

AC1500 1.2 GHZ DISTRIBUTION AMPLIFIER



The AC1500 is a single active output amplifier with 43dB operational gain. The used amplifier stages are based on high performance GaN solution that makes the usable gain range especially wide and high output level possible. Integrated interstage gain and slope controls optimise flatness performance and together with a transponder or a pilot detection module add ALSC functionality. Temperature compensating MLSC unit minimises the needed amount of ALSC units. With internal splitting there are 3 separate outputs available.

Elements like ingress switches and return amplifier are built on the motherboard. For upgrading return path to 85 MHz or 204 MHz there is no need to change return amplifier, but only duplex filters and a passive slope and response correction unit. Continuous rotary switch upstream controls are built on the motherboard.

Features

- 1.2 GHz bandwidth
- Forward amplifiers use GaN HEMT and GaAs pHEMT technology
- GaAs push-pull return amplifier on motherboard
- Temperature compensated forward and return path
- Flexible 862/1006/1218 MHz interstage slope pivot point selection
- Excellent ESD and surge protection
- Remote power supply with PFC
- Fixed station memory for electrical identification
- Optional AC6188 temperature compensating MLSC unit with RIS
- Optional AC6158 agile pilot ALSC unit with RIS
- Optional AC6952 transponder with:
 - CATVisor/HMS compatible RF modem with wide frequency ranges
 - ALSC with fully user programmable pilots and backup pilots
 - Downstream spectrum analyser
 - Upstream signal quality monitoring

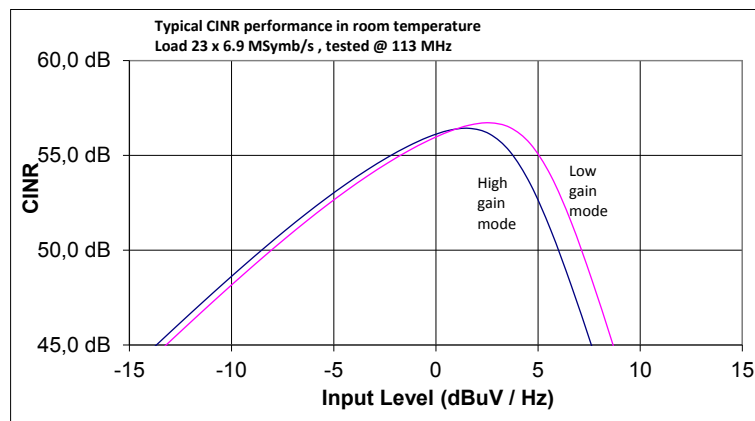
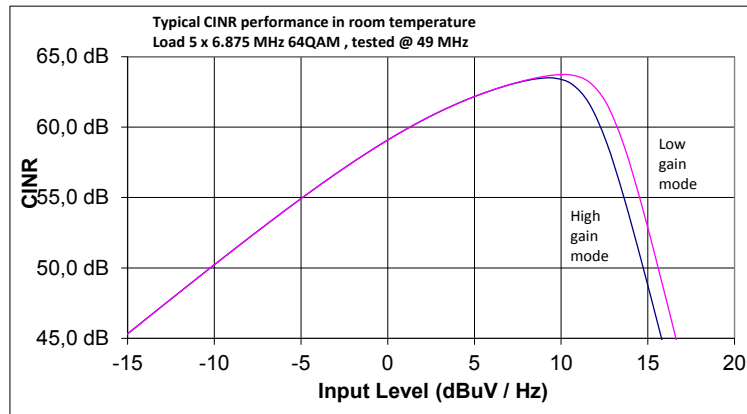
Technical specifications

Parameter	Specification	Note
Downstream signal path (values with diplex filters)		
Frequency range	85...1218 MHz	
Return loss	20 dB	1)
Operational gain	43 dB	2)
Maximum gain	47 dB	
Input attenuator control range	20 dB	3)
Input equaliser control range	25 dB	3)
Interstage nominal slope	13 dB	4)
Pivot point frequency	862 / 1006 / 1218 MHz	4)
Interstage slope control	±4 dB	5)
Interstage gain control	±4 dB	5)
Flatness	±0.4 dB	6)
Group delay	2 ns	7)
Test point	-20 dB	8)
Transponder connection	-19 dB	9)
Input by-pass attenuation	-2.5 dB	
Noise figure, f<1 GHz	< 5.5 dB	10)
Noise figure, f<1.2 GHz	< 6.5 dB	10)
$U_{\max}(112 \times \text{QAM channels}) @ 1 \text{ GHz}$	111.5 dB μ V	11)
$U_{\max}(138 \times \text{QAM channels}) @ 1.2 \text{ GHz}$	108.5 dB μ V	
CTB 41 channels	117.5 dB μ V	12)
CSO 41 channels	120.0 dB μ V	12)
XMOD 41 channels	114.5 dB μ V	12)
CTB mixed raster	79 dB	13)
CSO mixed raster	79 dB	13)
Upstream signal path (values with diplex filters)		
Frequency range	5...65 / 85 / 204 MHz	
Return loss	18 dB	14)
Gain	28	15)
Ingress switching	0 / -6 / < -45 dB	
Output attenuator control range	-15...0 dB	16)
High / low gain mode selection	28 / 16 dB	
Nominal slope (65 / 204 MHz)	0 / 3 dB	
Equaliser control range	0...15 dB	16)
Flatness	±0.5 dB	
Test point	-10 dB	
Transponder connection	-33 dB	
Noise figure, f<65 MHz	< 4.5 dB	17)
Noise figure, f<204 MHz	< 6.0 dB	17)
CINR	See curve	18)
General		
Power consumption (65 & 90 / 230 V _{AC})	25 / 26 W	19)
Supply voltage	27...65 / 40...90 / 205...255 VAC	20)
Maximum current feed through	7.0 A / port	21)
Hum modulation	70 dB	21)
Resistance for remote current	25 m Ω / port	
Input/Output connectors	PG11 thread, other types available	
Test point connectors	F female	
Dimensions	245 x 255 x 100 mm	h x w x d
Weight	3.0 kg	
Operating temperature	-40...+60 °C	
Class of enclosure	IP67	22)
EMC	EN50083-2	
ESD	4 kV	23)
Surge	6 kV (EN 60728-3)	

Notes

- 1) The limiting curve is defined at 40 MHz -1.5 dB / octave.
- 2) This the nominal operational gain in room temperature at highest frequency. Gain is defined with 2 pcs of diplex filters. All other used plug modules and settings have 0 dB value.
- 3) Fixed value pad attenuators and equalizers are used.
- 4) Slope is defined between 85 MHz and selected pivot frequency.
- 5) These control ranges are used for internal temperature compensation with MLSC unit and for adjustments with ALSC unit. Electrical adjustment is possible up to ± 5 dB, but temperature and unit-to-unit variation may cause adjustments over ± 4 dB to be unusable.
- 6) Typical value. The guaranteed value is ± 0.75 dB. Flatness is with nominal settings and 2 pcs of diplex filters. All other used plug modules are 0 dB jumpers. The specification is valid 2 MHz after the starting frequency of the selected diplex filter.
- 7) Typical value for 4.43 MHz band. Measured at channel S2. CXF065 diplex filters are in use.
- 8) Output TP has a tolerance of ± 0.8 dB between 85...1006 MHz and ± 1.0 dB between 1006...1218 MHz. The TP is defined with 0 dB plug as OUTPUT MODULE 1. This connection can be used also as an injection point for a test signal of return channel. Input TP is a transformer type with ± 1.5 dB accuracy between 5...1006 MHz. At higher frequency tolerance is ± 2.0 dB. Input TP accuracy has been defined with 3 dB input attenuator.
- 9) The level difference between output 1 and transponder connection pin on the motherboard.
- 10) Typical value with the nominal operational gain. Guaranteed value is 1.0 dB worse.
- 11) Typical value according to IEC60728-3-1. Channels have 13 dB cable equivalent slope between 85...1006 MHz and signal level has been defined at 1002 MHz. BER measurement has been done on the worst channel between 110...1006 MHz.
- 12) Typical value according to EN60728-3. Amplifier output is 13 dB cable equivalent sloped between 85...1006 MHz and signal level is defined at 862 MHz. All results are typical values in room temperature. XMOD is measured at the lowest channel. Guaranteed values are 2 dB worse.
- 13) Channel raster has 23 x PAL channels at low frequency end and rest of band has been fulfilled with 91 x 256QAM (-6 dB) channels. Amplifier output is 13 dB cable equivalent sloped between 85...1006 MHz and equivalent signal level is 115 dBuV at 1006 MHz. Guaranteed values are 3 dB worse.
- 14) $8 < f < 80$ MHz, $f > 80$ MHz -1.5 dB / octave.
- 15) Upstream amplifier is built on the motherboard. At 204 MHz usable gain is 29 dB.
- 16) Rotary switch with 1 dB step . This control is fixed built on the motherboard. Pivot point of slope control can be updated by changing passive plug-in module.
- 17) Typical value in high gain mode. Guaranteed value is 1 dB worse.

18) CINR



19) With control unit AC6158/-88.

20) 40...90 VAC power supply is purposed only for quasi-square wave form supply voltage.

21) At any frequency from 10 to 1218 MHz when the remote current is less than 7 A. Value is valid for one signal port. 15 A is the maximum total current which can be locally injected into all ports simultaneously.

22) The housing is tested to be class of IP67. However, in standard delivery condition the lowest side wall is equipped with a 1 mm ventilation hole. Then the practical enclosure class is IP54.

23) EN61000-4-2, contact discharge to enclosure and RF-ports.

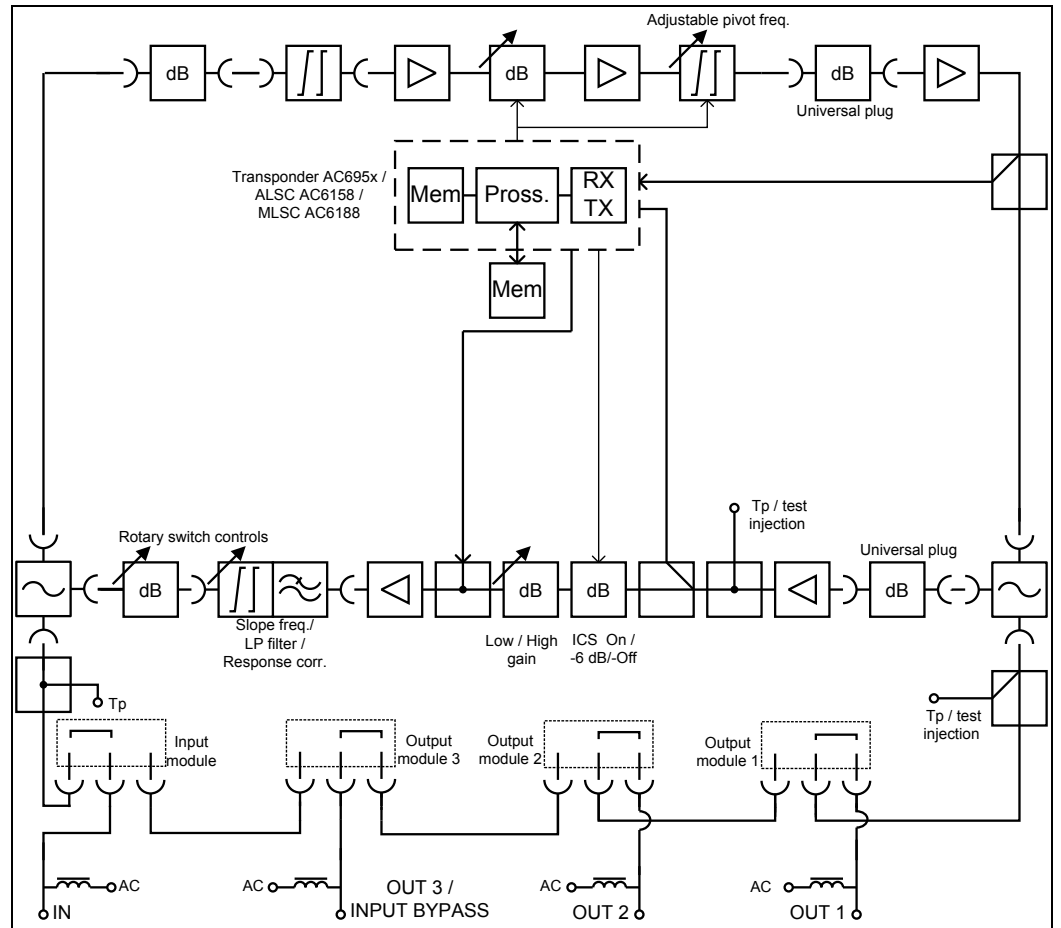
Functionality with units installed into transponder slot

Functionality	AC6188 MLSC unit	AC6158 ALSC unit	AC6952 transponder
Configuration via front panel UI	X	X	-
Configuration via USB / Bluetooth	-	-	X
Status indication in front panel	X	X	X
Return path ingress switch local control	X	X	X
Interstage gain and slope manual control	X	X	X
Interstage gain and slope control by ALSC pilots	-	X	X
ALSC pilot frequencies, types and levels user configurable	-	X	X
Reserve pilots and user configurable lost pilot behaviour	-	-	X
Remote and local voltage measurement with alarms	-	-	X
Simple unidirectional Remote Ingress Switching (RIS) receiver	X	X	-
CATVisor/HMS compatible RF modem for monitoring and control	-	-	X
Temperature measurement with alarms	-	-	X
Lid status monitoring with alarm	-	-	X
Service terminal monitoring with alarm	-	-	X
Configuration change monitoring with alarm	-	-	X
Modem receive and transmit signal level monitoring with alarms	-	-	X
Fully user configurable alarm limits, severities, enabling and delays	-	-	X
Uptime, total uptime and reset counters for power outage statistics	-	-	X
Alarm log stored into non-volatile memory for easy troubleshooting	-	-	X
Fast local software update via USB also without power supply	-	-	X
Spectrum analyser for downstream level measurement with alarm	-	-	X
Ingress analyser for upstream level measurement with alarms	-	-	X

Compatibility

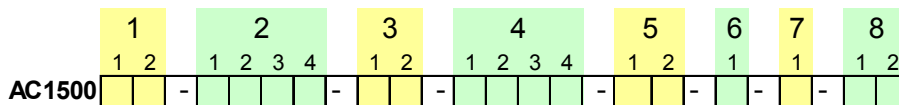
All accessories that are used with this product should be the newest generation available. Only by using up-to-date accessories proper operation can be ensured.

Block Diagram



Ordering information

AC1500 configuration map



<p>1-1 Gain and housing</p> <p>B 43 dB, 1.2 GHz</p>	<p>4-1 Forward path input plugs</p> <p>A JDA900 and TNE000 installed</p> <p>X No input attenuator or equalizer</p>
<p>1-2 Power supply</p> <p>A Local powering, euro plug (230 VAC)</p> <p>B Remote powering with cable clamp (65 VAC)</p> <p>C Local powering, UK plug (230 VAC)</p> <p>D Remote powering with cable clamp (90 VAC)</p> <p>E Customer specific</p>	<p>4-2 Forward mid-stage plug</p> <p>A 0 dB, (JDA900)</p> <p>B 3 dB, (JDA903)</p> <p>X None</p>
<p>2-1 Input connection (first from left)</p> <p>A PG11</p> <p>B 5/8"</p> <p>C IEC</p> <p>D 3.5/12</p> <p>E F</p>	<p>4-3 Output module 1</p> <p>A 0 dB, 1 output in use (AC6120)</p> <p>B Splitter , 2 outputs in use (AC6124)</p> <p>X None</p>
<p>2-2 Input by-pass/output 3 connection</p> <p>A PG11</p> <p>B 5/8"</p> <p>C IEC</p> <p>D 3.5/12</p> <p>E F</p> <p>X None (PG11 sealing plug)</p>	<p>5-1 Return path universal plug</p> <p>A 0 dB, (JDA900)</p> <p>X None</p>
<p>2-3 Output 2 connection</p> <p>A PG11</p> <p>B 5/8"</p> <p>C IEC</p> <p>D 3.5/12</p> <p>E F</p> <p>X None (PG11 sealing plug)</p>	<p>5-2 Return path configuration</p> <p>A 65 MHz, (AC6250)</p> <p>B 85 MHz, (AC6251), NA</p> <p>C 204 MHz, (AC6252)</p>
<p>2-4 Output 1 connection (first from right)</p> <p>A PG11</p> <p>B 5/8"</p> <p>C IEC</p> <p>D 3.5/12</p> <p>E F</p>	<p>6-1 Control or transponder module</p> <p>A Manual control module (AC6188)</p> <p>B Pilot based control module (AC6158)</p> <p>C Transponder and ALSC module (AC6952)</p> <p>X None</p>
<p>3-1 Input module</p> <p>A 0 dB, no by-pass (AC6110)</p> <p>X None</p>	<p>7-1 Settings</p> <p>A Customer settings</p> <p>X Factory default</p>
<p>3-2 Diplexer filters</p> <p>A 65/85 MHz (2 x CXF065)</p> <p>B 85/105 MHz (2 x CXF085)</p> <p>C 204/258 MHz (2 x CXF204 S)</p> <p>X None</p>	<p>8-1 Mode selections</p> <p>A Factory default</p> <p>B Customer specific selection (1G,Low US)</p> <p>C Customer specific selection (1.2G,Low US)</p>
	<p>8-2 Customer specific selections</p> <p>A Customer specific option</p> <p>B Customer specific option</p> <p>X None</p>