

HDBS-5000CW series
4-way SAT-IF & 1-way CATV
CWDM optical transmitter/optical receiver
950MHz~2400 MHz
Technical Specification

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1.0 PRODUCT DESCRIPTION

Huatai HDBS-5000CW series combines 4 units SAT-IF optical transmitters and 1 unit CATV optical transmitter, or SAT-IF optical receivers that has CWDM standard wavelength into one housing. The built-in CWDM Multiplexing or De-multiplexing the 5-way optic, and transmit via one single fiber, which can transmit four-way SAT-IF signal of VL, VH, HL HH four polarizations and one-way CATV signal in one satellite with a high quality, flexible to install and convenient to use.

CWDM (wide wave multiplexing) adopts 20nm channel distance. There are 18 wavelengths during 1270nm~1610nm. All these 18-way optical signals can be transmitted via one single fiber by WDM. The CWDM cannot amplified by normal type EDFA, it can only apply to a small range satellite FTTH, short distance satellite L-Band optical link.

HDBS-5000CW1 is with built-in CWDM. The 5-way optical signal Multiplexing or De-multiplexing inside the housing, then input (RX) or output (TX) by the SC/APC connector on the front panel or back panel.

HDBS-5000CW5 is without built-in CWDM. The 5-way optical signal input (RX) or output (TX) by the 5 SC/APC connectors on the front panel or back panel. It can transmit 17-way optical signal from 1 unit HDBS-5000CW5 and 3 units HDBS-4000CW4, which can transmit four satellites with 16-way SAF-IF signal of four polarizations and one-way CATV signal.

HDBS-5000CW series optical transmitter adopts un-cooling DFB laser that is featured with high linearity for SAT-IF, cooling DFB laser that is featured with high linearity and direct modulation mode for CATV. The whole unit is installed perfectly with built-in laser APC, ATC control circuit to ensure the laser's long life and high reliability. The CATV adopts the RF AGC driving circuit with pre-distortion compensation. The SAT-IF has high linearity IF amplify circuit with AGC function (TG type) and without IF amplify circuit (TO type) optional. The TO type allows high level input.

2.0 PRODUCT FEATURE

- Transmitting 18-way SAT-IF optical signal by internal CWDM standard wavelength via one single fiber
- 1U standard chassis, combine 4 units SAT-IF and 1 unit CATV optical transmitter or optical receiver
- HDBS-5000CW1 Multiplexing 5-way optic by built-in CWDM and transmit via one single fiber.
- HDBS-5000CW5 without built-in CWDM, 5-way optical output (TX) , or 5-way optical input (RX)
- Adopts external CWDM-17 , transmit 17-way optical signal from 1 unit HDBS-5000CW5 and 3 units HDBS-4000CW4 by Multiplexing 16-way SAF-IF signal of four polarizations and one-way CATV signal, and transmit via one single fiber
- HDBS-5100 adopts 1U standard chassis, the front panel LCD provides the select display and error diagnosis, with standard RS232 communication interface, SNMP network management function
- HDBS-5200 adopts small-size metal housing, wall mounted, easy to connect the Multi-switch to STB
- CATV adopts 1310nm cooling DFB laser with high linearity
- SAT-IF adopts DFB laser with high linearity and optical isolation, CWDM standard wavelength
- CATV work bandwidth: 47~862MHz
- SAT-IF 工 work bandwidth: 950~2400MHz
- CATV optical transmitter, with pre-distortion compensation and AGC control.
- SAT-IF has high linearity IF amplify circuit with AGC function (TG type) and without IF amplify circuit (TO type) optional. The TO type allow high level input
- All the four-way optical transmitter can provide +13VDC or +18VDC to LNB.
- Strong anti-electromagnetic, RF, lightning capability
- Can be installed flexibly, use conveniently
- High cost-efficient

3.0 MAIN APPLICATION

- CATV & DBS FTTH

4.0 Related product

- HDBS-4000CW
- HDBS-5000DW、HDBS-4000DW

5.0 Technique index

Performance			Index	Supplement
TX&RX optical feature	TX operating wavelength range	(nm)	1270~1610	CWDM, 18CH
	TX standard configuration operating HDBS-5105CW1-TX-S	(nm)	1310	CATV
			1510	VL-TX
			1530	VH-TX
			1550	HL-TX
			1570	HH-TX
	RX operating wavelength range	(nm)	1260~1620	CWDM, 18CH
	RX standard configuration HDBS-5105CW1-RX-S	(nm)	1310	CATV
			1510	VL-TX
			1530	VH-TX
			1550	HL-TX
			1570	HH-TX
	Number of TX output port		1	
			5	
	TX output power ¹⁾	(dBm)	5 ($\geq 3\text{mW}$)	SAT-IF
			6~30mW	CATV
	Number of RX input port		1	
			5	
RX input power	(dBm)	0~-13	SAT-IF	
		0~-8	CATV	
Return loss	(dB)	≥ 50		
Optical connector		SC/APC	Option FC/APC, LC/APC	
Laser type		Un-cooling DFB	SAT-IF CWDM	
		Cooling DFB	CATV	

	Optical receive tube type		PIN	RX
SAT-IF feature	Operating bandwidth	(MHz)	950~2400	
	TX input level	(dBmV)	-25~-14	TG type with IF amplification
			-6~+10	TO type without IF amplification
	RX output level	(dBmV)	-15~-40	
	Flatness	(dB)	0.5	40MHz
			±1.5	950~2400MHz
	Input impedance	(Ω)	75	
	RF return loss	(dB)	12	
	RF connector		F-female	
	C/IM3 ¹⁾	(dB)	≥55	
	Equivalent noise intensity	(dB/Hz)	>115	
Link gain ²⁾	(dB)	25		
CATV	Operating bandwidth	(MHz)	45~862	
	Input level	(dBmV)	15~25	AGC
	Output level	(dBmV)	28	Pin=-2dBm
	Flatness	(dB)	≤±0.75	45~862MHz
	Return loss	(dB)	>16	47~750MHz
	RF connector		F-female	
	Input impedance	(Ω)	75	
CATV link feature	Test channel		56CH (PAL-D)	OMI=3.8%
	CNR1	(dB)	56.6	Pin=-2dBm
	CNR2	(dB)	48.5	Pin=-8dBm
	CTB	(dB)	≤-65.5	Pin=-2dBm
	CSO	(dB)	≤-63	Pin=-2dBm
	HUM	(dB)	≤-60	
General feature	Serial interface		RS232	HDBS-5100
	SNMP network management interface		RJ45	HDBS-5100
	Power supply	(V)	95~260VAC	
	Power consume	(W)	<50	
	Operating temp.	(°C)	-5~+65	
	Storage temp.	(°C)	-40~+85	
	Relative humidity	(%)	5~95	
	Size	HDBS-5100	(mm)	483×267×44
HDBS-5200		263×198×35		

Remarks: 1. C/IM3 mean when testing with two channels carrier frequency (1.0GH and 1.1GHz), the ratio of carrier wave peak value and triple beat peak.

2. -40dBm RF input test.

3. Without calculating CWDM insertion loss.

6.0 SAT-IF link feature

Fiber input (dB)	Link loss (dB)	CNR (dB)	Link gain (dB)	Rf output level (dBm/Ch.)
-13	14	30.18	-2	-38
-12	13	32.18	0	-36
-11	12	34.13	2	-34
-10	11	38.59	6	-32
-8	9	40.11	8	-30
-7	8	42.18	10	-28
-6	7	44.24	12	-26
-5	6	45.67	14	-24
-4	5	46.53	16	-22
-3	4	46.76	18	-20
-2	3	46.92	20	-18
-1	2	47.01	22	-16
0	1	47.03	24	-14

Note: 1、 Without calculating CWDM insert loss, TX Output=5dBm。

2、 The input level typical value for digital satellite receiver is -60dBm ~ -30dBm.

7.0 Test data for CATV optical receiver

Pin (dBm)	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
Vo (dBμV)	90.7	88.7	86.7	84.7	82.7	80.7	78.7	76.7	74.7	72.7	70.7
CNR (dB)	56.1	55.6	54	53	51.7	50.3	49.1	48.2	46.8	45.5	43.7
CTB (dB)	63	65	65	65	65	67	68	67	65	65	65
CSO (dB)	62	63	64	65	65	65	65	65	63	63	63

Note: 1、 Test condition: PAL-D56CH, OMI=3.8%

2、 Without calculating CWDM insert loss.

8.0 CWDM-18 technical index (18-CH)

Performance		CWDM-18A	CWDM-18B
Operating wavelength	(nm)	1270, 1290, 1310, 1330, 1350, 1370	
		1390, 1410, 1430, 1450, 1470, 1490	
		1510, 1530, 1550, 1570, 1590, 1610	
Center wavelength accuracy	(nm)	±0.5	
Channel spacing	(nm)	20	
Channel passband (@-0.5dB bandwidth)	(nm)	>13	
Passband insertion loss (without connector)	(dB)	≤3.8	≤6.0
Channel consistency	(dB)	≤1.0	≤1.5
Channel ripple	(dB)	≤0.5	
Isolation	Adjacent	(dB)	≥30
	Non-adjacent	(dB)	≥40
Polarization dependence loss	(dB)	≤0.10	
Polarization mode dispersion	(ps)	≤0.1	
Directivity	(dB)	≥50	
Return loss	(dB)	≥45	
Power handling	(mW)	300	
Optical connector		SC/APC, option LC/APC, FC/APC	
Size	Modulator	(mm)	110×95×15 (CWDM-M)
	19" stander	(")	19×10×1.75 (CWDM-C)

9.0 Product series

9.1 TX & RX

Model	TX output level		RX input level		Optical port No.		Wavelength configuration	Connector
	SAT-IF	CATV	SAT-IF	CATV	Output	Input		
HDBS-5105CW1-TG/S-06-SA	5dBm 1)	6mW			1		Standard	SC/APC
HDBS-5105CW1-TG/S-08-SA		8mW						
HDBS-5105CW1-TG/S-10-SA		10mW						
HDBS-5105CW1-TG/S-12-SA		12mW						
HDBS-5105CW1-TG/S-16-SA		16mW						
HDBS-5105CW1-TG/S-20-SA		20mW						
HDBS-5105CW1-TG/S-24-SA		24mW						
HDBS-5105CW1-TG/S-30-SA		30mW						
HDBS-5105CW5-TG/C-06-SA	5dBm	6mW			5		Optional	SC/APC
HDBS-5105CW5-TG/C-08-SA		8mW						
HDBS-5105CW5-TG/C-10-SA		10mW						
HDBS-5105CW5-TG/C-12-SA		12mW						
HDBS-5105CW5-TG/C-16-SA		16mW						
HDBS-5105CW5-TG/C-20-SA		20mW						
HDBS-5105CW5-TG/C-24-SA		24mW						
HDBS-5105CW5-TG/C-30-SA		30mW						
HDBS-5113CW1-RX/S-10-SA			≥ -13	≥ -8		1	Standard	SC/APC
HDBS-5113CW5-RX/C-10-SA						5	Optional	
HDBS-5213CW1-RX/S-10-SA						1	Standard	
HDBS-5213CW5-RX/C-10-SA						5	Optional	

Note: 1、 Without calculating CWDM insert loss.

2、 TX has TO type (without IF apply) optional.

9.2 CWDM

Model	Appearance	Insert loss	Optical port No.		Wavelength configuration	Connector
			Output	Input		
CWDM-04A-T-C/SA	1RU	≤3.8	1	4	Optional	SC/APC
CWDM-08A-T-C/SA	1RU	≤3.8	1	8	Optional	SC/APC
CWDM-16A-T-C/SA	1RU	≤3.8	1	16	Optional	SC/APC
CWDM-17A-T-C/SA	1RU	≤3.8	1	17	Optional	SC/APC
CWDM-04A-R-C/SA	1RU	≤3.8	4	1	Optional	SC/APC
CWDM-08A-R-C/SA	1RU	≤3.8	8	1	Optional	SC/APC
CWDM-16A-R-C/SA	1RU	≤3.8	16	1	Optional	SC/APC
CWDM-17A-R-C/SA	1RU	≤3.8	17	1	Optional	SC/APC

Note: 1、Module type optional.

2、Channel No. and channel wavelength are user optional.

3、B type (insert loss≤6.0) optional.

10.0 Model explanation

10.1 TX & RX

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Satellite broadcast L-Band fiber link products (DBS)	Product type	Product feature	SAT-IF output power	Multiplex mode	Number of output port	Type	Wavelength configuration	CATV output power	Optical port position	Connector	Power supply
1	5~2700MHz	1 19" standered type	05 5dBm	CW	1	TG	S Standard layout	08 8mW	F Front panel	SA SC/APC	48 -48VDC
2	CATV-RF(47~862MHz)& SAT-IF(950~2200MHz)	2 RX small ferrous box	RX receive sensitivity	CW	1	TG	C Customer specified	10 10mW	B Back panel	FA FC/APC	22 220VAC
3	SAT-IF 950~2400MHz		13 -13dBm	DW	5	TO		12 12mW		LA LC/APC	11 110VAC
4	4×SAT-IF assemble					TO		14 14mW			
5	4×SAT-IF or 1×CATV assemble					TO		16 16mW			
6	950~6000MHz					RX		18 18mW			
								20 20mW			
								22 22mW			
								24 24mW			
								CATV receive sensitivity			
								10 -10dBm			

PS: WAVELENGTH CONFIGURATION TABLE

	S (wavelength configuration)	C (user optional)
TX1 (VL)	1510nm	
TX2 (VH)	1530nm	
TX3 (VL)	1550nm	
TX4 (VH)	1570nm	
TX5 (CATV)	1310nm	

10.2 CWDM

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DWDM wavelength division multiplexer	Number of channel		Insert loss class		Mode		Type		Optical port position		Connector	
	04	4CH	A	<3.8dBm	TX	Multiplexer	M	Mode	F	Front panel	00	Without
	06	6CH	B	<6.0dBm	RX	Division	C	19" stander	B	Back panel	SA	SC/APC
	16	16CH									FA	FC/APC
	17	17CH									LA	LC/APC

Comment: channel wavelength configuration

1	1270	4	1310	7	1390	10	1450	13	1510	16	1570
2	1290	5	1350	8	1410	11	1470	14	1530	17	1590
3	1310	6	1370	9	1430	12	1490	15	1550	18	1610