



HS++LINK/SM

“Dual Modem” Gigabit Ethernet MW Link



GENERAL DESCRIPTION

The HS++Link is the evolution of the IP-native HS+Link to meet the needs of low cost/high performances MW network. A “real” GIGABIT ETHERNET RADIO. The IDU integrates a Dual Channel-Modem supporting two active ODUs to aggregate or switch the traffic between two links. Superlative functionality with modulation scheme up to 1024QAM and channel BW up to 120MHz for each modem, capable to deliver a throughput of 810Mbps Full-Duplex for each channel. Ready-to-use redundant configuration for link protection (1+1 HSB, FD and SD), link aggregation (2+0) or Dual-End station (East/West). Capacity upgrade and additional functionality enabled through license keys: “PAY AS YOU GROW”.

MAIN FEATURES

- Up to 2 Gbps aggregate capacity.
- Available modulation schemes:
QPSK/16QAM/32QAM/64QAM/128QAM/256QAM/512QAM
1024QAM
- Available channel bandwidth:
 - ETSI standard: 7/14/28/40/56/80 and 112MHz
 - ANSI standard: 10/20/25/30/40/50/60/80 and 120MHz
- Up to 1Gbps throughput over a single channel at 1024QAM
- Integrated XPIC mechanism.
- Customer network data interface:
 - 3 x RJ Gigabit Ethernet (100/1000Base-T)
 - 4 x SFP (1000BaseSX/LX)
- Two USB ports for connecting USB-flash disk or PC.
- “In-Band”/”Out-of-Band” Management.
- Support of RADIUS Server authentication for users remote access.

SYSTEM ADVANTAGES

- Point-to-Point fixed and mobile links carrying data, voice and HD video.
- Telco and Broadcasting transport networks.
- Enterprise and private MW networks: OIL&GAS - WISP - UTILITIES - HEALTHCARE - DISASTER RECOVERY.
- High capacity backhaul and backbone critical communications infrastructures.
- Ultra High Speed MW links.

SYSTEM FEATURES

- FEC – Forward Error Correction with RS Coding.
- Hitless and Errorless Adaptive Coding & Modulation (ACM) with dynamic capacity allocation and priority data transmission (PBPS – Packet Based Priority System).
- On-line Ethernet packet compression with reduced length of frames allowing throughput efficiency increase up to 25%.
- NAT, Proxy ARP support for effective IP management setup.
- Large range of System and Ethernet Counters.
- Adaptive Power Control ATCP.
- Built-in Network Management System (NMS) – http, https, SNMP v1,2,3, TELNET, SSH.
- Built-in Bit Error Rate (BER) Tester + Built-in Spectrum Analyzer.
- Integrated synchronization solution.
- AES-128/256 encryption for data confidentiality.

OPTIONS (External Multiplexer Module)

EMM ASI: 4 X ASI OPTION (UP TO 16 X ASI)

- Integrated HD video transport in addition to IP/Ethernet
- Multiple DVB-ASI access ports
- Support of timing synchronization and distribution of timing reference for SFN



EMM 16E1: 16 X E1 / T1 G703 OPTION (UP TO 64 E1 / T1)

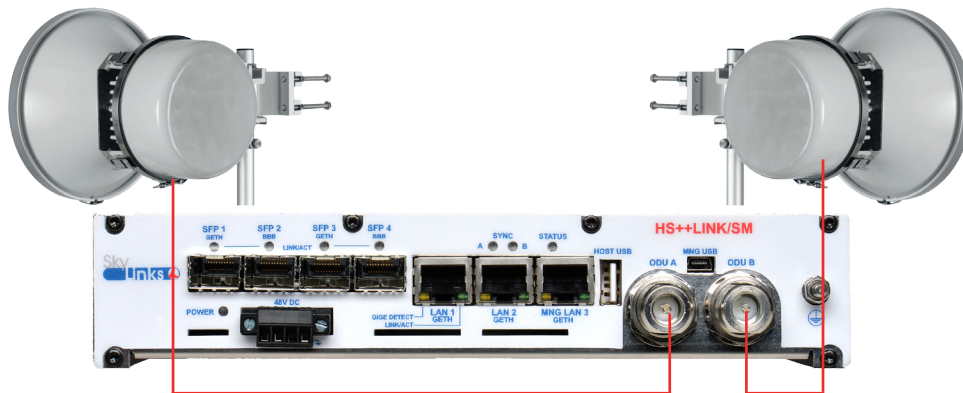
- IDU easily combined with TDM legacy data streams
- Transport of E1's/T1's with Ethernet over the same link



SYSTEM CONFIGURATIONS

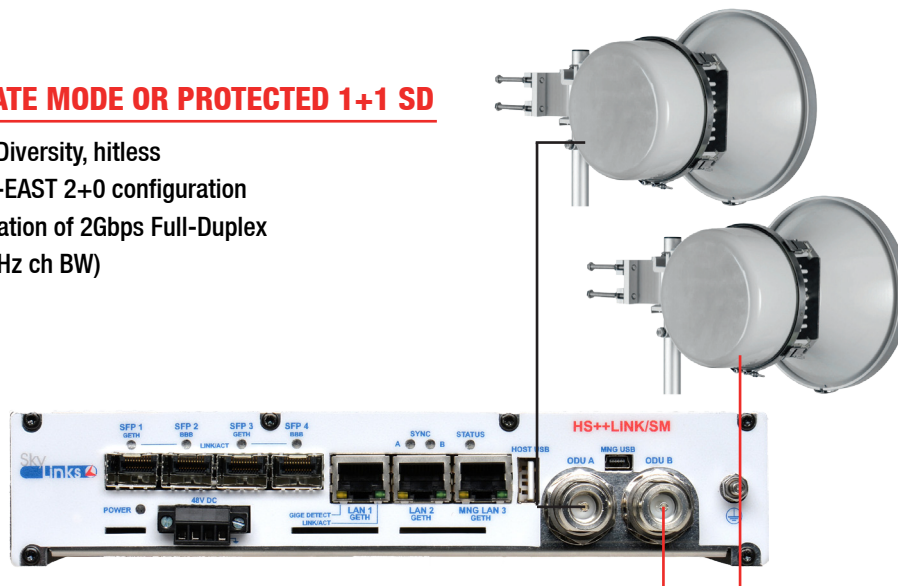
DUAL END STATION (EAST/WEST):

- Two separate links with a single IDU
- Relay station for long hops or star configuration networks
- Up to 1Gbps each direction



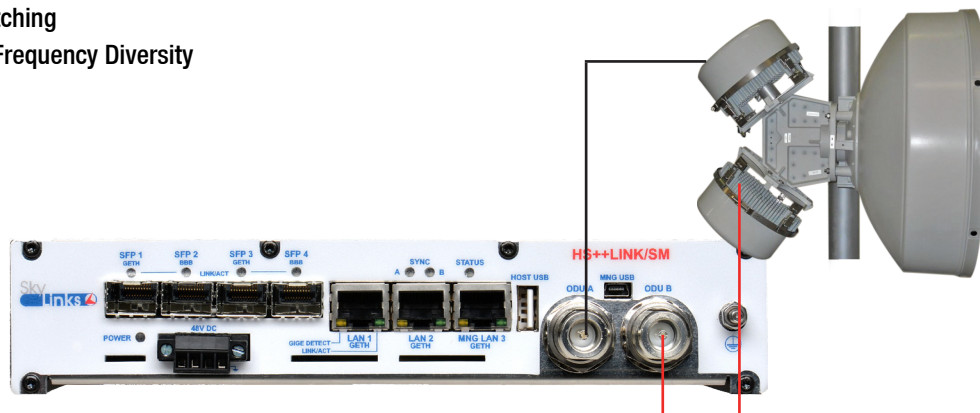
2+0/XPIC AGGREGATE MODE OR PROTECTED 1+1 SD

- Protected 1+1 Space Diversity, hitless
- Double capacity EAST-EAST 2+0 configuration
- TRUE capacity aggregation of 2Gbps Full-Duplex (at 1024QAM @ 112MHz ch BW)



PROTECTED MODE (HITLESS 1+1 HSB/FD)

- Increasing the uptime of a single and crucial MW link
- Hitless protection switching
- 1+1 Hot-Stand-By or Frequency Diversity



SYSTEM PARAMETERS

Frequency Band	4 GHz	5 GHz	6 GHz	7/8 GHz	10 GHz	11 GHz	13 GHz
Operating Frequency (GHz)	3.6 - 4.2	4.4 - 5	5.9 - 7.1	7.1 - 8.5	10.0 - 10.7	10.7 - 11.7	12.75 - 13.25
Tx Power (dBm)	SP / HP	SP / HP	SP / HP	SP / HP	SP / HP	SP / HP	SP / HP
QPSK	+27/+32	+27/+32	+27/+32	+27/+32	+26/+31	+26/+31	+26/+31
16, 32, 64 QAM	+24/+29	+24/+29	+24/+29	+24/+29	+23/+28	+23/+28	+23/+28
128 QAM	+22/+27	+22/+27	+22/+27	+22/+27	+21/+26	+21/+26	+21/+26
256 QAM	+20/+25	+20/+25	+20/+25	+20/+25	+19/+24	+19/+24	+19/+24
512 QAM*	+19/+24	+19/+24	+19/+24	+19/+24	+18/+23	+18/+23	+18/+23
1024 QAM*	+18/+23	+18/+23	+18/+23	+18/+23	+17/+22	+17/+22	+17/+22
Rx Sensitivity (dBm) @10 ⁻⁶ BER							
QPSK (28/56 MHz)	-88/-85	-88/-85	-88/-85	-88/-85	-88/-85	-88/-85	-88/-85
32 QAM (28/56 MHz)	-78/-74	-78/-74	-78/-74	-78/-74	-78/-74	-78/-74	-78/-74
128 QAM (28/56 MHz)	-70/-66	-70/-66	-70/-66	-70/-66	-70/-66	-70/-66	-70/-66
256 QAM (28/56 MHz)	-67/-63	-67/-63	-67/-63	-67/-63	-67/-63	-67/-63	-67/-63
512 QAM (28/56 MHz)*	-64/-60	-64/-60	-64/-60	-64/-60	-64/-60	-64/-60	-64/-60
1024 QAM (28/56 MHz)*	-61/-57	-61/-57	-61/-57	-61/-57	-61/-57	-61/-57	-61/-57
Antenna Port interface	N-Type	N-Type	UDR70	UDR84	UBR100	UBR100	Circular WG

Frequency Band	15 GHz	17 GHz UL	18 GHz	23 GHz	24 GHz UL	26 GHz	38 GHz*
Operating Frequency (GHz)	14.4 -15.35	17.1 to 17.3	17.7 to 19.7	21.2 to 23.6	24.0 to 24.25	24.55 to 26.45	37.0 to 39.5
Tx Power (dBm)	SP	SP	SP	SP	SP	SP	SP
QPSK	+25	+13	+23	+22	+10	+25	+18
16, 32, 64 QAM	+22	+10	+20	+19	+7	+22	+15
128 QAM	+20	+8	+18	+17	+5	+20	+13
256 QAM	+18	+6	+16	+15	+3	+18	+11
512 QAM*	+17	+5	+15	+14	+2	+17	+10
1024 QAM*	+16	+4	+14	+13	+1	+16	+9
Rx Sensitivity (dBm) @10 ⁻⁶ BER							
QPSK (28/56 MHz)	-88/-85	-87/-84	-87/-84	-87/-84	-87/-84	-87/-84	-86/-83
32 QAM (28/56 MHz)	-78/-74	-77/-73	-77/-73	-77/-73	-77/-73	-77/-73	-76/-72
128 QAM (28/56 MHz)	-70/-66	-69/-66	-69/-66	-69/-66	-69/-66	-69/-66	-68/-65
256 QAM (28/56 MHz)	-67/-63	-64/-61	-64/-61	-64/-61	-64/-61	-64/-61	-63/-60
512 QAM (28/56 MHz)*	-64/-60	-61/-57	-61/-57	-61/-57	-61/-57	-61/-57	-60/-56
1024 QAM (28/56 MHz)*	-61/-57	-58/-54	-58/-54	-58/-54	-58/-54	-58/-54	-57/-53
Antenna Port interface	Proprietary Circular WG ("Ball" Adapter)						
Standard Compliance	Radio ETSI EN 302 217, EN 301 216, EN 301 128, EN 300 198						
	Power Supply ETSI EN 300 132-2						
	EMC / Safety ETSI EN 301 489 / IEC EN 60950						
* Expected values							

NETWORK MANAGEMENT

Support	SNMP, WEB based GUI, TELNET, ASCII console
Local Access	Ethernet 10/100 Base-T / RJ-45, RS232, USB-A, USB-B
Out-of-Band Management	115 Mbps
In-band Management	Via LAN
IP Addresses	Primary, secondary
IP Option	NAT, Proxy ARP
IP Utilities	Ping, telnet

MECHANICAL / ENVIROMENTAL

Dimensions	IDU: "HALF" 19" standard rack (1U), 210 x 44 x201mm ODU: D 260mm x H 160mm
Weight	IDU: 2 Kg; ODU: 6.0 Kg
Operating Temperature	IDU: -5° to +45°C; ODU: -33° to +55°C (Arctic option -50°C)
Altitude	Up to 4500 meters
Humidity	IDU: 95% condensing; ODU: 100% all-weather

