

# PHOENIX NMR

Elevating your science

Probe Switch = 17  
(ID)

## NB 1200MHz HFX Y 1.6mm MAS Probe

PN: PH1FT1S6NN

Tender Ref: CJ-03-23-PHYSICS-MASNMR-SB

### Description

A 4 channel magic angle spinning probe for solid state NMR applications. The unique modular probe head design increases versatility by allowing easy exchange of different module sizes by the user, while utilizing the same probe base. The use of transmission line tuning efficiently transmits high power RF pulses to the sample with minimal probe ring-down over a wide tuning range. The H/F channel allows for optimized operation of 1H or 19F as well as simultaneous 1H and 19F. VT operation through the probe minimizes loss while eliminating the need to purchase additional hardware.

### Tuning Range

Quadruple Resonance Mode: H: 1H and 19F X: 31P to 13C Y: 23Na to 15N

Triple Resonance Mode: H: 1H and 19F X: 31P to 14N

Tuning on X can be lowered to ~15MHz with optional Low Gamma box.

### Spinning Module

Material:

PCTFE

The PCTFE module exhibits reduced 1H background. 13C background is improved when performing cross polarization experiments, however 19F is relatively strong.

Spin Rate:

8kHz-40kHz

Stability:

+/- 30Hz or +/- 0.1%, whichever is larger, over 24hrs at +/-50C

Sample Volume:

8uL Active sample volume used for all NMR tests

VT Range:

-125C to +125C with FTS pre-conditioner or LN2

### Resolution

Adamantane (13C): 0.05ppm FWHM, 0.12ppm @ 10%, 0.24ppm @ 2%

Signal to Noise<sup>1</sup>: HFCN 219:1 HFC 290:1

### Target RF Performance:

Nucleus	pw90(μs)* 500W amp
1H/19F <sup>2</sup>	3.3
1H & 19F <sup>3</sup>	4.6
31P	3.8
13C	3.8
15N	6.1

<sup>1</sup> Expected S/N on Agilent/Varian VNMRs system. Measured with Glycine, optimized variable amplitude CP and contact time, matched line broadening, and 32 scans.

<sup>2</sup> PW spec for H or F pulses

<sup>3</sup> PW spec for H & F simultaneous pulses

\*  $pw90 = (pw360 - pw180) / 2$

H Max pulse length, duty cycle; 50ms, 3%

X Max pules length, duty cycle; 15ms, 3%

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<sup>3</sup> PW spec for H & F simultaneous pulses

\* pw90=(pw360-pw180)/2

H Max pulse length, duty cycle; 50ms, 3%

X Max pulses length, duty cycle; 15ms, 3%



**Customer** University of Warwick  
**Serial Number** SN240505  
**Frequency** 1200MHz  
**Style** HFXY  
**Field Center** 701mm

**Module Size** 1.6mm  
**Module Material** PCTFE  
**Min Speed** 8kHz  
**Max Speed** 40kHz

Spin Speed (kHz)	Bearing Pressure (psi)	Drive Pressure (psi)
8	4.8	2.1
10	4.8	2.8
15	5.1	5.0
20	5.5	7.9
25	6.9	12.0
30	8.3	17.3
35	9.7	24.3
40	11.1	34.4

Spin Speed (kHz)	Bearing Pressure (mbar)	Drive Pressure (mbar)
8	331	145
10	331	193
15	352	345
20	379	545
25	476	827
30	572	1193
35	669	1675
40	765	2372



## Tuning Information

**Customer** University of Warwick  
**Serial Number** SN240505  
**Frequency** 1200MHz  
**Field Center** 701mm

**Module Size** 1.6mm  
**Module Material** PCTFE  
**Style** HFXV

X-Channel			
Trap (pf)	PCB #	Frequency Range	
3.3, 6T	1	298	353
2.7, 6T	2	350	403
1.8, 6T	3	402	467
2.7, 4T	6	31P in XY Mode	
Short	SC	X Mode	

Y-Channel			
Series (pf)	PCB#	Frequency Range	
22	1	118	141
18	2	134	155
15	3	143	166
12	4	162	188
10	5	175	202
8.2	6	190	220
7.5	7	200	232
6.8	8	212	245
5.6	9	228	264
4.7	10	244	283
3.9	11	263	305
3.3	12	281	326
3.0	13	293	311
2.7	14	308	327
1.8	15	X Mode	
Short	SC	X Mode	



### Tuning Information

Customer	University of Warwick	Module Size	1.6mm
Serial Number	SN240505	Module Material	PCTFE
Frequency	1200MHz	Style	HFX

XY Mode	Series Plug-In PCB#	Trap Plug-In PCB#	X Tune Tube	Y Tune Tube
PC	13	6	UHX	3
P <sup>15</sup> N	1	6	UHX	8
C <sup>15</sup> N	1	1	1	7
<sup>13</sup> C <sup>18</sup> O	3	1	1	5

19F is only available in simultaneous HF mode

## Tuning Information

<b>Customer</b>	University of Warwick	<b>Module Size</b>	1.6mm
<b>Serial Number</b>	SN240505	<b>Module Material</b>	PCTFE
<b>Frequency</b>	1200MHz	<b>Style</b>	HFX

X Mode	Series Plug-In PCB#	Trap Plug-In PCB#	X Tune Tube	Y Tune Tube
P	SC		UHX	
Al	9		2	
C	9		3	
<sup>2</sup> H	1		5	
<sup>15</sup> N	SC		6	
<sup>14</sup> N	SC		8	

19F is only available in simultaneous HF mode

Tune and observe on the X channel for X Mode

Do not leave a tune tube inserted in the Y channel when running in this mode

Using the SC series and SC trap with the 9 and 8 tune tubes the tuning can be lowered to 44MHz

X-Channel			
Series (pf)	PCB#	Frequency Range	
Short	SC	56	164
22	1	163	216
12	4	215	258
7.5	7	248	286
5.6	9	285	340
3.9	11	339	361
2.7	14	360	381
1.8	15	380	404
Short	SC	448	488

With UHX Tune Tube



# PHOENIXNMR

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## Probe Acceptance Criterion Sheet 1200MHz 1.6mm HFX Y

Spin Rate	8kHz-40kHz	<input checked="" type="checkbox"/>		
Magic Angle Adjustment		<input checked="" type="checkbox"/>		
Resolution, Adamantane( <sup>13</sup> C)	.05ppm FWHM, .12ppm @ 10%, .24ppm @ 2%	<input checked="" type="checkbox"/>		
<i>shim file = Phoenix\pb.HC 0.02 003</i>	<i>(6.8 Hz)</i>	<i><del>0.1</del> (15.7 Hz)</i>		
PW90 (Measured as PW360-PW180/2)	<i>.05</i>	<i>.15 (45.8 Hz)</i>		
<sup>1</sup> H/ <sup>19</sup> F	<i><sup>1</sup>H pw90 = 3.3µs in HC mode @ 81W</i> <i>" = 4.6µs in HFC mode @ 30W</i>	3.3	<i><sup>19</sup>F pw90 = 4.6µs in HFC mode @ 96W</i>	<input checked="" type="checkbox"/>
<sup>13</sup> C	<i>HC mode <sup>13</sup>C pw90 = 3.8µs @ 118W</i>	3.8	<i>HCO mode <sup>13</sup>C pw90 = 3.85µs @ 175W</i>	<input checked="" type="checkbox"/>
<sup>31</sup> P		3.8		<input type="checkbox"/>
<sup>15</sup> N		6.1		<input type="checkbox"/>
Signal to Noise	*HCN 219:1 *HC 290:1 <i>160:1</i>			<input type="checkbox"/> <input type="checkbox"/>

*170 Sel. pulse = 2µs @ 200W*

PhoenixNMR Representative

*C. Pedersen*

Customer

*Agilent*

- Signal to noise is dependent on both the system as well as the probe. As PhoenixNMR has no control over your system, we cannot guarantee that this specification can be met. Signal to Noise has been proven on our system with a known signal to noise baseline and the data is included with the probe.

*Wobb tuning for HF  
sfo (<sup>1</sup>H) = 1165.019 MHz  
wobb sw = 88.785 MHz*