Cambium Networks™

PTP 820i All Indoor, Multi-Carrier Licensed Microwave

Specifications

RADIO

- 6 GHz, FCC 7 GHz, 11 GHz
- 1+0, 1+1/2+2 HSB, 1+1 HSB with SD, 2+0, E/W
- 1+1 Unit redundancy (external protection)

Radio Features

- Multi-Carrier Adaptive Bandwidth Control (up to 2+0)
- Protection: 1+1 HSB
- QPSK to 2048 QAM w/ACM
- 10-60 MHz Channel
- XPIC

ETHERNET

Ethernet Interfaces

- Traffic Interfaces – 4 x 10/100/1000Base-T (RJ-45) and 2x1000base-X (SFP), 16 x E1/T1 (Optional MDR 69-pin)
- Management Interface - 2 x 10/100 Base-T (RJ-45)
- External Alarm Interface – 1 x DB9
- SFP Types - Optical 1000Base-LX (1310 nm) or SX (850nm)
  Note: SFP devices must be of industrial grade (-40°C to +85°C)

Ethernet Features

- MTU – 9600 Bytes
- Quality of Service
  - Multiple Classification criteria (VLAN ID, p-bits, IPv4, DSCP, IPv6 TC, MPLS EXP)
  - 8 priority queues per port
  - Deep buffering (configurable up to 64 Mbit per queue)
  - WRED
  - P-bit marking/remarking
- 4K VLANs
- VLAN add/remove/translate
- Frame Cut Through – controlled latency and PDV for delay sensitive applications
- Header De-Duplication – Capacity boosting by eliminating inefficiency in all layers (L2, MPLS, L3, L4, Tunneling – GTP for LTE, GRE)
- Adaptive Bandwidth Notification (ABN)
- Network Resiliency - G.8032 and Multiple Spanning Tree Protocol (MSTP)
- Ethernet OAM – ITU-T Y.1731 FM

SYNCHRONIZATION

Synchronization Distribution

- Sync Distribution over any traffic interface (GE/FE)
- Sync-E (ITU-T G.8261, G.8262)
- SSM/ESMC Support for ring/mesh applications (ITU-T G.8264)
- Sync-E Regenerator mode, providing PRC grade (ITU-T G.811) performance for smart pipe applications.

IEEE-1588

- Optimized Transport for reduced PDV
- IEEE-1588 Transparent Clock (TC)
- IEEE-1588 Boundary Clock (BC)

STANDARD

Supported Ethernet Standards

- 10/100/1000base-T/X (IEEE 802.3)
- Ethernet VLANs (IEEE 802.3ac)
- Virtual LAN (VLAN, IEEE 802.1Q)
- Class of service (IEEE 802.1p)
- Provider bridges (QinQ – IEEE 802.1ad)
- Link aggregation (IEEE 802.3ad)
- Auto MDI/MDIX for 1000baseT
- RFC 1349: IPv4 TOS
- RFC 2474: IPv4 DSCP
- RFC 2460: IPv6 Traffic Classes

Security

- AES 256-bit Encryption
- Secured protocols (HTTPS, SNMPV3, SSH, SFTP)
- Radius authentication and authorization

Standards Compliance

- EMC: EN 301 489-4, EN 301 489-1, FCC 47 CFR, Part15, Class B
- Safety: IEC 60950, EN60950-1, IEC 60950-1, UL60950-1, CSA-C22.2 No.60950-1, EN 60950-22, UL 60950-22, CSA C22.2.60950-22
- Operation: ETSI EN 300 019-1-3 class 3.2
- Storage: ETSI EN 300 019-1-1 Class 1.2
- Transportation: ETSI EN 300 019-1-2 Class 2.3

TECHNICAL SPECIFICATION

Mechanical Specifications

- IDU Dimensions – 44mm(H), 426mm(W), 180mm(D), 2.5kg
- RFU-A Dimensions – 46mm (H), 483mm (W), 335mm(D), 12kg

Environmental Specifications

- -5°C to +55°C (-25°C to +65°C extended)

Power Input Specifications

- Standard Input: -48 VDC
- DC Input range: -40 to -60 VDC

Power Consumption Specifications

- IDU Eth-only with single modem: 23.5W, addition for second modem, 2.9W, additional for 16 E1/DS1, 11W
- RFU-Ae / RFU-Aep
  - 1+0:

High Level:	77W / 90W
Medium Level:	53W / 73W
Low Level:	43W / 47W
Mute:	24W / 24W

  - 1+1 HSB/SD BBS:

High Level:	101W / 114W
Medium Level:	77W / 97W
Low Level:	67W / 71W
Mute:	48W / 48W

Specifications

TRANSMIT POWER

		Frequency				Frequency
	Modulation	L6, U6 and FCC 7 GHz	11 GHz		Modulation	L6, U6 and FCC 7 GHz
RFU-Ae	QPSK	33	30	RFU-Aep	QPSK	35
	8 PSK	33	30		8 PSK	35
	16 QAM	33	30		16 QAM	35
	32 QAM	33	30		32 QAM	35
	64 QAM	33	30		64 QAM	35
	128 QAM	33	29		128 QAM	34
	256 QAM	32	28		256 QAM	34
	512 QAM	29	26		512 QAM	33
	1024 QAM	29	26		1024 QAM	32
	2048 QAM	27	24		2048 QAM	30

Note: The Transmit power is measured at the antenna port of the RFU-A Chassis

RECEIVE SENSITIVITY

Modulation	Channel Spacing	L6, U6 and FCC 7 GHz	11 GHz
QPSK	10 MHz	-92.5	-92.0
8 PSK		-87.5	-87.0
16 QAM		-86.5	-86.0
32 QAM		-83.0	-82.5
64 QAM		-79.5	-79.0
128 QAM		-76.5	-76.0
256 QAM		-73.5	-73.0
512 QAM		-71.0	-70.5
1024 QAM Strong		-68.0	-67.5
1024 QAM Light		-67.0	-66.5
QPSK	20 MHz	-89.5	-89.0
8 PSK		-84.5	-84.0
16 QAM		-83.0	-82.5
32 QAM		-79.5	-79.0
64 QAM		-76.5	-76.0
128 QAM		-73.5	-73.0
256 QAM		-70.5	-70.0
512 QAM		-68.0	-67.5
1024 QAM Strong		-65.0	-64.5
1024 QAM Light		-64.0	-63.5
2048 QAM		-60.5	-60.0
QPSK	25 MHz	-89.0	-88.5
8 PSK		-83.5	-83.0
16 QAM		-82.0	-81.5
32 QAM		-78.5	-78.0
64 QAM		-75.5	-75.0
128 QAM		-72.5	-72.0
256 QAM		-69.5	-69.0
512 QAM		-67.0	-66.5
1024 QAM Strong		-64.0	-63.5
1024 QAM Light		-63.5	-63.0
2048 QAM		-59.5	-59.0

Modulation	Channel Spacing	L6, U6 and FCC 7 GHz	11 GHz
QPSK	30 MHz	-88.0	-87.5
8 PSK		-83.0	-82.5
16 QAM		-81.0	-80.5
32 QAM		-77.5	-77.0
64 QAM		-74.5	-74.0
128 QAM		-71.5	-71.0
256 QAM		-68.5	-68.0
512 QAM		-66.5	-66.0
1024 QAM Strong		-63.0	-62.5
1024 QAM Light		-62.5	-62.0
2048 QAM		-59.0	-58.5
QPSK	40 MHz	-86.5	-86.0
8 PSK		-81.5	-81.0
16 QAM		-80.0	-79.5
32 QAM		-76.5	-76.0
64 QAM		-73.5	-73.0
128 QAM		-70.5	-70.0
256 QAM		-68.0	-67.5
512 QAM		-65.5	-65.0
1024 QAM Strong		-62.0	-62.0
1024 QAM Light		-61.5	-61.0
2048 QAM		-58.0	-57.5
QPSK	50 MHz	-86.0	-85.5
8 PSK		-80.5	-80.0
16 QAM		-79.0	-78.5
32 QAM		-75.5	-75.0
64 QAM		-72.0	-71.5
128 QAM		-70.0	-69.5
256 QAM		-66.5	-66.0
512 QAM		-64.0	-63.5
1024 QAM Strong		-61.0	-60.5
1024 QAM Light		-60.0	-59.5
2048 QAM		-56.5	-56.0
QPSK	60 MHz	-85.0	-84.5
8 PSK		-80.5	-80.0
16 QAM		-78.0	-77.5
32 QAM		-74.5	-74.0
64 QAM		-71.5	-71.0
128 QAM		-68.5	-68.0
256 QAM		-65.5	-65.0
512 QAM		-63.5	-63.0
1024 QAM Strong		-60.0	-59.5
1024 QAM Light		-60.0	-59.5
2048 QAM		-56.0	-55.5

ETHERNET THROUGHPUT

		Ethernet Throughput (Mbps)				Ethernet Throughput (Mbps)		
Modulation	**Channel Size**	**No Compression**	**L2 Compression**	**Multi-Layer Compression**	**Channel Size**	**No Compression**	**L2 Compression**	**Multi-Layer Compression**
QPSK	10 MHz (No XPIC)	12	12-14	13-40	20 MHz (No XPIC)	27	28-31	29-88
8 PSK		19	19-21	20-61		41	41-47	43-132
16 QAM		26	26-30	27-83		56	57-64	59-180
32 QAM		34	35-39	36-111		74	75-85	78-238
64 QAM		42	43-48	45-137		91	92-104	96-293
128 QAM		51	51-58	53-164		110	111-126	116-354
256 QAM		58	59-67	61-188		125	126-142	131-401
512 QAM		64	65-73	67-206		136	137-156	143-438
1024 QAM (Strong FEC)		67	68-77	71-216		145	146-165	152-466
1024 QAM (Light FEC)		72	72-82	75-230		154	155-176	162-495
2048 QAM		N/A	N/A	N/A		164	165-187	172-528
QPSK	25 MHz (No XPIC)	35	35-40	37-112	25 MHz with XPIC	34	34-39	36-109
8 PSK		52	53-60	55-168		51	51-58	53-164
16 QAM		71	72-81	75-229		69	70-79	73-223
32 QAM		94	95-107	99-302		92	92-105	96-295
64 QAM		116	117-132	121-372		113	114-129	118-362
128 QAM		139	141-159	147-448		136	137-156	143-438
256 QAM		159	160-181	167-511		156	157-178	164-502
512 QAM		175	177-200	184-564		174	175-198	182-558
1024 QAM (Strong FEC)		186	188-213	196-599		184	186-210	194-593
1024 QAM (Light FEC)		198	199-226	208-636		196	197-223	206-629
2048 QAM		212	214-242	223-682		N/A	N/A	N/A
QPSK	30 MHz (No XPIC)	42	42-48	44-135	30 MHz with XPIC	41	41-47	43-132
8 PSK		61	62-70	64-197		61	62-70	65-197
16 QAM		86	87-98	90-277		84	85-96	88-270
32 QAM		113	114-129	119-364		111	111-126	116-355
64 QAM		140	141-159	147-449		136	137-155	143-437
128 QAM		168	169-192	176-540		164	166-188	173-528
256 QAM		193	195-220	203-621		188	190-215	198-604
512 QAM		206	208-235	216-662		209	211-238	220-672
1024 QAM (Strong FEC)		225	226-256	236-722		222	224-253	233-714
1024 QAM (Light FEC)		238	240-271	250-764		236	238-269	248-758
2048 QAM		260	262-296	273-833		N/A	N/A	N/A
QPSK	40 MHz (No XPIC)	57	57-65	60-183	40 MHz with XPIC	55	56-63	58-178
8 PSK		85	86-97	89-273		83	83-94	87-265
16 QAM		116	117-132	121-372		112	113-128	118-361
32 QAM		152	154-174	160-490		148	149-169	156-476
64 QAM		187	189-214	197-602		182	183-208	191-585
128 QAM		226	228-258	238-728		220	222-251	231-707
256 QAM		243	245-278	256-782		237	239-270	249-761
512 QAM		267	269-304	280-833		273	275-312	287-833
1024 QAM (Strong FEC)		302	305-345	318-833		297	299-339	312-833
1024 QAM (Light FEC)		321	324-366	337-833		316	318-360	331-833
2048 QAM		347	350-396	365-833		N/A	N/A	N/A
QPSK	50 MHz (No XPIC)	69	70-79	73-223	50 MHz with XPIC	71	71-81	74-228
8 PSK		108	108-123	113-346		106	107-121	111-340
16 QAM		146	147-166	153-469		144	145-164	151-462
32 QAM		183	185-209	193-589		189	191-216	199-609
64 QAM		237	239-270	249-761		233	234-265	244-747
128 QAM		276	278-315	290-833		281	283-321	295-833
256 QAM		327	330-374	344-833		322	324-367	338-833
512 QAM		355	358-405	373-833		349	352-398	367-833

1024 QAM (Strong FEC)		387	390-441	406-833		380	383-433	399-833
		Ethernet Throughput (Mbps)				**Ethernet Throughput (Mbps)**		
Modulation	**Channel Size**	**No Compression**	**L2 Compression**	**Multi-Layer Compression**	**Channel Size**	**No Compression**	**L2 Compression**	**Multi-Layer Compression**
1024 QAM (Light FEC)	50 MHz (No XPIC)	411	414-468	431-833	50 MHz with XPIC	403	406-460	424-833
2048 QAM		443	446-505	465-833		N/A	N/A	N/A
QPSK	60 MHz (No XPIC)	86	86-98	90-276	60 MHz with XPIC	84	85-96	88-270
8 PSK		125	126-143	131-402		125	126-143	131-402
16 QAM		174	175-198	182-558		170	171-194	179-546
32 QAM		229	230-261	240-734		224	226-255	235-719
64 QAM		281	283-320	295-833		275	277-314	289-833
128 QAM		339	342-387	356-833		332	335-379	349-833
256 QAM		391	394-447	411-833		380	383-433	399-833
512 QAM		421	424-480	442-833		412	416-471	433-833
1024 QAM (Strong FEC)		458	461-522	481-833		449	452-512	471-833
1024 QAM (Light FEC)		486	490-555	511-833		476	480-543	500-833
2048 QAM		527	531-601	553-833		N/A	N/A	N/A