAE-925
Reference		3183	3184	3181	3182
Powering mode		Mains	Mains	Line	Line
Bandwidth - Forward way	MHz	47 - 862	86 - 862	47 - 862	86 - 862
Bandwidth - Reverse way	MHz	5 - 30	5 - 55	5 - 30	5 - 55
Response flatness	dB	± 0.75		± 0.75	
Nominal gain	dB	36		36	
Input variable attenuator	dB	0 - 18		0 - 18	
Slope control range	dB	0 - 15		0 - 15	
Noise figure	dB	≤ 7		≤ 7	
Output level (-60 dB, DIN 45004B)	dB μ V	120		120	
Output level (-60 dB IMD2, EN 50083-3)	dB μ V	115		115	
Output level (-60 dB CTB 42 ch, EN)	dB μ V	105		105	
Output level (-60 dB CSO 42 ch, EN)	dB μ V	108		108	
Output test —forward	dB	-30		-30	
Return path through loss	dB	≤ 2		≤ 2	
Output test —reverse	dB	-30		-30	
Operating supply voltage	V _{AC}	185 - 264 ¹		24 - 60 ²	
Consumption	W	8		8	
Dimensions	mm	220 x 150 x 55		220 x 150 x 55	

Notes

¹ Mains lead with bipolar plug

² Line powering via RF input port

► EXTENSION AMPLIFIERS

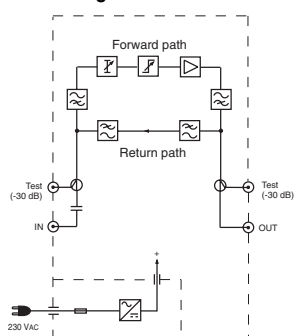
«TAE-700» — Passive Return Path, 862 MHz Amplifiers

CE

- Distribution of television, sound and interactive multimedia signals.
- Forward path extends to 862 MHz. Passive return path. Two available splits: 30/47 MHz or 66/86 MHz.
- Output level: 118 dB μ V (DIN-B). Push-pull technology.
- Continuous attenuation and equalization adjustments.
- Mains powering, 50/60 Hz. Electrical safety protection level: Class II. Mains lead and plug included.
- External 75 Ω output test F ports —forward and reverse.
- Injection-moulded zinc alloy housing. Access to the adjustment elements through an easy-to-open frontal panel. F type connection. Indoor mounting. Wall-fixing.
- Grounding terminal.


TAE-733

Block diagram



Model		TAE-733	TAE-736
Reference		3931	3192
Powering mode		Mains	Mains
Bandwidth - Forward way	MHz	47 - 862	86 - 862
Bandwidth - Reverse way	MHz	5 - 30	5 - 66
Response flatness	dB	± 1.5	± 1.5
Nominal gain	dB	29.5	29.5
Input variable attenuator	dB	0 - 18	0 - 18
Slope control range	dB	0 - 15	0 - 15
Noise figure	dB	≤ 7	≤ 7
Output level (-60 dB, DIN 45004B)	dB μ V	118	118
Output level (-60 dB IMD2, EN 50083-3)	dB μ V	115	115
Output level (-60 dB CTB 42 ch, EN)	dB μ V	103	103
Output level (-60 dB CSO 42 ch, EN)	dB μ V	106	106
Output test —forward	dB	-30	-30
Return path through loss	dB	≤ 2	≤ 2
Output test —reverse	dB	-30	-30
Mains supply voltage	V _{AC}	230 (-10%, +15%)	230 (-10%, +15%)
Consumption	W	6	6
Dimensions	mm	150 x 150 x 55	150 x 150 x 55

► EXTENSION AMPLIFIERS

«TAE-200» — One-way, 862MHz Amplifiers

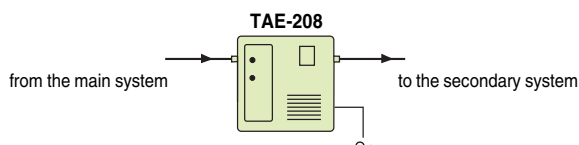
- Output level: 117 dB μ V (DIN-B). Push-pull technology.
- Continuous attenuation and equalization adjustments.
- Mains powering, 50/60 Hz. Operation shown by LED.
- External box made of ABS plastic, dimensions: 159x125x55 mm. F type connection. Indoor mounting. Packed with 2 screws for wall-fixing.



TAE-208

Model		TAE-208
Reference		2139
Bandwidth	MHz	47 - 862
Nominal gain	dB	30
Input variable attenuator	dB	0 - 20
Slope control range	dB	0 - 18
Noise figure	dB	≤ 6.5
Output level (-60 dB IMD3, DIN 45004B)	dB μ V	117
Output level (-60 dB IMD2, EN 50083-3)	dB μ V	109
Mains supply voltage	Vac	230 (-10%, +15%)
Consumption	W	8
Dimensions	mm	159 x 125 x 55

Application example

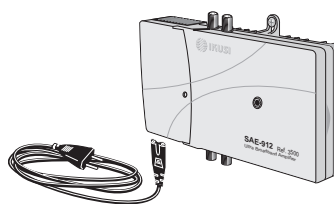


EXTENSION AMPLIFIERS

«SAE» — Two-way, 2150 MHz Amplifiers

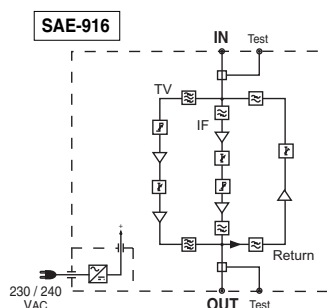
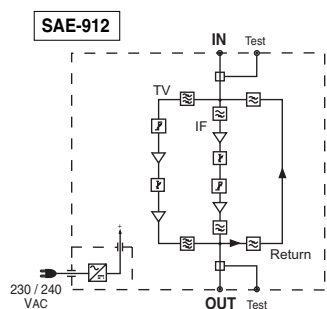
CE

- Distribution of terrestrial TV, satellite IF and multimedia signals.
- 1 RF input — 1 RF output. Terrestrial and satellite frequencies amplified separately, with push-pull technology used for terrestrial amplification. Passive or active return path, with respective 35/45 MHz or 65/86 MHz splits.
- Attenuation and equalization adjustments of TV and IF signals by potentiometer. In model with active return path, selection of return signal attenuation by the insertion of small plug-in links provided.
- 75Ω test ports for forward (TV+IF) and reverse output signals.
- Mains powering, 50/60 Hz. Operation shown by LED. Mains lead insertable into C8 type, 2-pin connection socket.
- Zinc alloy housing with protective cover for the adjustment controls. F connectors. Wall fixing.
- Indoor mounting. Grounding terminal.



SAE-912

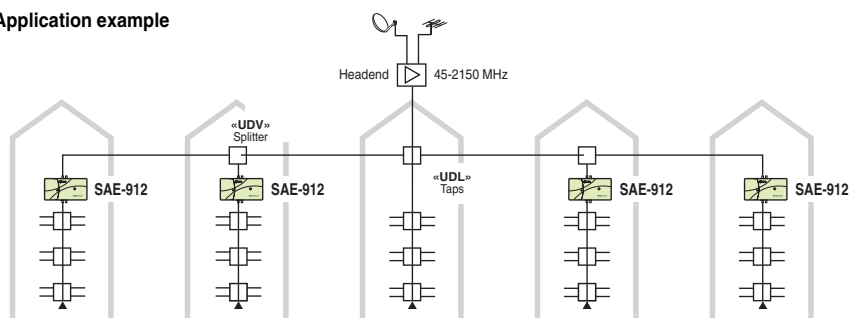
Block diagrams



Model		SAE-912	SAE-916	
Reference		3500	3503	
Powering mode		Mains	Mains	
Bandwidth	Terrestrial (TV)	45 - 862	86 - 862	
	Satellite (IF)	950 - 2150	950 - 2150	
	Return	5 - 35 (passive path)	5 - 65 (active path)	
Terrestrial path (TV)	Response flatness	dB	± 1.5	
	Nominal gain	dB	35	
	Variable interstage attenuator	dB	0 - 18	
	Slope control range	dB	0 - 18	
	Noise figure	dB	≤ 8	
	Output level	dBμV	118 ¹ / 115 ² / 103 ³	118 ¹ / 115 ² / 103 ³
	Output test	dB	-20 ± 1.5	-20 ± 1.5
Satellite path (IF)	Response flatness	dB	± 2	
	Nominal gain	dB	40	
	Variable interstage attenuator	dB	0 - 18	
	Slope control range	dB	0 - 12	
	Noise figure	dB	≤ 6	
	Output level	dBμV	120 ⁴	120 ⁴
	Output test	dB	-20 ± 1.5	-20 ± 1.5
Return path	Nominal gain	dB	-2.5	
	Selectable attenuation *	dB	—	
	Max RF input level	dBμV	—	
	Noise figure	dB	—	
	Output level	dBμV	—	
	Output test	dB	-20 ± 1	
General	Operating temperature	°C	-10 ... +55	
	Mains supply voltage	VAC	230 - 240 (±10%)	
	Consumption	W	8.5	
	Dimensions	mm	222 x 140 x 44	

* By plug-in links. Nine attenuation values between 0 and 11 dB.

Application example



Notes

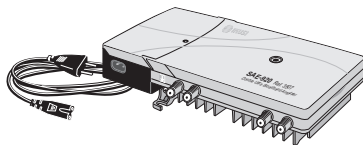
- ¹ -60dB IMD3 (DIN 45004B). See Reduction Table on page 168.
- ² -60dB IMD2 (EN 50083-3)
- ³ -60 dB CTB, CSO (42 ch, EN 50083-3)
- ⁴ -35dB IMD3 (EN 50083-3). See Reduction Table on page 168.

► EXTENSION AMPLIFIERS

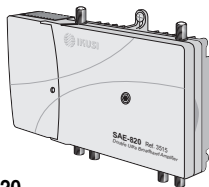
«SAE» — One-way, Double 2150 MHz Amplifiers

CE

- Application in collective installations with two download distribution cables carrying 2 satellite IF and 1 terrestrial TV signals.
- Two models for two powering options : mains (SAE-920) or line (SAE-820).
- 1 TV+IF-1 input — 1 IF-2 input » 1 TV+IF-1 output — 1 TV+IF-2 output.
- Separated amplification paths for TV, IF-1 and IF-2 signals, each including attenuation and equalization adjustment potentiometers. GaAs-MESFET technology used for terrestrial amplification.
- External 75Ω output test ports.
- Zinc alloy housing with protective cover for adjustment potentiometers. F type connection. Wall-fixing.
- Indoor mounting. Grounding terminal.



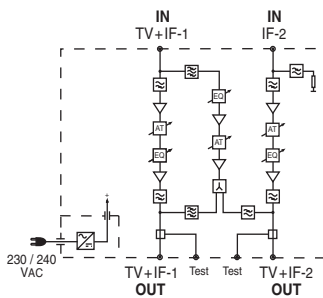
SAE-920



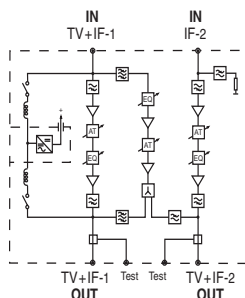
SAE-820

Block diagrams

SAE-920



SAE-820



Model		SAE-920	SAE-820
Reference		3507	3515
Powering mode		Mains *	Line **
Bandwidth	TV	45 - 862	45 - 862
	IF-1	950 - 2150	950 - 2150
	IF-2	950 - 2150	950 - 2150
RF inputs		2 TV+IF-1 IF-2	2 TV+IF-1 IF-2
RF outputs		2 TV+IF-1 TV+IF-2	2 TV+IF-1 TV+IF-2
Terrestrial path (TV)	Response flatness	dB	± 1.5
	Nominal gain	dB	35
	Variable interstage attenuator	dB	0 - 18
	Slope control range	dB	0 - 18
	Noise figure	dB	≤ 8
	RF output level	dBμV	(2x) 118 ¹ / 115 ² / 103 ³
	Output test	dB	-20 ±1.5
Satellite paths (IF-1 and IF-2)	Response flatness	dB	± 2
	Nominal gain	dB	40
	Variable interstage attenuator	dB	0 - 18
	Slope control range	dB	0 - 12
	Noise figure	dB	≤ 6
	RF output level	dBμV	120 ⁴
	Output test	dB	-20 ±1,5
General	Operating temperature	°C	-10 ... +55
	Supply voltage		230 - 240 VAC (±10%) 48 VAC and 65 VAC systems
	Consumption		15 W 15 W
	Dimensions	mm	222 x 140 x 44 222 x 140 x 44

* Insertable mains lead. C8 type, 2-pin connection socket.

** Connection (and passing, max 1A) of power current to the input or output TV+IF-1 port.

Notes

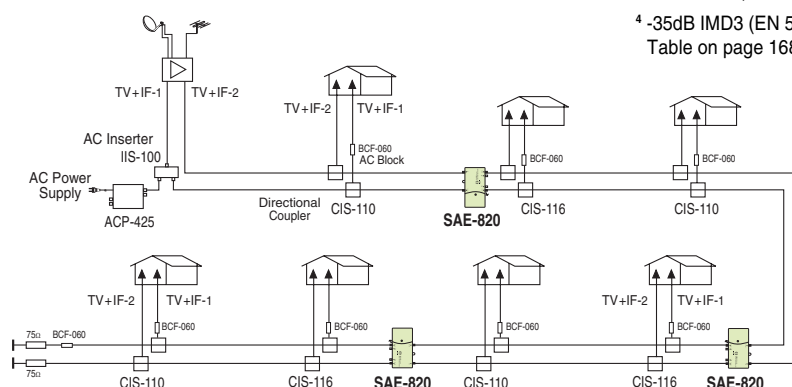
¹ -60dB IMD3 (DIN 45004B). See Reduction Table on page 168.

² -60dB IMD2 (EN 50083-3)

³ -60 dB CTB,CSO (42 ch, EN 50083-3)

⁴ -35dB IMD3 (EN 50083-3). See Reduction Table on page 168.

Application example



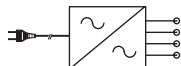
9

EXTENSION AMPLIFIERS

ACP-425 — AC Power Supply

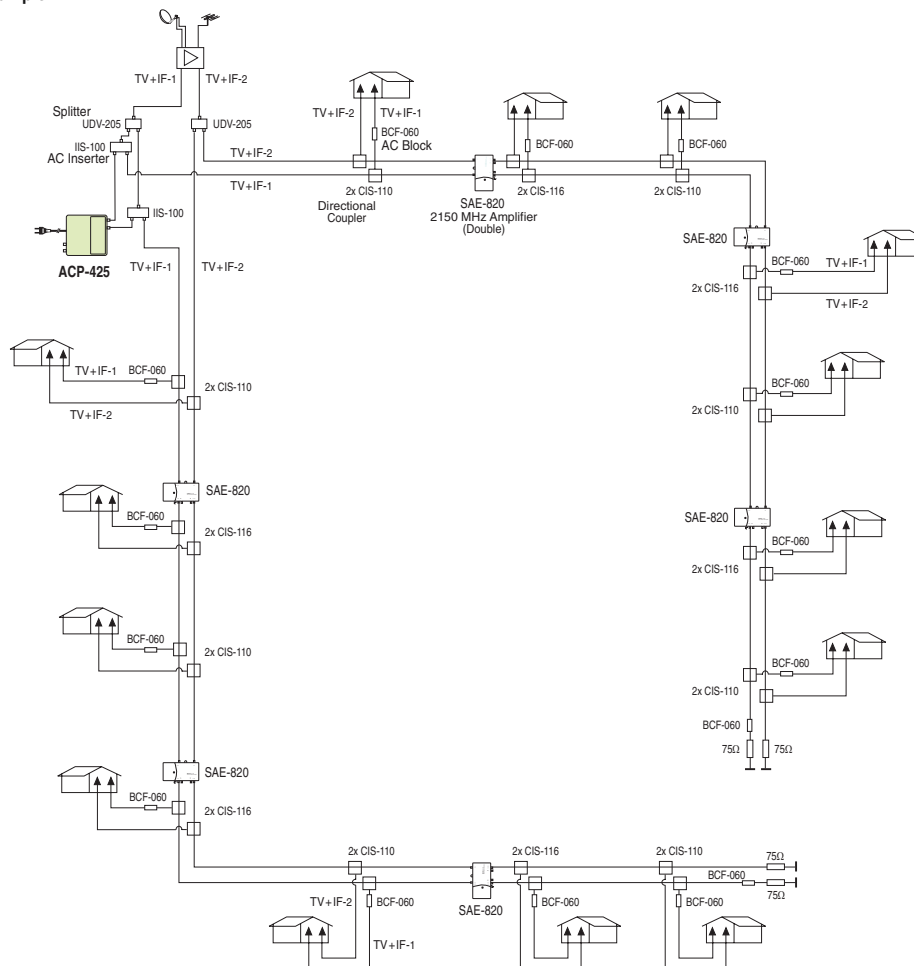
CE

- Line powering of extension amplifiers. To be utilized in conjunction with one or more (up to 4) IIS-100 power inserters (page 134).
- Mains 230 VAC input. Four 60 VAC outputs.
- Mains lead with bipolar plug. All output ports: F female connector.
- Injection-moulded zinc alloy housing. Wall fixing.
- Indoor mounting. Grounding terminal.


ACP-425

Model		ACP-425
Reference		1163
Mains voltage	VAC	230
Output voltage	VAC	(4x) 60
Max current to 1 output	A	1.1
Max total current to 4 outputs	A	2.5
Fuse of transformer's primary		F 1A / 250V
Efficiency	%	90
AC requirements	VA	170
AC output connectors		(4x) female F
Operating temperature	°C	-20 ... +70
Dimensions	mm	150 x 150 x 55

Application example



▶ APARTMENT AMPLIFIERS

«TAE-300» — Two-way, 862 MHz Amplifiers - F Connectors

CE

- Forward path extends to 862 MHz. Passive return-path. Three available splits: 30/47 MHz, 42/54 MHz or 66/86 MHz.
- Push-pull technology: very low 2nd order intermodulation distortion.
- 1 RF input — 1 or 2 RF outputs.
- Continuous attenuation and equalization adjustments.
- Mains powering, 50/60 Hz. Electrical safety protection level: Class II. Mains lead with bipolar plug.
- External plastic box, dimensions: 125x85x55 mm. F type connection. Earthing facility. Wall fixing.

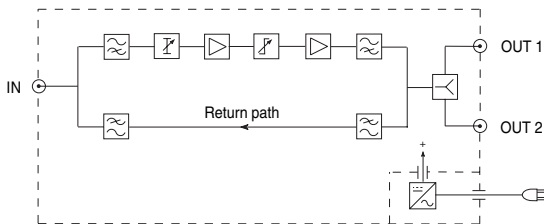


TAE-323

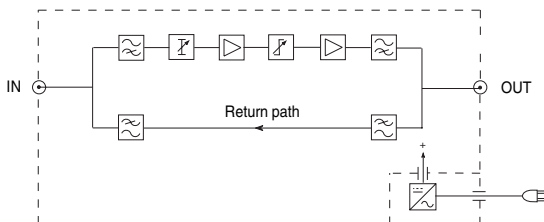
Model		TAE-323	TAE-324	TAE-326	TAE-316
Reference		3964	3965	3966	3963
Bandwidth - Forward way	MHz	47 - 862	54 - 862	86 - 862	86 - 862
Bandwidth - Reverse way	MHz	5 - 30	5 - 42	5 - 66	5 - 66
No. of RF outputs		2 (symm.) ¹	2 (symm.) ¹	2 (symm.) ¹	1
Gain	dB	15.5	15.5	15.5	19
Input variable attenuator	dB	0 - 10	0 - 10	0 - 10	0 - 10
Slope control range	dB	0 - 6	0 - 6	0 - 6	0 - 6
Noise figure	dB	≤ 5	≤ 5	≤ 5	≤ 5
Output level (-60 dB, DIN 45004B)	dBμV	(2x) 108	(2x) 108	(2x) 108	111.5
Output level (-60 dB IMD2, EN 50083-3)	dBμV	(2x) 97	(2x) 97	(2x) 97	100.5
Output level (-60 dB CTB 42 ch, EN)	dBμV	(2x) 93	(2x) 93	(2x) 93	96.5
Output level (-60 dB CSO 42 ch, EN)	dBμV	(2x) 96	(2x) 96	(2x) 96	99.5
Return path through loss	dB	4	4	4	1
Mains supply voltage	V _{AC}	230 (±15%)	230 (±15%)	230 (±15%)	230 (±15%)
Consumption	W	3	3	3	3

Block diagrams

TAE-323 - TAE-324 - TAE-326



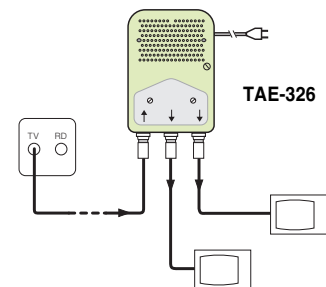
TAE-316



Note

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

Application example



▶ APARTMENT AMPLIFIERS

«ATP-900» — Two-way, 2150 MHz Amplifiers - F Connectors

CE

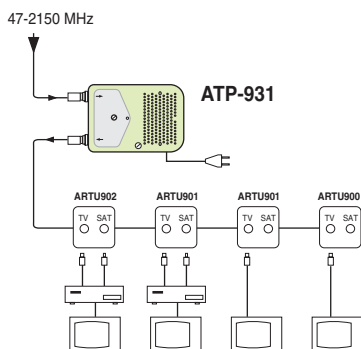
- Terrestrial (TV) and satellite (IF) frequencies amplified separately. Passive return path.
- Single RF Input and Single RF Output with DC power passing capability.
- Adjustable gain for terrestrial frequencies. Pre-emphasized response for satellite frequencies.
- Mains powered 50/60 Hz. Class II Electrical Safety protection. LED active when operating. Mains lead with bipolar plug.
- External plastic box, dimensions 125x85x55 mm. F type connection. Earthing facility. Wall-fixing.



ATP-961

Model			ATP-931	ATP-961
Reference			3490	3491
Frequency range	Terrestrial (TV)	MHz	47 - 862	86 - 862
	Satellite (IF) Return		950 - 2150 5 - 30	950 - 2150 5 - 66
Terrestrial Path (TV)	Nominal gain	dB	18	
	Gain adjustment	dB	-10	
	Noise figure	dB	≤ 7	
	RF output level	dBμV	108 ¹ / 100 ²	
Satellite Path (IF)	Nominal gain	dB	18 - 24 (6 dB fixed slope)	
	Noise figure	dB	≤ 10	
	Input return loss	dB	≥ 6	
	RF output level (IMD3 -35 dB, EN 50083-3)	dBμV	112	
Return Path	Through loss	dB	1.5	
General	Operating temperature	°C	0 ... +45	
	DC transit		24 V / 500 mA	
	Mains supply voltage	VAC	230 (-10 %, +15%)	
	Consumption	W	3	

Application example

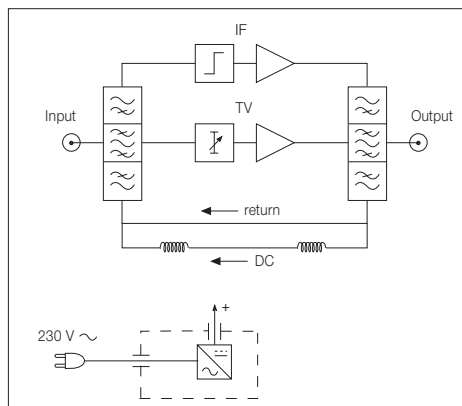


Notes

¹ Output level stated for IMD3=-60 dB (DIN 45004B), applicable for amplification of 2 TV-channels. If more than 2 channels are used, see Reduction Table on page 168 (Technical Annex).

² IMD2= -60 dB (EN 50083-3)

Block diagram



▶ APARTMENT AMPLIFIERS

«ATP-300» — One-way, 862 MHz Amplifiers - F Connectors

CE

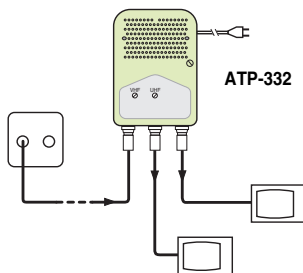
- 1 RF input — 2 RF outputs.
- Gain adjustment potentiometers.
- In ATP-332 model, two separate amplification paths for VHF and UHF signals, with adjustment potentiometer on each one (interstage position in UHF amplification for maintenance of low noise figure).
- In ATP-322 and ATP-302 models, sloped frequency response.
- Mains powered, 50/60 Hz. Electrical safety protection level: Class II. Mains lead with bipolar plug.
- External plastic box, dimensions: 125x85x55 mm. F type connection. Earthing terminal. Wall-fixing.



ATP-332

Model		ATP-332	ATP-322	ATP-302
Reference		3509	3489	3488
Frequency range	MHz	40 - 318 and 470 - 862	47 - 862	47 - 862
No. of RF outputs		2 ¹ (symmetrical)	2 ¹ (symmetrical)	2 (asymmetrical)
Gain	dB	14 (VHF) ,, 24 (UHF)	15 ... 21 (fixed slope: 6 dB)	18 ... 24 and 7 ... 13 (fixed slope: 6 dB)
Gain adjustment	dB	-16 (VHF) ,, -12 (UHF)	-10 (VHF/UHF)	-10 (VHF/UHF)
Noise figure	dB	4.5 (VHF) ,, 5.5 (UHF)	4.5 (VHF) ,, 5.5 (UHF)	4.5 (VHF) ,, 5.5 (UHF)
RF output level ²	dBμV	(2x) 105	(2x) 108	111 and 100
Mains supply voltage	V _{AC}	230 (-10%, +15%)	230 (-10%, +15%)	230 (-10%, +15%)
Consumption	W	2.3	2.5	2.5

Application example

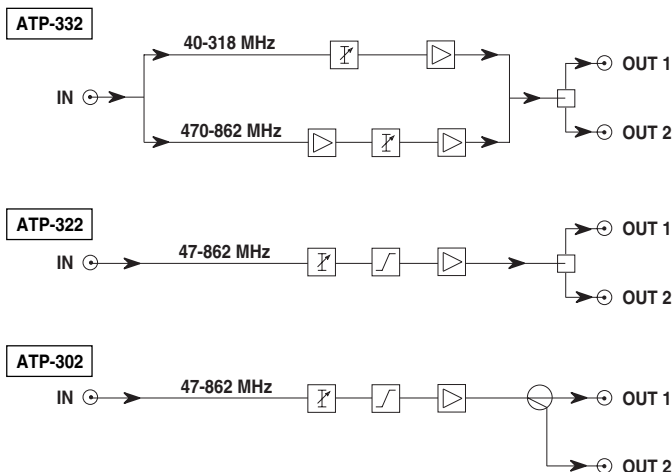


Notes

¹ If only one of the two outputs is being used, the spare port must be terminated with a CTF-175 (Ref. 1519) 75Ω terminator.

² IMD3= -60 dB (DIN 45004B). The indicated level refers to the amplification of 2 TV channels. If more than 2 channels are used, see Reduction Table on page 168 (Technical Annex).

Block diagrams



▶ APARTMENT AMPLIFIERS

«ATB-100» — One-way, 862 MHz Amplifiers - Terminal-Clamp Connection

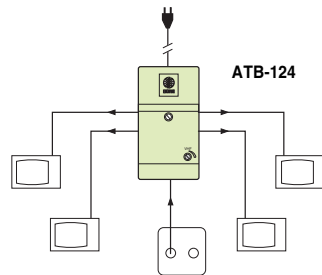
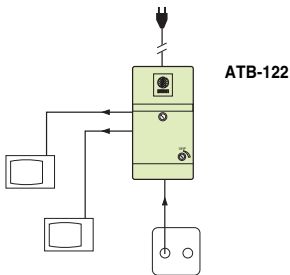
- 1 RF input — 1, 2 or 4 RF outputs.
- Variable input attenuator.
- Mains powered, 50/60 Hz. Electrical safety protection level: Class II. Mains lead with bipolar plug.
- ABS plastic box, dimensions: 105x60x38 mm. Terminal-clamp connection. Wall-fixing.



ATB-122

Model		ATB-181	ATB-121	ATB-122	ATB-124
Reference		1181	1184	1182	1183
Frequency range	MHz	47 - 862	47 - 230 470 - 862	47 - 230 470 - 862	47 - 230 470 - 862
No. of RF outputs		1	1	2 (symmetrical)	4 (symmetrical)
Gain	dB	26	26	23	20
Gain adjustment	dB	-20	-20 (only VHF)	-20 (only VHF)	-20 (only VHF)
Noise figure	dB	5	5	5	5
RF output level ¹	dB μ V	104	104	(2x) 100	(4x) 96
Mains supply voltage	Vac	230 (-10%, +15%)	230 (-10%, +15%)	230 (-10%, +15%)	230 (-10%, +15%)
Consumption	W	2	2	2	2

Application examples



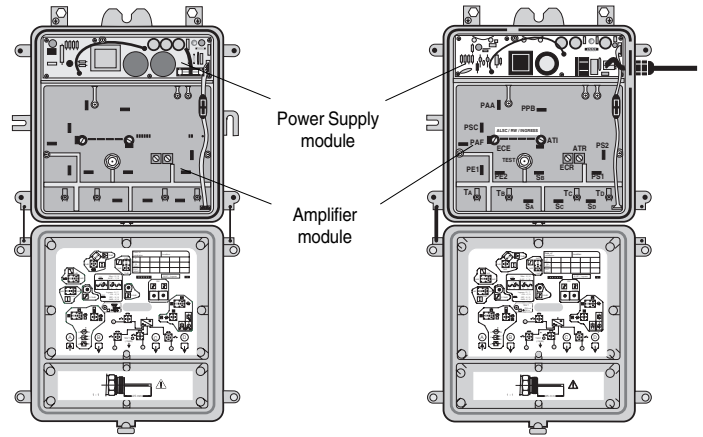
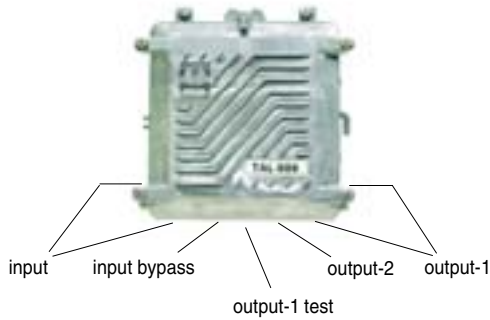
Note

¹ IMD3= -60 dB (DIN 45004B). The indicated level refers to the amplification of 2 TV channels. If more than 2 channels are used, see Reduction Table on page 168 (Technical Annex).

▶ LINE AND DISTRIBUTION CATV AMPLIFIERS

«TAL-800» — Configurable Line and Distribution Amplifiers

CE



Line Powered «TAL-800» Amplifier

Mains Powered «TAL-800» Amplifier

GENERAL DESCRIPTION

The line amplifiers «TAL-800» Series includes line and mains powered models for 862 MHz systems, with three available splits: 30/47 MHz, 42/54 MHz and 66/86 MHz. Advanced GaAsFET amplification technology is used providing excellent output levels at high channel capacities.

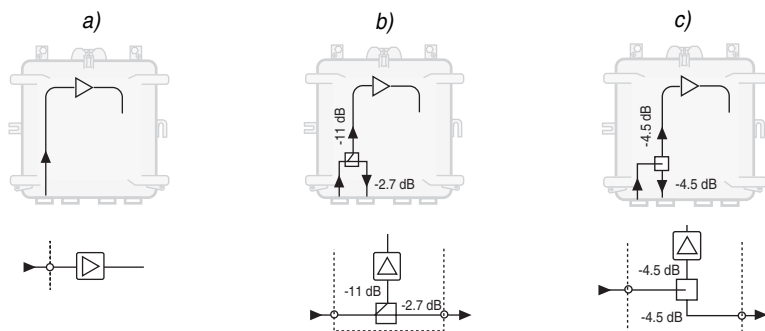
The «TAL-800» amplifiers come in a tough housing with drop-down front lid. The RF amplification block and the power supply are modular and can be taken out and replaced, when required, without removing the amplifier from its location and without the need of disconnection. Both modules are available as spare parts. At the bottom of the housing four separate 5/8" cable connections can be located (these are clearly shown in the picture above left); please note that alternatively both input and main output connections to the amplifier can be made to the side entry ports located at the bottom left and bottom right sides of the housing.

The amplifiers come fully optioned and do not require the purchase of additional modules, with the exception of the ALSC. By simply changing the internal plug-in links to the desired position, the amplifier can be configured to include a splitter or a tap at the input and output ports. Some of the other built in options are: add pre-amplification at the forward path, disable the return path, enable or disable both input and output power passing ports, just to name a few. An Automatic Level and Slope Control module, which will deliver a constant output level over temperature, can be simply plugged into the amplifier module if required.

- Aluminium die-cast housing with exceptional cooling characteristics. Weatherproofing IP67 grade and maximum RFI shielding. Stainless steel screws.
- Wall- and strand-fixing.
- Input and output RF connections by 5/8"—24 UNEF 2A pin connectors.
- Transient protected connection ports.
- Switch-mode power supply with automatic transient protection, output overvoltage protection and current limiting.
- 75 ohms test points on F type connectors.
- Earthing facility.

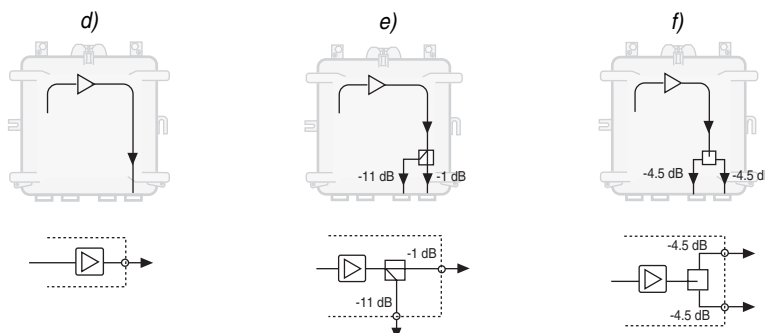
Input Configurations:

- No bypass
- Tap: bypass at -2.7 dB
- Splitter: bypass at -4.5 dB



Output Configurations:

- 1 port
- Tap: 2 asymmetrical ports
- Splitter: 2 symmetrical ports



▶ LINE AND DISTRIBUTION CATV AMPLIFIERS

«TAL-800» — Configurable Line and Distribution Amplifiers

(cont'd)

TECHNICAL DATA

Model		TAL-883	TAL-884	TAL-886	TAL-893	TAL-894	TAL-896	
Reference		3948	3949	3950	3975	3973	3974	
Technology		GaAsFET	GaAsFET	GaAsFET	GaAsFET	GaAsFET	GaAsFET	
Powering mode		Line	Line	Line	Mains	Mains	Mains	
Bandwidth — Forward way		MHz	47 — 862	54 — 862	86 — 862	47 — 862	54 — 862	86 — 862
Bandwidth — Reverse way		MHz	5 — 30	5 — 42	5 — 66	5 — 30	5 — 42	5 — 66
Forward way	Input bypass	dB	-2.7 (if tap is implemented) ,, -4.5 (if splitter is implemented)					
	Response flatness	dB	± 0.75					
	Nominal gain without input bypass	configuration: 1 output	dB	27 [37 if preamplification is implemented]				
		configuration: 2 symmetrical outputs		(2x) 22.5 [(2x) 32.5 if preamplification is implemented]				
		configuration: 2 asymmetrical outputs		26 and 16 [36 and 26 if preamplification is implemented]				
	Nominal gain with input bypass -2.7 dB	configuration: 1 output	dB	16 [26 if preamplification is implemented]				
		configuration: 2 symmetrical outputs		(2x) 11.5 [(2x) 21.5 if preamplification is implemented]				
		configuration: 2 asymmetrical outputs		15 y 5 [25 and 15 if preamplification is implemented]				
	Nominal gain with input bypass -4.5 dB	configuration: 1 output	dB	22.5 [32.5 if preamplification is implemented]				
		configuration: 2 symmetrical outputs		(2x) 18 [(2x) 28 if preamplification is implemented]				
		configuration: 2 asymmetrical outputs		21.5 and 11.5 [31.5 and 21.5 if preamplification is implemented]				
	Gain drift (-20° to +50° C; 20° C ref.)	dB	± 0.75					
	Input attenuation	without preamplification implemented	dB	0, 3, 6, 9, 12 or 15 (4 cells of 0, 3, 6 and 9 dB)				
		with preamplification implemented		0, 3, or 6 (3 cells of 0, 3, and 6 dB)				
	Interstage attenuation	dB	0 to 8					
	Input equalization	dB	-6 to 18 (3 cells of -6, -3 and 0 dB, and 1 variable equalizer of 0-18 dB)					
	Sloped response	dB	0, 6 or 12 (3 cells of 0, 6 and 12 dB)					
	Output level (-60dB IMD3, DIN 45004B)	dB μ V	≥ 124 (1 output) ,, ≥ (2x) 119.5 (2 symmetrical outputs) ,, ≥ 123 and 113 (2 asymmetrical outputs)					
	Output level (-60dB IMD2, EN 50083-3)	dB μ V	≥ 115 (1 output) ,, ≥ (2x) 110.5 (2 symmetrical outputs) ,, ≥ 114 and 104 (2 asymmetrical outputs)					
	Output level (-60dB CTB, 42 channels, EN 50083-3)	dB μ V	≥ 110 (1 output) ,, ≥ (2x) 105.5 (2 symmetrical outputs) ,, ≥ 109 and 99 (2 asymmetrical outputs)					
Output level (-60dB CSO, 42 channels, EN 50083-3)	dB μ V	≥ 114 (1 output) ,, ≥ (2x) 109.5 (2 symmetrical outputs) ,, ≥ 113 and 103 (2 asymmetrical outputs)						
Noise figure	dB	≤ 7						
Input/output impedance	Ω	75						
Input/output return loss	dB	> 14						
Input test (on internal F port)	dB	-30 ±1						
Output-1 test	dB	-19 ±1						
AUTOMATIC LEVEL AND SLOPE CONTROL (ALSC)		The specifications related with the insertion of an ALSC circuit card are indicated on page 126.						
Reverse way	Response flatness	dB	± 0.5					
	Nominal gain	dB	26					
	Gain drift (- 20° to +50° C; 20° C ref.)	dB	± 0.5					
	Input attenuation	dB	0 to 18					
	Interstage attenuation	dB	0 or 6 (2 cells of 0 and 6 dB)					
	Input equalization	dB	0 to 16					
	Output level (-60dB IMD3, DIN 45004 B)	dB μ V	118 (without input bypass)					
	Output level (-60dB IMD2, EN 50083-3)	dB μ V	106 (without input bypass)					
	Noise figure	dB	≤ 7					
	Input/output impedance	Ω	75					
	Input/output return loss	dB	≥ 16					
	Output test (on internal F port)	without input bypass	dB	-30 ±1				
		with input bypass -2.7 dB		-18 ±1				
with input bypass -4.5 dB		-25.5 ±1						

(cont.)

▶ LINE AND DISTRIBUTION CATV AMPLIFIERS

«TAL-800» — Configurable Line and Distribution Amplifiers

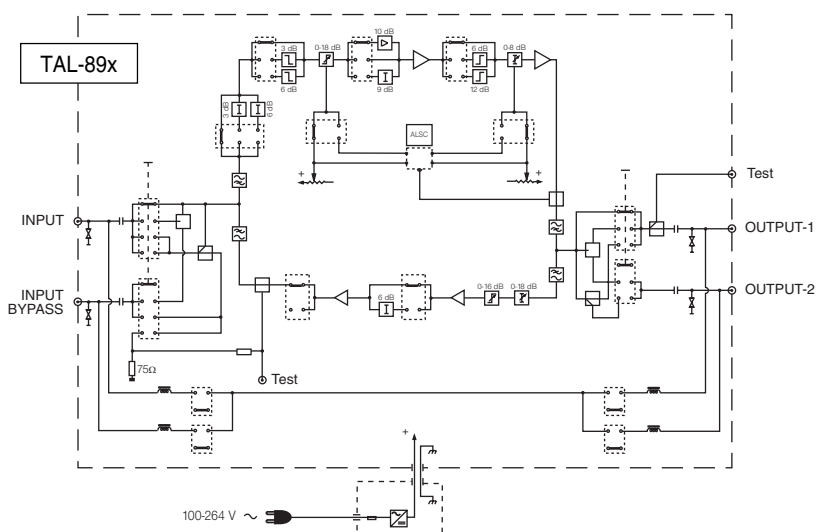
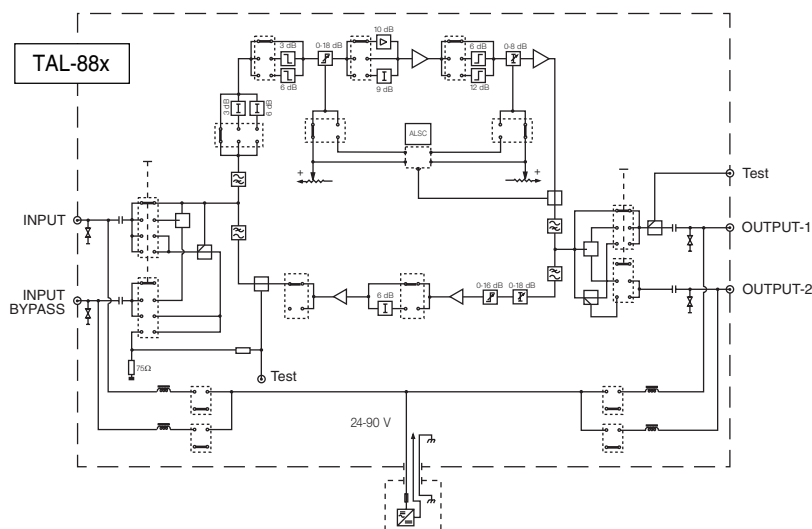
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TECHNICAL DATA (cont'd)

General	Powering voltage	V _{ac}	24 - 90 (line powered models) / 100 - 264 (mains powered models *)
	Consumption	W	21
	Maximum AC/DC through current	A	7
	Hum modulation, @ 7A	dB	< -70
	Screening factor	dB	> 80
	Operating temperature range	°C	-10 to +55
	Aluminium watertight housing		IP67
	Dimensions	mm	215 x 215 x 80
	Packed weight	kg	2.1

* Mains lead NOT INCLUDED. The lead to be used will have to be a two-conductor, round, diameter 5 to 7 mm lead, with appropriate plug on one end and free conductors on the other, these to be connected to an internal screw terminal within the amplifier. Compression gland supplied.

BLOCK DIAGRAMS



▶ LINE AND DISTRIBUTION CATV AMPLIFIERS

«TAL-800» — Configurable Line and Distribution Amplifiers

(cont'd)

ALSC Circuit Card

To upgrade a «TAL-800» amplifier with ALS (Automatic Level and Slope Control) function. Monitoring of 2 pilot carriers or 2 TV carriers selected from the system. This small module is simply plugged into the amplifier module of the TAL.



TMC-102

Model	TMC-102 (*)	
Reference	2898	
Reference signal	2 pilot carriers	
Lower carrier frequency between	MHz	47 and 130
Upper carrier frequency between	MHz	390 and 606, or 861.75
Automatic control range	dB	6
Forward signal output level stability	dB	± 0.5
Operating output level of the TAL-800	dB μ V	90 - 100
Consumption	W	1.2

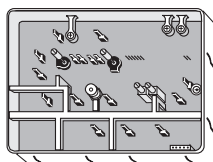
(*) The two control reference frequencies —lower and upper— must be indicated.

SPARE MODULES

Both amplifier and power supply modules for the TAL-800 are available separately as spare parts or standby modules. Replacement of such modules can be effected quickly and efficiently whenever the need arises.

Amplification Modules

Three different models related to the frequency splits (30/47 MHz, 42/54 MHz or 66/86 MHz).

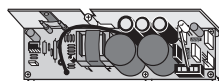


TMA-88x

Model	TMA-883	TMA-884	TMA-886
Reference	3952	3953	3954
Mounting in the amplifier	TAL-883 / TAL-893	TAL-884 / TAL-894	TAL-886 / TAL-896
Dimensions	mm	167 x 123 x 27	
Packed weight	g	325	

Power Supply Modules

Two models, one for remote powered amplifiers and the other for mains powered amplifiers.



TMP-880



TMP-890

Model	TMP-880	TMP-890
Reference	3951	3971
Mounting in the amplifier	TAL-883 / TAL-884 / TAL-886	TAL-893 / TAL-894 / TAL-896
Dimensions	mm	167 x 35 x 45
Packed weight	g	225

INFORMATION TO ORDER «TAL-800» AMPLIFIERS

If ALS is required, the order needs to include the TMC-102 module.

- The following is an example for 1 amplifier TAL-886 with ALS function controlled by two pilots of 125.75 MHz and 535.25 MHz:

1 TAL-886 - (Ref. 3950)

1 TMC-102 (125.75 MHz - 535.25 MHz) - (Ref. 2898)

▶ LINE AND DISTRIBUTION CATV AMPLIFIERS

TSI-500 — AC Power Supply / Power Inserter - RF Configurable

CE


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

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

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

AC Power Supply / Power Inserter

Model		TSI-500
Reference		2179
Bandwidth	MHz	5 – 862
Nominal mains supply	V _{AC}	220 / 240
Nominal inserted voltage (at max load)	V _{AC}	58
Impedance	Ω	75
Return loss	dB	>16
Max insertion loss	«single inserter» configuration	0.6
	«splitter» configuration	(2x) 4.5
	«tapoff» configuration	1.6 and 12
Response flatness	dB	≤ ±0.5
Max current to one RF port	A	5
Max current to all RF ports	A	5
Hum modulation	dB	≤ -70
Efficiency	%	90
Load regulation	%	0 ... -6
Screening factor	dB	>80
Fuse/switch of AC injection		(3x) Semi-delay 6.3A / 250V
Fuse of transformer primary		T 3.15A / 250V
Fuse of transformer secondary		T 6.3A / 250V
AC requirements	VA	330
Operating temperature range	°C	-20 ... +70
Outside dimensions	mm	300 x 200 x 100
Packed weight	kg	5.980

10

▶ RETURN TV MODULATORS

MVR-600 — 12-65 MHz VSB TV Modulator

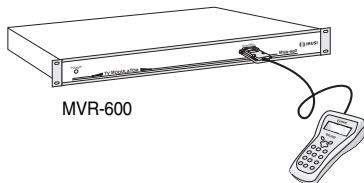
CE

- Applicable in two-way coax networks. The MVR-600 is installed in the site where the signal to be transported to the headend is generated.
- Vestigial Side Band. Mono Audio (A2 Stereo option is available). System B.
- IF modulation and SAW filtering. Adjacent channel operation.
- Frequency agility. Any selectable channel within the 12-65 MHz band.
- Built-in video test generator.
- Adjustment and selection of parameters with the SPI-300 programming unit, see below.
- Mains powered. Schuko type mains lead.
- 19" rack format.

Return TV Modulator

Model		MVR-600
Reference		2562
Selectable TV channel located between :	MHz	12 - 65
TV System		B
Audio operation mode		MONO (A2 STEREO on request)
Adjustable output level	dB μ V	89 to 104
Adjustable carrier level ratio	dB	10 to 20
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 ... 2.0
Audio input impedance	Ω	> 600
Adjustable audio peak deviation	kHz	± 40 to ± 50
Audio pre-emphasis	μ s	50
Applicable group retard pre-correction		Yes
Weighted S/N ratio	dB	> 61
Spurious in band	dBc	< -65
Broadband noise ($\Delta B = 5$ MHz)	dBc	< -90
Mains voltage	VAC	110 - 240 ($\pm 10\%$)
Consumption	W	11
Video input connector		(1x) female RCA
Audio input connector		(2x) female RCA
RF output connector (TV channel)		female F
Programming interface		RS-232 - DB9
Dimensions (w x h x d)	mm	483 x 44.5 x 275


MVR-600

MVR-600 — rear panel

MVR-600
SPI-300

Programming Unit

Model	SPI-300
Reference	4070
<ul style="list-style-type: none"> ● For setting the TV channel parameters of the MVR-600 modulator : video carrier frequency, carrier level ratio, video modulation depth, audio modulation index and RF output level. Also for generating a video test signal. Cable connection to the DB-9 front panel socket. ● 20x4 character alphanumeric display. Numerical and function keys. ● Microprocessor controlled. User friendly software. ● 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. 	

► DISTRIBUTION ELEMENTS

«DLS» — Indoor Tap-offs - 1000 MHz

- 2-, 4- and 8-way shielded directional tap-offs. Frequency range: 5-1000 MHz.
- Wall fixing, nickle-plated zinc diecast housing (2 screws attached). Grounding facilities. All ports F female connector.

2-way Tap-offs — «DLS-200» Series



DLS-217

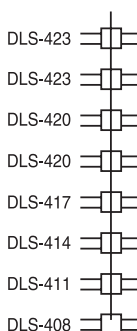
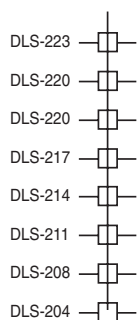


DLS-420

Model		DLS-204	DLS-208	DLS-211	DLS-214	DLS-217	DLS-220	DLS-223
Reference		3355	3353	3352	3351	3350	3349	3348
Tap loss (±0.7 dB in 5-469 MHz and ±1 dB in 470-1000 MHz)	dB	4	8	11	14	17	20	23
Through loss	5-469 MHz	T (*)	≤ 3.5	≤ 1.8	≤ 1.5	≤ 1.0	≤ 1.0	≤ 1.0
	470-862 MHz	T (*)	≤ 3.5	≤ 2.0	≤ 1.8	≤ 1.2	≤ 1.2	≤ 1.2
	863-1000 MHz	T (*)	≤ 3.5	≤ 2.5	≤ 2.2	≤ 1.5	≤ 1.5	≤ 1.5
Return loss	dB	≥ 16						
Directional isolation	5-469 MHz	T (*)	≥ 30	≥ 25	≥ 25	≥ 35	≥ 30	≥ 40
	470-1000 MHz	T (*)	≥ 30	≥ 25	≥ 22	≥ 25	≥ 30	≥ 30
Tap-to tap isolation	5-469 MHz	dB	≥ 25	≥ 35	≥ 35	≥ 40	≥ 35	≥ 40
	470-1000 MHz	dB	≥ 25	≥ 25	≥ 30	≥ 35	≥ 30	≥ 35
Dimensions	mm	75 x 48 x 19						

(*) T → Terminal.

Application examples (*)



- (*) - Distance between tap-offs: 3 m.
 - Coaxial cable CCS-178 (Ref. 2516).
 - Tap lines have similar length.

4-way Tap-offs — «DLS-400» Series

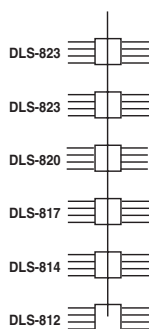
Model		DLS-408	DLS-411	DLS-414	DLS-417	DLS-420	DLS-423
Reference		3356	3344	3343	3342	3341	3340
Tap loss (±0.7 dB in 5-469 MHz and ±1 dB in 470-1000 MHz)	dB	7.5	11	14	17	20	23
Through loss	5-469 MHz	T (*)	≤ 3.7	≤ 2.0	≤ 1.5	≤ 1.0	≤ 1.0
	470-862 MHz	T (*)	≤ 4.2	≤ 2.5	≤ 1.8	≤ 1.2	≤ 1.0
	863-1000 MHz	T (*)	≤ 4.5	≤ 2.8	≤ 2.0	≤ 1.4	≤ 1.2
Return loss	dB	≥ 16					
Directional isolation	5-469 MHz	T (*)	≥ 35	≥ 35	≥ 35	≥ 40	≥ 40
	470-1000 MHz	T (*)	≥ 30	≥ 35	≥ 35	≥ 40	≥ 35
Tap-to-tap isolation	5-469 MHz	dB	≥ 25	≥ 30	≥ 25	≥ 25	≥ 20
	470-1000 MHz	dB	≥ 25	≥ 25	≥ 20	≥ 20	≥ 20
Dimensions	mm	75 x 60 x 24					

(*) T → Terminal.

► DISTRIBUTION ELEMENTS
«DLS» — Indoor Tap-offs - 1000 MHz

(cont'd)

8-way Tap-offs — «DLS-800» Series

DLS-823
Application example (*)


Model		DLS-812	DLS-814	DLS-817	DLS-820	DLS-823
Reference		3357	3358	3359	3360	3361
Tap loss (±0.7 dB in 5-469 MHz and ±1 dB in 470-1000 MHz)	dB	12	14	17	20	23
Through loss	5-469 MHz	T (*)	≤ 3.7	≤ 1.8	≤ 1.2	≤ 1.0
	470-862 MHz	T (*)	≤ 4.2	≤ 2.1	≤ 1.4	≤ 1.2
	863-1000 MHz	T (*)	≤ 4.5	≤ 2.7	≤ 1.8	≤ 1.6
Return loss	dB	≥ 16				
Directional isolation	5-469 MHz	T (*)	≥ 25	≥ 25	≥ 25	≥ 35
	470-1000 MHz	T (*)	≥ 22	≥ 22	≥ 22	≥ 30
Tap-to tap isolation	5-469 MHz	≥ 30	≥ 25	≥ 25	≥ 25	≥ 20
	470-1000 MHz	≥ 25	≥ 20	≥ 20	≥ 20	≥ 20
Dimensions	mm	120 x 60 x 24				

(*) T → Terminal.

- (*) - Distance between tap-offs: 3 m.
 - Coaxial cable CCS-178 (Ref. 2516).
 - Tap lines have similar length.

► DISTRIBUTION ELEMENTS

«UDL» — Indoor Tap-offs - 2300 MHz

CE

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

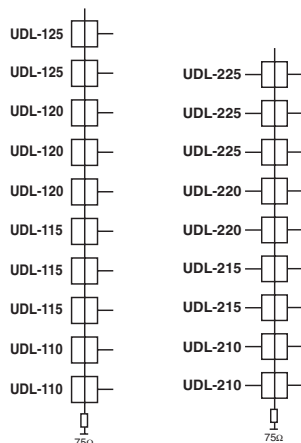
1-way Tap-offs — «UDL-100» Series


UDL-110

UDL-220

Model		UDL-110	UDL-115	UDL-120	UDL-125
Reference		3226	3227	3228	3229
Tap loss (± 0.7 dB)	dB	10	15	20	25
Through loss	5-862 MHz	≤ 1.1	≤ 1.0	≤ 0.9	≤ 0.5
	950-1550 MHz	≤ 1.7	≤ 1.7	≤ 1.6	≤ 1.3
	1551-2300 MHz	≤ 2.3	≤ 2.2	≤ 2.1	≤ 2.0
Directional isolation	5-300 MHz	≥ 29	≥ 28	≥ 31	≥ 38
	301-862 MHz	≥ 29	≥ 27	≥ 28	≥ 35
	950-2300 MHz	≥ 19	≥ 23	≥ 19	≥ 24
Return loss	dB	≥ 15 (TV) ≥ 10 (SAT)	≥ 15 (TV) ≥ 10 (SAT)	≥ 15 (TV) ≥ 10 (SAT)	≥ 15 (TV) ≥ 10 (SAT)
Dimensions	mm	54 x 58 x 26			

2-way Tap-offs — «UDL-200» Series

Application examples (*)


Model		UDL-210	UDL-215	UDL-220	UDL-225
Reference		3244	3245	3232	3233
Tap loss (± 0.7 dB)	dB	10	15	20	25
Through loss	5-862 MHz	≤ 2.3	≤ 1.6	≤ 1.1	≤ 1.1
	950-1550 MHz	≤ 3.0	≤ 2.0	≤ 1.9	≤ 1.9
	1551-2300 MHz	≤ 3.7	≤ 2.6	≤ 2.6	≤ 2.5
Directional isolation	5-300 MHz	≥ 26	≥ 29	≥ 31	≥ 35
	301-862 MHz	≥ 26	≥ 27	≥ 29	≥ 32
	950-2300 MHz	≥ 20	≥ 22	≥ 26	≥ 28
Tap-to-tap isolation	5-300 MHz	≥ 38	≥ 39	≥ 46	≥ 50
	301-862 MHz	≥ 35	≥ 37	≥ 42	≥ 45
	950-2300 MHz	≥ 28	≥ 37	≥ 39	≥ 35
Return loss	dB	≥ 12 (TV) ≥ 10 (SAT)	≥ 14 (TV) ≥ 10 (SAT)	≥ 12 (TV) ≥ 10 (SAT)	≥ 12 (TV) ≥ 10 (SAT)
Dimensions	mm	54 x 58 x 26			

- (*) - Distance between tap-offs: 3 m.
 - Coaxial cable CCS-178 (Ref. 2516).
 - Tap lines have similar length.

► DISTRIBUTION ELEMENTS

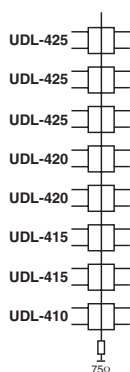
«UDL» — Indoor Tap-offs - 2300 MHz

(cont'd)



UDL-420

Application example (*)



- (*) - Distance between tap-offs: 3 m.
 - Coaxial cable CCS-178 (Ref. 2516).
 - Tap lines have similar length.

4-way Tap-offs — «UDL-400» Series

Model		UDL-410	UDL-415	UDL-420	UDL-425
Reference		3235	3236	3237	3238
Tap loss (± 1 dB)	dB	10	15	20	25
Through loss	5-862 MHz	≤ 4.0	≤ 1.9	≤ 0.9	≤ 0.6
	950-1550 MHz	≤ 4.4	≤ 2.8	≤ 1.5	≤ 1.1
	1551-2300 MHz	≤ 4.6	≤ 3.5	≤ 2.1	≤ 1.6
Directional isolation	5-300 MHz	≥ 35	≥ 30	≥ 37	≥ 37
	301-862 MHz	≥ 33	≥ 30	≥ 33	≥ 37
	950-2300 MHz	≥ 29	≥ 23	≥ 25	≥ 27
Tap-to-tap isolation	5-300 MHz	≥ 29	≥ 30	≥ 29	≥ 30
	301-862 MHz	≥ 26	≥ 28	≥ 26	≥ 26
	950-2300 MHz	≥ 24	≥ 28	≥ 24	≥ 26
Return loss	dB	≥ 10 (TV) ≥ 10 (SAT)	≥ 10 (TV) ≥ 10 (SAT)	≥ 12 (TV) ≥ 10 (SAT)	≥ 12 (TV) ≥ 10 (SAT)
Dimensions	mm	76 x 58 x 26			

8-way Tap-offs — «UDL-800» Series

Model		UDL-816	UDL-820	UDL-825
Reference		3366	3367	3368
Tap loss (± 1 dB)	dB	16	20	25
Through loss	5-862 MHz	≤ 4.0	≤ 1.8	≤ 1.8
	950-1550 MHz	≤ 4.4	≤ 2.0	≤ 2.0
	1551-2300 MHz	≤ 4.8	≤ 2.2	≤ 2.2
Directional isolation	5-300 MHz	≥ 30	≥ 30	≥ 33
	301-862 MHz	≥ 30	≥ 30	≥ 36
	950-2300 MHz	≥ 27	≥ 23	≥ 28
Tap-to-tap isolation	5-300 MHz	≥ 34	≥ 30	≥ 30
	301-862 MHz	≥ 32	≥ 28	≥ 28
	950-2300 MHz	≥ 25	≥ 28	≥ 28
Return loss	dB	≥ 10 (TV) ≥ 10 (SAT)	≥ 10 (TV) ≥ 10 (SAT)	≥ 10 (TV) ≥ 10 (SAT)
Dimensions	mm	120 x 60 x 20		



UDL-820

► DISTRIBUTION ELEMENTS

«DVS» — Indoor Splitters - 1000 MHz

CE

- 2-, 4- and 6-way shielded inductive splitters. Frequency range: 5-1000 MHz.
- Wall fixing, nickle-plated zinc diecast housing (2 screws attached). Grounding facilities. All ports F female connector.


DVS-408

DVS-610

«DVS» Series Splitters

Model			DVS-204	DVS-408	DVS-610
Reference			3336	3335	3334
No. of ways			2	4	6
Insertion loss	5-469 MHz	dB	≤ 3.5	≤ 6.8	≤ 9.5
	470-862 MHz		≤ 3.7	≤ 7.2	≤ 10.5
	863-1000 MHz		≤ 4.0	≤ 7.5	≤ 11.0
Return loss		dB	≥ 18		
Output isolation	5-469 MHz	dB	≥ 30	≥ 30	≥ 25
	470-1000 MHz		≥ 25	≥ 25	≥ 25
Dimensions		mm	54 x 48 x 19	75 x 48 x 19	120 x 60 x 24

«UDV» — Indoor Splitters - 2300 MHz

CE

- 2-, 3-, 4-, 6- and 8-way shielded inductive splitters. Frequency range: 5-2300 MHz.
- Wall fixing, nickle-plated zinc diecast housing (2 screws attached). Grounding facilities. All ports F female connector.
- Bidirectional DC transit (max +24 VDC, 0.5 A) between one of the outputs and the input, except for UDV-205 model, where the transit is unidirectional from each one of the two outputs to the input.


UDV-205

UDV-408

«UDV» Series Splitters

Model			UDV-205	UDV-307	UDV-408	UDV-612	UDV-813
Reference			3307	3365	3308	3309	3310
No. of ways ⁽¹⁾			2	3	4	6	8
Insertion loss	5-862 MHz	dB	≤ 3.8	≤ 6.7	≤ 8.2	≤ 10.1	≤ 13.0
	950-1550 MHz		≤ 4.7	≤ 7.3	≤ 8.7	≤ 12.9	≤ 15.0
	1551-2300 MHz		≤ 5.6	≤ 8.2	≤ 9.1	≤ 15.2	≤ 16.9
Return loss		dB	≥ 12	≥ 12	≥ 10	≥ 10	≥ 10
Output isolation	5-300 MHz	dB	≥ 28	≥ 28	≥ 34	≥ 25	≥ 27
	301-862 MHz		≥ 24	≥ 24	≥ 28	≥ 25	≥ 27
	950-2300 MHz		≥ 20	≥ 20	≥ 20	≥ 24	≥ 24
Dimensions		mm	54 x 58 x 26	58 x 58 x 26	76 x 58 x 26	120 x 58 x 26	120 x 58 x 26

⁽¹⁾ Unused outputs must be loaded with a 75Ω load CTF-175 (Ref. 1519).

► DISTRIBUTION ELEMENTS

Diverse Indoor Passive Elements with 65Vac/1A Power Passing - 2150 MHz **CE**

- Directional Couplers (10 and 16 dB) — Two-way Splitter — Power Inserter
- Frequency range: 5-2150 MHz
- Power passing (65 VAC / 1A) through all ports.
- Nickle-plated zinc diecast housing. Wall-fixing (2 screws attached). All ports: F female connector. Grounding facilities.

Directional Couplers



CIS-110

Model			CIS-110	CIS-116
Reference			3374	3375
Through loss	5-862 MHz	dB	≤ 2.0	≤ 1.6
	950-1550 MHz		≤ 2.3	≤ 1.8
	1551-2150 MHz		≤ 2.5	≤ 2.2
Tap loss	5-300 MHz	dB	10.5 (± 1.5)	16.0 (± 1.5)
	301-862 MHz		10.5 (± 1.5)	16.0 (± 1.5)
	950-2150 MHz		11.0 (± 2.0)	16.0 (± 2.0)
Tap-to-Output isolation		dB	≥ 15	≥ 18
Line input/output return loss		dB	≥ 12	≥ 12
Tap return loss	5-47 MHz	dB	≥ 7	≥ 14
	48-2150 MHz		≥ 12	≥ 12
Power passing through every port			max 65 VAC / 1A	
Hum modulation (1A)		dB	≤ -60	
Dimensions		mm	94 x 68 x 22	

2-way Splitter



SIS-102

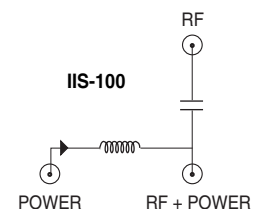
Model			SIS-102
Reference			3376
No. of ways			2
Insertion loss	5-862 MHz	dB	≤ 4.2
	950-1550 MHz		≤ 5.0
	1551-2150 MHz		≤ 5.8
Output isolation	5-47 MHz	dB	≥ 12
	48-862 MHz		≥ 20
	950-2150 MHz		≥ 15
Input return loss		dB	≥ 12
Output return loss		dB	≥ 10
Power pass through every port			max 65 VAC / 1A
Hum modulation (1A)		dB	≤ -60
Dimensions		mm	94 x 68 x 22

Power Inserter



IIS-100

Model			IIS-100
Reference			3377
Insertion loss	5-862 MHz	dB	≤ 0.8
	950-1550 MHz		≤ 1.0
	1551-2150 MHz		≤ 1.3
Return loss	5-862 MHz	dB	≥ 12
	950-2150 MHz		≥ 10
Voltage/Current for insertion			max 65 VAC / 1A
Hum modulation (1A)		dB	≤ -60
Dimensions		mm	94 x 68 x 22



(See ACP-425 power supply on page 118)

► DISTRIBUTION ELEMENTS

Diverse Outdoor Passive Elements with 60Vac/12A Power Passing - 1000 MHz **CE**



TRUNK-LINE PASSIVE ELEMENTS

Three directional couplers (8, 12 and 16 dB), two splitters (2 and 3-way) and one power inserter are the trunk-line passive elements available from IKUSI for cabled distribution systems up to 1GHz. They are presented in an aluminium alloy housing with double polyurethane coating to resist corrosion and are supplied with stainless steel metallic pieces for earthing and mounting —cable, wall or pole-mounting— (angle holder *Ref. 2974* required for the two last ones). A woven metallic gasket and a neoprene compression gasket provide exceptional RFI shielding (100 dB minimum) and IP67 grade weatherproofing.

The circuit board comes mounted on a faceplate but may be changed to housing to eliminate outages during diagnostics.

All ports are 5/8"-24 type. The power passing is a general feature and its high capacity is especially useful to simplify the powering and maintenance of the cable network.

Range is complemented with a 16-way splitter (page 137).

Directional Couplers — «RLDC10» Series

Model		RLDC10-08	RLDC10-12	RLDC10-16	
Reference		2682	2683	2684	
Through loss NOMINAL (MAXIMUM)	5 - 50 MHz	dB	1.9 (2.4)	1.3 (1.6)	1.1 (2.2)
	50 - 600 MHz		2.0 (3.2)	1.4 (2.5)	1.2 (2.5)
	600 - 862 MHz		2.6 (3.6)	1.4 (2.8)	1.4 (2.8)
	862 - 1000 MHz		3.4 (4.1)	1.8 (3.5)	1.8 (3.5)
Tap loss (±1 dB)	5 - 50 MHz	dB	8.6	12.2	16.9
	50 - 600 MHz		8.8	12.1	16.8
	600 - 862 MHz		8.2	11.7	16.2
	862 - 1000 MHz		8.3	11.7	15.8
Tap-to-Output isolation	5 - 50 MHz	dB	≥28	≥28	≥25
	50 - 600 MHz		≥21	≥23	≥24
	600 - 862 MHz		≥19	≥19	≥19
	862 - 1000 MHz		≥18	≥18	≥18
Return loss		dB	≥15		
Power passing between all ports			max 12 A, 60 V (AC/DC)		
Hum modulation (10 A)		dB	≤ -60		
Dimensions		mm	135 x 115 x 60		
Packed weight		g	650		

► DISTRIBUTION ELEMENTS

Diverse Outdoor Passive Elements with 60VAc/12A Power Passing - 1000 MHz (cont'd)

2-way and 3-way Splitters – «RLS10» Series

Model		RLS10-2	RLS10-3
Reference		2685	2686
Insertion loss NOMINAL (MAXIMUM)	5 - 50 MHz	3.7 (4.3)	3.7 / 7.1 (4.4 / 8.0) ⁽¹⁾
	50 - 600 MHz	3.9 (5.2)	4.0 / 7.4 (5.4 / 8.7) ⁽¹⁾
	600 - 862 MHz	3.9 (5.4)	4.0 / 7.6 (5.7 / 9.0) ⁽¹⁾
	862 - 1000 MHz	4.2 (5.7)	4.1 / 8.5 (6.0 / 9.2) ⁽¹⁾
Output isolation	5 - 50 MHz	≥23	≥23
	50 - 600 MHz	≥23	≥20
	600 - 862 MHz	≥22	≥20
	862 - 1000 MHz	≥18	≥18
Return loss	dB	≥16	
Power passing between all ports		max 12 A, 60 V (AC/DC)	
Hum modulation (10 A)	dB	≤ -60	
Dimensions	mm	135 x 105 x 60	
Packed weight	g	600	

⁽¹⁾ First value: port 2. Second value: ports 3 and 4. (Port 1: input. Ports 2, 3 and 4: outputs).

Power Inserter

Model		RPI-100
Reference		2687
Insertion loss NOMINAL (MAXIMUM)	5 - 50 MHz	0.5 (1.0)
	50 - 600 MHz	0.8 (1.2)
	600 - 862 MHz	0.8 (1.2)
	862 - 1000 MHz	1.0 (1.5)
Return loss	dB	≥16
Max insertion current ⁽¹⁾	A	12
Hum modulation (10 A)	dB	< -60
Dimensions	mm	135 x 115 x 60
Packed weight	g	650

⁽¹⁾ Towards both sides.



Angle - holder

TDE-100
Ref. 2974

- To fix the outdoor passive elements to a wall —with screws— or to a pole —with metal strip—.
- Galvanized steel. Packed weight: 60 g.

► DISTRIBUTION ELEMENTS

Diverse Outdoor Passive Elements — 1000 MHz

CE


16-WAY SPLITTER

The **GS16DGV** splitter may be used when cascading several 2- and 3-way splitters to meet the demands of dense MDU (multiple dwelling units) is needed.

It is presented in a chromate-treated zinc alloy housing to resist corrosion. Tongue and groove housing design provides exceptional RFI shielding (100 dB minimum) and an epoxy weather seal prevents water migration. Printed circuit board ensures consistent RF performance and high mechanical stability. All ports are machined "F" type.

Fitting and earthing of the housing are carried out using supplied screws.

16-way Splitter

Model		GS16DGV	
Reference		2651	
Insertion loss	5 - 50 MHz	dB	≤15.5
	50 - 600 MHz		≤16.5
	600 - 862 MHz		≤17.5
	862 - 1000 MHz		≤18.5
Output isolation	5 - 50 MHz	dB	≥18
	50 - 600 MHz		≥20
	600 - 862 MHz		≥19
	862 - 1000 MHz		≥18
Return loss		dB	≥15
Dimensions		mm	550 x 65 x 40
Packed weight		g	550

► DISTRIBUTION ELEMENTS

«RMT» — Outdoor Tap-offs - 1000 MHz

CE


The IKUSI outdoor tap-off range for distribution lines in cabled systems of up to 1 GHz includes 2-, 4- and 8-way models designed to optimize signal level to the drop. They are presented in an aluminium alloy housing with double polyurethane coating to resist corrosion and provided with stainless steel metallic pieces for earthing and mounting —cable, wall or pole-mounting (angle holder *Ref. 2974* required for the latter two). A woven metallic gasket and a neoprene compression gasket provide exceptional RFI shielding (100 dB minimum) and a weatherproofing IP67 grade.

The faceplate with circuit board may be taken out without removing the coaxial cables, making changes or upgrades of the system easy through single faceplate changeouts.

Line input-output ports are 5/8"-24 type and the tap ports come on neoprene sealed, nickel plated brass "F" connectors.

All units feature power passing between the two main line ports.

2-way Tap-offs — «RMT102» Series

Model		RMT102-	-4	-8	-11	-14	-17	-20	-23	-26
Reference			2652	2653	2654	2655	2656	2657	2658	2659
Through loss NOMINAL (MAXIMUM)	5 - 50 MHz	dB	T ⁽¹⁾	3.4 (3.7)	1.5 (1.9)	1.0 (1.4)	0.7 (1.1)	0.4 (0.8)	0.4 (0.8)	0.4 (0.8)
	50 - 600 MHz		T	4.0 (4.4)	1.9 (2.4)	1.3 (1.8)	0.9 (1.4)	0.8 (1.1)	0.6 (1.1)	0.8 (1.1)
	600 - 862 MHz		T	4.2 (4.6)	2.2 (3.1)	1.4 (2.3)	1.1 (1.8)	1.1 (1.6)	1.1 (1.6)	1.0 (1.6)
	862 - 1000 MHz		T	4.4 (4.8)	2.8 (3.7)	2.2 (3.1)	1.4 (2.2)	1.4 (1.7)	1.1 (1.7)	1.2 (1.7)
Tap loss	5 - 50 MHz	dB	3.4 ±1.0	7.2 ±1.0	10.5 ±1.0	14.6 ±1.0	16.5 ±1.0	20.6 ±1.0	22.5 ±1.0	25.6 ±1.0
	50 - 600 MHz		3.5 ±1.0	7.2 ±1.0	10.8 ±1.0	14.4 ±1.0	16.6 ±1.0	20.8 ±1.0	22.6 ±1.0	25.8 ±1.0
	600 - 862 MHz		3.7 ±1.7	7.5 ±1.7	10.7 ±1.7	13.5 ±1.7	16.8 ±1.7	21.1 ±1.7	22.9 ±1.7	26.0 ±1.7
	862 - 1000 MHz		4.0 ±2.0	8.6 ±2.0	11.0 ±2.0	12.9 ±2.0	17.0 ±2.0	21.3 ±2.0	23.4 ±2.0	25.5 ±2.0
Tap-to-Output isolation	5 - 50 MHz	dB	T ⁽¹⁾	≥18	≥18	≥20	≥30	≥30	≥35	≥38
	50 - 600 MHz		T	≥21	≥21	≥20	≥30	≥27	≥32	≥30
	600 - 862 MHz		T	≥20	≥21	≥20	≥29	≥26	≥29	≥27
	862 - 1000 MHz		T	≥18	≥18	≥18	≥25	≥23	≥27	≥25
Tap-to-Tap isolation		dB	≥18							
Return loss		dB	≥15							
Power passing between main line ports			max 6 A, 60 V (AC/DC)							
Hum modulation (6 A)		dB	≤ -70							
Dimensions		mm	90 x 90 x 60							
Packed weight		g	300							

⁽¹⁾ T → Terminal. RMT102-4 is the final tap-off.

► DISTRIBUTION ELEMENTS

«RMT» — Outdoor Tap-offs - 1000 MHz

(cont'd)

4-way Tap-offs — «RMT104» Series

Model		RMT104-	-8	-11	-14	-17	-20	-23	-26
Reference			2663	2664	2665	2666	2667	2668	2669
Through loss NOMINAL (MAXIMUM)	5 - 50 MHz	dB	T ⁽¹⁾	3.2 (3.7)	1.5 (1.9)	0.9 (1.4)	0.7 (1.1)	0.5 (0.9)	0.5 (0.9)
	50 - 600 MHz		T	4.1 (4.4)	2.0 (2.4)	1.2 (1.8)	0.8 (1.4)	0.7 (1.3)	0.6 (1.3)
	600 - 862 MHz		T	4.2 (4.6)	2.3 (3.0)	1.6 (2.4)	1.0 (1.8)	1.0 (1.6)	0.8 (1.6)
	862 - 1000 MHz		T	4.4 (4.9)	3.1 (3.7)	2.4 (3.1)	1.4 (2.2)	1.1 (1.8)	1.0 (1.8)
Tap loss	5 - 50 MHz	dB	7.0 ±1.0	10.3 ±1.0	13.7 ±1.0	17.7 ±1.0	20.2 ±1.0	23.1 ±1.0	25.5 ±1.0
	50 - 600 MHz		6.9 ±1.0	10.2 ±1.0	14.2 ±1.0	17.2 ±1.0	20.3 ±1.0	23.2 ±1.0	25.8 ±1.0
	600 - 862 MHz		7.2 ±1.7	10.4 ±1.7	14.3 ±1.7	16.4 ±1.7	20.1 ±1.7	22.7 ±1.7	25.7 ±1.7
	862 - 1000 MHz		7.4 ±2.0	10.8 ±2.0	14.2 ±2.0	15.7 ±2.0	20.6 ±2.0	23.5 ±2.0	26.3 ±2.0
Tap-to-Output isolation	5 - 50 MHz	dB	T ⁽¹⁾	≥18	≥20	≥26	≥35	≥35	≥38
	50 - 600 MHz		T	≥22	≥20	≥20	≥33	≥32	≥30
	600 - 862 MHz		T	≥20	≥19	≥19	≥30	≥28	≥26
	862 - 1000 MHz		T	≥18	≥18	≥18	≥28	≥27	≥25
Tap-to-Tap isolation		dB	≥18						
Return loss		dB	≥15						
Power passing between main line ports			max 6 A, 60 V (AC/DC)						
Hum modulation (6 A)		dB	≤ -70						
Dimensions / Weight		mm / g	90 x 90 x 60 / 300						

⁽¹⁾ T → Terminal. RMT104-8 is the final tap-off.

8-way Tap-offs — «RMT108» Series

Model		RMT108-	-11	-14	-17	-20	-23	-26
Reference			2673	2674	2675	2676	2677	2678
Through loss NOMINAL (MAXIMUM)	5 - 50 MHz	dB	T ⁽¹⁾	3.3 (3.7)	1.5 (1.9)	1.0 (1.4)	0.8 (1.2)	0.7 (1.1)
	50 - 600 MHz		T	3.8 (4.4)	1.9 (2.5)	1.4 (1.9)	1.2 (1.7)	1.2 (1.3)
	600 - 862 MHz		T	4.0 (4.7)	2.2 (3.1)	1.5 (2.3)	1.2 (1.9)	1.0 (1.6)
	862 - 1000 MHz		T	4.2 (4.9)	2.5 (3.5)	2.1 (3.1)	1.3 (2.2)	1.1 (1.8)
Tap loss	5 - 50 MHz	dB	10.3 ±1.0	14.0 ±1.0	17.1 ±1.0	20.1 ±1.0	23.2 ±1.0	25.4 ±1.0
	50 - 600 MHz		10.3 ±1.0	13.7 ±1.0	17.6 ±1.0	20.3 ±1.0	23.5 ±1.0	25.9 ±1.0
	600 - 862 MHz		10.7 ±1.7	14.0 ±1.7	17.5 ±1.7	20.4 ±1.7	23.4 ±1.7	25.7 ±1.7
	862 - 1000 MHz		11.5 ±2.0	14.7 ±2.0	17.9 ±2.0	21.0 ±2.0	23.3 ±2.0	25.3 ±2.0
Tap-to-Output isolation	5 - 50 MHz	dB	T ⁽¹⁾	≥18	≥20	≥26	≥35	≥35
	50 - 600 MHz		T	≥22	≥20	≥20	≥33	≥32
	600 - 862 MHz		T	≥20	≥19	≥19	≥30	≥28
	862 - 1000 MHz			≥18	≥18	≥18	≥28	≥27
Tap-to-Tap isolation		dB	≥18					
Return loss		dB	≥15					
Power passing between main line ports			max 6 A, 60 V (AC/DC)					
Hum modulation (6 A)		dB	≤ -70					
Dimensions / Weight		mm / g	130 x 95 x 55 / 500					

⁽¹⁾ T → Terminal. RMT108-11 is the final tap-off.

► DISTRIBUTION ELEMENTS

«ARTU» — Wall Outlets with 2 Outputs (TV and RD)

CE

- For use in single-cable tree distributions and for single systems or star distributions.
- Sturdy injection-moulded zinc alloy housing. Flush mounting in box $\varnothing 56$ mm. Dimensions of coverplate: 80x80 mm. Fast and easy connection of the coaxial cable. Surface mounting using the ABT-210 (Ref. 1460) frame, see page 142.
- Versions without coverplate available.
- Connectors:
 - TV: male IEC
 - RD: female IEC



ARTU201
ARTU002 / 001 / 000

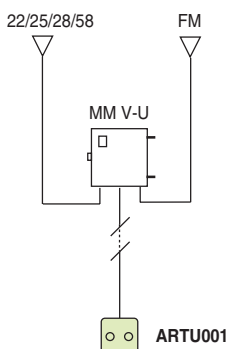
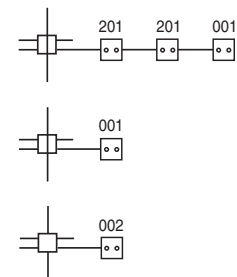


ARTU251
ARTU052V / 051



ARTU050

Application examples



TV - RD — Line Outlets

Model		ARTU201	
Reference		2750	
Without coverplate	Model	ARTU251	
	Reference	2763	
Frequency range		MHz	5 - 862
Transfer loss (± 0.5 dB)	input - TV	dB	7.5
	input - RD		27.5
Max through loss		dB	2.5
Isolation	output - TV	dB	> 26
	output - RD		> 44
TV-RD isolation		dB	> 20

TV - RD — Stub Outlets

Model		ARTU001	ARTU002	ARTU000
Reference		2736	2737	2735
Without coverplate *	Model	ARTU051	ARTU052V	ARTU050
	Reference	2766	2470	2734
Technology		Resistive	LC filters **	Bridged
Frequency range		MHz	TV: 5 - 68 and 118 - 1000 RD: 87.5 - 108	5 - 862
Transfer loss	input - TV	dB	≤ 3.5	-
	input - RD		≤ 10	-
Desacoplo TV-RD		dB	> 10	-

* Neither fixing hooks in the ARTU050 (Ref. 2734).

** The ARTU052V (Ref. 2470) features galvanic isolation between inner conductor input and inner conductor TV/RD outputs (3 kV RMS for at least 1 minute).

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

Coverplate

Model	Ref.	Description
PBT-100	2545	Coverplate for ARTU251, ARTU050, ARTU051 and ARTU052V outlets. Dim.: 80x80 mm.

► DISTRIBUTION ELEMENTS

«ARTU» — Wall Outlets with 2 Outputs (TV/RD and SAT)

- For use in single-cable tree distributions and for single systems or star distributions.
- Sturdy injection-moulded zinc alloy housing. Flush mounting in box $\varnothing 56$ mm. Dimensions of coverplate: 80 x 80 mm. Fast and easy connection of the coaxial cable. Surface mounting using the ABT-210 (Ref. 1460) frame, see next page.
- Versions without coverplate or fixing hooks available.
- Connectors:
 - TV/RD: male IEC
 - SAT: female IEC
- DC transit through the SAT output (24V/350mA, plus 22 kHz and DiSEqC signals). Easy elimination.



ARTU900 ...903
ARTU009



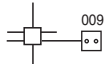
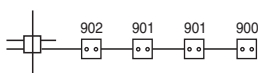
ARTU950 / 951 / 952
ARTU059

TV/RD - SAT — Line Outlets

Model		ARTU900	ARTU901	ARTU902	ARTU903
Reference		2474	2475	2476	2477
- Without coverplate - Without fixing hooks	Model	ARTU950	ARTU951	ARTU952	
	Reference	2478	2479	2480	
Frequency range		MHz	TV/RD : 5 - 862 SAT : 950 - 2300	TV/RD : 5 - 862 SAT : 950 - 2300	TV/RD : 5 - 862 SAT : 950 - 2300
Transfer loss (± 0.5 dB)	input - TV/RD	dB	4.5	11	15
	input - SAT		5.5	11	15
Max through loss	5-862 MHz	dB	— (*)	2	1.3
	950-2300 MHz		— (*)	3	2.5
Isolation	output - TV/RD	dB	— (*)	> 23	> 26
	output - SAT		— (*)	> 16	> 17
TV/RD - SAT isolation		dB	> 25	> 25	> 25
DC transit through the SAT output			Yes (ARTU900) No (ARTU950)	Yes	Yes

(*) ARTU900 and ARTU950 are final outlets

Application examples (*)



(*) - Distance between outlets: 3 m.
- Coaxial cable: CCS-178 (Ref. 2516).

TV/RD - SAT — Stub Outlets

Model		ARTU009	
Reference		2472	
- Without coverplate - Without fixing hooks	Model	ARTU059	
	Reference	2473	
Frequency range		MHz	
		TV/RD : 5 - 862 SAT : 950 - 2300	
Transfer loss	input - TV/RD	dB	≤ 1.5
	input - SAT		≤ 2
TV/RD - SAT isolation		dB	> 25
DC transit through the SAT output			Yes (ARTU009) No (ARTU059)

Coverplate

Model	Ref.	Description
PBT-200	2469	Coverplate for ARTU95x and ARTU059 outlets. Dimensions: 80x80 mm.

► DISTRIBUTION ELEMENTS

«ARTU» — Wall Outlets with 3 Outputs (TV, RD and SAT)

CE

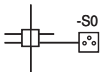
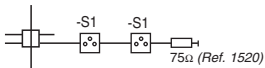
- For use in single-cable tree distributions and for single systems or star distributions.
- Sturdy injection-moulded zinc alloy housing. Flush mounting in box $\varnothing 56$ mm. Coverplate included, dimensions 80x80 mm. Surface mounting using the ABT-210 (Ref. 1460) frame, see below.
- Connectors:
 - TV: male IEC
 - RD: female IEC
 - SAT: female F
- Depending on the model, DC transit through the SAT output (24V/350mA, plus 22 kHz and DiSEqC signals).

TV - RD - SAT — Line Outlet


ARTU-S1 /S0 /U0

Model		ARTU-S1	
Reference		2720	
Frequency range	MHz	TV: 5 - 68 and 120 - 862 RD: 87 - 108 SAT: 950 - 2150	
Transfer loss (± 0.5 dB)	input - TV	dB	11.5
	input - RD		11.5
	input - SAT		10
Max through loss	5-68 and 120-862 MHz	dB	1
	87-108 MHz		1
	950-2150 MHz		4
Isolation	output - TV	dB	> 25
	output - RD		> 35
	output - SAT		> 16
TV-RD and TV-SAT isolations		dB	> 15
SAT-RD isolation		dB	> 25
DC transit through the SAT output			Yes

Application examples



TV - RD - SAT — Stub Outlets

Model		ARTU-S0	ARTU-U0
Reference		2719	2548
Frequency range	MHz	TV: 5 - 68 and 120 - 862 RD: 87 - 108 SAT: 950 - 2150	
Transfer loss	input - TV	dB	≤ 1
	input - RD		≤ 1.5
	input - SAT		≤ 2
TV-RD and TV-SAT isolations		dB	> 15
SAT-RD isolation		dB	> 25
DC transit through the SAT output			Yes


ABT-210


Surface Mounting Frame

Model	Ref.	Application
ABT-210	1460	Mounting of the outlets without embedding the body in the wall.

► COAXIAL CABLES AND CONNECTORS

Coaxial Cables

Indoor Distribution Cables

Model		CCS-178	CCH-175	CCS-175	CCI-175	CCI-179	CCS-190	CCI-190	CCI-191
Reference		2516	2506	2017	2522	2521	2018	2520	2015
Inner conductor - Diameter		Cu	Cu	Cu	Cu	Cu	Cu	Cu	Cu
	mm	1.13	1.13	1.13	1.13	1.10	1	1	1
Dielectric - Diameter		PE	PE	PE	PE	PE	PE	PE	PE
	mm	4.8	4.8	4.8	4.8	5	4.6	4.6	4.8
Outer conductor - Diameter		PET (tape) + Cu/PET (tape) + * Cu (braid) +	Cu (tape) + Cu (braid)	Cu (tape) + ** Cu (braid)	Cu (tape) + Cu (braid)	Al (tape) + Al (braid)	Al (tape) + ** Al (braid)	Al (tape) + Al (braid)	Cu (tape) + Cu (braid)
	mm	6.1	6.1	6.1	6.1	6.3	5	5	5
Outer sheath - Diameter		PVC white	Polyolefin white (LSOH ***)	PVC white	PVC white	PVC white	PVC white	PVC white	PVC white
	mm	6.8	6.8	6.8	6.8	7	6.8	6.8	6.8
Attenuation/100m									
	47 MHz	3.9	3.7	3.7	3.7	4.6	4.9	4.9	3.9
	100 MHz	5.4	5.3	5.3	5.3	6.0	6.5	6.5	5.7
	230 MHz	8.1	8.0	8.0	8.0	8.9	9.5	9.5	8.7
	470 MHz	12.3	11.9	11.9	11.9	13.2	14.0	14.0	12.8
	862 MHz	17.0	16.6	16.6	16.6	18.0	19.6	19.6	17.7
	950 MHz	17.9	17.5	17.5	17.5	19.5	21.0	21.0	18.8
	1750 MHz	25.3	24.5	24.5	24.5	27.0	29.4	29.4	26.0
2150 MHz	28.1	27.5	27.5	27.5	29.8	32.5	32.5	29.0	
Charact. impedance	Ω	75 ±3	75 ±3	75 ±3	75 ±3	75 ±3	75 ±3	75 ±3	75 ±3
Supply unit		(6x) reel 100 m	(6x) reel 100 m	(6x) reel 100 m	(6x) reel 100m	(6x) reel 100 m	(6x) reel 100 m	(6x) reel 100 m	(6x) reel 100 m

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

* Braid of the CCS-178 is highly thick (coverage factor: 60%).

** Braids of the CCS-175 and CCS-190 are highly thick (coverage factor: 70%).

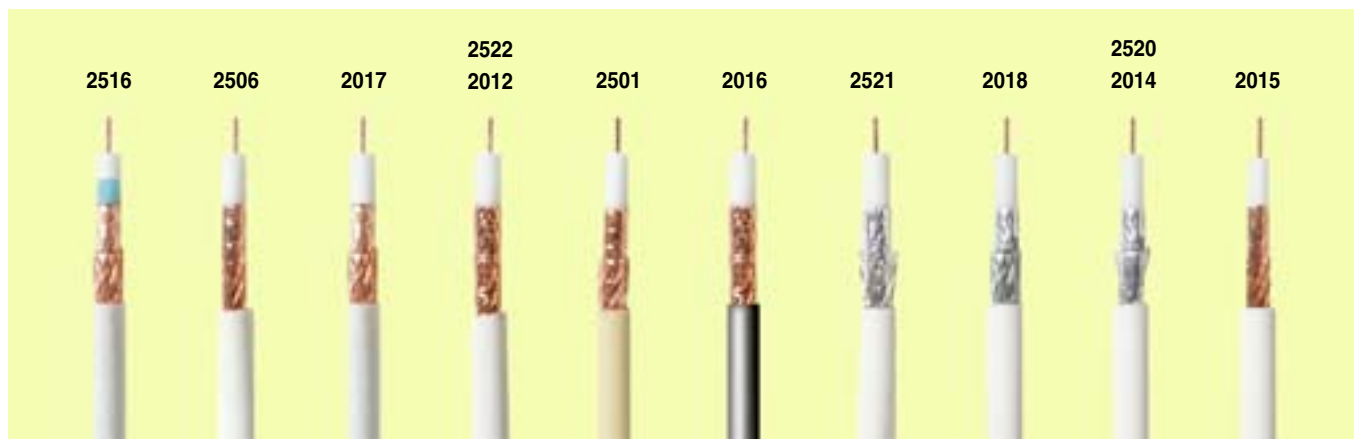
*** LSOH: Low Smoke Zero Halogen. Outer sheath of the CCH-175 does not contain halogens. It is flame retardant (EN/IEC 60332-3), the density of the smoke produced when the cable is burnt is very low (EN/IEC 61034-2) and the fumes are nontoxic (IEC 60754-2).

Variants

Model	Ref.	Outer sheath	Rest of physical and electric characteristics
CCI-176	2501	PVC beige	just like those of CCI-175 (Ref. 2522)
CCI-174	2016	PVC black	just like those of CCI-175 (Ref. 2522)

Variants

Model	Ref.	Supply Unit	Physical and electric characteristics
CCIB175	2012	(1x) reel 250 m	just like those of CCI-175 (Ref. 2522)
CCIB190	2014	(1x) reel 1000 ft	just like those of CCI-190 (Ref. 2520)



▶ COAXIAL CABLES AND CONNECTORS

Coaxial Cables

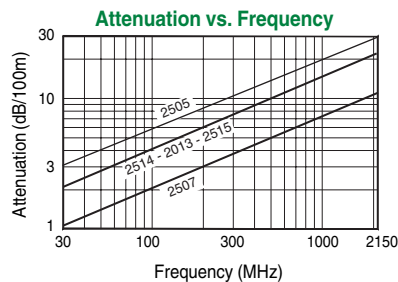
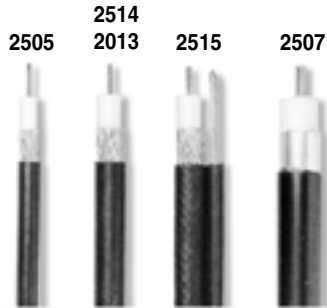
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CATV Trunk&Feeder Cables

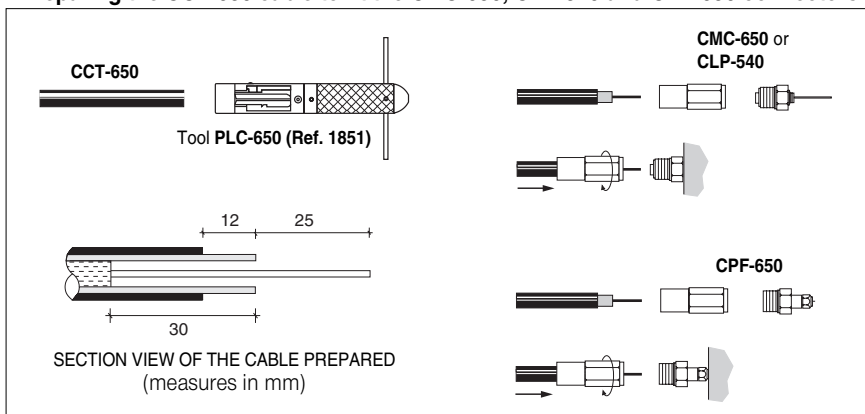
Model		CCT-171	CCT-125	CCTB125	CCT-126	CCT-650
Reference		2505	2514	2013	2515	2507
Inner conductor - Diameter	mm	Cu 1.10	Cu 1.65			Cu clad Al 3.15
Dielectric - Diameter	mm	Foam PE 5	Foam PE 7,1			Foam PE 13
Outer conductor - Diameter	mm	Al (tape) + Al (braid) 6.3	Al (tape) + Cu/Sn (braid) 7.8			Al (tube) 13.7
Outer sheath (black) - Diameter	mm	PE 7	PE 10.2			PE 15.4
Characteristic impedance	Ω	75 ±3	75 ±3			75 ±2
Maximum attenuation at 20° C (*) f = 100 MHz 200 500 600 750 862 950 1750 2150	dB/100m	6.0 8.2 13.4 14.4 16.6 18.0 19.5 27.0 29.8	4.6 6.2 10.1 11.0 12.3 13.1 15.2 20.5 23.0			2.1 3.0 4.9 5.4 6.1 6.5 7.5 10.2 11.5
DC resistance of: - inner conductor - outer conductor	Ω/100m	1.72 1.14	0.9 1.2			0.33 0.19
Velocity ratio of propagation	%	77	77			88
Nominal capacitance	pF/m	55	55			50
Operating temperature	°C	-20 ... +50	-20 ... +50			-20 ... +50
Minimum bending radius	cm	7	8	8	10	13
Pulling tension	daN	40	60	60	170	100
Weight	kg/100m	4.2	8.6	8.6	13.4	20
Support strand - Diameter	mm	—	—	—	2.2	—
Supply unit		(6x) reel 100m	(1x) reel 500m	(1x) reel 200m		

(*) Attenuation coefficient: $2 \cdot 10^{-3} / ^\circ\text{C}$

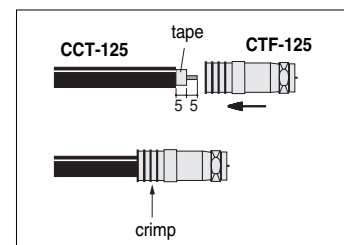
NOTE : By way of information: CCT-125 / CCTB125 cable is RG-11 type and CCT-650 cable is RG-245 type.



Preparing the CCT-650 cable to fit the CMC-650, CLP-540 and CPF-650 connectors



Preparing the cable CCT-125 to fit the CTF-125 connector



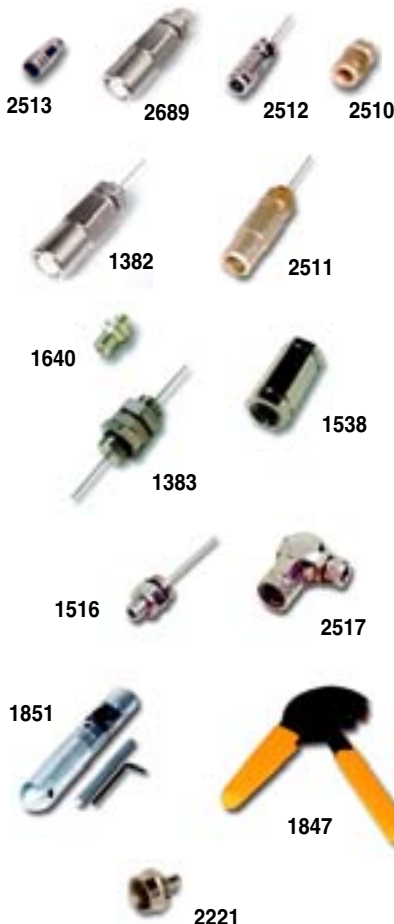
► COAXIAL CABLES AND CONNECTORS

Cable Connectors



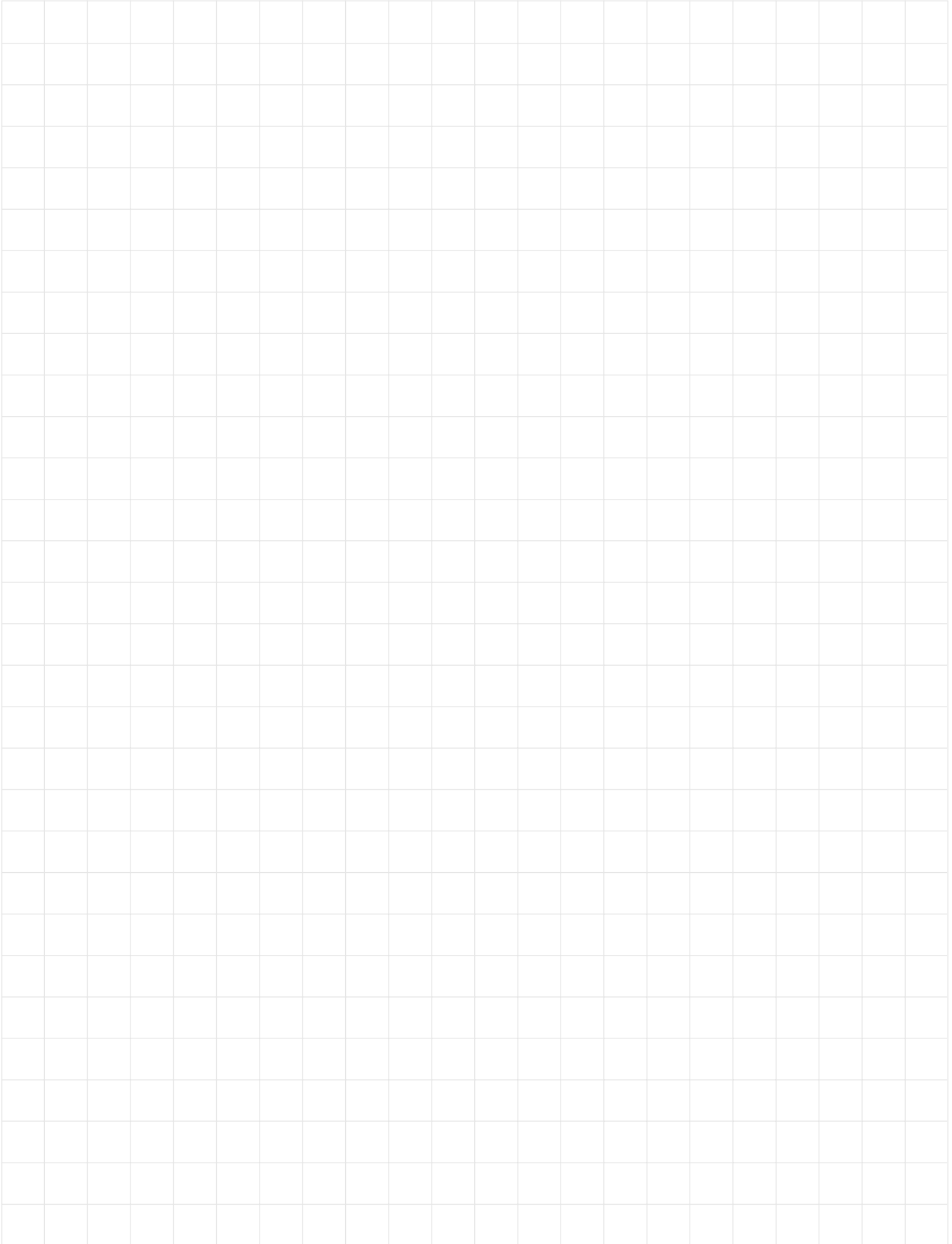
Connectors for Indoor Distribution Cables

Model	Ref.	Description
F CONNECTORS		
CFR-680	2377	Screw-on plug. Use cable: CCS, CCH, CCI, CCIB and CCT-171.
CTF-190	2368	Crimp plug. Use cable: CCS, CCH, CCI, CCIB and CCT-171.
TOOL		
UCF-175	2370	Crimp pliers for CTF-190 connector.
F ADAPTERS		
FAR-900	2351	90 degree adapter: F male — F female
FRH-081	2350	Joining connector: F male — F male
FDH-215	2371	Joining connector: F female — F female
ARF-100	2360	Fast-fit adapter, F male
IEC CONNECTORS		
CAD	1502	Elbow plug
CHD-950	1503	Elbow jack
CONNECTOR TYPE ADAPTERS		
TBF-101	2364	F female — BNC male
TIF-100	2365	IEC male — F female
TIF-102	2366	IEC female — F male
OTHERS		
ECC	1521	Coaxial cable splicer



Connectors for CATV Trunk&Feeder Cables

Model	Ref.	Description
F CONNECTORS		
CTF-125	2513	Crimp F plug. Material: nicked brass. Use cable: CCT-125 , -126.
CPF-650	2689	F Plug. Material: nicked brass. Use cable: CCT-650.
5/8" CONNECTORS		
CTP-125	2512	Pin 5/8". Material: nicked brass. Use cable: CCT-125 , -126.
CLP-125	2510	5/8". Material: chromate coating aluminium. Use cable: CCT-125 , -126.
CMC-650	1382	Pin 5/8". Material: nicked brass. Use cable: CCT-650.
CLP-540	2511	Pin 5/8". Material: chromate coating aluminium. Use cable: CCT-650.
ADAPTERS-DOUBLE		
SAI-311	1640	F Double female. Material: nicked brass.
EHP-162	1538	5/8" Double female. Material: nicked brass.
CMM-580	1383	5/8" Double male. Material: nicked brass.
ADAPTERS		
TCF-580	1516	F female — 5/8" male. Material: nicked brass.
TTF-090	2517	5/8" female — F male. Material: nicked brass.
TOOLS		
PLC-650	1851	For preparing the CCT-650 cable to fit pin 5/8" connectors.
UCF-170	1847	Hex crimp tool for CTF-125 connector.
75Ω LOAD		
CTF-075	2221	F type. For loading an F port. Idem a 5/8" port through the TCF-580 adapter. Material: nicked brass.



► RACK CABINETS

19" Rack Cabinets — "Top Line" Series



ART-630

19" Rack Cabinets Without Door

Model		ART-630	ART-642
Reference		3640	3641
Panel height	U	30	42
Outside dimensions (h x w x d)	mm	1445 x 600 x 600	1978 x 600 x 600
Packed weight	kg	62	82

- External structure of painted epoxy graphite grey aluminium. ABS corner pieces.
- Panel mounting members made from 2 mm thickness steel. They are fully adjustable throughout the depth of the cabinet.
- Metallic, lockable rear door.
- Ventilated top cover.
- Adjustable feet to facilitate levelling of the cabinet on a uneven surface.
- Cabinets are capable of accepting distributed loads of up to 500 kg.



PRT-030

Frontal Cabinet Doors

Model		PRT-030	PRT-042
Reference		3642	3643
Installing in cabinet		ART-630	ART-642
Packed weight	kg	9.5	13

- Made from tempered, 5mm thickness, bronze-coloured security crystal. Frame of painted epoxy graphite grey aluminium.
- Doors may be hung to open from either the left or right.



VRT-602

19"-1U Fan Tray

Model		VRT-602
Reference		3645

- Front fixing to the cabinets. Three fans. Grilles are integrated.
- IEC mains inlet fitted in the rear (mains lead not supplied). Illuminated switch fitted in the front panel.
- Material: epoxy painted, 1 mm thickness steel. Front panel of silver anodised aluminium.
- Dimensions: 19" x 225 mm x 1U. Packed weight: 3.6 kg.



DRT-600

19"-1U Deflector Tray

Model		DRT-600
Reference		3805

- Deflects the upward hot air stream, so that this does not flow between the modules of the upper decks. Material: 1.5 mm thickness aluminium.
- Dimensions: 19" x 290 mm x 1U. Packed weight: 600 g

19"-1U Brushed Cable Entry Panel

Model		CRT-119
Reference		3644

- Provides a solution for cable access into cabinet while providing protection to the ingress of airborne dust or dirt.
- Material: epoxy painted, 1.5 mm thickness steel.
- Dimensions: 19" x 11.5 mm x 1U. Packed weight: 320 g.



CRT-119

Support Angles

Model		GRT-602
Reference		3646

- Provide 44.5 mm of horizontal surface along each side of the depth of the cabinet to facilitate mounting and support of heavy 19" components. Material: bi-chromated, 2 mm thickness steel.
- No screws. Anchorage to the rack is performed through flanges in the angles.
- Dimensions: 44.5 x 350 x 44.5 mm. 2 angles per box. Packed weight: 1 kg.



GRT-602

▶ RACK CABINETS

19" Rack Cabinets — "Standard" Series



RAC-530

19" Rack Cabinets

Model		RAC-510	RAC-520	RAC-530
Reference		3800	3802	3804
Panel height	U	10	20	30
Number of 4U rear panels with blowing units		1	2	4
Power supply included	Vdc/A	+24 / 0.6	+24 / 0.6	+24 / 0.6
Outside dimensions (h x w x d)	mm	490 x 525 x 400	935 x 525 x 400	1370 x 525 x 400
Packed weight	kg	12	18	25

- Structure: synthetic resin pieces fixed to an aluminium frame.
- Power supply included for providing +24 VDC voltage through the banana jacks of the TAC-401 rack panel (when this is installed in the cabinet, see here below).

Cabinet Rear Panels

Model	TAC-401	TAC-402	TAC-403	TAC-400
Reference	2607	2614	1353	2606
Usage	Satellite reception and/or terrestrial reception using mast-head preamplifiers	Satellite reception and/or terrestrial reception without using mast-head preampli	"Blank"	"Blank"
Holes to place double female "F" adapters (input ports of the headend)	10	10	—	—
Banana jacks providing DC voltage for power inserters	9	—	—	—
Mains connection receptacle	1	1	—	—
Dimensions	19" - 4U (483 x 178 mm)	19" - 4U (483 x 178 mm)	19" - 4U (483 x 178 mm)	19" - 2U (483 x 89 mm)
Packed weight	700 g	700 g	700 g	360 g

- Mounting in «RAC-500» cabinets. Metallic. Epoxy painted.



TAC-401

Simple front panels

Blank 19"-1U Panel

Model	BEC-400
Reference	2605

- Material: epoxy painted, 1.5 mm thickness steel. Dimensions: 19" x 1.5 mm x 1U. Packed weight: 200 g

Ventilation 19"-1U Panel

Model	FIT-501
Reference	3626

- Material: epoxy painted, 1.5 mm thickness steel. Dimensions: 19" x 1.5 mm x 1U. Packed weight: 120 g

Factory Assembly Options

IKUSI welcome request for factory assembly of manufactured products into a prefabricated headend. The prefabricated headends come complete with all hardware and electrical interconnects. These headends are factory pretested, tuned, burned-in and adjusted prior to shipment in a special packing.

Assembly option	OMF-520	OMF-530	OMF-540	
Reference	3618	3620	3622	
Cabinet size	U	10 / 20	30	42

▶ ELECTRONIC ACCESSORIES

Plug-in Electronic Accessories — 862 MHz

CE

With F Connectors



Model	Ref.	Description
ABF-010	2378	BROADBAND AMPLIFIER Bandwidth: 45-862MHz. Gain: 10dB. Noise figure: 5dB. Power supply: +24VDC/30mA ("banana" jumper). F-M (Female-Male).
RFM-040	3122	FILTERS FM trap. Attenuation ≥ 40 dB. F-M.
RVR-066	2376	5-66 MHz reverse signal trap. Reject.: ≥ 55 dB. Insert. loss (88-862MHz): ≤ 0.5 dB. F-M.
FPB-2137	2100	B IV Band-Pass Filter. Insert. loss (470-606MHz): ≤ 1.5 dB. Reject. (± 32 MHz): ≥ 50 dB. F-M.
FPB-3869	2101	B V Band-Pass Filter. Insert. loss (606-862MHz): ≤ 1.5 dB. Reject. (± 32 MHz): ≥ 50 dB. F-M.
FAV-020	3105	ATTENUATORS Variable 0-20dB in VHF/UHF. Constant impedance. F-M.
FAV-120	3107	Variable 0-20dB in VHF/UHF. Constant impedance. DC by-pass 260 mA. F-M.
FPB-2137	2353	Fixed 6dB in VHF/UHF. F-M.
FAM-006	2355	Fixed 12dB in VHF/UHF. F-M.
FAM-012	2357	Fixed 20dB in VHF/UHF. F-M.
FAV-020	1519	75Ω LOADS Shielded load.
CTF-175	3127	DC-isolated load. External jack for insertion/extraction of +24Vdc.
FAM-006	2137	VARIABLE EQUALIZERS Variable equalizer 20dB for 40-860 MHz band. Insertion loss: 2 dB.
IEF-024	3130	OTHERS Power inserter (260 mA/30 V). Insertion loss: ≤ 0.5 dB. F-M.
EIF-025	3129	Power extractor (260 mA/30 V). Insertion loss: ≤ 0.5 dB. F-M.
BCF-060	2379	60V AC/DC block. F-M.



VEQ-860



IEF-024



EIF-025



BCF-060

With IEC Connectors



Model	Ref.	Description
AV-020	1674	ATTENUATORS Variable 0-20dB in VHF/UHF. Constant impedance. F-M.
DH-13	1407	2-WAY SPLITTERS / 2-INPUT COMBINERS Insertion loss: ≤ 4 dB
V-2T	1408	Insertion loss: ≤ 4 dB



Splitting: input; outputs.
Combining: inputs; output.

► **ELECTRONIC ACCESSORIES**

Electronic Accessories — 862 MHz

CE

Power Inserter - Attenuator

- Utilizable to insert a powering voltage on a downlead antenna cable and to adjust the level of the incoming RF signal. Plugable on the input connectors at the rear panel of the rack cabinets. Male-female F connectors.



IAR-300

Model		IAR-300
Reference		2594
Bandwidth	MHz	47 - 862
Adjustable insertion loss	dB	1 - 21
Max voltage/current	V/mA	24 / 300
Dimensions	mm	60 x 60 x 40
Packed weight	g	80

FM Variable Trap

- To attenuate 1, 2 or 3 FM channels in the 87.5-108 MHz band. Plugable on the FM (BII) input connector at the rear panel of the rack cabinets. Male-female F connectors.



FRB-203

Model		FRB-203
Reference		2593
Rejection of frequencies between :	MHz	87.5 - 108
Number of rejectable frequencies		1, 2 or 3
Rejection	dB	34 (adjustment on 1 frequency) 28 (adjustment on 2 frequencies) 22 (adjustment on 3 frequencies)
Dimensions	mm	75 x 80 x 30
Packed weight	g	220

Return Signal Extractors

- Used to separate forward and reverse signals in two-way systems. Input: 5-862 MHz. Three models for three band splits: 30/47 MHz, 55/86 MHz and 66/86 MHz. Mountable outdoors. Wall- or pipe-fixing using the TDE-100 (Ref. 2974) angle-holder. Input and output RF connections by 5/8"-24 UNEF 2A pin connectors.



TER-803

Model		TER-803	TER-805	TER-806
Reference		2608	2609	2628
Input - Frequency range	MHz	5 - 862	5 - 862	5 - 862
Reverse Signal output - Frequency range	MHz	5 - 30	5 - 55	5 - 66
Forward Signal output - Frequency range	MHz	47 - 862	86 - 862	86 - 862
Insertion loss	dB	0.3	0.3	0.3
Dimensions	mm	125 x 75 x 55	125 x 75 x 55	125 x 75 x 55
Packed weight	g	560	560	560

▶ ELECTRONIC ACCESSORIES

Electronic Accessories — 2150 MHz

CE

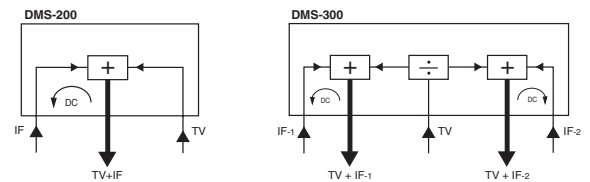
TV - IF Combiners



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

* See below

Block diagrams

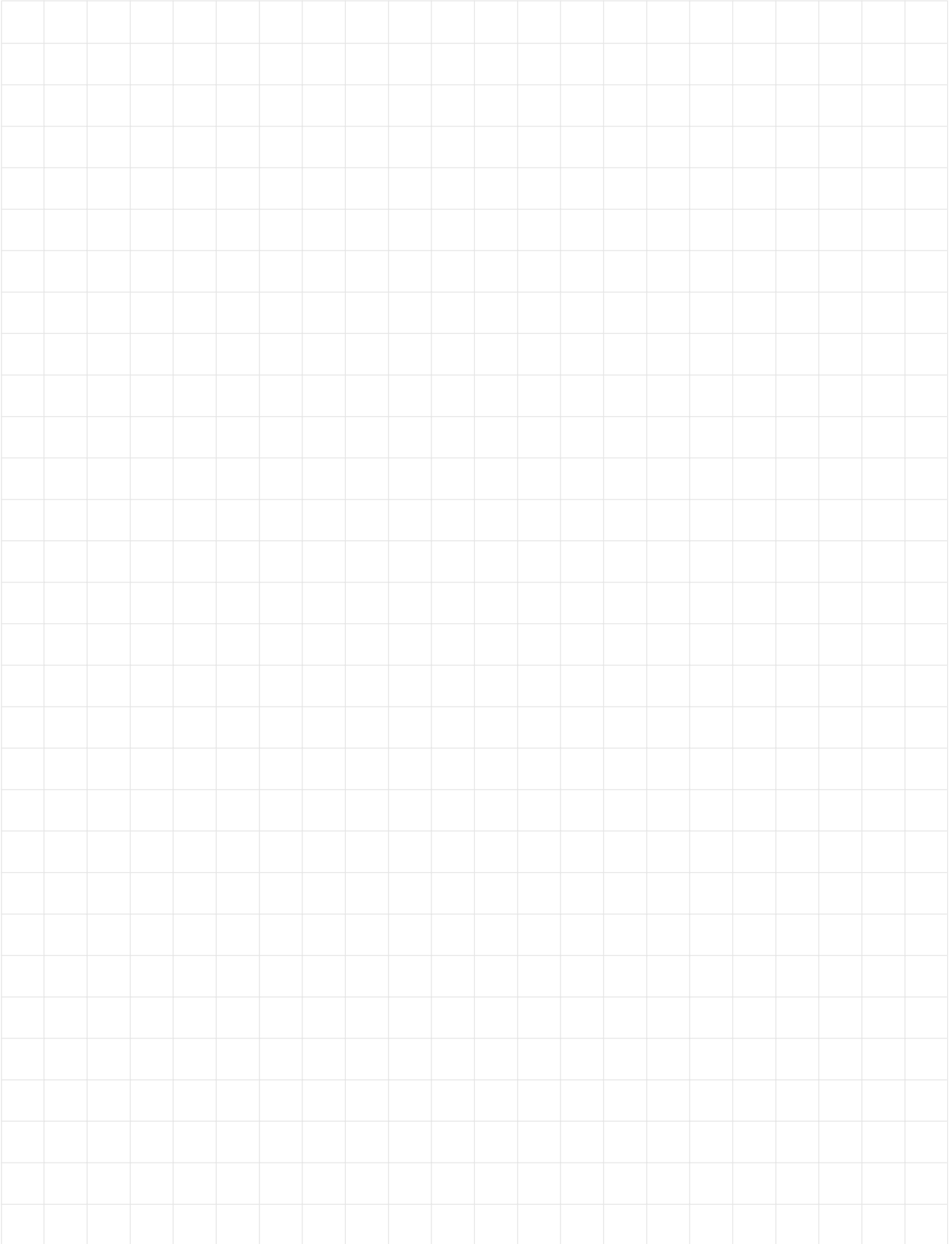


Others



Model	Ref.	Description
FAV-920	3242	18 dB variable attenuator. Min attenuation: ≤ 1.5 dB (5-1000 MHz) and ≤ 4 dB (1001-2150 MHz). DC by-pass. F-type male-female connectors. Dim.: 51x49x22 mm.
FIS-950	1107	950-2150 MHz IF amplifier. Sloped gain: 12 up to 20 dB. Noise figure: 7 dB. Operating voltage: +15 ... +18 Vdc. Consumption: 40 mA. Mounting outdoors. F-type female connectors. Dimensions: 80x27x20 mm.
IFC-215	3241	Power inserter (1A/24 V). Frequency range: 10-2150 MHz. Insertion loss: ≤ 1 dB. F-type female connectors. Dimensions: 66x45x25 mm.
BCF-060	2379	60V AC/DC block. F-type male-female connectors.
CTF-175	1519	75Ω F load.
OMH-110	3378	Plastic box to install outdoors the DMS-200 combiner (see above). No screws required. Plastic fixing clamp for mast. Dimensions: 100 x 90 x 45 mm.





► USER'S EQUIPMENT

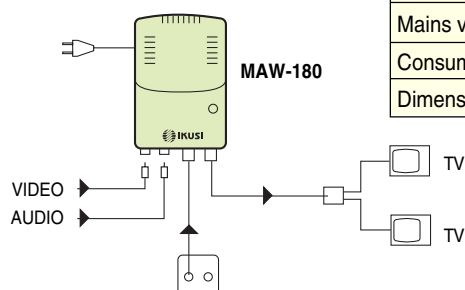
«MAW» — Home DSB TV Modulator

- Appropriate use with TV satellite receivers, VCR's and video cameras.
- Direct video/audio modulation. Multistandard. DSB response (Double Side-Band).
- Agile selection of channel. Possibility of shifting the standard video carrier frequency up to ± 2.5 MHz.
- Built-in test pattern generator.
- Two buttons and one 2-digit LED display for selection and programming of operating parameters.
- Panel potentiometers for audio modulation and RF output level settings.
- Input port for RF coupling of antenna/SMATV signal. 75Ω load supplied to close the port when not using.
- External plastic box. Indoor mounting. Wall fixing by two screws supplied.
- Mains lead with bipolar plug. Operation shown by LED.



MAW-180

Application example



CVA-002

Model		MAW-180
Reference		3028
Output TV Channel Frequencies	MHz	47 - 84 174 - 300 470 - 862
Selectable TV System		B, G, H, D, K, I, L, M, N
Output Channel Spectrum		Double Side-Band
Audio operation mode		Mono
RF coupling frequencies	MHz	47 - 2150 (TV + IF)
Fine tuning of video carrier frequency	MHz	± 2.5 MHz (steps of 0.25 MHz)
Adjustable output level	dB μ V	60 - 75
Switchable carrier level ratio	dB	12 \pm 3 / 16 \pm 3
Video input level	V _{pp}	0.9 ... 1.1
Video input impedance	Ω	75
Video modulation depth	%	81 (typ.)
Audio input level	mV	150 ... 775
Audio input impedance	k Ω	10
Adjustable audio peak deviation	kHz	± 50
Audio pre-emphasis	μ s	50
Weighted S/N ratio	dB	> 55
RF coupling loss	dB	< 1.5 (TV) ,, < 2.7 (IF)
Video connector		(1x) female RCA
Audio connector		(1x) female RCA
RF output connector		(1x) female F
RF coupling connector		(1x) female F
Mains voltage	VAC	200 - 250
Consumption	W	3
Dimensions	mm	118 x 78 x 47

(RCA plugs for video and audio input connections are not supplied)

Audio/Video Interfacing Kit

Model	Ref.	Description
CVA-002	2245	Includes the following accessories: - 1 plug-to-jack SCART adapter, with 3 RCA sockets (2 audio and 1 video) and 1 mini-DIN socket (S-Video). A built-in switch allows to change from input mode to output mode. - 3 coaxial leads, length 1.5 m each, terminated in RCA plugs all ends.

MEASURING EQUIPMENT

«DSA» — TV - SAT - CABLE - RADIO Signal Analysers

CE

DSAs-500

DSAs-100
Signal Analysers
DSAs-500
Ref. 4815

DSAs-100
Ref. 4814

The **DSAs-500** & **DSAs-100** Signal Analysers are a new range of Digital/Analogue, Satellite & Terrestrial & Cable measurement instruments. These analysers measure actual demodulated digital parameters such as Average Digital Power, BER, SNR, MER as well as the constellation for both COFDM, DAB & QPSK carriers, and very accurate emulated BER in QAM utilizing accurate algorithms. A visual check of the digital multiplex or the Network ID can be checked on both the two instruments.

Worldwide channel plans are pre loaded on both instruments and in addition Auto Discovery of available channels quickly locates signals by transponder (for satellite) and by channel (for terrestrial) signals.

For analogue TV & FM Radio services, measurements such as signal levels, V/A ratio & CNR levels can easily be acquired at the touch of a single button.

In the **DSAs-500** a second TFT high resolution screen is available to access better presentation of measured data as well as viewing actual images from the available programs in analogue as well as digital signals.

Each instrument offers two operating modes: MEAS, which provides accurate values of the parameters measured, and SPECT, which shows professional, vertical format spectrums for the frequencies and spans selected with a Max Hold function.

Both instruments are able to Data Log all results measured. All stored information can be downloaded to a PC through a USB-2 port that also provides PC control using specialized software and lifetime firmware upgrades as they come available.

Both instruments are sturdily built and come in a padded shock absorbing bag. Power is supplied through the on board long lasting Li-ion batteries or via AC mains through the AC power adapter/charger provided.

MAIN FUNCTIONS

- Measurement fields :
 - Analogue Terrestrial TV
 - DVB-T&H (COFDM)
 - FM Radio
 - Analogue Satellite TV
 - DVB-S (QPSK)
 - DVB-C (QAM) —emulation
- Spectrum analysis for TV, SAT, and FM-DAB radios
- Measurements : Level/Power, bBER, aBER, MER, SNR, CNR, EVM, Noise Margin
- 99 memory plans
- Up to 199 programs for every memory plan
- OSD graphs with stable text indications
- COFDM constellation display
- Digital signal quality analysis : Pass - Marginal - Fail
- Satellite finder automatic function
- Dual LNB dish alignment using the DiSEqC Switch provided
- DiSEqC motor driver
- SAT navigation by transponder number, network name & frequency
- Names of digital services, and values of audio and video PIDs
- Data Logger (measurement recording)
- LNB and mast-head preamplifier remote powering
- Buzzer varying with the quality or level of the measured parameter
- Sound of analogue television programs and FM radio
- USB interface for logged data download, channel plan upload and download, firmware updates, measurement printing through a PC
- ABS plastic casing structure
- Soft shock dampening case and strap
- Shock-, dust- and moisture-proof front panel
- Excellent view of data and graphs on the screen, in a poorly lit ambient or in direct sunlight


Additional functions in the DSAs-500 model :

- Images of the TV programs (except analogue SAT and QAM cable)
- Sound of the digital television programs (except QAM cable)
- Bar Scan display of up to 100 channels on one screen
- SMATV test with Data Logger
- Impulse Response in both μ s or km for DVB-T&H echo interference analysis
- SCART A/V socket with both inputs and outputs

► MEASURING EQUIPMENT

«DSA» — TV - SAT - CABLE - RADIO Signal Analysers

(cont'd)

TECHNICAL SPECIFICATIONS

■ GENERAL

- **Input impedance:** 75Ω
- **Interchangeable & Replaceable input connector:** F - IEC - BNC
- **Power on the line protection on RF input:** up to 60 VAC
- **File Manager:** for file archive and data logger handling
- **Measurement resolution:** 0.1 dB
- **Measurement units:** dBμV - dBmV - dBm, selectable
- **RBW @ -3dB:** 100 kHz (FM); 130 kHz (TV); 4 MHz (SAT)
- **Measurement accuracy:** 1 dB typ (TV); 1.5 dB typ (SAT)
- **Measurement stability:** 0.03 dB/°C (TV); 0,1 dB/°C (SAT), between -10 and +50 °C
- **Memory plans:** 99
- **Programs:** 199 for every plan

■ TV-FM-DAB SPECTRUM ANALYSIS

- **Frequency band:** 45-870 MHz
- **Span:** 2 - 5 - 7 - 10 - 20 - 50 - 100 - 200 - 500 - VHF - UHF - FULL
- **dB/div:** 10
- **Dynamic range:** 60 dB
- **Reference level:** from 0 to 130 dBμV
- **Frequency/Level marker:** automatic position on the video carrier (analogue channels) or at the centre of the multiplex (digital channels).
- **MAX HOLD function** (peak memory): keeps the upper value obtained during a measurement course.

■ SAT SPECTRUM ANALYSIS

- **Frequency band:** 930-2250 MHz
- **Span:** 50 - 100 - 200 - 500 - FULL
- **dB/div:** 5
- **Dynamic range:** >30 dB
- **Reference level:** 0 a 130 dBμV
- **MAX HOLD function** (peak memory): keeps the upper value obtained during a measurement course.
- **SAT POINTING function:** Automatic optimum settings for dish alignment.

■ ANALOGUE TERRESTRIAL TV

- **Frequency band:** 45-870 MHz
- **Selection and memorization of:** plan No., program No., channel, DC at RF in, video carrier, audio intercarrier, TV system.
- **Frequency resolution:** 120 kHz
- **Voltage at RF IN:** Off, +5V (0.2A), +12V, +18V, +24V
- **RF level measurement dynamics:** from 5 to 123 dBμV
- **Multi-standard:** B-G-I-D-K-M-N (L opt.), PAL-SECAM-NTSC
- **V/A carrier level ratio accuracy:** 1.5 dB typ

■ FM RADIO

- **Frequency band:** 88-108 MHz
- **Selection and memorization of:** plan No., program No., channel, frequency.
- **Audio demodulation:** FM
- **Bandwidth of the demodulation filter:** 100 kHz. Sound with volume adjustable.
- **Rest of specifications:** same as ANALOGUE TERRESTRIAL TV

■ COFDM (Demodulated)

- **Frequency band:** 45-870 MHz
- **Selection and memorization of:** plan No., program No., channel, DC at RF in, channel's central frequency, carriers No., channel bandwidth.
- **Frequency resolution:** 120 kHz
- **Voltage at RF IN:** Off, +5V (0.2A), +12V, +18V, +24V
- **RF level measurement dynamics:** from 5 to 123 dBμV
- **MER measurement accuracy:** 1 dB typ (2 dB max)
- **bBER and aBER measurement:**
 - pre- : up to 2 x 10⁻⁵
 - post- : up to 2 x 10⁻⁸
- **Automatic recognition and visualization of:** Hierarchy (HP, LP), FEC (1/2, 2/3, 3/4, 5/6, 7/8), guard interval (1/4, 1/8, 1/16, 1/32) and constellation (QPSK, 16QAM, 64QAM).
- **Automatic quality analysis:** PASS-MARG-FAIL
- **Noise Margin measurement accuracy:** 1 dB
- **Spectrum inversion:** automatic

■ QAM (Emulated)

- **Frequency band:** 45-870 MHz
- **Selection and memorization of:** plan No., program No., channel, channel's central frequency, constellation, symbol rate.
- **Frequency resolution:** 120 kHz
- **RF level measurement dynamics:** from 5 to 123 dBμV
- **C/N measurement accuracy:** 1.5 dB typ (2 dB max)
- **BER evaluation:** up to 2 x 10⁻⁸
- **Automatic quality analysis:** PASS-MARG-FAIL, with exclusive algorithm "(near) nC/N" or "(far) fC/N" depending of the existence or not of adjacent channels.
- **Multiplex flatness measurement accuracy:** 1 dB typ (1.5 dB max)

■ ANALOGUE SAT TV

- **Frequency band:** 930-2250 MHz
- **Selection and memorization of:** plan No., program No., polarization, IF sub-band, DiSEqC, LNB LO frequency, transponder frequency, audio sub-carrier, video polarity, frame frequency.
- **Frequency resolution:** 4 MHz
- **Voltage at RF IN:** Off, 13V / 18V, 0 / 22 kHz
- **LNB current measurement:** 0-500 mA (only DSA-500)
- **"a.b.c.d." DiSEqC:** pre-programmed in sequence and very easy to use. Any kind of LNB (DiSEqC or not, single or dual feed) or multiswitch (4, 8, 12 or 16 inputs).
- **RF level measurement dynamics:** 30 to 123 dBμV (-79 to +14 dBm)
- **LNB LO frequency:** 0 - 20,000 MHz

■ QPSK (Demodulated)

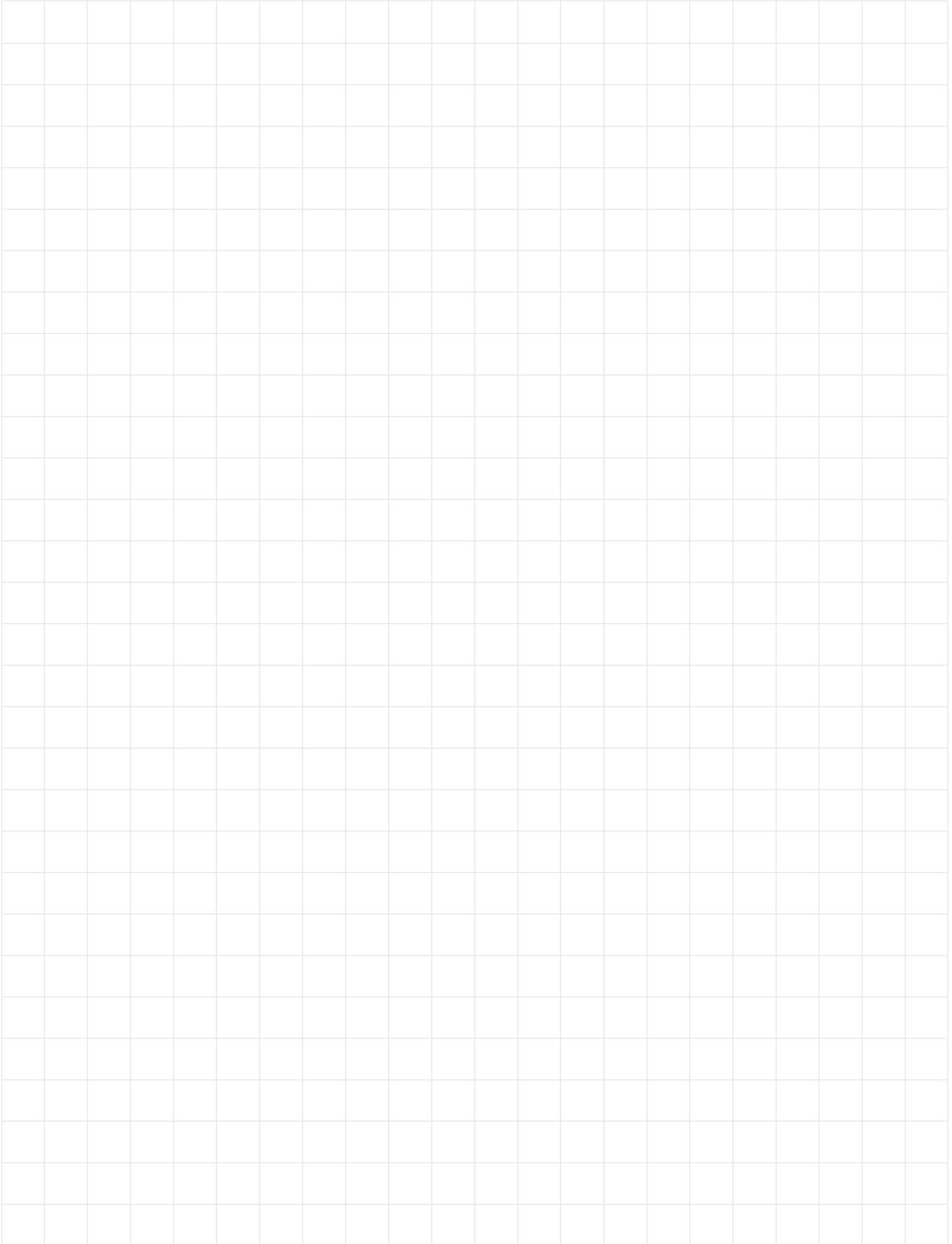
- **Frequency band:** 930-2250 MHz
- **Selection and memorization of:** plan No., program No., polarization, IF sub-band, DiSEqC, LNB LO frequency, transponder frequency, standard, symbol rate.
- **Frequency resolution:** 0.1 MHz
- **Voltage at RF IN:** Off, 13V / 18V, 0 / 22 kHz
- **LNB current measurement:** 0-500 mA (only DSA-500)
- **"a.b.c.d." DiSEqC:** pre-programmed in sequence and very easy to use. Any kind of LNB (DiSEqC or not, single or dual feed) or multiswitch (4, 8, 12 or 16 inputs).
- **RF level measurement dynamics:** 30 to 123 dBμV (-79 to +14 dBm)
- **Selection of symbol rate:** 2-45 MS/s @ 1 kS/s steps.
- **MER measurement accuracy:** 1 dB typ
- **bBER and aBER measurement:**
 - pre- : up to 2 x 10⁻⁵
 - post- : up to 2 x 10⁻⁸
- **Automatic recognition and visualization of:** FEC (1/2, 2/3, 3/4, 5/6, 7/8).
- **Automatic quality analysis:** PASS-MARG-FAIL
- **Noise Margin measurement accuracy:** 1 dB
- **LNB LO frequency:** 0 - 20,000 MHz

■ MPEG-2 DECODER (Only DSA-500)

- **NETWORK IDENTIFIER:** Names of network, transponder, bouquet and services. Conditional access system. Orbital position. Date.

■ OTHERS

- **Displays:**
 - DSA-500: 4" high resolution TFT (950 x 240 pixel) and 2.5" LCD (64 x 128 pixel)
 - DSA-100: 2.5" LCD (64 x 128 pixel)
- **Power supply:**
 - DSA-500: rechargeable batteries: 8.4V x 4,5A load voltage, 12VAC or 12-18VDC
 - DSA-100: rechargeable batteries 7.2V x 2,5A load voltage, 12VAC or 12VDC
- **Battery duration @ 25 °C:**
 - DSA-500: 4 hours (using only LCD display) 2 hours (LCD + TFT)
 - DSA-100: 2.5 hours
- **Battery charge time:** 2 hours to reach 50%, 4 hours for 80%, 12 hours for 100%
- **Battery discharge alarm:** acoustic signalling and icon on display.
- **Automatic power down timer:** 5 min.
- **PC interface:** USB
- **Video/Audio output/input** (only DSA-500): SCART.
- **Dimensions** (high x large x deep):
 - DSA-500: 110 x 280 x 160 mm
 - DSA-100: 80 x 235 x 200 mm
- **Weight (battery included):**
 - DSA-500: 2.5 kg
 - DSA-100: 1.2 kg
- **Accessories supplied:**
 - Connecting adapters: F-F, F-IEC and F-BNC
 - AC/DC charger (input 230V, output 12V)
 - USB cable
 - Car lighter adapter
 - DiSEqC switch for dual LNB dish alignment



► PAY-PER-VIEW

vHOTEL System

General description

vHOTEL is a low cost, high security PPV Television System dedicated fundamentally to hotels, but also applicable to apartment complexes, hospitals and similar institutions. It may be installed into standard coaxial television distribution networks. Although the system has been especially designed to make use of Digital Terrestrial or Satellite TV channels as signal sources, others such as DVD or video camera delivered TV signals can also be applied.

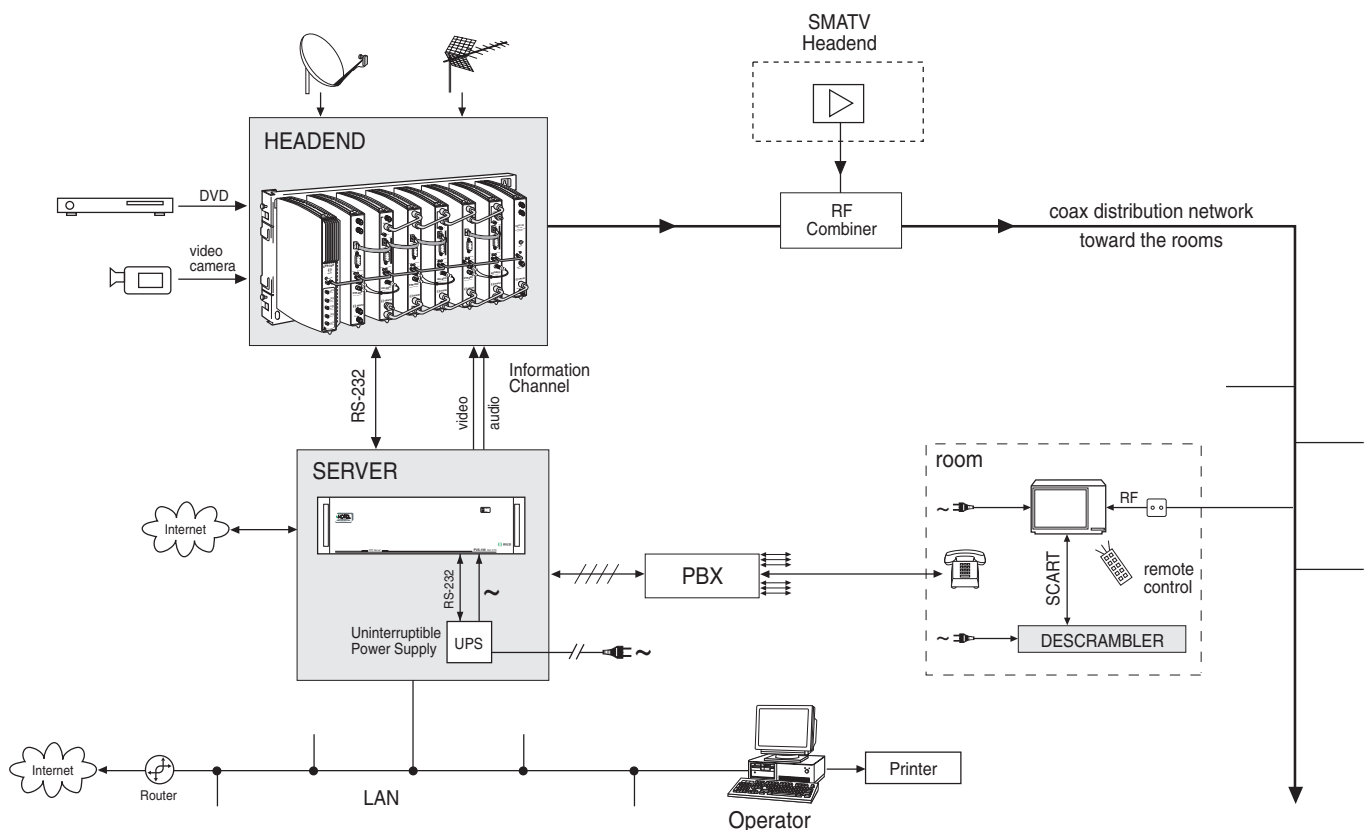
The system processes the signals of the available video sources and transmits them as vHOTEL scrambled programs on Vestigial Side Band TV channels within the 45-862 MHz band. These channels are accessible to the guest together with the clear channels of the existing SMATV installation.

vHOTEL comprises:

- The Headend where the scrambling modules are installed.
- The Server on which the vHOTEL application runs. All data of the system are administered and maintained on this server. An UPS is supplied together.
- The Room Descramblers that control the access to the pay programs. Each descrambler is configured with an address which is used by the management system.

Contact from the room to the Server is accomplished through a phone call without the need for vocal reply: guest dials the PBX's number which is shown on the screen and follows the instructions from the automatic operator. The code number of the signed up TV program and additional information (hours, cost) will have been shown on the screen when selecting it by zapping (the program may be presented cleared during a predetermined time interval). There is one unique code number for each program/room combination. Once confirmed the request, the Server sends authorization data to the headend's scrambling module that is related to the program chosen. Confidence is absolute. Processes of requesting and accessing are totally automatic; the system only requires operator's intervention for restricting access to adult programs when minors are present in the room (it is also possible to turn to the operator for a nonautomatic purchase).

vHOTEL features "Black image / No sound" scrambling. To regenerate the picture without distortion, encoded keys are transferred to the descrambler on the vertical retrace.

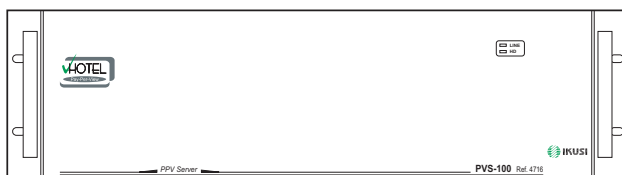


Shaded areas indicate the vHOTEL equipment:

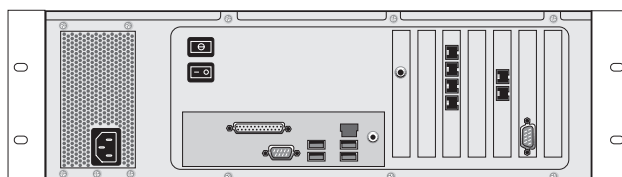
- **Headend:** provides the scrambled multichannel signal. The headend contains the Scrambling Modules, one per each pay program being distributed.
- **Server:** is the workhorse of the system. Includes an UPS (Uninterruptible Power Supply). It is connected to the headend, to the PBX and to the LAN of the hotel.
- **Room Descrambler:** autonomous unit that requires no attention on the part of the guest. It is connected to the TV set through an SCART lead.


Server of the vHOTEL System
**PVS-100
Ref. 4716**

- Administration and maintenance of all data of the system, either locally or remotely via Internet.
- Internal firmware operating under Windows XP. Easy selection of particular operation parameters of the hotel. Languages: spanish, english, others in preparation.
- Connection to the headend using 2-wire shielded cable.
- Connection to the PBX through a 4-line link: up to 4 simultaneous communications. Automatic reply voice message (languages: spanish, english, french, german, others on request).
- Connection to the system operator's PC either directly or through the existing LAN .
- Internal modem to get access to the internet via PSTN. Utilizable to mail billing information to an external operating company.
- Generation of video/audio signals from image and sound files (avi, jpg, mp3, etc.) that can be combined and played with a programmable cadence. The generated V/A signal is connected to a TV modulator installed in the headend in order to create an Information Channel through which the hotel can broadcast its services as well as any type of information useful for the guest.
- Serial connection to the UPS module supplied together.
- Connection to a ticket printer either directly or through the existing LAN.
- AC input: 230 V. Runtime of the UPS: 5 minutes.
- Rack mountable. Dimensions: 19" x 520 mm x 3U
- Packed weight: 14 kg (server) + 7 kg (UPS module)


FRONT PANEL

- 1 "Power" LED.
- 1 "Activity" LED.


REAR PANEL

- 6 x RJ-11 ports. Four of them to be connected to the PBX. The other two are internal modem's.
- 2 x RS-232 serial ports to be connected to the headend and the UPS module.
- 1 x RJ-45 ethernet port to be connected to LAN or PC.
- 2 x RCA video/audio sockets to be connected to the modulator for the channel information.
- 1 x IBM compatible PC printer port.
- 4 x free USB ports.
- 1 x IEC socket for mains connection via UPS module.
- 1 x ON/OFF switch.
- 1 reset button.

► PAY-PER-VIEW

«vHOTEL» — Scrambling Module

CE

- "Black image" scrambling. PAL/SECAM compatible.
- The module receives an analog video signal and returns it already scrambled and provided with the authorization information transmitted from the Server of the vHOTEL system.
- External RF through loops for noninterruption of both the antenna signal cascade and the VHF/UHF output cascade when the scrambler is paired with a ClassA receiver module (SRF-SDC-SRC-TRF-TDC-CRF-CDC-CRC types).

Scrambler


CTP-200

Model			CTP-200
Reference			4701
VIDEO	Input level (clear signal)	Vpp	1.0 (± 10%)
	Output level (scrambled signal)	Vpp	equal to the level of the input signal (± 5%)
	Impedance	Ω	75
	Luminance/Chrominance Cross Modulation	%	< 1
	Luminance/Chrominance Delay	ns	< 10
	Weighted Signal/Noise Ratio	dB	> 60
	Differential Gain	%	< 1.5
	Differential Phase	°	< 1.5
	K-Factor (2T Pulse)	%	< 2
DATA	Transmission to descrambler		on the VBI lines
	Interface of communication between modules		RS-485
	Interface of communication with the Server		RS-232
RF PATH	RF input loop-through loss (45-2150 MHz)	dB	1.0 (±0.5)
	RF output loop-through loss (45-862 MHz)	dB	1.0 (±0.5)
GENERAL	Supply voltage	VDC	+12 (100 mA)
	Operating temperature	°C	-10 ... +55
	RF input loop connector		(2x) female F
	RF output loop connector		(2x) female F
	DC connector type		"banana" socket
	Video-loop connector type		(2x) female RCA
	Local bus connector		(2x) 4-pin socket
	Updating interface		DB-9
	Dimensions	mm	230 x 195 x 32
Packed weight	kg	1.3	

- The module is packed with:
 - 2 F plug bridges, 64 mm length, for RF way-through cascades.
 - 2 BUS-013 jumpers, for communication local bus cascade.
 - 1 Mini-DIN to RCA jumper, for video interconnection with a ClassA receiver module.
 - 1 DC plug bridge, 53 mm length, for connection of +12 VDC voltage from the CFP power supply.

Functional ClassA Modules

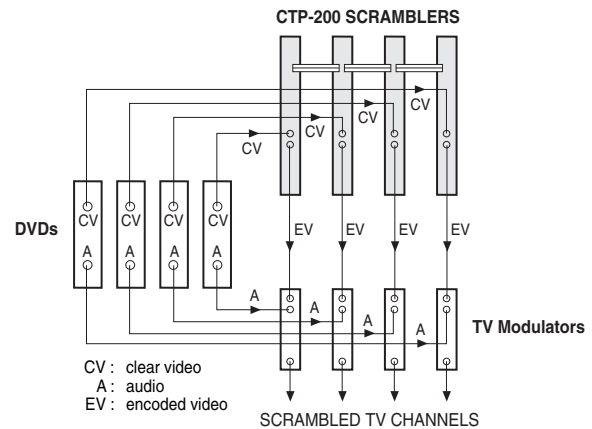
The **ClassA** family from IKUSI includes the following functional modules for vHOTEL headends:

- CTP-200 Video Scrambler.
- «SRF» : Receivers for Free-To-Air Digital Sat-TV.
- «SDC» : Receivers with embedded Conditional Access, for Encrypted Digital Sat-TV.
- «SRC» : Receivers with Common Interface, for Encrypted Digital Sat-TV.
- «TRF» : Receivers for Free-To-Air Digital Terrestrial-TV.
- «TDC» : Receivers with embedded Conditional Access, for Encrypted Digital Terrestrial-TV.
- «CRF» : Receivers for Free-To-Air Digital Cable-TV.
- «CDC» : Receivers with embedded Conditional Access, for Encrypted Digital Cable-TV.
- «CRC» : Receivers with Common Interface, for Encrypted Digital Cable-TV.
- «HPA-100» : RF Power Amplifiers.
- «CFP» Power Supplies.

Headend configuration

A vHOTEL headend can be constituted by separate functional units as indicated in the illustration at right, where DVD players are being used as video sources. However, the system has been especially designed to make use of IKUSI's ClassA terrestrial and satellite receiving modules operating as "video source plus TV modulator" assemblies; one ClassA receiving module is paired with one CTP-200 scrambler to create one scrambled vHOTEL channel (see application example here below).

(ClassA receiving modules are those listed in the box at the bottom of previous page).



Application example using SDC receiving modules

SIGNAL INTERCONNECTION

Three different interconnection lines must be performed between the SDC receivers and the CTP-200 scramblers:

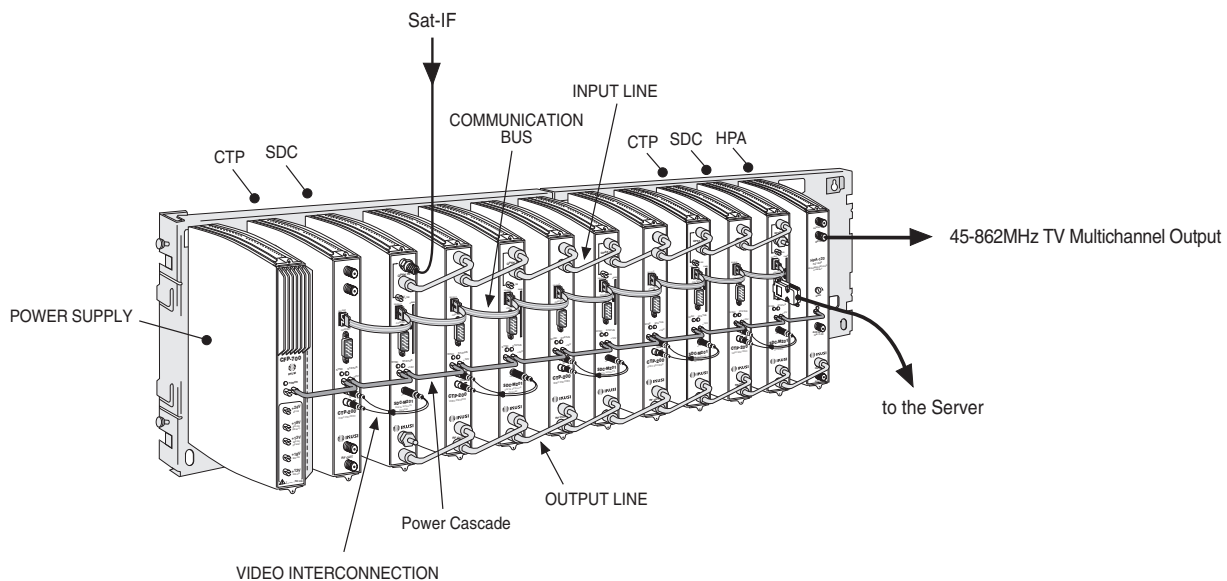
- *RF Interconnection* : Every module has two antenna loop ports and two VHF/UHF loop ports. Ones and the others are cascaded by the F plug bridges provided. The ports have a proper mission in the SDC receiving modules, while they operate as simple "RF path" in the CTP scramblers.
- *Video Interconnection* : At each SDC+CTP pair there is a SDC→CTP clear video transmission and a reverse CTP→SDC scrambled video transmission. These transmissions are assured by the video jumpers provided.
- *Data Interconnection* : Each one of the SDC and CTP modules has 2 small 4-pin sockets which are used to install a property communication bus through the jumpers provided.

POWER CONNECTION

All modules SDC and CTP are +12 VDC powered by the CFP-700 Power Supply. Each module has two DC banana sockets that allow to build a power cascade through the DC plug bridges provided.

CONNECTION TO THE CENTRAL CONTROLLER

The headend uses an RS-232 interface to communicate with the Server. Connection is made on the last scrambler module at the right end of assembly.



— Example of «vHOTEL» headend for 5 scrambled TV stations. Contains 5 Receiver+Scrambler pairs (SDC+CTP), 1 HPA-120 Amplifier and 2 CFP-700 Power Supply Modules, all fixed on 2 horizontally joined BAS-700 Base-Plates.

► PAY-PER-VIEW

«vHOTEL» — Room Descrambler

CE

- Addressing by internal DIP-switch. Up to 2048 rooms.
- PAL/SECAM baseband input/output.
- Wall-fixing. Inviolable closing.

Room Descrambler


DTP-200

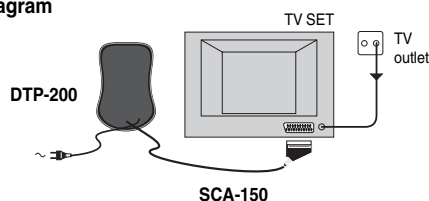
Model		DTP-200	
Reference		4700	
VIDEO	Input/output level	According to EN 50049-1	
	Luminance/Chrominance Cross Modulation	%	< 3
	Luminance/Chrominance Delay	ns	< 10
	Weighted Signal/Noise Ratio	dB	> 48
	Differential Gain	%	< 1.5
	Differential Phase	°	< 1.5
ADDRESSING	Internal DIP-switch	12 microswitches	
GENERAL	Mains voltage	VAC	230 (±10%)
	Consumption	W	1
	Operating temperature	°C	0 ... +40
	TV connection	SCART	
	Dimensions	mm	140 x 110 x 35
	Packed weight	g	360


SCA-150

SCART lead

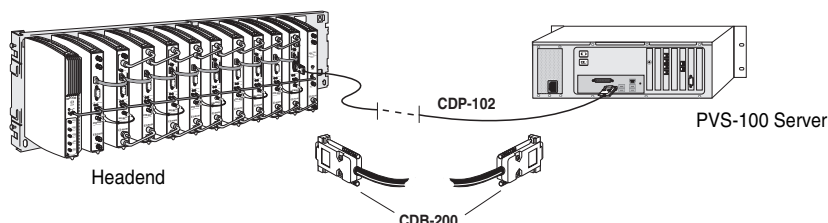
Model	Ref.	Description
SCA-150	4705	Descrambler-to-TV interconnecting cable with a SCART plug on each end. Length: 1.5 m.

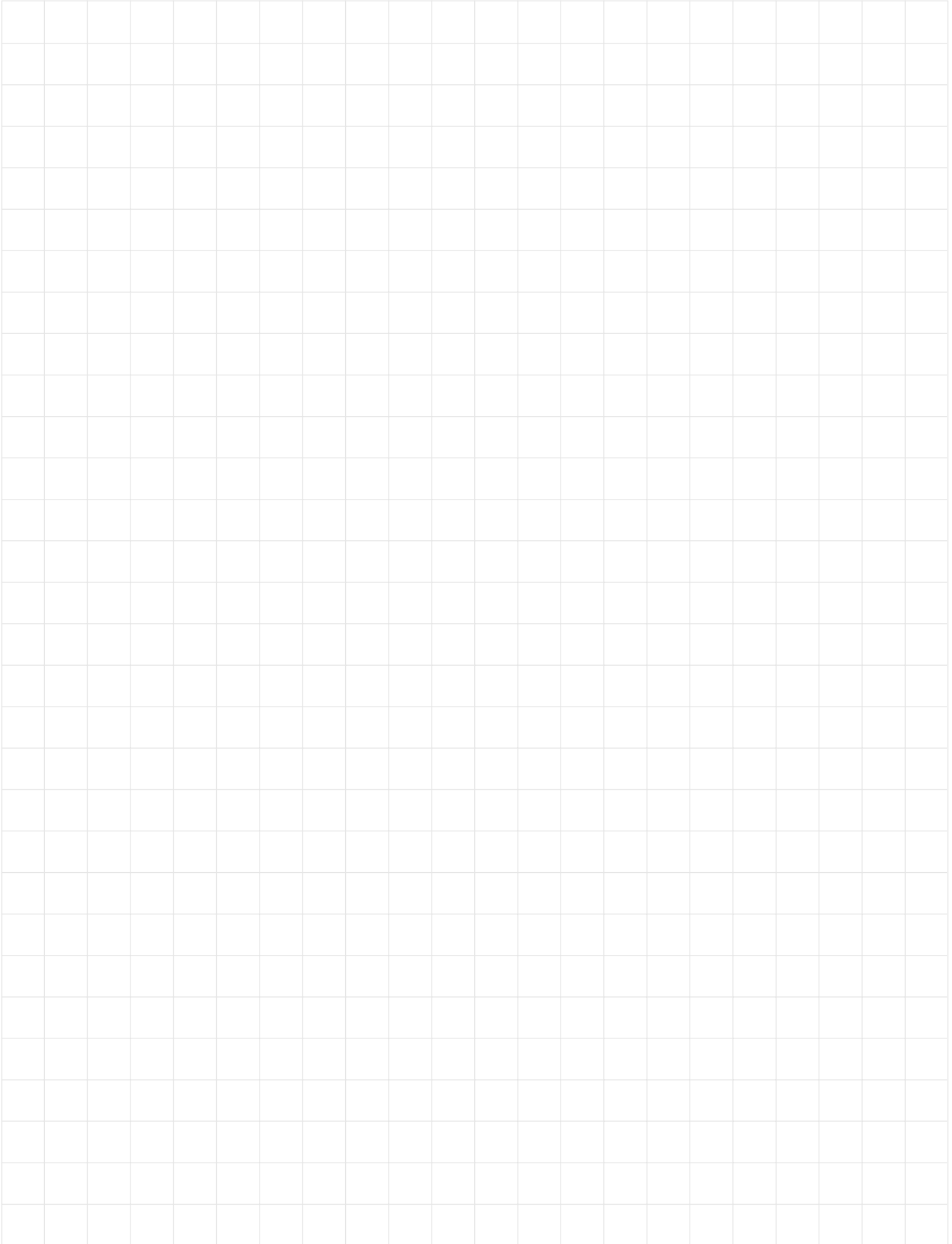
Connection diagram



«vHOTEL» — Data cable & Connectors

Model	Ref.	Description
CDP-102	4704	1m of shielded cable for data transmission from the Server to the Headend. Supply length: 100m
CDB-200	4706	Two DB-9 female connectors to be mounted on the CDP-102 cable.





► TECHNICAL ANNEX

World Analog TV Standards

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

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

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

► **TECHNICAL ANNEX**

TV-Channel Allocation

Systems B/G (Europe) + K, I, L for B IV/V ⁽¹⁾

Band	Channel	Channel frequency MHz	Picture carrier MHz	Sound carrier MHz
I	E2	47 - 54	48.25	53.75
	E3	54 - 61	55.25	60.75
	E4	61 - 68	62.25	67.75
Low S-Band (SI)	S3	118 - 125	119.25	124.75
	S4	125 - 132	126.25	131.75
	S5	132 - 139	133.25	138.75
	S6	139 - 146	140.25	145.75
	S7	146 - 153	147.25	152.75
	S8	153 - 160	154.25	159.75
	S9	160 - 167	161.25	166.75
III	S10	167 - 174	168.25	173.75
	E5	174 - 181	175.25	180.75
	E6	181 - 188	182.25	187.75
	E7	188 - 195	189.25	194.75
	E8	195 - 202	196.25	201.75
	E9	202 - 209	203.25	208.75
	E10	209 - 216	210.25	215.75
High S-Band (SI-I)	E11	216 - 223	217.25	222.75
	E12	223 - 230	224.25	229.75
	S11	230 - 237	231.25	236.75
	S12	237 - 244	238.25	243.75
	S13	244 - 251	245.25	250.75
	S14	251 - 258	252.25	257.75
	S15	258 - 265	259.25	264.75
Hyperband (SII)	S16	265 - 272	266.25	271.75
	S17	272 - 279	273.25	278.75
	S18	279 - 286	280.25	285.75
	S19	286 - 293	287.25	292.75
	S20	293 - 300	294.25	299.75
	S21	302 - 310	303.25	308.75
	S22	310 - 318	311.25	316.75
S23	318 - 326	319.25	324.75	
S24	326 - 334	327.25	332.75	
S25	334 - 342	335.25	340.75	
S26	342 - 350	343.25	348.75	
S27	350 - 358	351.25	356.75	
S28	358 - 366	359.25	364.75	
S29	366 - 374	367.25	372.75	
S30	374 - 382	375.25	380.75	
S31	382 - 390	383.25	388.75	
S32	390 - 398	391.25	396.75	
S33	398 - 406	399.25	404.75	
S34	406 - 414	407.25	412.75	
S35	414 - 422	415.25	420.75	
S36	422 - 430	423.25	428.75	
S37	430 - 438	431.25	436.75	
S38	438 - 446	439.25	444.75	

Band	Channel	Channel frequency MHz	Picture carrier MHz	Sound carrier MHz
IV	21	470 - 478	471.25	476.75
	22	478 - 486	479.25	484.75
	23	486 - 494	487.25	492.75
	24	494 - 502	495.25	500.75
	25	502 - 510	503.25	508.75
	26	510 - 518	511.25	516.75
	27	518 - 526	519.25	524.75
	28	526 - 534	527.25	532.75
	29	534 - 542	535.25	540.75
	30	542 - 550	543.25	548.75
	31	550 - 558	551.25	556.75
	32	558 - 566	559.25	564.75
	33	566 - 574	567.25	572.75
	34	574 - 582	575.25	580.75
	35	582 - 590	583.25	588.75
	36	590 - 598	591.25	596.75
	37	598 - 606	599.25	604.75
V	38	606 - 614	607.25	612.75
	39	614 - 622	615.25	620.75
	40	622 - 630	623.25	628.75
	41	630 - 638	631.25	636.75
	42	638 - 646	639.25	644.75
	43	646 - 654	647.25	652.75
	44	654 - 662	655.25	660.75
	45	662 - 670	663.25	668.75
	46	670 - 678	671.25	676.75
	47	678 - 686	679.25	684.75
	48	686 - 694	687.25	692.75
	49	694 - 702	695.25	700.75
	50	702 - 710	703.25	708.75
	51	710 - 718	711.25	716.75
	52	718 - 726	719.25	724.75
	53	726 - 734	727.25	732.75
	54	734 - 742	735.25	740.75
	55	742 - 750	743.25	748.75
	56	750 - 758	751.25	756.75
	57	758 - 766	759.25	764.75
	58	766 - 774	767.25	772.75
	59	774 - 782	775.25	780.75
60	782 - 790	783.25	788.75	
61	790 - 798	791.25	796.75	
62	798 - 806	799.25	804.75	
63	806 - 814	807.25	812.75	
64	814 - 822	815.25	820.75	
65	822 - 830	823.25	828.75	
66	830 - 838	831.25	836.75	
67	838 - 846	839.25	844.75	
68	846 - 854	847.25	852.75	
69	854 - 862	855.25	860.75	

⁽¹⁾ Sound carrier is different :

Systems K, L :
Sound carrier = Picture carrier + 6.5 MHz

System I :
Sound carrier = Picture carrier + 6 MHz

► **TECHNICAL ANNEX**

TV-Channel Allocation

(cont'd)

Other Systems and Channels (Europe, Morocco)

Band	Channel	Channel frequency MHz	Picture carrier MHz	Sound carrier MHz
System D (OIRT)				
I	R1	48.5 - 56.5	49.75	56.25
	R2	58 - 66	59.25	65.75
II	R3	76 - 84	77.25	83.75
	R4	84 - 92	85.25	91.75
	R5	92 - 100	93.25	99.75
Special channels	S1	110 - 118	111.25	117.75
	S2	118 - 126	119.25	125.75
	S3	126 - 134	127.25	133.75
	S4	134 - 142	135.25	141.75
	S5	142 - 150	143.25	149.75
	S6	150 - 158	151.25	157.75
	S7	158 - 166	159.25	165.75
	S8	166 - 174	167.25	173.75
III	R6	174 - 182	175.25	181.75
	R7	182 - 190	183.25	189.75
	R8	190 - 198	191.25	197.75
	R9	198 - 206	199.25	205.75
	R10	206 - 214	207.25	213.75
	R11	214 - 222	215.25	221.75
Special channels	S11	230 - 238	231.25	237.75
	S12	238 - 246	239.25	245.75
	S13	246 - 254	247.25	253.75
	S14	254 - 262	255.25	261.75
	S15	262 - 270	263.25	269.75
	S16	270 - 278	271.25	277.75
	S17	278 - 286	279.25	285.75
	S18	286 - 294	287.25	293.75
	S20	294 - 302	295.25	301.75
	S21	302 - 310	303.25	309.75
	S22	310 - 318	311.25	317.75
	S23	318 - 326	319.25	325.75
	S24	326 - 334	327.25	333.75
	S255	334 - 342	335.25	341.75
	S26	342 - 350	343.25	349.75
	S27	350 - 358	351.25	357.75
	S28	358 - 366	359.25	365.75
	S29	366 - 374	367.25	373.75
	S30	374 - 382	375.25	381.75
	S31	382 - 390	383.25	389.75
	S32	390 - 398	391.25	397.75
	S33	398 - 406	399.25	405.75
	S34	406 - 414	407.25	413.75
	S35	414 - 422	415.25	421.75
	S36	422 - 430	423.25	429.75
	S37	430 - 438	431.25	437.75
	S38	438 - 446	439.25	445.75
	S39	446 - 454	447.25	453.75
	S40	454 - 462	455.25	461.75
	S41	462 - 470	463.25	469.75

Band	Channel	Channel frequency MHz	Picture carrier MHz	Sound carrier MHz
System B (Italy)				
I	A	52.5 - 59.5	53.75	59.25
	B	61 - 68	62.25	67.75
II	C	81 - 88	82.25	87.75
III	D	174 - 181	175.25	180.75
	E	182.5 - 189.5	183.75	189.75
	F	191 - 198	192.25	197.75
	G	200 - 207	201.25	206.75
	H	209 - 216	210.25	215.75
	H1	216 - 223	217.25	222.75
H2	223 - 230	224.25	229.75	
System I (Great Britain, Ireland)				
I	A	44.5 - 52.5	45.75	51.75
	B	52.5 - 60.5	53.75	59.75
	C	60.5 - 68.5	61.75	67.75
III	D	174 - 182	175.25	181.25
	E	182 - 190	183.25	189.25
	F	190 - 198	191.25	197.25
	G	198 - 206	199.25	205.25
	H	206 - 214	207.25	213.25
	I	214 - 222	215.25	221.25
J	222 - 230	223.25	229.25	
System B (Morocco)				
III	M4	162 - 169	163.25	168.75
	M5	170 - 177	171.25	176.75
	M6	178 - 185	179.25	184.75
	M7	186 - 193	187.25	192.75
	M8	194 - 201	195.25	200.75
	M9	202 - 209	203.25	208.75
	M10	210 - 217	211.25	216.75
System L (France)				
I	02	49 - 57	55.75	49.25
	03	53.75 - 61.75	60.50	54.00
	04	57 - 65	63.75	57.25
III	05	174.75 - 182.75	176	182.50
	06	182.75 - 190.75	184	190.50
	07	190.75 - 198.75	192	198.50
	08	198.75 - 206.75	200	206.50
	09	206.75 - 214.75	208	214.50
	10	214.75 - 222.75	216	222.50

TECHNICAL ANNEX
TV-Channel Allocation

(cont'd)

Australian Channels — Analogue & Digital

Band	Channel #	Aust. Ch.	Picture carrier MHz	Digital freq. MHz	Sound carrier MHz	Band	Channel #	Aust. Ch.	Picture carrier MHz	Digital freq. MHz	Sound carrier MHz	
I		0	46.25		51.75	UHF	E 21		471.25		476.75	
		1	57.25		62.75		E 22		479.25		484.75	
		2	64.25		69.75		E 23		487.25		492.75	
Low S-Band (SI)	S2		112.25		117.75		E 24		495.25		500.75	
	S3		119.25		124.75		E 25		503.25		508.75	
	S4		126.25		131.75		E 26		511.25		516.75	
	S5		133.25		138.75		E 27		519.25		524.75	
	S6		140.25		145.75		28		527.25	529.5	532.75	
	S7		147.25		152.75		29		534.25	536.5	539.75	
	S8		154.25		159.75		30		541.25	543.5	546.75	
	S9		161.25		166.75		31		548.25	550.5	553.75	
	S10		168.25		173.75		32		555.25	557.5	560.75	
	III		6	175.25	177.5		180.75	33		562.25	564.5	567.75
		7	182.25	184.5	187.75		34		569.25	571.5	574.75	
		8	189.25	191.5	194.75		35		576.25	578.5	581.75	
		9	196.25	198.5	201.75		36		583.25	585.5	588.75	
		9a	197.25	205.5	202.75		37		590.25	592.5	595.75	
		10	209.25	212.5	214.75		38		597.25	599.5	602.75	
		11	216.25	219.5	221.75		39		604.25	606.5	609.75	
		12	223.25	226.5	228.75		40		611.25	613.5	616.75	
High S-Band (SI-1)		S11		231.25			236.75	41		618.25	620.5	623.75
		S12		238.25			243.75	42		625.25	627.5	630.75
		S13		245.25			250.75	43		632.25	634.5	637.75
		S14		252.25			257.75	44		639.25	641.5	644.75
	S15		259.25		264.75		45		646.25	648.5	651.75	
	S16		266.25		271.75		46		653.25	655.5	658.75	
	S17		273.25		278.75		47		660.25	662.5	665.75	
	S18		280.25		285.75		48		667.25	669.5	672.75	
	S19		287.25		292.75		49		674.25	676.5	679.75	
	S20		294.25		299.75		50		681.25	683.5	686.75	
Hyperband (SII)	S21		303.25		308.75		51		688.25	690.5	693.75	
	S22		310.25		315.75		52		695.25	697.5	700.75	
	S23		317.25		322.75		53		702.25	704.5	707.75	
	S24		324.25		329.75		54		709.25	711.5	714.75	
	S25		331.25		336.75		55		716.25	718.5	721.75	
	S26		338.25		343.75		56		723.25	725.5	728.75	
	S27		345.25		350.75		57		730.25	732.5	735.75	
	S28		352.25		357.75		58		737.25	739.5	742.75	
	S29		359.25		364.75		59		744.25	746.5	749.75	
	S30		366.25		371.75		60		751.25	753.5	756.75	
	S31		373.25		378.75		61		758.25	760.5	763.75	
	S32		380.25		385.75	62		765.25	767.5	770.75		
	S33		387.25		392.75	63		772.25	774.5	777.75		
	S34		394.25		399.75	64		779.25	781.5	784.75		
	S35		401.25		406.75	65		786.25	788.5	791.75		
	S36		408.25		413.75	66		793.25	795.5	798.75		
	S37		415.25		420.75	67		800.25	802.5	805.75		
	S38		422.25		427.75	68		807.25	809.5	812.75		
	S39		429.25		434.75	69		814.25	816.5	819.75		
	S40		436.25		441.75							
	S41		443.25		448.75							

► **TECHNICAL ANNEX**

TV-Channel Allocation

(cont'd)

Systems M/N (South America, USA)

Band	Channel	Channel frequency MHz	Picture carrier MHz	Sound carrier MHz
LOW	2	54 - 60	55.25	59.75
	3	60 - 66	61.25	65.75
	4	66 - 72	67.25	71.75
	5	76 - 82	77.25	81.75
	6	82 - 88	83.25	87.75
	HIGH	7	174 - 180	175.25
8		180 - 186	181.25	185.75
9		186 - 192	187.25	191.75
10		192 - 198	193.25	197.75
11		198 - 204	199.25	203.75
12		204 - 210	205.25	209.75
13		210 - 216	211.25	215.75
UHF	14	470 - 476	471.25	475.75
	15	476 - 482	477.25	481.75
	16	482 - 488	483.25	487.75
	17	488 - 494	489.25	493.75
	18	494 - 500	495.25	499.75
	19	500 - 506	501.25	505.75
	20	506 - 512	507.25	511.75
	21	512 - 518	513.25	517.75
	22	518 - 524	519.25	523.75
	23	524 - 530	525.25	529.75
	24	530 - 536	531.25	535.75
	25	536 - 542	537.25	541.75
	26	542 - 548	543.25	547.75
	27	548 - 554	549.25	553.75
	28	554 - 560	555.25	559.75
	29	560 - 566	561.25	565.75
	30	566 - 572	567.25	571.75
	31	572 - 578	573.25	577.75
	32	578 - 584	579.25	583.75
	33	584 - 590	585.25	589.75
	34	590 - 596	591.25	595.75
	35	596 - 602	597.25	601.75

Band	Channel	Channel frequency MHz	Picture carrier MHz	Sound carrier MHz
UHF	36	602 - 608	603.25	607.75
	37	608 - 614	609.25	613.75
	38	614 - 620	615.25	619.75
	39	620 - 626	621.25	625.75
	40	626 - 632	627.25	631.75
	41	632 - 638	633.25	637.75
	42	638 - 644	639.25	643.75
	43	644 - 650	645.25	649.75
	44	650 - 656	651.25	655.75
	45	656 - 662	657.25	661.75
	46	662 - 668	663.25	667.75
	47	668 - 674	669.25	673.75
	48	674 - 680	675.25	679.75
	49	680 - 686	681.25	685.75
	50	686 - 692	687.25	691.75
	51	692 - 698	693.25	697.75
	52	698 - 704	699.25	703.75
	53	704 - 710	705.25	709.75
	54	710 - 716	711.25	715.75
	55	716 - 722	717.25	721.75
	56	722 - 728	723.25	727.75
	57	728 - 734	729.25	733.75
	58	734 - 740	735.25	739.75
	59	740 - 746	741.25	745.75
	60	746 - 752	747.25	751.75
	61	752 - 758	753.25	757.75
	62	758 - 764	759.25	763.75
	63	764 - 770	765.25	769.75
	64	770 - 776	771.25	775.75
	65	776 - 782	777.25	781.75
	66	782 - 788	783.25	787.75
	67	788 - 794	789.25	793.75
	68	794 - 800	795.25	799.75
69	800 - 806	801.25	805.75	
70	806 - 812	807.25	811.75	
71	812 - 818	813.25	817.75	
72	818 - 824	819.25	823.75	
73	824 - 830	825.25	829.75	
74	830 - 836	831.25	835.75	
75	836 - 842	837.25	841.75	
76	842 - 848	843.25	847.75	
77	848 - 854	849.25	853.75	
78	854 - 860	855.25	859.75	
79	860 - 866	861.25	865.75	
80	866 - 872	867.25	871.75	
81	872 - 878	873.25	877.75	
82	878 - 884	879.25	883.75	
83	884 - 890	885.25	889.75	

► TECHNICAL ANNEX

Output level reduction in broadband amplifiers

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

Number of channels (n)	2	3	4	5	6	7	8	9	10	15	20
Output level reduction = $7.5 \cdot \log(n-1)$ dB	0	2	3.5	4.5	5	5.5	6	6.5	7	8.5	9.5

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

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

Number of channels (n)	2	3	4	5	6	7	8	9	10	15	20
Output level reduction = $10 \cdot \log n$ dB	3	4.5	6	7	8	8.5	9	9.5	10	11.5	13

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

Channel allocation for CTB and CSO measurement — CENELEC Frequency Plan

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

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

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

EN 50083-3

► TECHNICAL ANNEX

«Level/Voltage» conversion table

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

Ex.: 66 dB μ V = 2.0 mV
125 dB μ V = 1.8 V

«dB μ V / dBm» conversion on 75 Ω

Convert dB μ V to dBm → Subtract 108.7 from the figure in dB μ V :

$$(N) \text{ dB}\mu\text{V} = (N - 108.7) \text{ dBm}$$

Ex.: 110 dB μ V = 1.3 dBm

Convert dBm to dB μ V → Add 108.7 to the figure in dBm :

$$(M) \text{ dBm} = (M + 108.7) \text{ dB}\mu\text{V}$$

Ex.: -50 dBm = 58.7 dB μ V

«dB μ V / dBmV» conversion

Convert dB μ V to dBmV → Subtract 60 from the figure in dB μ V :

$$(N) \text{ dB}\mu\text{V} = (N - 60) \text{ dBmV}$$

Ex.: 100 dB μ V = 40 dBmV

Convert dBmV to dB μ V → Add 60 to the figure in dBmV :

$$(M) \text{ dBmV} = (M + 60) \text{ dB}\mu\text{V}$$

Ex.: 22 dBmV = 82 dB μ V

Earthing and equipotential bonding cables

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

Earthing cables:

Material	Cross-section	Ø	Condition
Copper	≥ 16 mm ²	≥ 4.6 mm	bare or insulated
Aluminium	≥ 25 mm ²	≥ 5.7 mm	bare (indoors only) or insulated
Aluminium	≥ 50 mm ²	≥ 8.0 mm	(wrought) alloy
Steel wire	-	8.0 mm	galvanized
Steel strip	2.5 x 20 mm	-	galvanized

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

Equipotential bonding cables:

Material	Cross-section	Ø	Condition
Copper	4 mm ²	2.3 mm	bare or insulated

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