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Data Sheet

6 to 38 GHz CEPT digital hierarchy

TRuepoint™ 5000

a new generation

of point-to-point

PDH / SDH / Ethernet

digital radios

The TRuepoint 5000 series of point-to-point digital radios delivers highly flexible, highly reliable solutions for NxE1, STM-1, and data communication links over a broad range of frequency bands from 6 to 38 GHz. This data sheet provides technical information about the TRuepoint 5000, including specifications, characteristics, and applications.

Technical Specifications

Bit Rate Capacity: 4, 8, 16 E1, E3 + 1 E1, 21 E1, STM-1 + 1 E1, 2x100BASE-T (2 through 75 E1 equivalent capacity, ~4-155 Mbps)

Modulation: 4, 16, 32, 64, 128 QAM

FEC: Low/medium capacity: Reed-Solomon
High capacity: Reed-Solomon concatenated with 2D or 4D (Dimensional) TCM (Trellis Code Modulation) depending on bandwidth and system gain requirement

Digital Interfaces: E1 (75 or 120 Ohms), E3 (75 Ohms), STM-1 (75 Ohms, OMM [optical multimode], OSM [optical single mode]), 10BASE-T, 100BASE-T

Frequency Source: All transceivers are tunable within the full frequency range

Frequency Stability: 6 to 38 GHz: ±5 ppm including aging

Auxiliary Channels:
Standard: Service Channel 1: 19.2 kbps asynchronous (RS-232)
Optional: Service Channels 2 and 3: Orderwire or Data Channel 64 kbps synchronous co- or contra-directional V.11 or G.703

Configurations:
TRuepoint 5200: 1+0, 1+1 (MHSB, FD, SD), 2+0, 3+0, 4+0
TRuepoint 5100: 1+0, 1+1 (MHSB, SD), 2+0

Network Management:
FarScan, StarView™, NetBoss™, SNMP Manager

Radio Control, Monitoring, and Maintenance Tools:
Web-CIT, VT-100, Harris handheld terminal, NMS, PCR

Alarms:
Programmable relay alarms, 4 basic relays, 2 input (controller)
Optional: 12 relays/12 inputs or 6 relays/30 inputs, or a combination using two Relay & Alarm modules

Power Source:
21 to 60 Vdc negative or positive ground (auto-detection)

(*continues*)

Technical Specifications

Power Consumption:
(SPU+RFU for high-capacity typical configuration)

	Unprotected	Protected
TRuepoint 5100:	67 Watts	128 Watts
TRuepoint 5200:	85 Watts	164 Watts

Operating Temperature Range:	**Indoor**	**Outdoor**
Guaranteed Performance:	-5° to +50° C	-33° to +55° C
Operational:	-10° to +55° C	-40° to +55° C

Humidity: 95% maxC

Regulatory Information

Frequency Plans: According to each relevant ITU-R and CEPT recommendation

Digital Interface: Rec. G.703 (E1, E3, STM-1p, STM-1)

Electromagnetic Compatibility: EN 301 489-4, EN 301 489-1
Complies with the latest ETSI and R&TTE directive and future European Harmonized EN 302 217-2-2 Class 2 type equipment operating in non-harmonized frequency bands.

Mechanical Characteristics

Connections: SPU to RFU, coaxial cable with N-Type connectors

Dimensions:	**Height**	**Width**	**Depth**	**Weight**
SPU 1+0	45 mm (1 RMS)	483 mm	258 mm	3.3 kg
SPU 1+1	90 mm (2 RMS)	483 mm	258 mm	5.2 kg
TRuepoint 5100	358 mm (8 RMS)	245 mm	122 mm	6.0 kg
TRuepoint 5200	442 mm (10 RMS)	216 mm	300 mm	18.0 kg (2 TRs)

Antenna Characteristics

Integrated Flat* Antenna: (using unique Harris flat antenna)

23 GHz	419 mm	35 dBi
26* GHz	419 mm	35 dBi
38* GHz	305 mm	38 dBi

Detachable Configuration:
Uses high- or standard-performance parabolic antenna from qualified vendors. Dimension varies from 30 cm to 1.8 m diameter depending on frequency band. Uses latches for the antenna connection.

Separate Configuration:
Off-the-shelf parabolic antenna from any vendor. Uses waveguide or Flex Twist to interconnect radio and antenna. Radio flange interfaces are specified in the table below.

System Characteristics

Band		Product Frequency Range	Transmit/Receive Frequency Spacing (MHz)	Channel Spacing (MHz) (specify type at time of order)	Flange for Separate Antenna[1]		Waveguide[2]
					IEC	EIA or US Mil	
TRuepoint 5200	L6 GHz	5925 - 6425 MHz	240, 252.04	28 (Bosnia), 29.65, 40	PDR 70	CPR 137G	WR 137
	U6 GHz	6425 - 7125 MHz	340, 345 (China)	20, 30 (China) 40	PDR 70	CPR 137G	WR 137
	7 GHz	7110 - 7900 MHz	151.614, 154, 160, 161, 182, 196, 245, 276	3.5, 7, 14, 27(Dom. Rep.),28	PDR 84	CPR 112G	WR 112
	8 GHz	7725 - 8500 MHz	119, 126, 208, 213.5, 266, 310, 311.32	3.5, 7, 14, 28, 29.65	PDR 84	CPR 112G	WR 112
	10 GHz	10500 - 10680 MHz	65, 84 (France), 91 (Argentina)	7, 14, 28	PDR 100	CPR 90G	WR 90
	11 GHz	10700 - 11700 MHz	490, 530	20 (China), 40	PDR 100	CPR 90G	WR 90
TRuepoint 5100	13 GHz	12700 - 13250 MHz	266	3.5, 7, 14, 28	PBR 120	UG Choke	WR 75
	15 GHz	14400 - 15350 MHz	315, 322, 420, 490, 640, 644, 728, 840	3.5, 7, 14, 27(Dom. Rep.) 28, 56	PBR 140	UG 541A/U	WR 62
	18 GHz	17700 - 19700 MHz	120, 340, 1008, 1010, 1092.5, 1120, 1560, 1615	3.5, 7, 13.75, 27.5, 55	PBR 220	UG 596A/U	WR 42
	23 GHz	21200 - 23600 MHz	252 (France), 1008, 1232	3.5, 5 (Brazil), 7, 14, 28, 56	PBR 220	UG 596A/U	WR 42
	26* GHz	24500 - 26500 MHz	1008	3.5, 7, 14, 28, 56	PBR 220	UG 596A/U	WR 42
	38* GHz	37000 - 40000 MHz	700 (Argentina), 1260	3.5, 7, 14, 28, 56	PBR 320	UG 600A/U	WR 28

(1) The flanges shown refer to the radio flanges. They have flange through-holes to mate with the waveguide or flextwist flange through-holes.
(2) Waveguide for separate or indoor RFU.

* Contact Harris for more information.

Unless otherwise indicated, typical performance specifications are listed and apply to transmitters/receivers connected back-to-back. Specifications must be confirmed before they become applicable to any specific system, contract, or order.

RF Characteristics

Channel Spacing (Other channel spacings are available. Consult Harris.)

Capacity	Modulation States	Lower 6 GHz	Upper 6 GHz	7 GHz	8 GHz	10.5 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	26 GHz**	38 GHz**
2 E1	4	3.5	3.5	3.5	3.5	3.5	-	3.5	3.5	3.5	3.5	3.5	3.5
4 E1	4 16	7.0 3.5	7.0 3.5	7.0 3.5	7.0 3.5	7.0 3.5	- -	7.0 3.5	7.0 3.5	7.0 3.5	7.0 3.5	7.0 3.5	7.0 3.5
8 E1	4 16	14 7.0	14 7.0	14 7.0	14 7.0	14 7.0	- -	14 7.0	14 7.0	13.75 7.0	14 7.0	14 7.0	14 7.0
16 E1	4 16	28/29.65 14	28/29.65 14	27/28 14	28/29.65 11,662*/14	28 14	- -	28 14	27/28 14	27.5 13.75	28 14	28 14	28 14
E3 + 1 E1	4 16	29/29.65 *	* *	27/28 14	28/29.65 14	28 14	- -	28 14	27/28 14	27.5 13.75	28 14	28 14	28 14
21 E1/STM-1 (partially filled)	4 16 32	* 28/29.65 *	* 30 *	* 27/28 14	* 28/29.65 14	* 28 14	40 20 -	- 28 14	- 7/28 14	- 20/27.5 13.75	56 28 14	40/56 28 14	56 28 14
STM-1 + 1 E1	32 64 128	- 40 29/29.65	- 40 30	- - 27/28	- - 28/29.65	- - 28	* 40 -	- - 28	56 - 28/28	55 - 27.5	56 - 28	56 - 28	56 - 28

Typical Receiver Threshold dBm (BER 10^{-6})

Capacity	Modulation States	Lower 6 GHz	Upper 6 GHz	7 GHz	8 GHz	10.5 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	26 GHz**	38 GHz**
2 E1	4	-95.5	-95.5	-95.5	-95.0	-95.0	-	-93.0	-93.0	-93.0	-93.0	-92.5	-92.0
4 E1	4 16	-92.5 -88.5	-92.5 -88.5	-92.5 -88.5	-92.0 -88.0	-92.0 -88.0	- -	-90.0 -86.5	-90.0 -86.5	-90.0 -86.5	-90.0 -86.5	-90.0 -86.0	-89.5 -85.5
8 E1	4 16	-89.5 -86.5	-88.5 -86.5	-89.5 -86.0	-89.0 -86.0	-89.0 -86.0	- -	-87.5 -84.0	-87.5 -84.0	-87.5 -84.0	-87.5 -84.0	-87.0 -83.5	-86.5 -83.0
16 E1	4 16	-87.0 -84.0	-87.0 -84.0	-87.0 -84.0	-86.5 -82.5*/-83.5	-86.5 -83.5	- -	-84.5 -81.5	-84.5 -81.5	-84.5 -81.5	-84.5 -81.5	-84.0 -81.0	-83.5 -80.5
E3 + 1 E1	4 16	-86.5 *	* *	-86.5 -83.5	-86.0 -83.0	-86.0 -83.0	- -	-84.0 -81.0	-85.0 -81.0	-84.0 -81.0	-84.0 -81.0	-83.5 -80.5	-83.0 -80.0
21 E1/STM-1 (partially filled)	4 16 32	* -82.5 *	* -82.5 *	* -82.5 -78.5	* -82.0 -78.0	* -82.0 -78.0	-84.5 -81.5 -	- -80.0 -76.0	- -80.0 -76.0	- -79.5/-80 -76.0	-81.5 -79.5 -75.5	-82.0 -80.0 -76.0	-81.5 -79.5 -75.5
STM-1 + 1 E1	32 64 128	- -76.5 -72.0	- -76.5 -71.5	- - -70.5	- - -70.0/-71	- - -70.0	* -75.0 -	- - -68.5	-76.0 - -68.5	-76.0 - -67.0	-76.0 - -68.5	-75.5 -73.0 -68.0	-75.5 - -67.5

Note: For guaranteed value, remove 1 dB from the typical value.

Nominal Output Power dBm

Capacity	Modulation States	Lower 6 GHz	Upper 6 GHz	7 GHz	8 GHz	10.5 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	26 GHz**	38 GHz**
2 E1	4	32.0	32.0	31.0	30.5	28.5	-	26.0	26.0	26.0	24.0	24.0	24.0
4 E1	4 16	32.0 28.0	32.0 28.0	31.0 27.0	30.5 26.5	28.5 24.5	- -	26.0 23.0	26.0 23.0	26.0 23.0	24.0 21.0	24.0 21.0	24.0 21.0
8 E1	4 16	32.0 28.0	32.0 28.0	31.0 27.0	30.5 26.5	28.5 24.5	- -	26.0 23.0	26.0 23.0	26.0 23.0	24.0 21.0	24.0 21.0	24.0 21.0
16 E1	4 16	32.0 28.0	32.0 28.0	31.0 27.0	30.5 26.5	28.5 24.5	- -	26.0 23.0	26.0 23.0	26.0 23.0	24.0 21.0	24.0 21.0	24.0 21.0
E3 + 1 E1	4 16	32.0 *	* *	31.0 27.0	30.5 26.5	28.5 24.5	- -	26.0 23.0	26.0 23.0	26.0 23.0	24.0 21.0	24.0 21.0	24.0 21.0
21 E1/STM-1 (partially filled)	4 16 32	* 28.0 *	* 28.5 *	* 27.0 26.0	* 26.5 25.5	* 24.5 23.5	28.5 24.5 -	- 23.0 22.0	- 23.0 22.0	- 23.0 22.0	24.0 21.0 20.0	24.0 21.0 20.0	24.0 21.0 20.0
STM-1 + 1 E1	32 64 128	- 25.5 24.5	- 25.5 24.5	- - 23.5	- - 23.0	- - 21.0	* 22.0 -	- - 19.0	22.0 - 19.0	22.0 - 19.0	20.0 - 17.0	20.0 - 17.0	20.0 - 17.0

Guaranteed values:
TRuepoint 5100/5200: 2dB below nominal value

* Additional bandwidth and configurations can be made available. Please contact Harris.

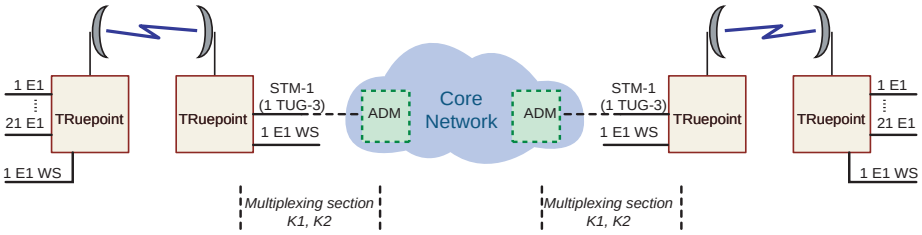
** Contact Harris for more information.

- (hyphen) means not available.

Typical receiver threshold and nominal output power are given for unprotected (1+0) configuration.

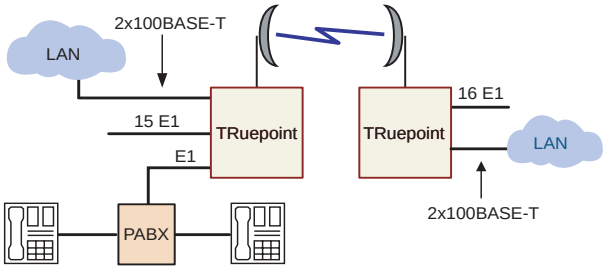
Applications

21 E1/STM-1 Partially Filled

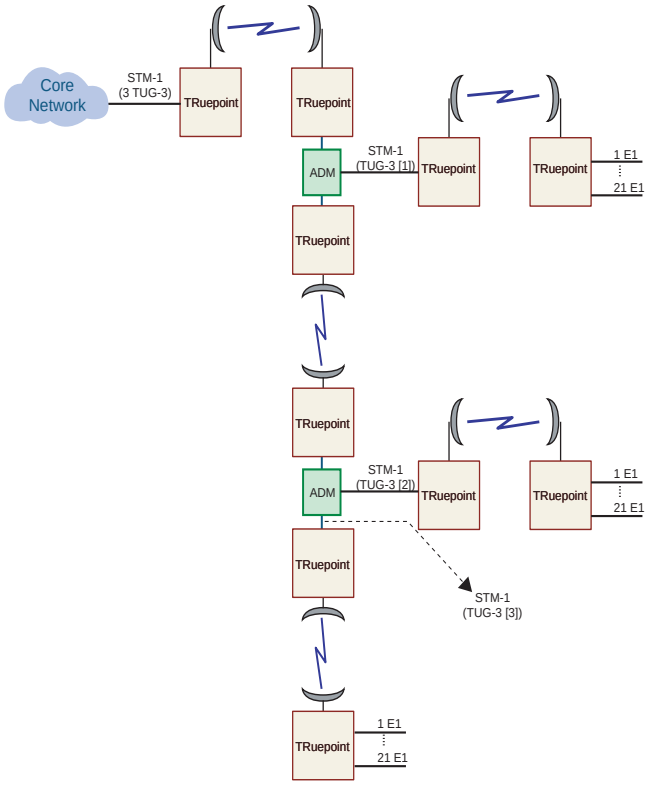


The 21 E1 Mux is mapped into a partially filled STM-1 and the Mux board behaves with the ADM to which it is connected as a multiplexing section. The 21 E1 Mux includes an E1 by filling the unused bytes of STM-1 RSOH and MSOH, bringing the total usable capacity to 22 E1.

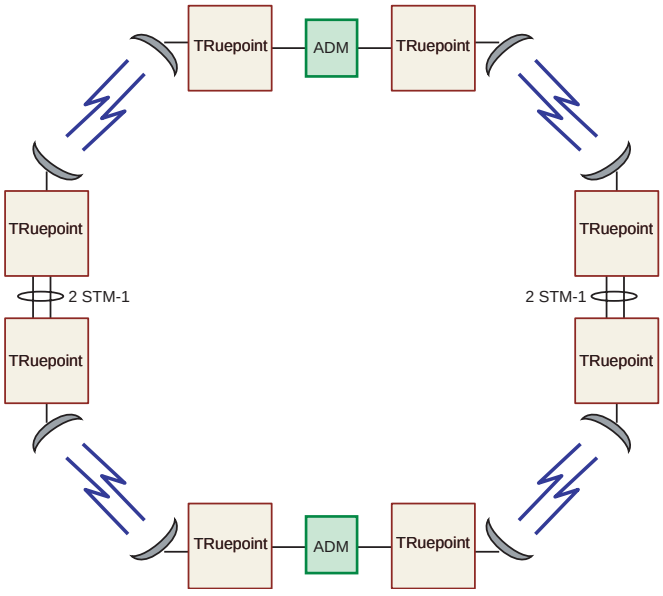
2-16 E1 + 2x100BASE-T (up to 75 E1 equivalent airlink capacity)



SDH Linear Spur



SDH Ring 2+0 (dual frequency)



HARRIS®
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Microwave Communications Division | 637 Davis Drive | Morrisville, NC, USA 27560
Phone 1-800-4-HARRIS ext. 3240 (within North America) 1-321-727-9207 ext. 3240 (outside North America)
www.harris.com