

AC8000 FIBRE OPTIC PLATFORM



The AC8000 is a dual active output node. It is based on fixed platform but flexible modular solution. There is possible to have an optical receiver with redundancy for downstream signal. The upstream channel can also be fully redundant with double transmitter solution. When more segmentation is needed, both optical transmitters can be fed by separate individual return signals. The amplifier stages are based on high performance hybrids, what makes the used output level range especially wide. By using internal splitting there can be available even 3 separate outputs.

The AC8000 is having a plug-in module slot for transponder unit, which can be locally controlled by lap top or hand terminal. The transponder unit does the measurements and controls the ingress switches on the mother board. Double PSUs are also monitored by transponder. This solution increases the reliability of the station to even higher level. Electrical level adjustment modules can be installed. They make it possible to have adjusted output levels through EMS or using the fully electrical ALC function.

Features

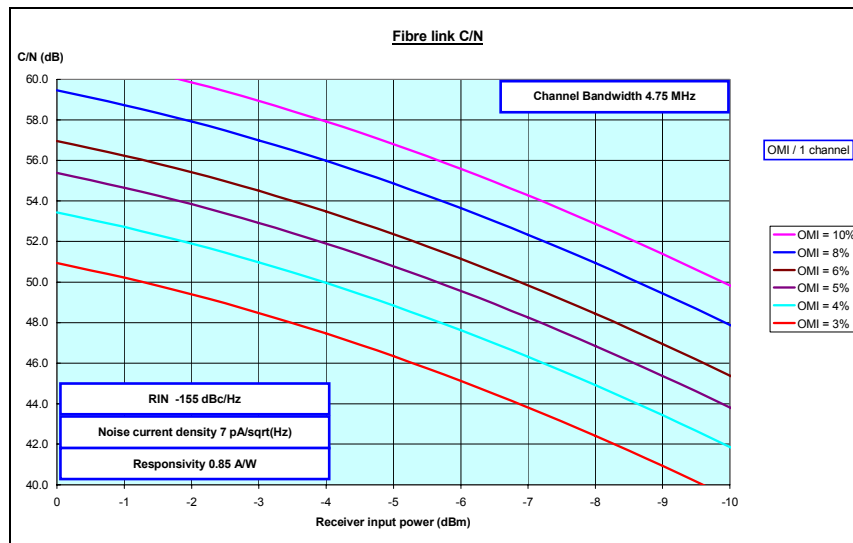
- Integrated splice organizing option
- Wide range of upstream laser technologies available
- Efficient surge and ESD protection
- Redundancy power supply
- Amplifiers stages use GaAs technology
- 3 outputs
- Electrical level control
- Spectrum analyser function as an option
- HMS compatible EMT module available
- Fixed station memory for electrical identification

Technical specifications

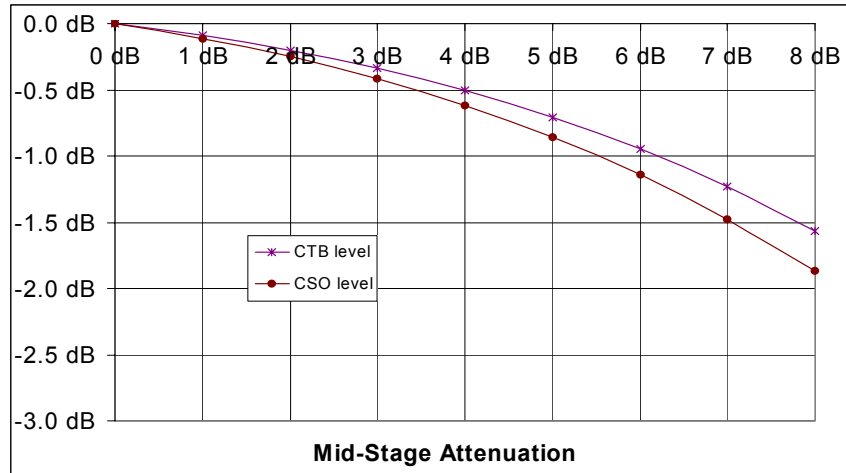
Parameter	Specification	Note
Downstream signal path		
Light wavelength	1290...1600 nm	1
Optical input power range	- 7...+ 2dBm	2
Frequency range	47 / 54 / 70 / 85...862 MHz	
Return loss	20 dB	3
Gain limited output level	2 x 110 dBuV	4
Output level adjustment	20 dB	5
Mid-stage slope	8 dB	6
Flatness	± 0.5 dB	7
Test point	- 20 dB	8
Transponder connection	- 19 dB	9
Noise current density	7 pA / √ Hz	10
CTB 42 channels	114.0 dBμV	11
CSO 42 channels	115.5 dBμV	11
XMOD 42 channels	110.0 dBμV	11
CTB 110 / 77 channels	69.0 / 78.0 dBc	12
CSO 110 / 77 channels	72.0 / 76.0 dBc	12
XMOD 110 / 77 channels	63.0 / 72.0 dBc	12
Upstream signal path		
Frequency range	5...30 / 42 / 50 / 65 MHz	
Return loss	18 dB	13
Ingress switching	0 / - 6 / < - 45 dB	
Input level	62.0 dBμV	14
Transponder connection	- 26 dB	15
General		
Power consumption	40 W	16
Supply voltage	27...65 Vac , ±35...90 Vdc	
Supply current	see note	17
Maximum current feed through	10.0 A / port	18
Hum modulation	70 dB	18
Optical connectors	SC/APC, FC/APC, E-2000	19
Output connectors	PG11	
Test point connectors	F- female	
Dimensions	245 x 255 x 145 mm	h x w x d
Weight	4.0 kg	
Operating temperature	-40...+55 °C	
Class of enclosure	IP 54	
EMC	EN50083-2	
ESD	4 kV	20
Surge	6 kV	21

Notes

- 1) The typical responsivity of the photodiode is 0.85 A/W at 1310 nm and 0.95 A/W at 1550 nm.
- 2) Dependent on selected receiver module.
- 3) The limiting curve is defined at 40 MHz -1.5 dB / octave.
- 4) This is the typical output level when OMI is 4.0% . The level is available with the optical input power of - 7 dBm (AC6810) and - 3 dBm (AC6820). The used wavelength is 1310 nm.
- 5) Fixed value JDA9xx series attenuators are available with the steps of 1 dB. Level can be also controlled by electrical adjustment module AC6173 with a control range of 10 dB. It can be operated in ALC or MGC mode.
- 6) The platform is defined with 8 dB tilted output. However, it is possible to use the node with other slopes by changing the mid-stage equaliser plug.
- 7) Typical value. The guaranteed value is ± 0.9 dB. Flatness is defined with mid-stage equaliser and diplex filter. All other used plug modules are 0 dB jumpers.
- 8) Output TP is from a directional coupler and has a ± 0.75 dB tolerance. The output test point can be used as an injection point for return path test signal.
- 9) This is the level difference between output 1 and transponder connection pin on the motherboard.
- 10) This is a typical value at 862 MHz and the value can be used for C/N calculations.

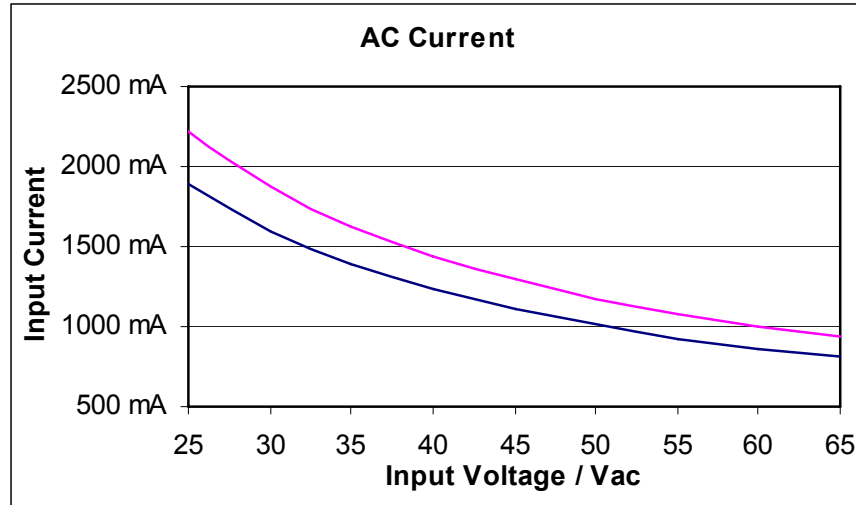


- 11) EN50083-3. The output was 8 dB cable equivalent sloped. All results are typical values in room temperature, which can be used in system calculations. XMOD is measured at the lowest channel.
The highest recommended output level for the node is 113.0 dBuV with 42 channels.



This picture shows how distortion performance is changing if mid-stage level control is used.

- 12) Measured with 77 and 110 NTSC channels. The output was 12 dB linearly sloped and the used levels were at 55 / 550 / 750 / 862 MHz 35.0 / 42.5 / 45.5 / 47.0 dBmV. All results are typical values in room temperature, which can be used in system calculations. XMOD is measured at 55.25 MHz. The high end of the frequency band up to 862 MHz was fulfilled with QAM channels having a level of -6 dB relative to analogue CW carriers.
The highest recommended output level for the node is 51 dBmV with 110 channels and 53 dBmV with 77 channels.
- 13) $7 < f < 65$ MHz
- 14) Typical input level for 4% OMI. Defined at the output connector of the node. Valid with AC6840 transmitter.
- 15) This is the theoretical level difference between the input connector of the return signal path and the injection pin of the up-stream signal of the transponder. It can be used when adjusting the transmitter of the modem. In cases when combiner module is used the level rises 6 dB before the optical transmitter.
- 16) An optical receiver (AC6810), return transmitter (AC6840) and EMT (AC6951) units are installed. With the redundancy optics and EMT module the power consumption is 43 W.
- 17)



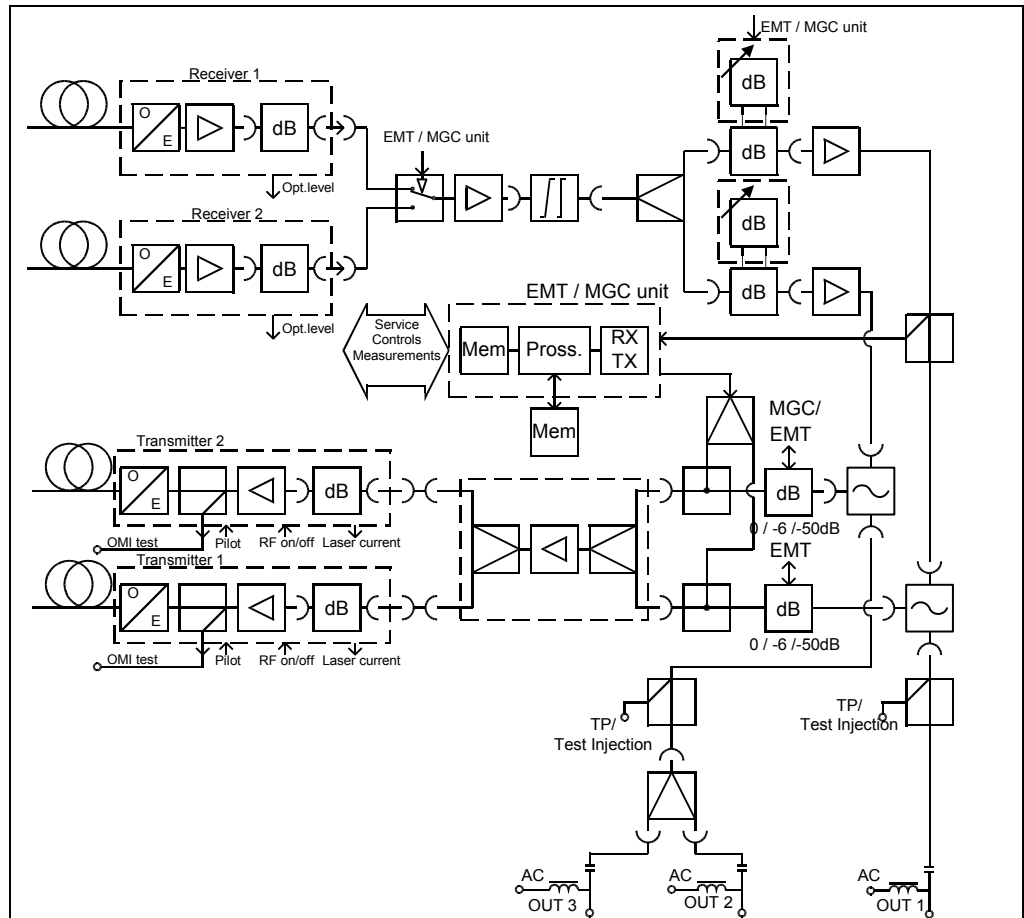
The lower curve is with single optics (modules like in previous note). The higher curve with optical redundancy.

- 18) 70 dB hum value is valid at any frequency from 10 to 862 MHz, when the remote current is less than 8.0 A/ port. Hum modulation is 65 dB, if 10.0 A is fed. 15.0 A is the maximum current, which can be locally injected into all ports together.
- 19) The type has to be specified by customer. See available options in "Ordering Information".
- 20) EN61000-4-2, contact discharge to enclosure and RF-ports.
- 21) EN61000-4-5, 1.2 / 50 μ s pulse to RF-ports.

Monitored Functions and Controlled Parameters

- Optical level of the RX module
- ALC-and electrical level adjustment functions
- Spectrum analyser function
- Receiver selection switch
- Laser current measurement
- Pilot generator control in optical TX
- RF amplifier ON/OFF in optical TX
- Return path ingress switches ON/ -6 dB / OFF control
- 65 VAC voltage measurement
- Local voltage 12 V
- Local voltages 24 V separately at both PSUs
- Temperature measurement
- Individual channel level measurement
- Lid status monitoring
- Local connection indication at server
- Configuration data stored in main board eeprom (station memory)
- External alarm possibility

Block Diagram



Ordering Information

AC8000 configuration map

		1-	2-	3-	4-	5-	6-	7-	8-	9-	10-
		1	2	3	4	1	3	1	2	1	2
AC8000											
1-1 Fibre feed-through adapter	E 5/8 Adapter (KDC316) G 1-4 fibres (KDO900) X None										
1-2 Output 3 connection	A PG11 B 5/8 C IEC D 3.5/12 E F X None (PG11 sealing plug)										
1-3 Output 2 connection	A PG11 B 5/8 C IEC D 3.5/12 E F X None (PG11 sealing plug)										
1-4 Output 1 connection (first from right)	A PG11 B 5/8 C IEC D 3.5/12 E F										
2-1 Optical receiver RX1	10 RX1 input level -7...-2 dBm (AC6810) 20 RX1 input level -3...+2 dBm (AC6820) XX None										
2-3 Optical connector for receiver RX1	A SC/APC, 9 deg. B FC/APC, 8 deg. C E-2000 D SC/APC, 8 deg. E SC/APC, 8 deg. AMP X None										
3-1 Optical receiver RX2	10 RX2 input level -7...-2 dBm (AC6810) 20 RX2 input level -3...+2 dBm (AC6820) XX None										
3-3 Optical connector for receiver RX2	A SC/APC, 9 deg. B FC/APC, 8 deg. C E-2000 D SC/APC, 8 deg. E SC/APC, 8 deg. AMP X None										
4-1 Interstage slope and gain adjustment	A 8 dB slope @ 862 MHz (TDE810) and no gain adjustment plugs B 8 dB slope @ 862 MHz (TDE810) and full gain (2 x JDA900) C 8 dB slope @ 862 MHz, temp. comp. (TTE810) and no gain adjustment plugs D Flat response (TXA000) and full gain (2 x JDA900) E 8 dB slope @ 862 MHz (TDE810) and electrical level adj. (2xAC6173) K 8 dB slope @ 862 MHz (TDE810) and electrical level adj. (2xAC6174) L Flat response (TXA000) and electrical level adj. (2 x AC6173) X None										
4-2 Diplexer filter	A 30/47 MHz (2 x CXF030) B 42/54 MHz (2 x CXF042) C 50/70 MHz (2 x CXF050) D 65/85 MHz (2 x CXF065) E Forward path jumper (2 x CXF000) F 55/70 MHz (2 x CXF055) G 65/85 MHz (2 x CXF065 18) X None										
4-3 Output module for output 2	A 0 dB, 2 outputs in use (AC6120) B Splitter -3.7 dB, 3 outputs in use (AC6124) C Tap -8 dB, 3 outputs in use (AC6128) D Tap -12 dB, 3 outputs in use (AC6112) E Tap -16 dB, 3 outputs in use (AC6116) F Tap -20 dB, 3 outputs in use (AC6119) X None										
4-4 Return path operation	A Combined return lines, 30 MHz (AC6195) B Combined return lines, 42 MHz (AC6196) C Combined return lines, 50 MHz (AC6197) D Combined return lines, 65 MHz (AC6198) E Two separate return lines, 30 MHz (AC6190) F Two separate return lines, 42 MHz (AC6191) G Two separate return lines, 50 MHz (AC6192) H Two separate return lines, 65 MHz (AC6193) X None										
5-1 Return path transmitter TX1	30 FP 1310 nm (AC6830) 35 FP 1310 nm (AC6835) 40 FP 1310 nm (AC6840) 45 DFB 1310 nm (AC6845) 47 CWDM 1470 nm (AC6847) 49 CWDM 1490 nm (AC6849) 51 CWDM 1510 nm (AC6851) 53 CWDM 1530 nm (AC6853) 55 CWDM 1550 nm (AC6855) 57 CWDM 1570 nm (AC6857) 59 CWDM 1590 nm (AC6859) 61 CWDM 1610 nm (AC6861) XX None										
5-3 Optical connector for transmitter TX1	A SC/APC, 9 deg. B FC/APC, 8 deg. C E-2000 D SC/APC, 8 deg. E SC/APC, 8 deg. AMP X None										
6-1 Return path transmitter TX2	30 FP 1310 nm (AC6830) 35 FP 1310 nm (AC6835) 40 FP 1310 nm (AC6840) 45 DFB 1310 nm (AC6845) 47 CWDM 1470 nm (AC6847) 49 CWDM 1490 nm (AC6849) 51 CWDM 1510 nm (AC6851) 53 CWDM 1530 nm (AC6853) 55 CWDM 1550 nm (AC6855) 57 CWDM 1570 nm (AC6857) 59 CWDM 1590 nm (AC6859) 61 CWDM 1610 nm (AC6861) XX None										
6-3 Optical connector for transmitter TX2	A SC/APC, 9 deg. B FC/APC, 8 deg. C E-2000 D SC/APC, 8 deg. E SC/APC, 8 deg. AMP X None										
7-1 Optical filter 1	0 FWDM filter, 1310/1550 nm (AC6570) X None										
7-2 Optical connectors (3 pcs) for filter 1	A SC/APC, 9 deg. B FC/APC, 8 deg. C E-2000 D SC/APC, 8 deg. E SC/APC, 8 deg. AMP X None										
8-1 Optical filter 2	0 FWDM filter, 1310/1550 nm (AC6570) 9 Optical combiner / splitter X None										
8-2 Optical connectors (3 pcs) for filter 2	A SC/APC, 9 deg. B FC/APC, 8 deg. C E-2000 D SC/APC, 8 deg. E SC/APC, 8 deg. AMP X None										
9-1 Element management transponder	A Standard, CATVisor (AC6910) B With tuner level measurement, CATVisor (AC6950) C Standard, HMS (AC6910 HMS) D With tuner level measurement, HMS (AC6950 HMS) E ALC controller module (AC6940) F Manual node controller module (AC6183) G Standard, CATVisor (AC6951) H Standard, HMS (AC6951 HMS), Q2/2007 X None										
10-1 Power supply	A Single PSU, 65 VAC (1 x AC6310) B Double PSUs, 65 VAC (2 x AC6310)										
10-2 Platform performance	B High gain, standard fibre organiser (socket head lid screws), plug-in adjustments C High gain, standard fibre organiser (socket head lid screws), electrical adjustments N High gain, splice and fibre organiser in the lid (socket head lid screws), plug-in adjustments										