

# TRuepoint™ 5000

## Data Sheet

### A new generation of point-to-point SONET / PDH / Ethernet digital radios



The TRuepoint 5000 series of point-to-point digital radios delivers highly flexible, highly reliable solutions for NxDS1 up to OC-3 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, 12, 16, 28 DS1+1 DS1, 1 DS3+1 DS1, 3 DS3+3 DS1, OC-3+1 DS1, NxDS1+2x10/100BASE-T (4-100 DS1 equivalent capacity, ~6-155 Mbps)

**Modulation:** QPSK, 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:** DS1 (110 ohms), DS3 (75 ohms), OC-3/STS-3 (OMM [optical multimode], OSM [optical single mode], 75 ohms), 10BASE-T, 100BASE-T

**Frequency Source:** All transceivers are tunable within the full frequency range of each transceiver

**Frequency Stability:** 6 to 38 GHz:  $\pm 5$  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 contradirectional V.11 or G.703

**Installation:** SPU: indoors only; RFU: indoors or outdoors

#### **Configurations:**

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

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

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

**Alarms:** Programmable relay alarms, 4 basic relays, 2 inputs (controller)

Optional: 12 relays/12 inputs or 6 relays/30 inputs, or a combination using two Relay & Alarm modules

## Technical Specifications

### 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% max, non-condensing	

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

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

	Unprotected	Protected
TRuepoint 5100:	59 Watts	111 Watts
TRuepoint 5200:	84 Watts	161 Watts

## Regulatory Information

### Frequency Plans: SRSPs (Canada), FCC Part 101 and 74 (USA)

### Digital Interface: GR-499-CORE, GR-253-CORE

### Electromagnetic Compatibility: FCC Part 15, Subpart B (Class B), GR-1089-CORE, ICES-003 (Class B)

## Mechanical Characteristics

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

Dimensions:	Height			Width		Depth		Weight	
	inch	mm	RMS	inch	mm	inch	mm	lbs	kg
SPU 1+0	1.8	45	1	19	483	10.2	258	7.3	3.3
SPU 1+1	3.5	90	2	19	483	10.2	258	11.5	5.2
TRuepoint 5100	13.9	358	8	9.5	245	4.7	122	13.4	6.0
TRuepoint 5200	17.4	442	10	10.2	216	11.8	300	39.7	18 (2 TRs)

## Antenna Characteristics

### Detachable Configuration: Off-the-shelf parabolic high-performance antenna from 1 ft. to 4 ft. (30cm to 1.2m) depending on frequency band. Uses latches for the antenna connection.

### Separate Configuration: Standard parabolic antenna. Uses waveguide or Flex Twist to interconnect radio and antenna. Radio flange interfaces are specified in the table below.

## System Characteristics

Band (GHz)		Product Frequency Range (GHz)	Channel Spacing (MHz) (specify type at time of order)	Transmit/Receive Frequency Spacing (MHz)	Flange (EIA) Specification <sup>1</sup>	Waveguide <sup>2</sup>
TRuepoint 5200	L6	5.915 - 6.425	2.5, 3.75, 5, 10, 29.65, 30	251.875/252.04	CPR 137G	WR 137
	U6	6.425 - 7.125	10, 20, 25, 30, 40	90, 100, 160, 170, 180, 340, 345	CPR 137G	WR 137
	7	7.125 - 7.895	2.5, 3.75, 5, 10, 20, 30	150, 160, 175, 180, 270	CPR 112G	WR 112
	8	7.725 - 8.500	3.75, 5, 10, 18.75, 20, 29.65, 30	180, 300, 311.32, 350	CPR 112G	WR 112
	10.5/11	10.55 - 10.68	2.5, 3.75, 5	65	CPR 90G	WR 90
	10.5/11	10.696 - 11.71	2.5, 3.75, 5, 10, 20, 30, 40	490, 500	CPR 90G	WR 90
	13	12.70 - 13.25	10, 20, 25	N/A	UG Choke	WR 75
	15	14.5 - 15.35	2.5, 3.75, 5, 10, 20, 30, 40	475, 640	UG 541A/U	WR 62
	18	17.7 - 19.7	2.5, 5, 10, 20, 27.5, 30, 40	120, 340, 1010, 1160, 1560	UG 596A/U	WR 42
	18	18.58 - 19.16	5, 10, 20	340	UG 596A/U	WR 42
TRuepoint 5100	23	21.2 - 23.6	2.5, 5, 10, 15, 20, 30, 40, 50	1200	UG 596A/U	WR 42
	38	38.6 - 40.0	2.5, 5, 10, 15, 20, 30, 50	700	UG 600A/U	WR 28

**NOTE:** Per FCC, IC, NTIA and ITU-R standards, as applied to the respective parts thereto. For specific regulatory information, refer to manual IMN-903000-Exx

<sup>1)</sup> The flanges shown refer to the radio flanges. They have flange through-holes to mate with the waveguide or Flex Twist flange through-holes.

<sup>2)</sup> Waveguide for separate or indoor RFU.

## RF Characteristics

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.

		Channel Spacing (MHz)									
		Frequency Band (GHz)									
Airlink Capacity	Modulation QPSK/QAM	L6	U6	7	8	11	13	15	18	23	38
4 DS1	QPSK 16	2.5	2.5	2.5	2.5	2.5		5 2.5	5 2.5	5 2.5	5 2.5
8 DS1	QPSK 16 32			5 3.75				10 5 3.75	10 5	10 5	10 5
12 DS1	32	5	5	5	5	5		5	5	5	5
16 DS1	QPSK 16 128							20 10	20 10	20 10	20 10
28 DS1	16 64	10	10	10	10	10	10	15 10		15 10	15 10
1 STS-1 (28 DS1 Sub STS-3) SMX	QPSK QPSK 16 16 32 64						40	40	40	50 40	50 30 20 15 12.5
DS3 + DS1	QPSK QPSK 16 64	30					30 40		30 40	30 40	30 20 10
29 DS1	QPSK QPSK 16 64	30					30 40		30 40	30 40	30 20 10
2 STS-1 (56 DS1 Sub STS-3) SMX	16 16 32 128						40 30		40 30	40 30	50 40 30 20
58 DS1	16 16 64	30 20	20	20			40 30	20	40 30	40 20	40 20
100BT+4 DS1 (107 Mb/s)	16 128		20	20	20		40		40 20	40 20	40 20
3 DS3 + 3 DS1	16 32 128						40 30		40 30	40 30	50 40 30
87 DS1	16 32 64	29.65/30	30	30	30		40 30		40 30	40 30	50 40 30
100 DS1	32 64 128	29.65/30	30	30	30		40 30		40 30	40 30	50 40 30
OC-3 + DS1, (3 STS-1) SMX	32 64 128	29.65/30	30	30	30		40 30		40 30	40 30	50 40 30

Notes: Other configurations are also available

## RF Characteristics

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.

		Typical Receiver Threshold dBm (BER 10 <sup>-6</sup> ) With the 5100 RFU (13 to 23 GHz), values are enhanced by .5 dB.									
		Frequency Band (GHz)									
Airlink Capacity	Modulation QPSK/QAM	L6	U6	7	8	11	13	15	18	23	38
4 DS1	QPSK 16	-89.5	-89.5	-89.5	-89.0	-93.0 -89.0		-91.0 -87.0	-91.0 -87.0	-91.0 -87.0	-90.0 -86.0
8 DS1	QPSK 16 32	-84.5	-84.5	-86.5 -84.5	-84.0	-84.0		-88.0 -84.0 -82.0	-88.0 -84.0	-88.5 -84.5	-87.5 -83.5
12 DS1	32	-83.0	-83.0	-83.0	-82.5	-82.5		-80.5	-80.5	-80.5	-79.5
16 DS1	QPSK 16 128	-77.5	-77.5	-77.5	-77.0	-84.5 -77.0		-85.5 -82.5	-85.5 -82.5	-86.0 -83.0	-85.0 -82.0
28 DS1	16 64	-77.0	-77.0	-77.0	-76.5	-76.5	-75.0	-79.0 -75.0	-75.0	-79.5 -75.0	-78.5
1 STS-1 (28 DS1 Sub STS-3) SMX	QPSK QPSK 16 16 32 64	-82.5 -80.5	-82.5 -80.5	-82.5 -80.5	-82.0 -80.0	-82.0		-84.0 -82.0 -80.0 -78.5	-82.0 -80.5 -78.5	-83.0 -82.5 -80.5 -78.5 -75.0 -72.5	-82.0 -79.5 -77.5 -75.0 -72.5
DS3 + DS1	QPSK QPSK 16 64	-85.0	-84.5	-76.5	-76.0	-84.5 -85.0 -76.0	-81.5	-80.0 -78.5 -74.0	-82.5 -80.0 -82.0 -74.0	-80.0 -82.5 -74.5	-81.5
29 DS1	QPSK QPSK 16 64	-85.5	-84.5	-77.0	-77.0	-85.0 -85.0 -76.5	-81.5	-80.0 -82.0 -75.0	-83.0 -80.0 -82.0 -75.0	-80.5 -82.5 -75.0	-82.5 -81.5
2 STS-1 (56 DS1 Sub STS-3) SMX	16 16 32 128	-77.5	-77.5	-77.5	-77.0	-78.5 -77.0		-77.0 -75.0 -68.5	-77.0 -75.5 -68.5	-77.0 -75.0 -68.5	-74.0
58 DS1	16 16 64	-78.5 -74.5	-74.5	-74.5		-81.0 -78.0	-72.0	-79.5 -72.0	-79.5 -72.0	-79.5 -72.0	-72.0
100BT+4 DS1 (107 Mb/s)	16 128	-71.0	-71.0	-71.0		-78.0		-76.5 -69.0	-76.5 -69.0	-76.5 -69.0	
3 DS3 + 3 DS1	16 32 128	-73.0	-73.0	-73.0	-72.5	-75.5 -72.5		-74.0 -71.0	-74.0 -71.0	-76.0 -74.0	-75.0
87 DS1	16 32 64	-73.5	-73.5	-73.5	-73.0	-76.0 -73.0		-74.0 -71.0	-74.0 -71.0	-75.5 -74.0	-74.5 -70.5
100 DS1	32 64 128	-71.5	-71.5	-71.5	-71.0	-75.0 -71.0		-73.5 -69.0	-73.5 -69.0	-76.0 -69.5	-75.0
OC-3 + DS1 (3 STS-1) SMX	32 64 128	-71.5	-71.5	-71.5	-71.0	-75.0 -71.0		-73.5 -69.0	-73.5 -69.0	-76.0 -73.5 -69.5	-75.0

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

Notes: For guaranteed value, remove 1 dB from the typical value.  
Other configurations are also available.  
Values for wide T/R spacing. Additional loss must be added for narrower T/R spacing (ex: 10.5-10.68GHz band).

## RF Characteristics

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.

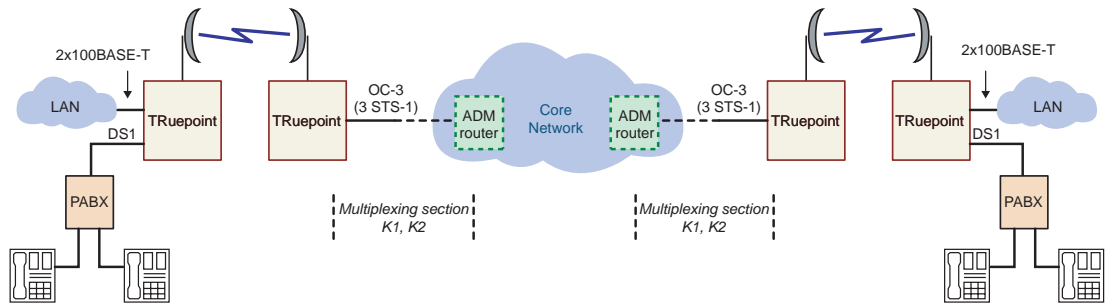
		Typical Output Power dBm (BER 10 <sup>-6</sup> ) With the 5100 RFU (13 to 23 GHz), values are enhanced by .5 dB.									
		Frequency Band (GHz)									
Airlink Capacity	Modulation QPSK/QAM	L6	U6	7	8	11	13	15	18	23	38
4 DS1	QPSK 16	26.5	26.5	25.5	25.0	23.0 23.0		26.0 23.0	26.0 23.0	23.0 21.0	21.0 19.0
8 DS1	QPSK 16 32	26.5	26.5	25.5 25.5	25.0	23.0		26.0 23.0 22.0	26.0 23.0	23.5 21.0	22.0 19.0
12 DS1	32	24.5	24.5	23.5	23.0	21.0		22.0	22.0	20.0	18.0
16 DS1	QPSK 16 128	24.5	24.5	23.5	23.0	21.0 21.0		26.0 23.0	26.0 23.0	24.0 21.0	22.0 19.0
28 DS1	16 64	24.5	24.5	23.5	23.0	21.0	17.5	23.0 21.0	21.0	21.0 19.0	19.0
1 STS-1 (28 DS1 Sub STS-3) SMX	QPSK QPSK 16 16 32 64	24.5	24.5	23.5 23.5	23.0 23.0	21.0	22.0	26.0 23.0 23.0	26.0 23.5 23.5	24.0 24.0 21.0 21.0	22.0 19.0 18.0 17.0
DS3 + DS1	QPSK QPSK 16 64	24.5	24.5	23.5	23.0	21.0 22.0	20.0 17.5	26.0 23.0 21.0	26.0 23.0 21.0	24.0 21.0 19.0	22.0 19.0
29 DS1	QPSK QPSK 16 64	24.5	24.5	23.5	23.0	21.0 22.0	20.0 17.5	26.0 23.0 21.0	26.0 26.0 21.0	24.0 21.0 19.0	22.0 19.0
2 STS-1 (56 DS1 Sub STS-3) SMX	16 16 32 128	24.5 24.5	24.5 24.5	23.5 23.5	23.0 23.0	22.0 22.0		23.0 22.0 19.0	23.0 22.5 19.0	20.0 21.0 20.0 17.0	19.0
58 DS1	16 16 64	24.5 24.5	24.5	23.5		22.0 21.0	17.5	23.0 23.0 21.0	23.0 23.0 21.0	21.0	15.5
100BT+4 DS1 (107 Mb/s)	16 128	24.5	24.5	23.5		22.0		23.0 19.0	23.0 19.0	21.0 17.0	
3 DS3 + 3 DS1	16 32 128	24.5	24.5	23.5	23.0	22.0 21.0		22.0 19.0	22.0 19.0	21.0 20.0	19.0
87 DS1	16 32 64	24.5	24.5	23.5	23.0	22.0 21.0		22.0 21.0	22.0 21.0	21.0 20.0	19.0 17.0
100 DS1	32 64 128	24.5	24.5	23.5	23.0	22.0 21.0		21.0 19.0	21.0 19.0	20.0 19.0 17.0	18.0
OC-3 + DS1, (3 STS-1) SMX	32 64 128	24.5	24.5	23.5	23.0	22.0 21.0		21.0 19.0	21.0 19.0	18.0 19.0 17.0	18.0

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

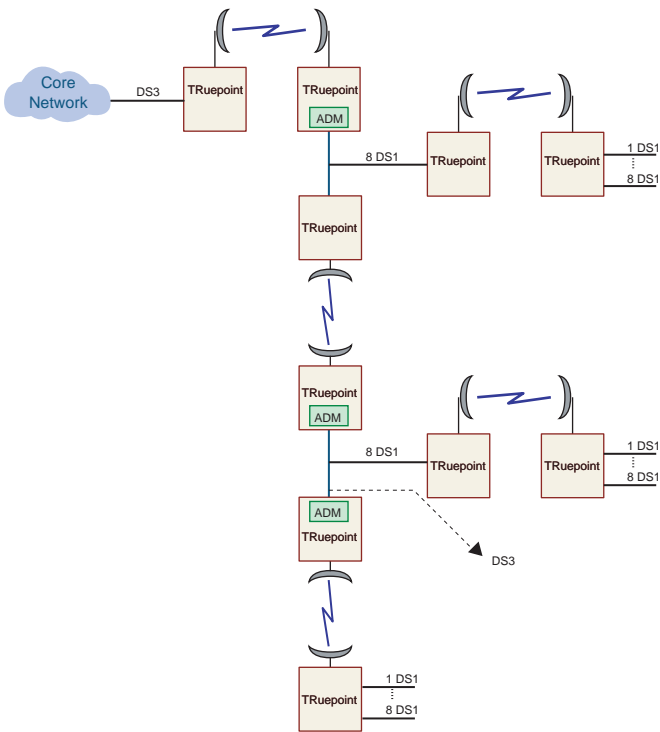
Notes: For guaranteed value, TRuepoint 5100/5200: 2 dB below typical value.

## Applications

0-16 DS1 + 2 x 100BASE-T (4-100 DS1 equivalent airlink capacity)



### Linear Spur DS3 with 8 DS1 ADM (Terminal Add/Drop Mux)



### 2 OC-3 Ring Protected System

