

# Optimize Your NMR System with Agilent DD2 Console Technology

## Data Sheet

### Benefits of DD2 technology

- Amplifier linearization
- Flat baselines with time-corrected digital filtering
- State-of-the-art VnmrJ 3 software
- Compatibility with Agilent NMR automation solutions
- Access to OneNMR Probe technology



Figure 1. Agilent 400-MR DD2 (400 MHz systems) and DD2 (300-900 MHz systems) consoles.

### Introduction

Agilent Technologies offers a wide selection of NMR console upgrade options that add the benefits of DD2 technology to existing NMR systems, including board-level upgrades, and partial or whole console replacements. These changes are designed to enhance the performance and lengthen the lifespan of your NMR system. As a result, you will gain new capabilities while extending the support life of your system. Console and component upgrades are a cost-effective way to directly incorporate cutting-edge technology and to gain broader access to time-saving accessories for your existing NMR setup, without incurring the expense of replacing your magnet.



**Agilent Technologies**

## Upgrade Path Summary

Your console model determines the options available for the DD2 technology upgrade. Locate your console model in the left-hand column of Table 1.

## VNMRS DD to DD2 Technology Upgrade

Upgrade your VNMRS DirectDrive system to a second-generation DirectDrive 2 (DD2) system through an on-site, board-level upgrade. The DD2 upgrade improves the RF of the Varian NMR System (VNMRS) with high-performance iCAT transmitters and mixers.

Using the Fidelity module of VnmrJ (3.1 and later), the new DD2 transmitter can produce a strictly linear relationship between input and output power, and phase of the full transmit chain, including the system amplifiers (Figure 2). Upgrading also makes the system probe ID-ready, allowing systems with a probe ID-capable probe to store and retrieve probe-specific parameters that can be recalled instantly when probes are exchanged. Upgrades are available for 2 to 5 transmit channels, and 1 or 2 receive channels.

Table 1. NMR system selection guide and DD2 technology options.

Upgrade option	DD/DD1 to DD2 board level upgrade	Console Replacement Options		
		400–MR DD2	DD2	DD2 with retained components
Console model				
VNMRS DD/DD1	●			
MERCURY/MERCURYplus		●*	●	
INOVA		●*	●	●**
Infinity/Infinityplus			●	●**
UNITY/UNITYplus			●	
CMX			●	
Other		inquire		
Key benefits of each option	Onsite board upgrade automatically resets the support life to that of a new DD2 system	Adds DD2 technology in a compact, easy-to-use format for routine, fast, and reliable analyses	Brings the benefits of DD2 architecture to a broad range of NMR systems to extend their capabilities	Reuses your high-power RF amplifiers for substantial savings

\* 400 MHz systems only.

\*\* Solids, liquids/solids, MRI, micro-imaging, and UHF configurations only.

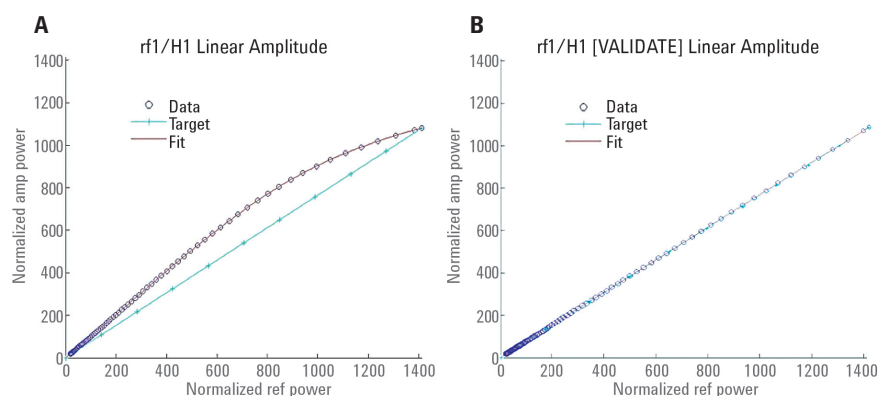


Figure 2. Uncorrected (A) and corrected (B) comparison plots of output power from the DD2 transmitter.

## New Agilent 400-MR DD2 for Varian, MERCURY, and INOVA 400 MHz NMR Systems

Legacy consoles of Varian, Mercury, or INOVA 400 systems can be upgraded to the Agilent 400-MR DD2 platform—bringing you all the benefits of advanced DD2 architecture while retaining your existing magnet.

The 400-MR DD2 provides unmatched productivity for diverse chemical applications by combining easy-to-use software with the outstanding performance of this new second-generation DirectDrive and DirectDigital spectrometer architecture. With push-button experiments, and straightforward data processing and export capabilities, the 400-MR is the best choice for compound detection, quantitation, and structure confirmation.

The DD2 architecture and parallel RF design of the 400-MR represent integral elements of every Agilent NMR spectrometer, providing uncompromising performance. The receiver digitizes at 80 MHz, delivering outstanding dynamic range, superior sensitivity, and solid baselines across multiple applications. Advanced phase and amplitude modulation offer exceptional performance for automated fast liquids experiments. In addition, the 400-MR DD2 console was designed for improved performance and ease-of-use because it incorporates variable temperature (VT) support in the standard console.

## New Agilent DD2 Console for 300–900 MHz NMR Systems

Systems with Oxford Instruments magnets that have outlasted their consoles can be upgraded to the flexible DD2 console. In addition to the benefits of the DD2 upgrade, your system can be configured with up to 5 RF channels, each with parallel controllers that feature advanced phase and amplitude pulse shaping capability for RF and gradient pulses.

System hardware control is achieved through high-performance FPGAs and includes greater than 30 MB waveform memory per RF and gradient channel. The DD2 includes a DirectDigital Receiver (DDR) which provides artifact-free quadrature data. The DDR digitizes and oversamples the IF, using a 14 bit 80 MHz ADC with an effective dynamic range of 20 bits at 10 KHz spectral width. Time-corrected digital filtering provides flat baselines (Figure 3).

## New Agilent DD2 Console for 300-900 MHz NMR Systems with Retained High-Value Components

With some systems, the high-power amplifiers and other high-value components from older consoles can be retained for use with your new DD2 console. In these instances, a substantial savings can be realized compared to the cost of a completely new console. At installation, the service engineer will verify the functionality of your retained components before installing them into your new console. Ideal candidates for this upgrade solution are systems of 700 MHz and above, and consoles configured for solids, liquids/solids, or micro-imaging.

Components that are candidates for retention:

- High-power amplifiers > 400 W
- Micro-imaging gradient amplifiers
- UHF synthesizers
- XYZ PFG amplifiers

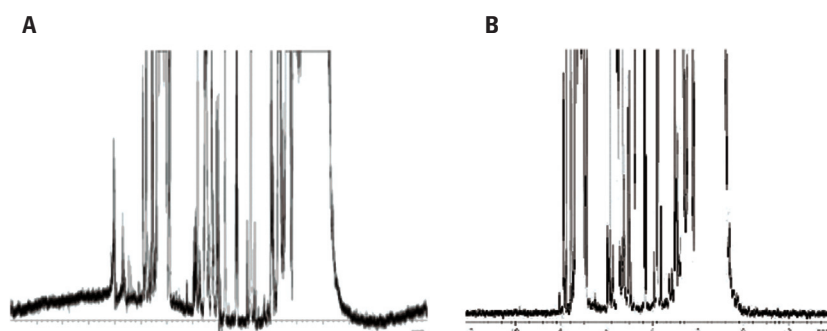


Figure 3. Spectra of a 30 % gasoline sample in  $\text{CDCl}_3$  acquired at 500 MHz using a traditional, quadrature-based base-band receiver (A) or an Agilent NMR System with DDR technology (B).

## Ordering Information

Description	Part Number
Console Replacement Upgrade to 400-MR DD2	G5135A
VNMRS DD/DD1 to DD2 Console Upgrade	G5136A
300 MHz through 800 MHz DD2 NMR Console – New	G8318A through G8324A
300 MHz through 800 MHz DD2 NMR Console – components retained <sup>1</sup>	G8318B through G8324B
850 MHz through 900 MHz DD2 NMR Console – New	G5121A-G5122A
850 MHz through 900 MHz DD2 NMR Console – components retained <sup>1</sup>	G5121B-G5122B

1- Factory review required.

Learn more

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