R&S®IQR
I/Q Data Recorder
Specifications

ROHDE&SCHWARZ

Test & Measurement

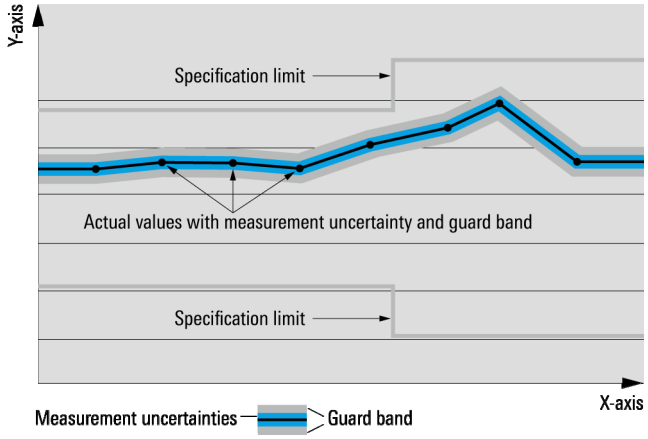
Data Sheet | 03.00

Definitions

General
Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

Specifications with limits
Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as <, ≤, >, ≥, ±, or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.



Specifications without limits
Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

Typical data (typ.)
Characterizes product performance by means of representative information for the given parameter. When marked with <, > or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

Nominal values (nom.)
Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

Measured values (meas.)
Characterize expected product performance by means of measurement results gained from individual samples.

Uncertainties
Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

Signal interfaces

DIG IQ IN/OUT	interface for connecting the Rohde & Schwarz instrument	in line with Rohde & Schwarz standard for digital I/Q interface [1], version 1.0
	use of either digital input or digital output (no simultaneous operation of input and output)	1 × IN, 1 × OUT (I/Q data, control signals, interface clock)
	logic level	LVDS
	connector	26-pin MDR
	clock rate IN	66 MHz to 100 MHz
	clock rate OUT	100 MHz
Control signals I/O 1 to I/O 8	programmable I/O for trigger	8 (2 × groups of 4 I/O)
	logic level output	0 V to 3.3 V
	logic level input	0 V to 3.3 V; threshold and 50 Ω termination can be programmed for each group
	connectors	BNC female
10 MHz reference clock	input connector output connector	BNC female BNC female

R&S®Digital I/Q Interface

Data rate	R&S®IQR20	up to 80 Mbyte/s
	R&S®IQR100	up to 270 Mbyte/s
DIG IQ IN		
Interface	direction	input
	connector	26-pin MDR
	level	LVDS
Standard protocol	R&S®IQR100 sample rate	1 ksample/s to 66 Msample/s
	R&S®IQR20 sample rate	1 ksample/s to 20 Msample/s
	resolution	16 bit for I and 16 bit for Q
	general-purpose signals	unused
Transfer modes	enable mode	supported
DIG IQ OUT		
Interface	direction	output
	connector	26-pin MDR
	level	LVDS
Standard protocol	R&S®IQR100 sample rate	1 ksample/s to 66 Msample/s
	R&S®IQR20 sample rate	1 ksample/s to 20 Msample/s
	resolution	16 bit for I and 16 bit for Q
	general-purpose signals	unused
Transfer modes	enable mode	supported
	resampling at DIG IQ IN	supported

Trigger

Start trigger modes	manual, LAN, external BNC, timer, I/Q level	single, continuous [2], retrigger
Stop trigger modes	manual, LAN, external BNC, timer	single
External trigger source	any control signal on I/O 1 to I/O 8; programmable slope, level, polarity	1 × start, 1 × stop

Reference clocks

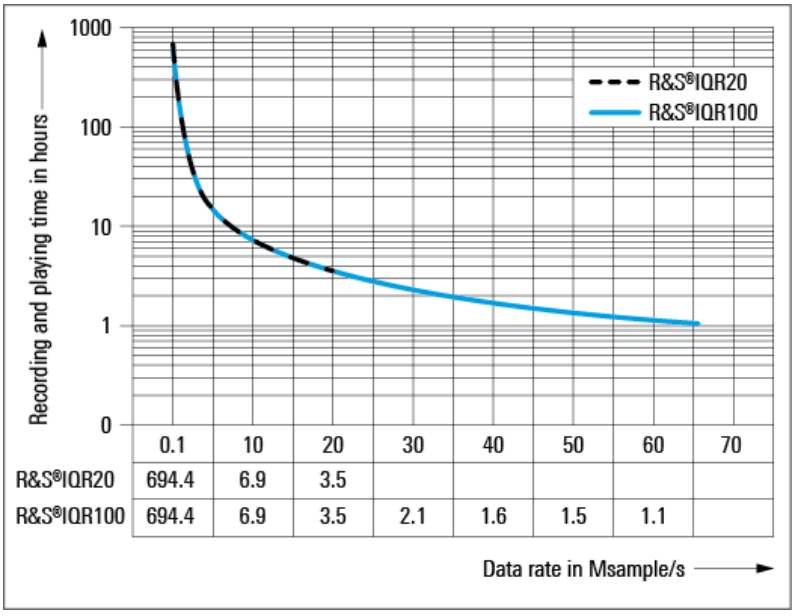
Reference clock		internal or external
Internal reference source	frequency	10 MHz ± 10 ppm
Reference input	frequency	10 MHz
	impedance	50 Ω
	required level	> 0 dBm into 50 Ω
Reference output	level	> 0 dBm

[1] R&S®Digital I/Q Interface for the transmission of digital I/Q data. It is supported by a wide range of instruments (signal generators, signal analyzers, communications testers and receivers).

[2] Only for player (depending on firmware version).

Mass memory

Type of memory	operating system and special data files	8 Gbyte, SSD [3], included
	ARB generator	1 Gbyte, solid-state memory, included
	I/Q data	1 × removable memory pack with HDDs or SSDs [3], 2 × SATA disk, 2.5"



	0.1	10	20	30	40	50	60	70
R&S®IQR20	694.4	6.9	3.5					
R&S®IQR100	694.4	6.9	3.5	2.1	1.6	1.5	1.1	

Relationship between I/Q data rate and recording/streaming time.

[3] Lifespan and data retention time of a NAND Flash SSD typically depend on the number of write cycles, the temperature and the write method.

The SSDs used in the R&S®IQR-B110 storage module have a write volume of up to 2000 Tbyte. When this value is reached, the SSD enters a read-only mode to ensure data retention. Depending on the operating and storage temperatures, the data retention period decreases over the SSD lifespan from several years to a guaranteed value of over 60 days.

Lifespan example:
A lifespan of 2 years is obtained with a daily write volume of 2.7 Tbyte (SSD is read and backed up 2.7 times). This corresponds to 9.3 hours write time per day at a sample rate of 20 Msample/s.

General data

Environmental conditions		
Temperature	operating temperature range	0 °C to +50 °C
	storage temperature range	–20 °C to +70 °C
Humidity		85 % rel. humidity, without condensation
Damp heat		in line with EN 60068-2-30, 85 % rel. humidity, cyclic test at +40 °C
Mechanical resistance		
Vibration	sinusoidal	in line with EN 60068-2-6, 5 Hz to 150 Hz, 0.15 mm amplitude const., 55 Hz to 150 Hz, 0.5 g const.
	random	
	R&S®IQR20 and R&S®IQR100 non-operating and operating mode without removable memory packs	in line with EN 60068-2-64, 10 Hz to 300 Hz, acceleration 1.9 g (RMS), 300 Hz to 500 Hz, acceleration 1.2 g (RMS)
	R&S®IQR20 and R&S®IQR100 operating mode with SSD memory packs (R&S®IQR-B1xx)	
	R&S®IQR20 and R&S®IQR100 operating mode with HDD memory packs (R&S®IQR-B0xx)	limited by HDD [4] (ideal for stationary use)
Shock		in line with MIL-STD-810, method 516.4, procedure I, 40 g shock spectrum
Power supply		
Nominal voltage		100 V to 240 V AC (± 10 %)
Nominal frequency		50 Hz to 60 Hz/400 Hz (± 5 %)
Nominal current		2.5 A to 1.1 A
Power consumption	configuration-dependent	60 W to 100 W (typ.)
Dimensions	W × H × D, overall	249.5 mm × 150 mm × 401 mm (9.82 in × 5.91 in × 15.79 in)
	in case of rackmounting	½ 19", 3 HU, depth 350 mm (13.78 in)
Weight		6.6 kg (14.55 lb)

Product conformity		
Electromagnetic compatibility	EU: EMC Directive 2004/108/EC	in line with EN 61326-1 (industrial environment) EN 61326-2-1 EN 55011 (group 1, class A) EN 61000-3-2 EN 61000-3-3
Electrical safety	EU: Low Voltage Directive 2006/95/EC	in line with EN 61010-1 VDE safety approval: GS mark
	USA and Canada	in line with UL 61010-1 (2nd edition) CAN C22.2 No. 61010.1-04 CSA safety approval: cCSAus

Controller interfaces		
Front panel		
USB	for keyboard, mouse or USB stick	2 × USB 2.0, type A connector (f)
Display	with touchscreen	5.7", 640 × 480, color, LED backlighting
Rear panel		
DVI	for external monitor	DVI-D connector (f)
DISPLAY PORT	not activated	display port connector (f)
LAN	remote control via LAN	2 × Ethernet RJ-45 connector (f), 10/100/1000 Mbit/s
USB	host	4 × USB 2.0, type A connector (f)
	device	1 × USB 2.0, type B connector (f)

[4] No values specified by the manufacturer of the HDD.

Overview of the Rohde & Schwarz instruments that work with the R&S®IQR and list of the required options [5]

Rohde & Schwarz instruments	Digital I/Q input option	Digital I/Q output option
Signal generation		
R&S®AMU200A [5] baseband signal generator and fading simulator	R&S®AMU-B17 analog/digital baseband inputs	R&S®AMU-B18 digital baseband output
R&S®SMBV100A vector signal generator	R&S®SMBV-K18 digital baseband connectivity	
R&S®SMU200A vector signal generator	R&S®SMU-B17 analog/digital baseband inputs	R&S®SMU-B18 digital baseband output
R&S®SFE broadcast tester	R&S®SFE-K80 digital I/Q input interface [6]	–
R&S®SFE100 test transmitter	R&S®SFE-K80 digital I/Q input interface [6]	–
R&S®SFU broadcast test system	R&S®SFU-K80 extended I/Q (analog IN, digital IN/OUT) [6, 7]	
Signal analysis		
R&S®FSQ signal analyzer	R&S®FSQ-B17 digital baseband interface [8]	
R&S®FSV baseband signal analyzer	R&S®FSV-B17 digital baseband interface	
R&S®FSVR real-time spectrum analyzer	R&S®FSV-B17 digital baseband interface	
RF wideband receiver/RF scanner		
R&S®TSMW radio network analyzer	–	R&S®TSMW-B1 I/Q hardware interface R&S®TSMW-K1 I/Q software license
Digital I/O		
R&S®EX-IQ-Box digital signal interface module	included	

[5] Compatibility as of July 2011; additional Rohde & Schwarz measuring instruments with R&S®Digital I/Q Interface on request.

[6] These devices contain the I/Q data interface for I/Q data transfer but no I/Q info interface.

[7] The R&S®IQR currently does not support the I/Q output interface of this instrument.

[8] The R&S®IQR currently does not support the I/Q input interface of this instrument.

Ordering information

I/Q data recorder

Designation	Type	Order No.
Models		
I/Q Data Recorder with touchscreen, basic (optimized for HDD memory packs) I/Q channel: 1 × input, 1 × output Sample rate: up to 20 Msample/s Data rate: up to 80 Mbyte/s Scope of delivery: R&S®IQR20, manual, software and documentation on CD, 4 × BNC cable, 1 × I/Q data cable	R&S®IQR20	1513.4600.02
I/Q Data Recorder, high speed (optimized for SSD memory packs) I/Q channel: 1 × input, 1 × output Sample rate: up to 66 Msample/s Data rate: up to 270 Mbyte/s Scope of delivery: R&S®IQR100, manual, software and documentation on CD, 4 × BNC cable, 1 × I/Q data cable	R&S®IQR100	1513.4600.10
Memory pack (one module is required)		
Hard disk drives (HDD), recommended for the R&S®IQR20		
1 Tbyte HDD Memory Pack, up to 80 Mbyte/s	R&S®IQR-B010	1513.4700.10
High-speed and rugged solid-state disks (SSD), recommended for the R&S®IQR100		
1 Tbyte SSD Memory Pack, up to 300 Mbyte/s	R&S®IQR-B110	1513.4717.10

Options

Options for the R&S®IQR		
Import/Export of I/Q Files via USB interface (free-of-charge update for LAN interface) [9]	R&S®IQR-K101	1513.5001.02
GPS Data Recording on the R&S®IQR as meta data file	R&S®IQR-K102	1513.5018.02
Service options		
One-Year Repair Service following the warranty period	R&S®RO2IQR	please contact your local Rohde & Schwarz office
Two-Year Repair Service following the warranty period	R&S®RO3IQR	
Four-Year Repair Service following the warranty period	R&S®RO5IQR	

Accessories

Accessories for the R&S®IQR		
Cable for connecting R&S®Digital I/Q Interface	R&S®SMU-Z6	1415.0201.02
19" Adapter, design 2010 cabinet, 3,HU 1/2, two devices side by side	R&S®ZZA-KN24	1175.3233.00
19" Adapter, design 2010 cabinet, 3,HU 1/2, device + dummy	R&S®ZZA-KN25	1175.3240.00
Carrier Trolley with inlet for R&S®IQR and accessories Exterior dimensions (W × H × D): 538 mm × 269 mm × 406 mm (21.20 in × 10.60 in × 16.00 in)	R&S®IQR-Z5	1516.4260.02
GPS Module, uBlox, external antenna, PPS, USB, 4-pin serial	R&S®TSMX-PPS	1503.4850.02
Accessories for R&S®IQR and R&S®TSMW		
Carrier Trolley with inlet for R&S®IQR, R&S®TSMW and accessories Exterior dimensions (W × H × D): 625 mm × 297 mm × 500 mm (24.60 in × 11.70 in × 19.70 in)	R&S®IQR-Z6	1516.4360.02
19" Rack Adapter, 3 HU, for 1 × R&S®TSMW and 1 × R&S®IQR	R&S®IQR-Z19-T	1513.4623.30
Y Cable for two DC power supplies (R&S®IQR, R&S®TSMW) with D-Sub connectors	R&S®IQR-Z101	1513.4630.10
R&S®TSMW AC Power Supply	R&S®TSMW-Z1	1503.4608.02

Recommended extras for configuration

Compact Keyboard with integrated trackball, USB interface (US character set)	R&S®TSPC-KEYB	1508.1607.02
17" TFT Monitor	R&S®PMC3	1082.6004.12

[9] For the time being, only R&S®TSMW, R&S®FSV, R&S®FSVR, R&S®FSQ, R&S®FSG and R&S®FMU36 data can be exported.

Service you can rely on

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- Customized and flexible
- Uncompromising quality
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About Rohde&Schwarz

Rohde&Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established more than 75 years ago, Rohde&Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

Environmental commitment

- Energy-efficient products
- Continuous improvement in environmental sustainability
- ISO 14001-certified environmental management system

Certified Quality System
ISO 9001

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