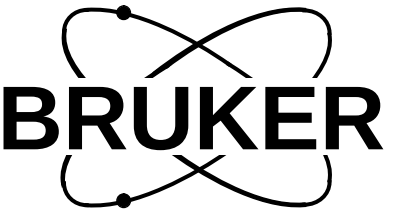

BRUKER Advanced Service Handbook

BASH

Version 002

BRUKER

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About ACROBAT READER 1.1

The ACROBAT READER program is supplied by ADOBE SYSTEMS, Inc. This program is used in BASH to display and print documents (text and graphics) on the workstation. The ACROBAT READER program is available for many platforms. The current BASH release was tested with Silicon Graphics workstations using IRIX Release 5.3 on SGI/INDY, with IRIX 6.x on SGI/O2 machines, and on Personal Computers running WINDOWS 3.11, WINDOWS NT 3.51, and WINDOWS 95. The program expects files in the dedicated ACROBAT READER format, which are stored with the extension „.PDF“ on both UNIX and PC/Windows systems. BASH was tested successfully with both ACROBAT READER Version 2.1 and 3.0.

Using ACROBAT READER within BASH 1.2

The BASH CD-ROM contains a top level document named

`/CDROM/bashmain.pdf`

(assuming IRIX name conventions). Starting BASH means to run ACROBAT READER with the file **`bashmain.pdf`**. This document contains an introduction to the BASH system, and the master table of contents. Individual service documents are stored in a subdirectory, using their BRUKER part number as a file name, in the form

`/CDROM/pdffiles/zxxxxx.pdf`

The service documents are opened as „children“ of the top level document. Individual service documents are opened by clicking on their title in the **Document Table** (see below).The following items in all documents are active hyperlinks:

- Each line in the **Document Table** (in this document)
- Each line in the **Contents** section of the manuals
- Optionally, large service documents may have a subject **Index,** list of **Figures**, list of **Tables** etc. If these sections exist, they are also equipped with hyperlinks.

After visiting any service document, using CLOSE in the FILE menu returns to the parent document.

Navigating within BASH documents 1.3

Navigation in ACROBAT READER is described in the HELP menu of this program. A few hints are useful for efficient navigation in BASH:

- You can use the single arrow buttons on the toolbar and the arrow buttons on your keyboard to scroll a document up or down by pages.

- You can use the double arrow button on the toolbar to return to the previous display. This is especially useful to return to a point from where you arrived by clicking on an active hyperlink, e.g. from the master document to the selected service document.

- A brute-force return to the top level document is always possible by clicking on the FILE menu, and opening **`bashmain.pdf`** from the list of recently used files.

Recommended Settings for ACROREAD 2.1 *1.4*

ACROBAT READER Version 2.1 is installed on the Silicon Graphics INDY during installation of XWIN-NMR Version 1.3 or 2.0 with the Acrobat Reader checkbox enabled. It is also pre-installed on SGI/O2 machines being delivered in with IRIX Release 6.3. XWIN-NMR runs its HELP command using ACROBAT READER. ACROBAT READER Version 2.1 has no special „Preferences“ menu.

Recommended Settings for ACROREAD 3.0 *1.5*

ACROBAT READER Version 3.0 can be installed from the BASH CDROM. When started the first time after installation, it uses the default „Preferences“. BASH works well with the default settings but can be tuned for more convenient operation. With ACROBAT READER running, select the menu points

File-> Preferences -> General

and adjust following items:

- Default Page Layout: **Continuous**
- Default Magnification: **125**
- Max. „Fit Visible“ Magnification: **150**
- Smooth Text and Monochrome Images: **OFF**
- Open Cross-Document Links in Same Window: **OFF**

Except „open cross document links..“, none of the settings will affect the BASH program flow; they rather improve the appearance of the documents. There are further options which may be set according to your taste. Note that some of the items take only effect after exiting and restarting ACROBAT READER.

NOTE: When using ACROBAT READER 3.0, you must have a true PostScript printer to be able to print manual pages on SGI computers.

NOTE: Your personal ACROBAT setup is stored in the file `$HOME/.acrorc` on UNIX machines. Removing this file causes ACROBAT READER to create a new setup file with default parameters when the program is started the next time.

AVANCE Series 2

General 2.1

The comprehensive AVANCE family of digital NMR spectrometers was developed in direct response to the increasing demands of the NMR community for optimum performance and stability in a highly automated, easy to use instrument. Within the AVANCE series there is a virtual continuum of configurations from 200 to 800 MHz, optimized for high resolution, solids, liquids and imaging applications. Whatever the environment or application, there is an appropriate AVANCE model to choose from.

The following basic building blocks of the RF electronics are common to all spectrometers of the AVANCE series:

- Digital Lock
- Digital frequency generation and acquisition control
- Digital filtering and oversampling using digital signal processors (DSP)
- Digital signal routing
- High performance microprocessor controlled preamplifier
- High performance transmitter systems

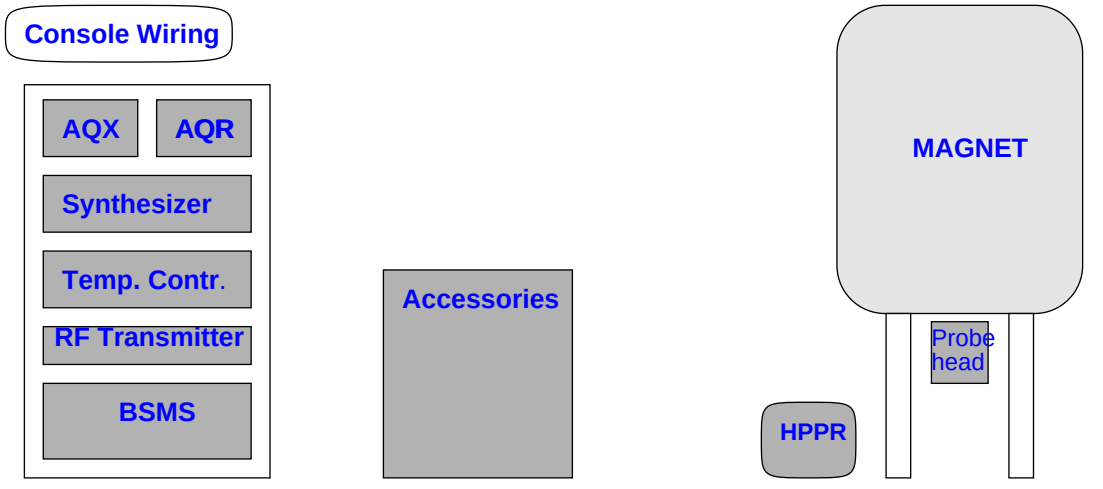
The AVANCE spectrometer platform has been specifically designed to allow different configurations according to customer's requirements.

AVANCE Models 2.2

Depending on customer's requirements, a one or two bay electronic cabinet of the AVANCE model is selected. The one bay electronic cabinet, as well as the previous AVANCE DPX configurations, contains all electronics required for high resolution spectroscopy with 2 channels.

The standard two bay electronic cabinet, as well as the previous AVANCE DRX configuration, contains all electronics for high resolution NMR applications with the capabilities for expansion up to 8 RF channels. The standard two bay electronic cabinet can be expanded to a configuration optimized for NMR solids, previously named AVANCE DMX/DSX.

AVANCE DPX / One bay cabinet *2.3*



AQX/P:

- The acquisition control system AQX/P generates all digital control signals as specified by the user's pulse program. The CCU runs as a "diskless UNIX" client and controls TCU, 2 FCU's, RCU and GCU. The TCU controls all timings and pulses. The FCU's generate RF phases, frequencies, and control the RF amplitudes. Amplified, demodulated and digitized NMR signals are fed to the RCU which performs real time digital filtering and accumulation. The optional GCU generates the gradient shapes for GRASP experiments.

AQR/P:

- The acquisition rack AQR/P contains all the RF/AF components for signal routing, transmitting and receiving purposes. The NMR signal is mixed down to audio frequency by the RX22 receiver system and then converted to digital data by the ADC. The local oscillator frequency is derived from the ASU/LOT module.

Synthesizer:

- The excitation signal for each channel is generated by combination of the appropriate FCU and synthesizer.

RF Transmitter:

- The linear RF transmitters generate both pulsed and CW frequencies for each channel with appropriate amplitudes.

BSMS:

- The BSMS unit provides NMR sample control (SLCB), shim (SCB) and H0 current (LCB) control, houses the digital lock (LTX, LRX) and the optional gradient amplifier (GAB).

HPPR preamplifier module:

- The HPPR amplifies, filters and routes the NMR response signals from the probehead to the RX22 receiver. It switches the RF transmitter output to the probehead.

Probeheads:

- General information common to most probeheads can be found here. See appropriate NMR probehead documentation for details.

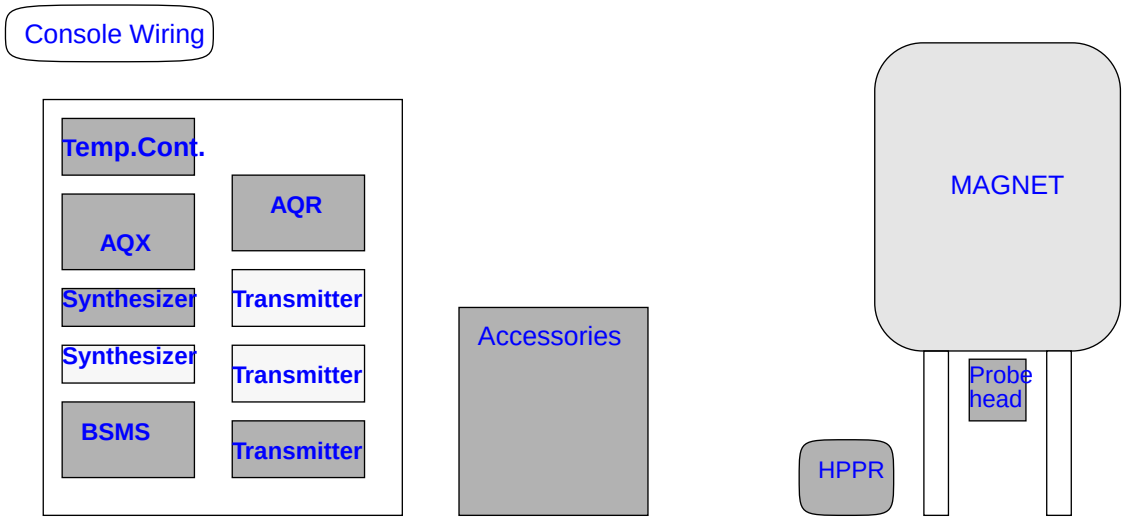
Magnet:

- General handling and maintenance information for all magnets can be found here. Specific documents are supplied with each magnet.

Accessories:

- Temperature Controller (BVT3300), Sample Changers (Sixpack, BACS-60), GRASP and many other accessories can be installed optionally.

AVANCE DRX / Two bay cabinet *2.4*



AQX:

- The acquisition control system AQX generates all digital control signals as specified by the user's pulse program. The CCU runs as a "diskless UNIX" client and controls TCU, FCU's, RCU and GCU. The TCU controls all timings and pulses. The FCU's generate RF phases, frequencies, and control the RF amplitudes and modulation. Amplified, demodulated and digitized NMR signals are fed to the RCU which performs real time digital filtering. The optional GCU generates the gradient shapes for GRASP experiments.

AQR:

- The acquisition rack AQR contains all the RF/AF components for signal routing, transmitting and receiving purposes. The NMR signal is mixed down from RF frequency by the RX22 to audio frequency and then digitized by the ADC. The local oscillator frequency is derived from the LOT module. The RF frequencies are shaped by the ASU's, and routed to the appropriate RF transmitters. The RF transmitters are controlled by the ACB module. Routing and output power information is displayed on the BSMS keyboard.

Synthesizer:

- The excitation signal for each channel is generated by combination of the appropriate FCU and synthesizer.

RF Transmitter:

- The linear RF transmitters generate both pulsed and CW frequencies for each channel with appropriate amplitudes.

BSMS:

- The BSMS unit provides NMR sample control (SLCB), shim (SCB) and H0 current (LCB) control, houses the digital lock (LTX, LRX) and the optional gradient amplifier (GAB).

HPPR preamplifier module:

- The HPPR amplifies, filters and routes the NMR response signals from the probehead to the RX22 receiver. It switches the RF transmitter output to the probehead.

Probeheads:

- General information common to most probeheads can be found here. See appropriate NMR probehead documentation for details.

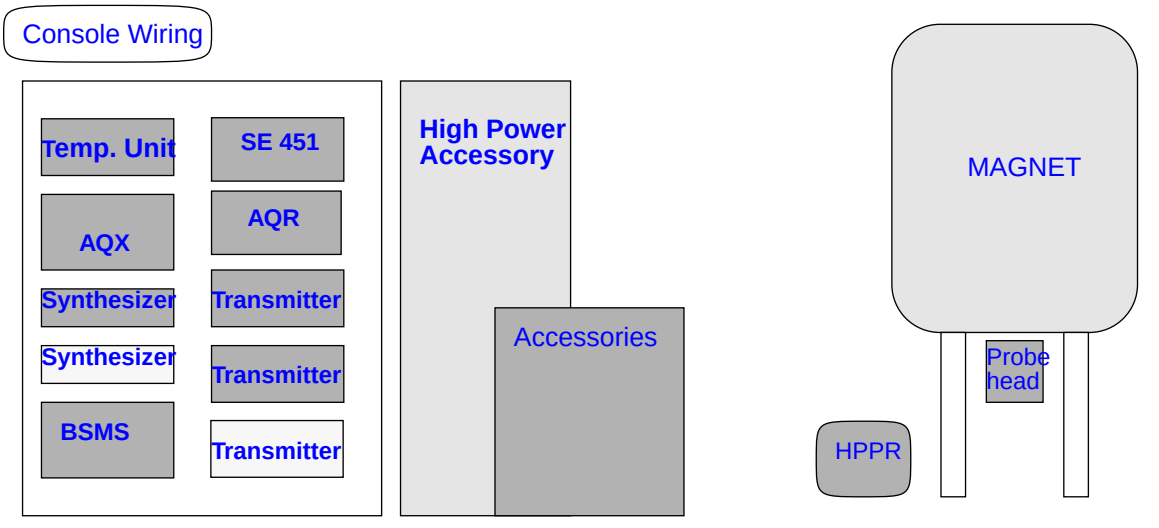
Magnet:

- General handling and maintenance information for all magnets can be found here. Specific documents are supplied with each magnet.

Accessories:

- Temperature Controller (BVT3300), Sample Changers (Sixpack, BACS-60), GRASP and many other accessories can be installed optionally.

AVANCE DMX/DSX / Optimized solids configurations *2.5*



AQX:

- The acquisition control system AQX generates all digital control signals as specified by the user's pulse program. The CCU runs as a "diskless UNIX" client and controls TCU, FCU's, RCU and GCU. The TCU controls all timings and pulses. The FCU's generate RF phases, frequencies, and control the RF amplitudes and modulation. Amplified, demodulated and digitized NMR signals are fed to the RCU which performs real time digital filtering. The optional GCU generates the gradient shapes for GRASP experiments. For fast data acquisition the fast digitizer (FADC) is coupled to the RCU.

AQR:

- The acquisition rack AQR contains all the RF/AF components for signal routing, transmitting and receiving purposes. The signal is mixed down from RF frequency by the SE451 to audio frequency and then digitized by the ADC. The LO frequency is generated on the SE451 which is controlled by the RXC. For broadband applications the SE451 is followed by the antialiasing filters FTLP/4M and the FADC. - The RF frequencies are shaped by the ASU's, and routed to the appropriate RF transmitters. The RF transmitters are controlled by the ACB module. Routing and output power information is displayed on the BSMS keyboard. The 4-Phase Modulator performs fast phase adjustment for solids.

Synthesizer:

- The excitation signal for each channel is generated by combination of the appropriate FCU, SE451 and synthesizer.

RF Transmitters:

- The linear RF transmitters generate both pulsed and CW frequencies for each channel with appropriate amplitudes.

SE451 receiver module:

- The SE451 is used as frequency generation unit in conjunction with the synthesizer and FCU. It generates transmitter signals and contains the quadrature receiver. It uses an IF of 451 MHz. For wide line applications a fast n * 90 degrees phase shifting device is on board.

High Power Accessory:

- For experiments at kilowatt power levels (B-HPCU) and for wide line applications, ultrafast 90 degree phase shifting and high speed digitizer (FADC) are required.

BSMS:

- The BSMS unit provides NMR sample control (SLCB), shim (SCB) and H0 current (LCB) control, houses the digital lock (LTX, LRX), and the optional gradient amplifier (GAB).

HPPR preamplifier module:

- The HPPR amplifies, filters and routes the NMR response signals from the probehead to the SE451 receiver. It switches the output of the RF transmitter to the probehead. - The HPPR can be equipped with the optional High Power module.
-

Probeheads:

- General information common to most probeheads can be found here. See appropriate NMR probehead documentation for details.

Magnet:

- General handling and maintenance information for all magnets can be found here. Specific documents are supplied with each magnet.

Accessories:

- Temperature Controller (BVT3300), Sample Changers for HR tubes or MAS rotors, and GRASP can be installed optionally.

Document Table 3

Magnet System 3.1

- Important Notes
- Installation Procedures
- Nitrogen Fills (Movie)
- Refill User Manual
- Safety Notes
- Trouble Shooting

AVANCE Console Wiring Diagrams 3.2

- AVANCE DPX (one bay cabinet) Wiring Diagram
- AVANCE DRX (two bay cabinet) Wiring Diagram
- AVANCE DMX and DSX (solids) Wiring Diagram

AQX 3.3

- AQX Mainframe Manual
- AQX/P Mainframe Manual
- CCU Technical Manual
- FCU Technical Manual
- GCU Technical Manual
- RCU Technical Manual
- TCU Technical Manual

Frequency System 3.4

- PTS DL 620 Technical Manual
- SE 451 Technical Manual

AQR *3.5*

- AQR Mainframe Technical Manual
- AQR/P Mainframe Technical Manual
- 4-Phase Modulator Technical Manual
- ACB Technical Manual
- ASU/LOT Technical Manual
- ASU1 Technical Manual
- ASU2 Technical Manual
- FTLP/4M Technical Manual
- HADC Technical Manual
- HADC/2 Technical Manual
- LOT Technical Manual
- Router Technical Manual
- RX22 Technical Manual
- RXC Technical Manual
- SADC Technical Manual

BSMS *3.6*

- BSMS Mainframe Technical Manual
- GAB Technical Manual
- BSMS User Manual
- Lock Technical Manual
- RCB Technical Manual
- Sample and Level (SLCB) Technical Manual
- Shim (SCB) Technical Manual

Transmitter System *3.7*

- BLARH100 200-400 MHz Technical Manual
- BLARH100 500-600 MHz Technical Manual
- BLAX300 RS Technical Manual
- BLAXH20 Technical Manual
- BLAXH50 200-400 MHz Technical Manual
- BLAXH50 500-600 MHz Technical Manual

HPPR *3.8*

- HPPR Technical Manual

Probes *3.9*

- Probes User Manual

High Power Accessory *3.10*

- B-HPCU User Manual
- DMX/DSX High Power User Manual
- Power Router Technical Manual

Accessories *3.11*

- AVANCE GRASP User Manual
- BACS-CE Technical Manual
- BCU05 Technical Manual
- GREAT 1 Technical Manual
- Q-Switch Technical Manual
- RF GRASP Technical Manual
- BVT3000 Technical Manual
- BVT3300 Technical Manual
- BVTB3500 Technical Manual

Document Table