PBAR Note 657
The StackTail Magic Numbers
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<u>INTRODUCTION</u>

This note will tabulate the desired phase and delay offsets for a Stacktail Momentum beam transfer function measurement as a function of beam energy and pickup leg. These phase and delay offsets were computed from beam transfer functions made around April 14, 2000. The StackTail system with these offsets will have a gain slope of about 10 MeV.

<u>BEAM TRANSFER FUNCTION PROGRAM SETUP</u>

When using the Run II Pbar network analyzer program PA1788, the offset numbers are typed into the fields in the **Measurement Fit** window. The delay offset is typed into the **Delay Change** field and the phase offset is typed into the **Phase Offset** field. (See Figure 1.) The actual system delay is then varied to maximize the **Bandwidth** in the **Measurement Fit** window. With the offsets entered and the system phased correctly, the beam transfer response should look like Figure 2.

Leg 1							
Rev. Freq.	628817	628827	628837	628847	628857	628867	628877
Phase (deg.)	-29.2	-31.8	-38.4	-43.0	-36.4	-5.8	59.6
Delay (pS)	100.8	60.4	16.3	-24.9	-56.5	-65.8	-42.0

Table 1. Leg 1 Phase and Delay Offsets

Leg 2							
Rev. Freq.	628817	628827	628837	628847	628857	628867	628877
Phase (deg.)	102.1	98.7	98.4	98.4	93.5	95.5	119.8
Delay (pS)	372.1	330.4	292.8	255.8	213.0	176.2	160.1

Table 2. Leg 2 Phase and Delay Offsets

| System Select | Measurement Type | Markers – Frequency Computation |

< Make Measurement >   < Remeasure >   < Abort Measurement >
Record Title: LEG 1 628827

Measurement Parameters
Start Freq: 1999.041033   Mhz
Stop Freq: 4011.287433   Mhz
◆No. Points◆ 101
Sweeptime: 10.000   Sec
◆IF Bandwidth◆   30   Hz
Number Avgs: 1   OFF
Sweep Osc. Power: -25.00   dB
Revolution Freq.: 628827.00 Hz
Tune: 0.700   BMW: 10.00   Hz

Measurement Status
System: ACC STACKTAIL MOM
Type: MOMENTUM
Stage: Display Complete
Calibration: NA -> Uncalibrated
Attenuator: A:SPPA06   30
Pin Switch: A:SPPS01 Open
Transfer Sw: A:SPXT11 Normal/Cal

Measurement Fit
Delay Change: 60.40   pSec
Phase Offset: -31.80   Deg
Bandwidth: 1.114480   GHz
Search Range: 100.00   pSec
Search Res.: 1.00   pSec

Record Filing System
< Edit Record Title >
◆Recall Measurement Record◆
< Review Record Information >
Rec. Save: < Auto Manual None >
< Mail Recalled Record >
◆Delta File◆

Mail Measurement Record: < Auto Manual None >
◆To:◆ Record mailed to: derwent@fnal.gov

Messages
Preparing processed data for graphing
Preparing processed data for graphing
Preparing processed data for graphing
Main display set to RECALLED RECORD state
1: 4 of 16

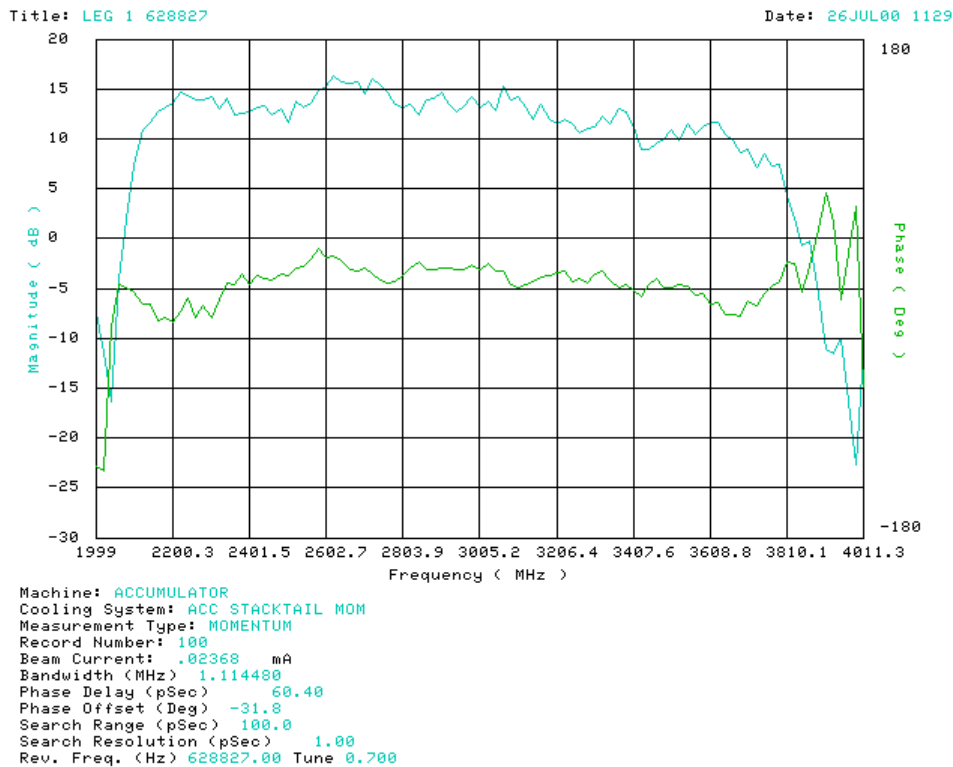*Figure 1. Network Analyzer Setup showing a delay change of 60.4 pS and a phase offset of -31.8 degrees*

Title: LEG 1 628827   Date: 26JUL00 1129

Machine: ACCUMULATOR
Cooling System: ACC STACKTAIL MOM
Measurement Type: MOMENTUM
Record Number: 100
Beam Current: .02368   mA
Bandwidth (MHz) 1.114480
Phase Delay (pSec)   60.40
Phase Offset (Deg) -31.8
Search Range (pSec) 100.0
Search Resolution (pSec)   1.00
Rev. Freq. (Hz) 628827.00 Tune 0.700

Figure 2. Beam Transfer function with correct system phasing and offsets entered.

Delay Magic Number
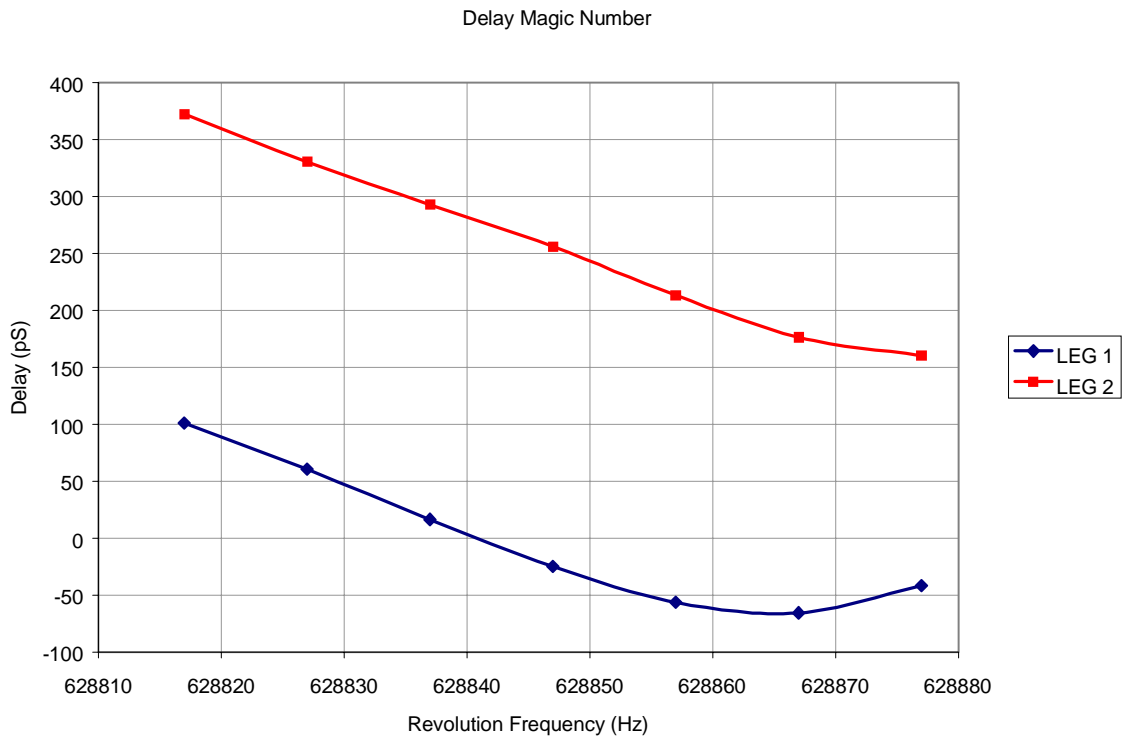
Figure 3. Delay offsets as a function of beam energy.

Phase Magic Number

Figure 4. Phase offset as a function of beam energy.