IQC5000B Series is the industry's smallest high-fidelity dual-channel RF Record & Playback System. With up to 255 MHz of record and playback bandwidth, the IQC5000B can meet recording needs from HF to millimeter wavelengths in mission-critical applications.

The IQC5000B has been designed to support operational security with removable memory for a total of 4TB of storage within the IQC5000B-MEM module, which can provide up to 50 minutes of single-channel record time at full bandwidth. The system's external datapacks (up to 15 TB) also give users over 3 hours of single-channel record time at full bandwidth. The IQC5000B Record & Playback System is suited for laboratory, production, or field applications.

FEATURES

• 255 MHz RF streaming bandwidth on record and playback
• Low-cost, removable storage options
• Time-synchronous dual channel recording
• Fast offload speeds using cabled PCI Express
• Compatible with Keysight, Rhode & Schwarz and Tektronix Signal Analyzers

The RF environment is growing increasingly complex. The IQC5000B can be used to bring large datasets back into the laboratory for real-world analysis. The data can be used as-is or modified to margin and stress test system designs for compliance. Whether recording several seconds, hours, or even days of RF data, has the hardware and software tools to get the job done.
IQC5000B
RF Record & Playback System

IQC5000B FRONT PANEL FUNCTIONS AND INTERFACES

Two Removable 2TB Memory Modules
Configuration Menu Buttons
System Configuration & Status Display

The IQC5000B front panel provides local control of basic system functions.

IQC5000B BACK PANEL FUNCTIONS AND INTERFACES

External Storage Output
Channel 2 IQ analog outputs
PCIe bus for high speed Offload to workstation
Interface to stream to MEM Module

Channel 1 IQ analog outputs
drive vector generator for replay

Channel 1 digital IQ inputs from signal analyzer
External Reference

Network control via GUI or SCPI commands
Synchronize operation with other system events
Tag incoming data for precise event marking
Correlate data to IRIG-B and GPS time and location
Channel 2 digital IQ inputs from signal analyzer

Rear panel interfaces include two analog I&Q Channel Outputs and two digital I&Q Channel Inputs, PCIe data offload, and IRIG-B and GPS inputs.
APPLICATIONS

ELECTRONIC WARFARE
Record, store, and playback real-world RF signals for threat analysis and to build EW libraries.

INTERFERENCE ANALYSIS
It is not always easy to record interfering signals. With the IQC5000B’s sophisticated triggering capability, you can use up to two external triggers to start recording when the interference occurs. This allows for efficient use of the onboard memory as well as being able to record those elusive interferers.

SURVEILLANCE
With the IQC5000B, you can record in-theater RF signal activity for later offload and analysis in a laboratory.

SPECTRUM MANAGEMENT
Ensuring that critical communications, radars, and other RF systems have a fighting chance to survive in harsh electromagnetic environments can be an almost impossible task. Bird Systems provides Spectrum Managers with systems and analysis tools that help to deconflict the RF world we live in to make the impossible…possible.
**IQC5000B RF Record & Playback System**

**IQC5000B DUAL-CHANNEL CONFIGURATION**

Record & Playback up to 2 channels of RF signals with 160 MHz of bandwidth each.

**SUPPORTING PRODUCTS FOR THE IQC5000B SERIES**

**SPECTRO-X SIGNAL ANALYSIS TOOLKIT**

Spectro-X software allows users to visualize and analyze up to four recorded RF and microwave spectrum files at the same time. You can parse through very large files of RF data with its four powerful search functions to get to the signal or area in the file that interests you the most. Then, export only those smaller portions of the file that require deeper analysis. Several file formats are supported such as .bin (KEYSIGHT®), .mat (MATLAB®), and .tiq (Tektronix®).

**RF EDITOR SIGNAL EDITING SOFTWARE**

RF Editor is a drag-and-drop graphical editing tool that lets you easily modify I&Q signals of any length or create entirely new ones. Users can modify and build signal waveforms in the time and frequency domains make many frequency domain signal modifications, and move any signal or slice of spectrum anywhere among 10 time domain tracks in the recording. Snippets of recorded data can be dragged and dropped onto any track and delayed, filtered, and shifted in frequency before playback.

**SIGNAL ANALYSIS WORKSTATION**

Bird's signal analysis workstation is designed to provide an optimum environment for storage, analysis, and editing of files record by the IQC5000B. The Windows 7™ system configuration includes a dual-Quad core Xeon processor, high-resolution graphics, and large SATA hard drive. It can be custom tailored to individual needs, including pre-installed Spectro-X and RF Editor software.
### IQC5000B SPECIFICATIONS

#### RF RECORD INTERFACE

**I&Q INPUTS**

<table>
<thead>
<tr>
<th>Logic level</th>
<th>LVDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample depth</td>
<td>16-bit I&amp;Q</td>
</tr>
<tr>
<td>Number of channels</td>
<td>2 I&amp;Q channels running concurrently</td>
</tr>
<tr>
<td>Connector</td>
<td>Four 50-pin 3M MDR</td>
</tr>
</tbody>
</table>

| Maximum data rate |
| Single-Channel | 1200 MB/s |
| Dual-Channel | 1600 MB/s |

**Spectrum analyzer compatibility**

- Keysight® X-Series: N9040B, N9030B/A, N9020B/A, N9010B/A
- Rohde & Schwarz*: FSV, FSVR, and FSW
- Tektronix*: RSA5100/6100

<table>
<thead>
<tr>
<th>Minimum record bandwidth (kHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.531 (24.4140625 ksamples/s, 16 bits, I&amp;Q)</td>
</tr>
</tbody>
</table>

| Maximum record bandwidth (MHz) |
| Single-Channel | 255MHz (300 MSPS) |
| Dual-Channel | 160MHz (200 MSPS) |

#### PLAYBACK INTERFACE

**ANALOG I&Q INPUTS**

| 1-dB bandwidth (MHz) |
| 255 MHz centered at 0 Hz (single channel) |
| 160 MHz (dual channel) |

| Power level (dBm) |
| 0 (fixed) |

| Amplitude flatness across 255 MHz bandwidth (dB) |
| +/-2 |

| VSWR |
| ≤ 1.8:1 |

| Impedance (ohms) |
| 50 |

| Connector |
| SMA female |

**RF OUTPUTS (Not intended for normal use)**

| Channel 1 Only |
| 2400 |

| Center frequency (MHz) |
| 225 MHz |

| Power level (dBm) |
| 0 nominal (for full scale recordings) |

| VSWR |
| ≤ 1.8:1 |

| Impedance (ohms) |
| 50 |

| Connector |
| SMA female |

#### WAVEFORM STORAGE INTERFACE

**Digital I/O Record and Playback Interface**

- High-speed serial link to/from External
- IQC5000B-MEM

#### GENERAL SPECIFICATIONS

**GPS**

- Protocol: ASCII, 8-bit data, one start and one stop bit, no parity
- Supported Speeds: 4800, 9600 and 115200 baud
- Supported NEMA Sentences: GPGGA, GPVTG, GPZDA

| Connector |
| 9-pin D female |

**IRIG-B**

- Accuracy: IRIG-B122
- Signal Format: Amplitude modulated sine wave

| Connector |
| SMA female |

**MARKERS**

| Voltage levels (VDC) |
| TTL Logic Levels: 0 to 3.3, 5 maximum |

| Impedance (ohms) |
| 4.7k |

| Connector |
| SMA female |

| Maximum allowed per record |
| Maximum quantity 100,000 per recording |

| Marker content |
| Date, time of day, latitude, longitude, altitude, Ground Speed, sample number |

| Latency (μs) |
| <1 from marker valid at connector to insertion in record file |

| Maximum Marker Record Speed (per second) |
| 1000 per marker input per marker edge |

**TRIGGER FUNCTIONS**

| Voltage levels (VDC) |
| TTL Logic Levels: 0 to 3.3, 5 maximum |

| Impedance (ohms) |
| 4.7k |

| Connector |
| SMA female |

| Latency (μs) |
| 0.4 from valid trigger applied to first recorded sample |

| Re-arm time (ms) |
| <1 |

| Pre-record memory (μs) |
| 0 |

#### START/STOP RECORD

- Record Types: Manual, duration, time of day, and event
- Trigger Port Configurations: Port 1, port 2, ports 1 and 2, ports 1 or 2
- Logic (user-specified): Leading edge valid, trailing edge valid (after start pulse or same pulse)

#### START/STOP PLAYBACK

- Playback modes: Manual, looped play between markers
## IQC5000B GENERAL SPECIFICATIONS CONTINUED

### REFERENCE CLOCKS

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency (MHz, +/-ppm)</th>
<th>Connector</th>
<th>Required level (dBm)</th>
<th>Frequency (MHz, +/-ppm)</th>
<th>Connector</th>
<th>Frequency (MHz, +/-ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERNAL</td>
<td>10, +/-10</td>
<td></td>
<td>0 into 50 ohms</td>
<td>10, +/-10</td>
<td>SMA female</td>
<td>10, +/-10</td>
</tr>
<tr>
<td>EXTERNAL</td>
<td>Provided by external input port if active. Otherwise internal clock signal is used.</td>
<td></td>
<td></td>
<td>Provided by external input port if active. Otherwise internal clock signal is used.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### INSTRUMENT CONTROL

- **IQC Control software**: Graphical user interface, full control of record, playback, file offload and upload
- **Operating environment**: Dual-core desktop or laptop, Windows® 7, 64bit, 2Gbytes RAM, 100 Mbytes free disk space, mouse
- **API**: IQC Control API Server
- **Front Panel**: Display of instrument parameters and manual marker insertion via membrane switches and 2-line LCD

### ENVIRONMENTAL

- **Designed to meet MIL-PRF-28800F Class 3 except where noted by ***: Designed to meet MIL-PRF-28800F Class 3 except where noted by *
- **Temperature**: 0° to +50° C operating, -20° C to +71° C storage. 95% relative humidity (non-condensing)
- **Vibration**: Sinusoidal: 5 to 55 Hz, 0.33 mm amplitude. Random with solid-state drives installed: in conformance with MIL-PRF-28800F Class
- **Shock (non-operating)**: 30g

### POWER

- **AC**: External AC/DC, 100 to 240V +/-10%, 50 to 60 Hz +/-5%, at 1.1 to 2.5 A (72 W)
- **DC**: 12 VDC, 6 A maximum (72 W)

### DIMENSIONS

- **Width x Height x Depth**: 12 x 3.5 x 10.5 in / 305 x 89 x 266 mm
- **Weight**: 8.5 lb / 3.85 kg

### PRODUCT CONFORMITY

- **Electromagnetic conformance**: EMC Directive 2014/30/EU EN 61326-1 and electrical equipment for measurement, control, and laboratory use ICES-003 Issue 5, August 2012 for a Class A device FCC Title 47 of the Code of Federal Regulations (CFR), Part 15 Subpart B for a Class A digital device
- **Electrical safety conformance**: CE Compliant IAW EN 61010-1:2010

### IQC5000B-MEM WAVEFORM STORAGE

**DIGITAL I/O RECORD AND PLAYBACK INTERFACE**

- **Aurora Link from/to External IQC5000B-MEM**
- **Connector**: Mini SAS SFF-8644

**EXTERNAL STORAGE INTERFACE**

- **Serial Attached SCSI (SAS)**: 2 Connections of 4 lanes each
- **Connector**: Mini-SAS SFF-8088

**INTERNAL STORAGE**

- **Removable Solid State Media Modules**: Two Modules, RAID 0
- **Capacity (TBytes)**: 2, 4

**EXTERNAL STORAGE**

- **Solid State Media**: RAID 0, 16 drives
- **Capacity (TBytes)**: 8, 15

**PCIe (DATA OFFLOAD)**

- **Specification**: PCIe Gen2
- **Lanes**: 8

### ENVIRONMENTAL

- **Designed to meet MIL-PRF-28800F Class 3 except where noted by ***: Designed to meet MIL-PRF-28800F Class 3 except where noted by *
- **Temperature**: 0° to +50° C operating, -20° C to +71° C storage. 95% relative humidity (non-condensing)
- **Vibration**: Sinusoidal: 5 to 55 Hz, 0.33 mm amplitude. Random with solid-state drives installed: in conformance with MIL-PRF-28800F Class
- **Shock (non-operating)**: 30g

### POWER

- **AC**: External AC/DC, 100 to 240V +/-10%, 50 to 60 Hz +/-5%, at 1.1 to 2.5 A (72 W)
- **DC**: 12 VDC, 6 A maximum (72 W)

### DIMENSIONS

- **Width x Height x Depth**: 12 x 1.75 x 10.5 in / 305 x 45 x 266 mm
- **Weight**: 5 lb / 2.68 kg

### PRODUCT CONFORMITY

- **Electromagnetic conformance**: EMC Directive 2014/30/EU EN 61326-1 and electrical equipment for measurement, control, and laboratory use ICES-003 Issue 5, August 2012 for a Class A device FCC Title 47 of the Code of Federal Regulations (CFR), Part 15 Subpart B for a Class A digital device
- **Electrical safety conformance**: CE Compliant IAW EN 61010-1:2010
### IQC5000B ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQC5040B</td>
<td>Signal recorder with up to 40 MHz record bandwidth. Two each LVDS inputs (I &amp; Q) with a maximum data rate per connector of 100 MB/sec. Includes an IQC5000B-MEM interface module, removable AC power supply, Bird Control SW and documentation on CD.</td>
</tr>
<tr>
<td>IQC5160B</td>
<td>Signal recorder with up to 160 MHz record bandwidth. Two each LVDS inputs (I &amp; Q) with a maximum data rate per connector of 400 MB/sec. Includes an IQC5000B-MEM interface module, removable AC power supply, Bird Control SW and documentation on CD.</td>
</tr>
<tr>
<td>IQC5255B</td>
<td>Signal recorder with up to 255 MHz record bandwidth. Two each LVDS inputs (I &amp; Q) with a maximum data rate per connector of 600 MB/sec. Includes an IQC5000B-MEM interface module, removable AC power supply, Bird Control SW and documentation on CD.</td>
</tr>
<tr>
<td>IQC5000B-MEM</td>
<td>Memory interface module for RAID0 storage units</td>
</tr>
<tr>
<td>QC5000B-ME2</td>
<td>Internal RAID0 SSD disk storage: 2 TB. Supports single channel operation up to 160 MHz bandwidth. Two units of option ME2 must be purchased for dual channel operation at bandwidths of 160 MHz or single channel operation at 255MHz.</td>
</tr>
<tr>
<td>IQC5000B-ME0</td>
<td>Additional blank memory module cover for the IQC5000B-MEM interface module.</td>
</tr>
<tr>
<td>IQC5000B-S08</td>
<td>External RAID0 SSD external disk storage: 8 TB. Supports both single and dual channel operation up to 160 MHz bandwidth.</td>
</tr>
<tr>
<td>IQC5000B-S15</td>
<td>External RAID0 SSD external disk storage: 15 TB. Supports both single and dual channel operation up to 160 MHz bandwidth.</td>
</tr>
<tr>
<td>IQC5000B-042</td>
<td>Adds second recording channel to support up to 40 MHz capture bandwidth.</td>
</tr>
<tr>
<td>IQC5000B-162</td>
<td>Adds second recording channel to support up to 160 MHz capture bandwidth.</td>
</tr>
<tr>
<td>IQC5000B-101</td>
<td>Adds single playback channel to support up to 160 MHz; Baseband I &amp; Q (2ea SMA female) and RF Out at 2.4 GHz, 0dBm (1ea SMA female). Not compatible with options 042 or 162.</td>
</tr>
<tr>
<td>IQC5000B-102</td>
<td>Adds second playback channel to support up to 160 MHz; Baseband I &amp; Q (4ea SMA female) and one RF Out at 2.4 GHz, 0dBm (1ea SMA female). Requires option 042 or 162.</td>
</tr>
<tr>
<td>IQC5000B-DP1</td>
<td>Adds single channel digital playback when using the Keysight N5172B (options 653 &amp; 655) or N5182B (options 656 and 657) vector signal generators for playback rates up to 200 MS/s.</td>
</tr>
<tr>
<td>IQC5000B-DP2</td>
<td>Adds dual channel digital playback when using the Keysight N5172B (options 653 &amp; 655) or N5182B (options 656 and 657) vector signal generators for playback rates up to 200 MS/s.</td>
</tr>
<tr>
<td>IQC5000B-XCB</td>
<td>LVDS Cable pair (2ea) for Signal Analyzers supporting up to 255 MHz bandwidth.</td>
</tr>
<tr>
<td>IQC5000B-ACB</td>
<td>LVDS Cable (1ea) for Keysight X-series Signal Analyzers supporting 40 MHz bandwidth.</td>
</tr>
<tr>
<td>IQC5000B-GPS</td>
<td>GPS/IRIG-B Timing Standard. Includes GPS antenna and interface cable.</td>
</tr>
<tr>
<td>IQC5000B-BKT</td>
<td>Non-rackmount bracket for affixing the IQC5000B to the IQC5000B-MEM interface module.</td>
</tr>
<tr>
<td>IQC5000B-RM1</td>
<td>19 inch Rack Mount Kit for IQC5000B only (2U)</td>
</tr>
<tr>
<td>IQC5000B-RM2</td>
<td>19 inch Rack Mount Kit for IQC5000B and option – MEM Adapter Combined (3U)</td>
</tr>
<tr>
<td>IQC5000B-RM3</td>
<td>19 inch Rack Mount Kit for IQC5000B option MEM only (1U)</td>
</tr>
<tr>
<td>IQC5000B-PC4</td>
<td>PCIe x8 host cable adapter for use in desk top computers and systems that use option MEM; Full Height Bracket. Includes 2 meter cable.</td>
</tr>
<tr>
<td>IQC5000B-PC7</td>
<td>PCIe x8 to x4 cable 2 meters in length.</td>
</tr>
<tr>
<td>IQC5000B-EX1</td>
<td>Extends factory warranty of IQC5000B by one additional year.</td>
</tr>
<tr>
<td>IQC5000B-EX2</td>
<td>Extends factory warranty of IQC5000B by two additional years.</td>
</tr>
<tr>
<td>IQC5000B-EX3</td>
<td>Extends factory warranty of IQC5000B by three additional years.</td>
</tr>
<tr>
<td>IQC5000B-EX4</td>
<td>Extends factory warranty of IQC5000B by four additional years.</td>
</tr>
<tr>
<td>IQC5000B-TRN</td>
<td>Daily rate for onsite training and consulting by Bird Applications Engineer.</td>
</tr>
<tr>
<td>IQC5000B-CBL</td>
<td>Adds one pair (2ea) of SMA-male to BNC-male cables for IQ analog playback. Each cable is 5 feet long.</td>
</tr>
<tr>
<td>IQC5000B-1A5</td>
<td>Transit Case for IQC5000B series. Case can hold the IQC5000B, IQC5000B-MEM and related accessories.</td>
</tr>
</tbody>
</table>
## IQC5000B ORDERING INFORMATION CONTINUED

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQC5000B-3UP</td>
<td>Upgrade from 160 MHz to 255 MHz capture bandwidth. Requires option -162 or</td>
</tr>
<tr>
<td></td>
<td>option -5UP.</td>
</tr>
<tr>
<td>IQC5000B-4UP</td>
<td>Upgrade from 40 MHz single channel to 40 MHz dual channel operation.</td>
</tr>
<tr>
<td>IQC5000B-5UP</td>
<td>Upgrade from 160 MHz single channel to 160 MHz dual channel operation.</td>
</tr>
<tr>
<td>IQC5000B-6UP</td>
<td>Upgrade from 40 MHz single channel to 160 MHz single channel operation.</td>
</tr>
<tr>
<td>IQC5000B-WS1</td>
<td>Rackmounted SigAnalyst Workstation</td>
</tr>
<tr>
<td></td>
<td>Dual Xeon, Quad-Core Workstation, 64GB RAM with 128 TB HDD Storage Archive</td>
</tr>
<tr>
<td></td>
<td>(96 TB usable).</td>
</tr>
<tr>
<td>IQC5000B-WS2</td>
<td>Rackmounted SigAnalyst Workstation</td>
</tr>
<tr>
<td></td>
<td>Dual Xeon, Quad-Core Workstation, 64GB RAM with 128 TB HDD Storage Archive</td>
</tr>
<tr>
<td></td>
<td>(96 TB usable), Spectro-X and RF Editor software packages.</td>
</tr>
<tr>
<td>IQC5000B-ENL</td>
<td>Rack enclosure to house IQC5000B, down converter, 2ea solid state data</td>
</tr>
<tr>
<td></td>
<td>packs, upconverter, workstation, storage archive and power distribution.</td>
</tr>
</tbody>
</table>

### SOFTWARE

- **WC-RF-EDITOR**  
  RF Editor Signal Generation software

- **Spectro-X**  
  Spectro-X Advanced Signal Analysis software