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Alternating Gradient Synchrotron Department
BROOKHAVEN NATIONAL LABORATORY
Associated Universities, Inc.
Upton, New York 11973

EP&S Division Technical Note
No. 111

A3 Line Tune/Beam Line Information

Gerry M. Bunce

June 3, 1985

A Transport display of the A3 beam envelope for the E749 magnet settings is enclosed, along with magnet listings and curves and collimator information. Note that the actual spot achieved at A3 is approximately 1 to 2 mm half width vs the Transport result of 2 mm(H) x 4 mm (V).

Tunes:

A3-A Tune of E749, 2/4/84, $\Delta p/p = \pm .2\%$

A3-B Q6/7 and Q8/9 polarities are reversed to give a smaller horizontal divergence to match the aperture of the beam dump in the K_L collimator. $\Delta p/p = \pm .2\%$

A3-C Same as B, but $\Delta p/p = \pm 2\%$, to show effects of momentum shifts.

A3-D $\Delta p/p = \pm .2\%$, Q7/8 = 0. (Q9 then runs at a high gradient--not ideal.)

Date: 2/4/84
• Fib 16

A3 "Tunes" A3-A

Magnet	I*	BL	Dibbuk* Counts	Remarks
Q12	2428 B	$-3.03\frac{kg}{in}\times 52"$		
Q34	1973 A	$2.50\frac{kg}{in}\times 36"$ (Q3) $52"$ (Q4)		
P01	0			
D1	1897 A	$17.90\,kg\times 78"$		
D2	1700 A	$18.37\,kg\times 76"$		
Q5	565 A	$.723\frac{kg}{in}\times 36"$		
D3	1550 A	$25.8\,kg\times 74"$	2480	
D4	1771 A	"	2835	
D5	1453 A	"	2325	
D6	1130 A	$20.1\,kg\times 74"$	2150	
Q6	2125 B	$-2.69\frac{kg}{in}\times 52"$		
Q7/8	900 B/A	$\mp 3.70\frac{kg}{in}\times 37.5"$	1800	
Q9	1800 A	$7.98\frac{kg}{in}\times 38"$		

↑ calculated for use in transport.

Comments on tune: from expt. 749 logbook.

Transport spot at A3: 2 mm × 4.5 mm
H V
(½ Full width)

* The current is the Dibbuk count value, except as indicated in the last column.

5/8/85

G. Bunce

A3 Magnet List

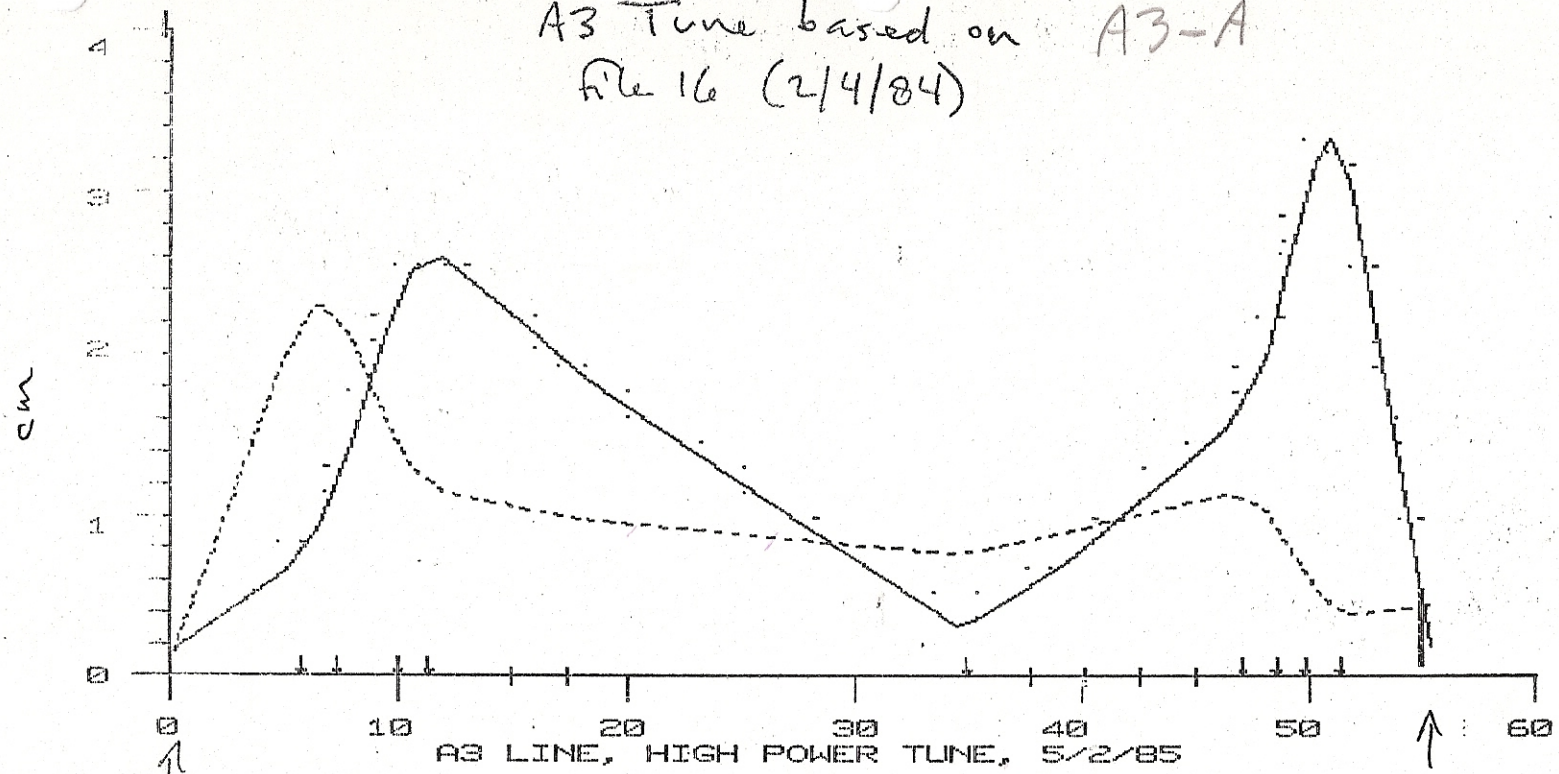
	Type*	gap	B/I or BL/I†	Leffective†,††
Q1	8Q48		.0649 $\frac{kg \times inches}{amp}$	(52")
Q2	8Q48		.0649	(52")
Q3	8Q32		.001275 $\frac{kg}{amp}$	35.8"
Q4	8Q48		.0660 $\frac{kg \times inches}{amp}$	(52")
P1	8P24			
D1	18D72	6"	.718 $\frac{kg \times inches}{amp}$	(78")
D2	18D72	4"	~18.37 kg/1700 amps	(76")
Q5	8Q32		.00128 $\frac{kg}{amp}$	36.0"
D3	18D72	2"	~25.8 kg/1550 amps	(74")
D4	18D72	2"	~25.8 kg/1771	(74")
D5	18D72	2"	~25.8 kg/1453	(74")
D6	10D72	2"	~20.1 kg/1130	(74")
Q6	8Q48		.0658 $\frac{kg \times inches}{amp}$	(52")
Q7	5Q36		.0041 $\frac{kg}{amp}$	37.5"
Q8	5Q36		.0041	37.5"
Q9	N3Q36		.1685 $\frac{kg \times inches}{amp}$	(38")
D7	18D72	2"	17.7 kg/1245 amps (2000 Dibbooks)	
D8	18D72	4"		
D9	18D72	6.5"	7.9 kg/938 amps	

†† Parentheses indicate nominal lengths for Transport purposes.

† Field at 1" radius for quadrupoles. Transfer functions are given in the operating region of the tune of 2/4/84.

* Notation: iLj => i = inside diameter of quads; unshimmed gap width for dipoles.
j = length of poles.

A3 Tune based on A3-A
file 16 (2/4/84)



RUN PLTR

ENTER UP TO 55 CHARACTERS OF DESCRIPTION:

A3-A

A3 Tune

(2/4/84)

DRIFT	3.		5.00000	0.00000	0.00000	0.00000
QUAD*	5.	"A1Q1	1.32000	-3.03000	2.54000	-5.82200
DRIFT	3.		0.28000	0.00000	0.00000	0.00000
QUAD*	5.	"A1Q2	1.32000	-3.03000	2.54000	-5.82200
DRIFT	3.		1.52000	0.00000	0.00000	0.00000
QUAD*	5.	"A1Q3	0.91000	2.50000	2.54000	10.76700
DRIFT	3.		0.28000	0.00000	0.00000	0.00000
QUAD*	5.	"A1Q4	1.32000	2.50000	2.54000	7.54100
DRIFT	3.		1.97000	0.00000	0.00000	0.00000
ROTAT	2.		1.03300	0.00000	0.00000	0.00000
BEND*	4.	"A1D1	1.98000	17.90000	0.00000	2.13600
ROTAT	2.		1.03300	0.00000	0.00000	0.00000
DRIFT	3.		0.51000	0.00000	0.00000	0.00000
ROTAT	2.		1.03300	0.00000	0.00000	0.00000
BEND*	4.	"A1D2	1.93000	18.37000	0.00000	2.13600
ROTAT	2.		1.03300	0.00000	0.00000	0.00000
DRIFT	3.		16.13000	0.00000	0.00000	0.00000
QUAD*	5.	"A1Q5	0.91000	0.72300	2.54000	36.85300
DRIFT	3.		1.37000	0.00000	0.00000	0.00000
ROTAT	2.		1.41200	0.00000	0.00000	0.00000
BEND*	4.	"A3D3	1.88000	25.80000	0.00000	2.92300
ROTAT	2.		1.41200	0.00000	0.00000	0.00000
DRIFT	3.		0.56000	0.00000	0.00000	0.00000
ROTAT	2.		1.41200	0.00000	0.00000	0.00000
BEND*	4.	"A3D4	1.88000	25.80000	0.00000	2.92300
ROTAT	2.		1.41200	0.00000	0.00000	0.00000
DRIFT	3.		0.56000	0.00000	0.00000	0.00000
ROTAT	2.		1.41200	0.00000	0.00000	0.00000
BEND*	4.	"A3D5	1.88000	25.80000	0.00000	2.92300
ROTAT	2.		1.41200	0.00000	0.00000	0.00000

RUN PLTR

ENTER UP TO 55 CHARACTERS OF DESCRIPTION:

A3-A
A3 Twin
(2/4/84)

```
DRIFT    3.                    0.51000     0.00000     0.00000     0.00000
ROTAT    2.                    1.10000     0.00000     0.00000     0.00000
BEND*    4.          "A3D6     1.88000    20.10000     0.00000     2.27700
ROTAT    2.                    1.10000     0.00000     0.00000     0.00000
DRIFT    3.                    0.51000     0.00000     0.00000     0.00000
QUAD*    5.0  1      "A3Q6     1.32000    -2.69000     2.54000    -6.58500
DRIFT    3.                    0.39000     0.00000     0.00000     0.00000
QUAD*    5.          "A3Q7     0.95300    -3.70000     2.54000    -6.69100
DRIFT    3.                    0.27000     0.00000     0.00000     0.00000
QUAD*    5.          "A3Q8     0.95300     3.70000     2.54000     7.00900
DRIFT    3.                    0.57000     0.00000     0.00000     0.00000
QUAD*    5.0  1      "A3Q9     0.97000     7.98200     2.54000     3.28600
DRIFT    3.                    3.64000     0.00000     0.00000     0.00000
FIT     10.                    1.00010     0.10000     0.01000     0.19800
FIT     10.                    3.00030     0.10000     0.01000     0.44880
         0.                    0.00000     0.00000     0.00000     0.00000
```

```
RUN PLTR

ENTER UP TO 55 CHARACTERS OF DESCRIPTION:
```

```
DRIFT   3.              5.00000    0.00000    0.00000    0.00000
QUAD*   5.    "A1Q1     1.32000   -3.03000    2.54000   -5.82200
DRIFT   3.              0.28000    0.00000    0.00000    0.00000
QUAD*   5.    "A1Q2     1.32000   -3.03000    2.54000   -5.82200
DRIFT   3.              1.52000    0.00000    0.00000    0.00000
QUAD*   5.    "A1Q3     0.91000    2.50000    2.54000   10.76700
DRIFT   3.              0.28000    0.00000    0.00000    0.00000
QUAD*   5.    "A1Q4     1.32000    2.50000    2.54000    7.54100
DRIFT   3.              1.97000    0.00000    0.00000    0.00000
ROTAT   2.              1.03300    0.00000    0.00000    0.00000
BEND*   4.    "A1D1     1.98000   17.90000    0.00000    2.13600
ROTAT   2.              1.03300    0.00000    0.00000    0.00000
DRIFT   3.              0.51000    0.00000    0.00000    0.00000
ROTAT   2.              1.03300    0.00000    0.00000    0.00000
BEND*   4.    "A1D2     1.93000   18.37000    0.00000    2.13600
ROTAT   2.              1.03300    0.00000    0.00000    0.00000
DRIFT   3.             16.13000    0.00000    0.00000    0.00000
QUAD*   5.    "A1Q5     0.91000    0.72300    2.54000   36.85300
DRIFT   3.              1.37000    0.00000    0.00000    0.00000
ROTAT   2.              1.41200    0.00000    0.00000    0.00000
BEND*   4.    "A3D3     1.88000   25.80000    0.00000    2.92300
ROTAT   2.              1.41200    0.00000    0.00000    0.00000
DRIFT   3.              0.56000    0.00000    0.00000    0.00000
ROTAT   2.              1.41200    0.00000    0.00000    0.00000
BEND*   4.    "A3D4     1.88000   25.80000    0.00000    2.92300
ROTAT   2.              1.41200    0.00000    0.00000    0.00000
DRIFT   3.              0.56000    0.00000    0.00000    0.00000
ROTAT   2.              1.41200    0.00000    0.00000    0.00000
BEND*   4.    "A3D5     1.88000   25.80000    0.00000    2.92300
ROTAT   2.              1.41200    0.00000    0.00000    0.00000

RUN PLTR

ENTER UP TO 55 CHARACTERS OF DESCRIPTION:
```

$\Delta p/p = .2\%$

A3-B

A3-B

Δp/p = .2%

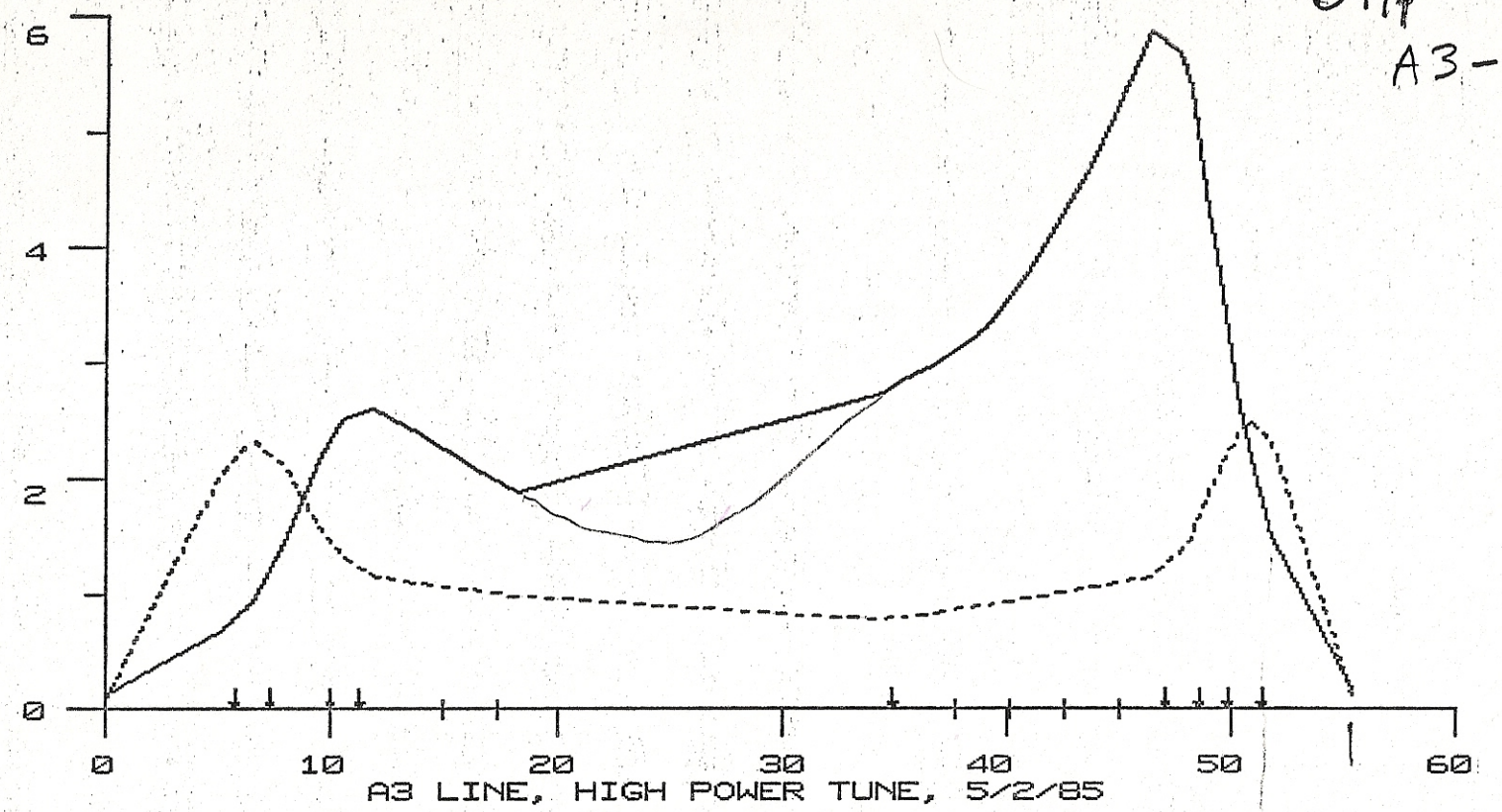
```
DRIFT   3.                      0.51000     0.00000     0.00000     0.00000
ROTAT   2.                      1.10000     0.00000     0.00000     0.00000
BEND*   4.          "A3D6       1.88000    20.10000     0.00000     2.27700
ROTAT   2.                      1.10000     0.00000     0.00000     0.00000
DRIFT   3.                      0.51000     0.00000     0.00000     0.00000
QUAD*   5.0 1       "A3Q6       1.32000     3.78800     2.54000     5.05500
DRIFT   3.                      0.39000     0.00000     0.00000     0.00000
QUAD*   5.          "A3Q7       0.95300     3.70000     2.54000     7.00900
DRIFT   3.                      0.27000     0.00000     0.00000     0.00000
QUAD*   5.          "A3Q8       0.95300    -3.70000     2.54000    -6.69100
DRIFT   3.                      0.57000     0.00000     0.00000     0.00000
QUAD*   5.0 1       "A3Q9       0.97000    -8.26700     2.54000    -2.85500
DRIFT   3.                      3.64000     0.00000     0.00000     0.00000
FIT    10.                      1.00010     0.10000     0.01000     0.16860
FIT    10.                      3.00030     0.10000     0.01000     0.09980
        0.                      0.00000     0.00000     0.00000     0.00000
```

```
RUN PLTR

ENTER UP TO 55 CHARACTERS OF DESCRIPTION:
```

$\Delta p/p = 2\%$

A3-C



ENTER UP TO 55 CHARACTERS OF DESCRIPTION:

ENTER UP TO 55 CHARACTERS OF DESCRIPTION:

$\theta_+ = \frac{12\,mm}{4\,m} = 3\,mrad$

$\Delta p/p = 2\%$
A3-C

DRIFT	3.		5.00000	0.00000	0.00000	0.00000
QUAD*	5.	"A1Q1	1.32000	-3.03000	2.54000	-5.82200
DRIFT	3.		0.28000	0.00000	0.00000	0.00000
QUAD*	5.	"A1Q2	1.32000	-3.03000	2.54000	-5.82200
DRIFT	3.		1.52000	0.00000	0.00000	0.00000
QUAD*	5.	"A1Q3	0.91000	2.50000	2.54000	10.76700
DRIFT	3.		0.28000	0.00000	0.00000	0.00000
QUAD*	5.	"A1Q4	1.32000	2.50000	2.54000	7.54100
DRIFT	3.		1.97000	0.00000	0.00000	0.00000
ROTAT	2.		1.03300	0.00000	0.00000	0.00000
BEND*	4.	"A1D1	1.98000	17.90000	0.00000	2.13600
ROTAT	2.		1.03300	0.00000	0.00000	0.00000
DRIFT	3.		0.51000	0.00000	0.00000	0.00000
ROTAT	2.		1.03300	0.00000	0.00000	0.00000
BEND*	4.	"A1D2	1.93000	18.37000	0.00000	2.13600
ROTAT	2.		1.03300	0.00000	0.00000	0.00000
DRIFT	3.		16.13000	0.00000	0.00000	0.00000
QUAD*	5.	"A1Q5	0.91000	0.72300	2.54000	36.85300
DRIFT	3.		1.37000	0.00000	0.00000	0.00000
ROTAT	2.		1.41200	0.00000	0.00000	0.00000
BEND*	4.	"A3D3	1.88000	25.80000	0.00000	2.92300
ROTAT	2.		1.41200	0.00000	0.00000	0.00000
DRIFT	3.		0.56000	0.00000	0.00000	0.00000
ROTAT	2.		1.41200	0.00000	0.00000	0.00000
BEND*	4.	"A3D4	1.88000	25.80000	0.00000	2.92300
ROTAT	2.		1.41200	0.00000	0.00000	0.00000
DRIFT	3.		0.56000	0.00000	0.00000	0.00000
ROTAT	2.		1.41200	0.00000	0.00000	0.00000
BEND*	4.	"A3D5	1.88000	25.80000	0.00000	2.92300
ROTAT	2.		1.41200	0.00000	0.00000	0.00000

ENTER UP TO 55 CHARACTERS OF DESCRIPTION:

ENTER UP TO 55 CHARACTERS OF DESCRIPTION:

$\Delta p/p = 2.$

A3-C

DRIFT	3.		0.51000	0.00000	0.00000	0.00000
ROTAT	2.		1.10000	0.00000	0.00000	0.00000
BEND*	4.	"A3D6	1.88000	20.10000	0.00000	2.27700
ROTAT	2.		1.10000	0.00000	0.00000	0.00000
DRIFT	3.		0.51000	0.00000	0.00000	0.00000
QUAD*	5.0 1	"A3Q6	1.32000	3.82700	2.54000	5.00600
DRIFT	3.		0.39000	0.00000	0.00000	0.00000
QUAD*	5.	"A3Q7	0.95300	3.70000	2.54000	7.00900
DRIFT	3.		0.27000	0.00000	0.00000	0.00000
QUAD*	5.	"A3Q8	0.95300	-3.70000	2.54000	-6.69100
DRIFT	3.		0.57000	0.00000	0.00000	0.00000
QUAD*	5.0 1	"A3Q9	0.97000	-8.28100	2.54000	-2.85000
DRIFT	3.		3.64000	0.00000	0.00000	0.00000
FIT	10.		1.00010	0.10000	0.01000	0.17200
FIT	10.		3.00030	0.10000	0.01000	0.09990
	0.		0.00000	0.00000	0.00000	0.00000

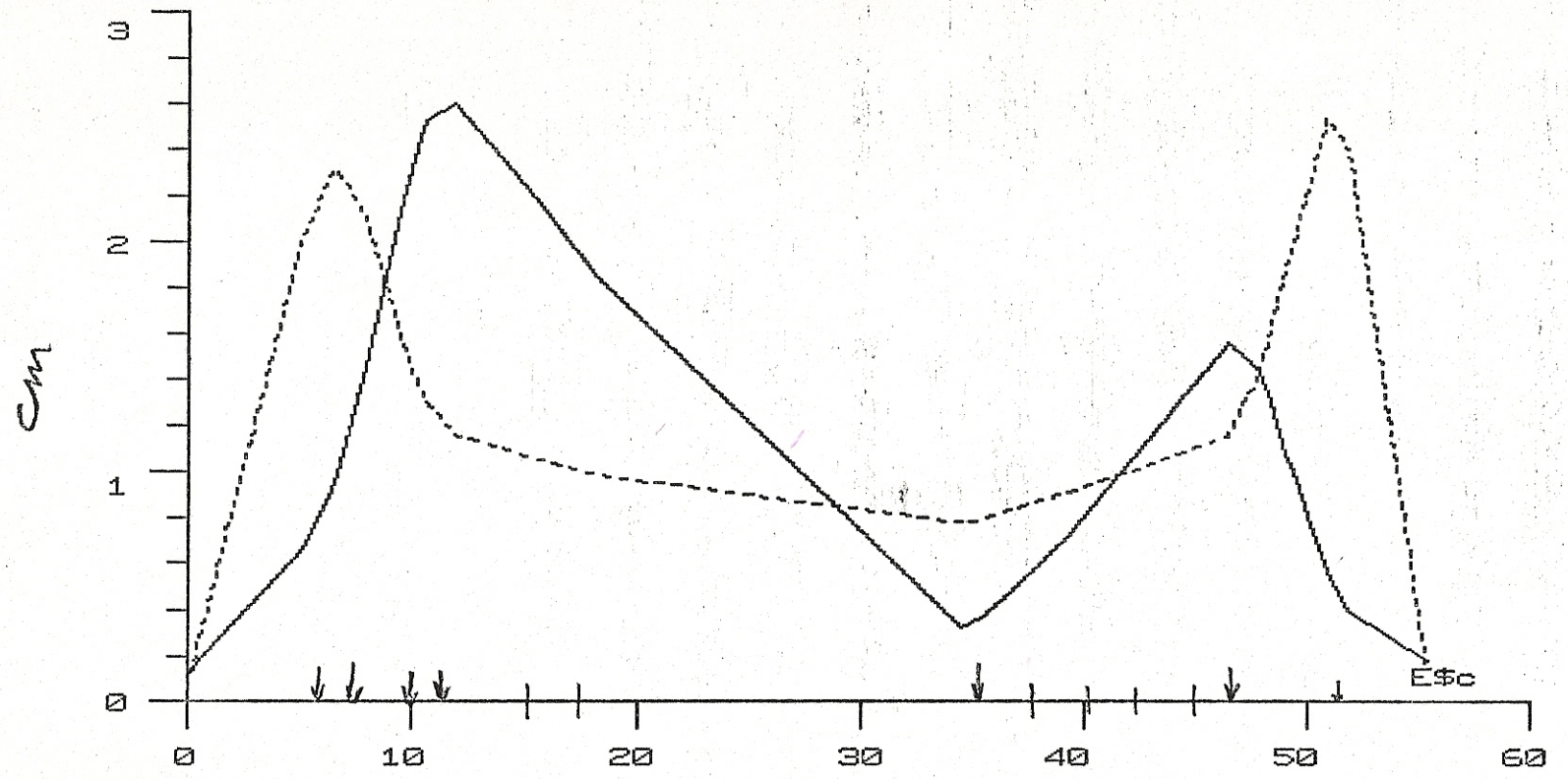
ENTER UP TO 55 CHARACTERS OF DESCRIPTION:

ENTER UP TO 55 CHARACTERS OF DESCRIPTION:

A3-D

Q7/8=0, Q6/9 REVERSED POLARITY.

4-Jun-85 09:11



A3 LINE - meters

A3-D

```
"A3 LINE, HIGH POWER TUNE, 5/2/85
DRIFT   3.                5.00000     0.00000     0.00000     0.00000
QUAD*   5.      "A1Q1     1.32000    -3.03000     2.54000    -5.82200
DRIFT   3.                0.28000     0.00000     0.00000     0.00000
QUAD*   5.      "A1Q2     1.32000    -3.03000     2.54000    -5.82200
DRIFT   3.                1.52000     0.00000     0.00000     0.00000
QUAD*   5.      "A1Q3     0.91000     2.50000     2.54000    10.76700
DRIFT   3.                0.28000     0.00000     0.00000     0.00000
QUAD*   5.      "A1Q4     1.32000     2.50000     2.54000     7.54100
DRIFT   3.                1.97000     0.00000     0.00000     0.00000
ROTAT   2.                1.03300     0.00000     0.00000     0.00000
BEND*   4.      "A1D1     1.98000    17.90000     0.00000     2.13600
ROTAT   2.                1.03300     0.00000     0.00000     0.00000
DRIFT   3.                0.51000     0.00000     0.00000     0.00000
ROTAT   2.                1.03300     0.00000     0.00000     0.00000
BEND*   4.      "A1D2     1.93000    18.37000     0.00000     2.13600
ROTAT   2.                1.03300     0.00000     0.00000     0.00000
DRIFT   3.               16.13000     0.00000     0.00000     0.00000
QUAD*   5.      "A1Q5     0.91000     0.72300     2.54000    36.85300
DRIFT   3.                1.37000     0.00000     0.00000     0.00000
ROTAT   2.                1.41200     0.00000     0.00000     0.00000
BEND*   4.      "A3D3     1.88000    25.80000     0.00000     2.92300
ROTAT   2.                1.41200     0.00000     0.00000     0.00000
DRIFT   3.                0.56000     0.00000     0.00000     0.00000
ROTAT   2.                1.41200     0.00000     0.00000     0.00000
BEND*   4.      "A3D4     1.88000    25.80000     0.00000     2.92300
ROTAT   2.                1.41200     0.00000     0.00000     0.00000
DRIFT   3.                0.56000     0.00000     0.00000     0.00000
ROTAT   2.                1.41200     0.00000     0.00000     0.00000
BEND*   4.      "A3D5     1.88000    25.80000     0.00000     2.92300
ROTAT   2.                1.41200     0.00000     0.00000     0.00000
```

Q7/8 = 0

Δp/p ≈ .2%

A3-D

DRIFT	3.			0.51000	0.00000	0.00000	0.00000
ROTAT	2.			1.10000	0.00000	0.00000	0.00000
BEND*	4.		"A3D6	1.88000	20.10000	0.00000	2.27700
ROTAT	2.			1.10000	0.00000	0.00000	0.00000
DRIFT	3.			0.51000	0.00000	0.00000	0.00000
QUAD*	5.0	1	"A3Q6	1.32000	4.78900	2.54000	4.04800
DRIFT	3.			0.39000	0.00000	0.00000	0.00000
QUAD*	5.		"A3Q7	0.95300	0.00000	2.54000	0.00000
DRIFT	3.			0.27000	0.00000	0.00000	0.00000
QUAD*	5.		"A3Q8	0.95300	0.00000	2.54000	0.00000
DRIFT	3.			0.57000	0.00000	0.00000	0.00000
QUAD*	5.0	1	"A3Q9	0.97000	-9.73500	2.54000	-2.40200
DRIFT	3.			3.64000	0.00000	0.00000	0.00000
FIT	10.			1.00010	0.10000	0.01000	0.17500
FIT	10.			3.00030	0.10000	0.01000	0.09980
	0.			0.00000	0.00000	0.00000	0.00000

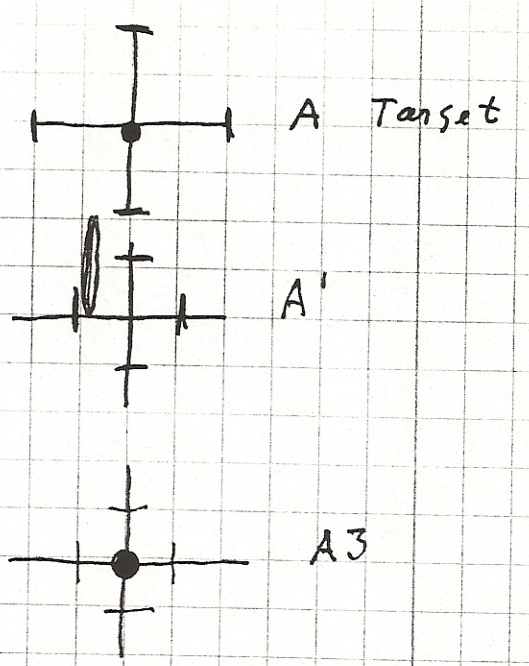
Q7/8 = 0

$\Delta p/p = .2\%$

Beam Characteristics Feb 4, 1984 12:00 M RHA

FROM THE LOG BOOK MS

	Set	I
Q12	2428	2428
Q34	1973	1973
P01	0	0
D1	1897	1897
D2	1700	1700
Q5	565	565
D4	2834	1770
D5	2325	1453
Q6	2125	2125
Q78	1800	900
Q9	1800	1800
D10	3333	2498
D9	2750	1032



See page 13 for Counting Characteristics

Beam / Pulse 13:15 Feb 4 RHA

A (SEC)	1600
A3 (SEC)	1000
Ecl	~~50~~ 170
T4-T5	30,000
OR-D	650,000
Events	150

K-Short

Software Bells and Beam time seem coterminus — i.e. software appears to be keeping up with no problem

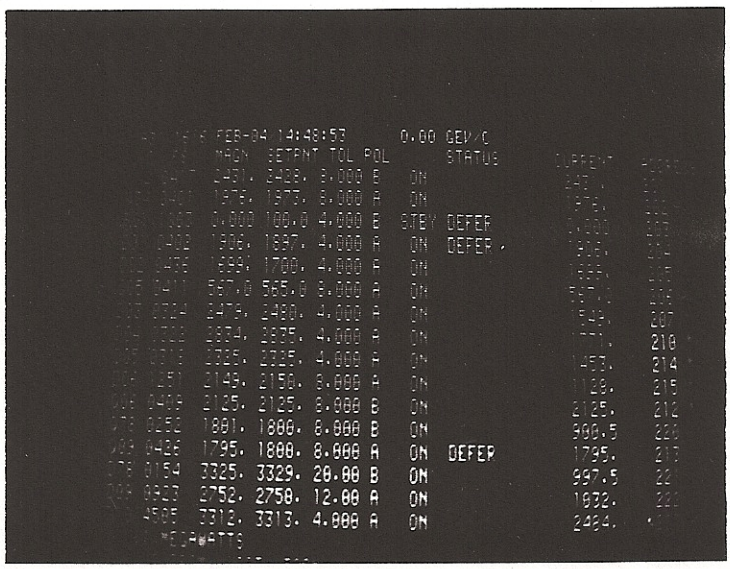
Feb 4 13:35 Go to KL (RHA)

Feb 4 13:35 Set D10 — 3313 set point 2484 Amps

14:30 DIBBUK FILE #16 HAS CURRENT SETTING

COMPUTER BOMBS ON P.O. LPA - LINE 50 (PC= 02

11:25 K^0_L P.O. - SWITCH TO K^0_S.



Saved on File 16

Feb 4 - 14:48

RCL
MS
RKA

Exp: 735

Collimators on Dibbuk (A3 Line)

	Max. Opening	Max Close	Collimation (looking downstream)	Current = Max. opening (mm)	Tuning Address
K1	3245	2090	A1C1: Horizontal	189.77	050
K2	3180	2056	A1C2 Vert. top	84.90	051
K3	3175	2059	A1C2 Vert. Bottom	84.52	052
K4	3130	2066	A1C3 Vert. top ~~2400~~	81.00	072
K5	3085	2067	A1C3 Vert. bottom ~~2400~~	-77.85	073
K6	3250	2070	A1C3 Horiz. Right	-90.22	074
K7	~~3300~~ 3250	2070	A1C3 Horiz. Left	93.82	075
~~K8~~	~~3070~~	~~2067~~	~~A1C4 Vert. Top~~	~~76.57~~	062
~~K9~~	~~3080~~	~~2068~~	~~A1C4 Vert. Bottom~~	~~-77.47~~	063
~~K10~~	~~3285~~	~~2068~~	~~A1C4 Horiz. Right~~	~~-92.85~~	064
~~K11~~	~~3155~~	~~2069~~	~~A1C4 Horiz. Left~~	~~83.82~~	065

(There is no A1C4 in the A3 beam line.)

K1 is two pieces (left and right) controlled together. The maximum opening at A1C1 is thus 180 mm, or twice the Dibbuk reading.

BEAM A-3 EXP. NO. 780 DATE 11-5-84

REF. D'W'G. NOS. D14-1188-C-5A1 BY [illegible] ORIG.

BEAM COMPONENTS					COORDINATES	
SYMBOL	TYPE	BEARING	ANGLE	DISTANCE	NORTH	EAST
"A" STATION		16.9345°	16°56'04"		13165.997	12966.042
Absorber	series of holes			114."		
			197" drift			
A1C1	COLL.	Hor.	5.00m	167."		
A1Q1	M210 8Q48	l_{eff}=52"	1.32m	223."	-2.779 kg/inch	
		l=11"	.28m			
A1Q2	M220 8Q48	l_{eff}=52"	1.32m	286."	"	
A1C2	COLL.	Vert. top bottom	l=60"	341."		
			1.52m			
A1Q3	8Q32-3	l_{eff}=36"	.91m	390."	2.045 kg/inch	
		l=11"	.28m			
A1Q4	M221 8Q48	l_{eff}=52"	1.32m	445."	"	
A1P1	8P24	l=77.5"	1.97m	499."		
A1D1	M717	-2.0651°	-2°03'54"	587.457"	17.90 kg	
	18D72 gap=6"	14.8694°	l_{eff}=78" 1.98m	l=20" .51m		
A1D2	M708	-2.0651°	-2°03'54"	97."		
	18D72 gap=4"	12.8043°	l_{eff}=76" 1.93m		18.37 kg	
A1C3	COLL.	Vert, Hor.	l=635" 16.13m	638."		Pick up primary beam to clean up
A1Q5	8Q32-9		l_{eff}=36" .91m	692."	off	
			l=54" 1.37m			
A3D3	M702	-2.8233°	-2°49'24"	801.014"	25.80 kg	
	18D72 2" gap	9.981°	l_{eff}=74" 1.88m	l=22"	.56m	
A3D4	M802	-2.8232°	-2°49'23"	96."	25.80 kg	
	18D72 2" gap	7.1578°	l_{eff}=74 1.88m	l=22"	.56m	
A3D5	M730	-2.8233°	-2°49'24"	96"	25.80 kg	
	18D72 2" gap	4.3345°	l_{eff}=74 1.88m	l=20"	.51m	
A3D6	K.O.A.	-2.2°	-2°12'	94"	20.10 kg	
	10D72	2.1345°	l_{eff}=74 1.88m	l=20"	.51m	
A3Q6	M206 8Q48		l_{eff}=52" 1.32m	82.987"	-4.105 kg/in	
			l=~~13.8~~" 15.5 .39m			
A3Q7	M5Q36-1		l_{eff}=~~41~~" 37.5 .95m	143.237"	off	
			l=~~7~~" 10.5 .27m			

SWICs Flag & SEC

not ramped for strong

Flag → (see a sweep here)

BEAM A-3 EXP. NO. 180 DATE 11-5-84

REF. D'W'G. NOS. D14-1188-C-5A1 BY [illegible] ORIG. [illegible]

BEAM COMPONENTS					COORDINATES	
SYMBOL	TYPE	BEARING	ANGLE	DISTANCE	NORTH	EAST
A3Q8	M5Q36-2	left = 41"	.953m 1.04m	191.237"	off	
		l = 20.8"	.57m .53m			
A3Q9	MN3Q36-10	left = 38"	.97m	251.487"	7.941 kg/in	
		l = 143.5"	3.64m			
A-3 TARGET				429.987"		
A3D7	M715			473.987"		
	18D72					
A3D8	M712			587.987"		
	18D72					
A3D9	M727			704.987"		
	18D72					
A3D10	M72D18-3			980.98"		

EXPERIMENTAL AREA OPERATIONS

BEAM SET-UP SHEETS HIGH POWER TUNE

BY SCHWANER DATE 4/23/85 SHEET 1 OF 2

EXPERIMENT NAME MORSE/SCHMIDT No. 780 LIAISON T. BLAIR

BEAM CONDITION POSITIVE MOMENTUM 28.5 GeV/c +

REQUESTED BY _____ DATE _____ TIME _____

COMPLETED-WATCH SUP. _____ DATE _____ TIME _____

Feb 4, 1984

DESIG.	MAG.	P.S.	R.V.	POL.	POS.	INIT.	T.S.	POS.	~~INIT.~~ dibbuks	TAP	INIT.	MAG. I	INIT.
A1Q1	210	407	69	B					✓	2		2430	✓
A1Q2	220	417 M	/	B					✓	2		"	✓
A1Q3	8Q32 -3	401 M	67	A					✓	4		1975	✓
A1Q4	221	425	/	A					✓	4		"	✓
A1P1	8P24 -1	10-3	BI	B						—		138	off
A1D1	717	402	62	A					✓	2		1882	1897
A1D2	708	436	BI	A					✓	3		1640	1700
A1Q5	8Q32 -9	412	80	A					✓	4		565	✓
A1D3	702	324	BI	A					2480	3		1550	✓
A1D4	802	322	BI	A					2835	1		1770	✓
A3D5	730	318	36	A					2325	3		1500	1453
A3D6	CATH OF ARGON	5125 -1	NA	A					2150	1		269	1130
A3Q6	206	421	AS4	B			81		✓	4		2600	2125
A3Q7	5Q36 -1	252	45	B			41		1800	1		1100	900
A3Q8	5Q36 -2			A					↓			1100	900
A3Q9	N3Q36 -10	420	68	A			90		✓	4		2200	1800
A3D7	715	307	NA	B			88			3		1200	
A3D8	712	405	AS2	B			63			2		1867	
A3D9	727	923	BI	A			38			1		1000	
A3D10	72D18 -3	208 450-5	BI	A			44			1		2500	
A3D10T	18C72 COILS	468	BI	A						3		1500	

SENSITROLS SET BY _____ DATE _____

EXPERIMENTAL BEAM COMPUTER SETUP

BEAM LINE A3 STATUS PRIME SHEET 2 OF 2

EXPERIMENT NAME MORSE/SCHMIDT NO. 780 MOMENTUM 28.5 GeV/c+

COMPUTER B PORT NO. 3 TERMINAL NO. 6 TUNE BOX 7

REQUESTED BY _____ DATE _____ LIAISON _____

COMPLETED BY _____ DATE _____ FILE LOCATION _____

ID	POWER SUPPLY	SET POINT	TOL	POL	STATUS	MAGN LIMIT IN CTS	ADD
Q12	417	2430	4.0	B	ON	2564	201
Q34	401	1975		A	ON	1996	202
P01	10-3	2208.		B	ON	4000	203
D01	402	1882		A	SECURITY INTLK ON	2409	204
D02	436	1640		A	SECURITY INTLK ON	2409	205
Q05	412	565		A	ON	3000	206
D03	324	2480.		A	SECURITY INTLK ON	2496	207
D04	322	2832.		A	ON	2848	210
D05	318	2400.		A	ON	2416	214
D06	5125-1	2152.		A	ON	2232	215
Q06	421	2600		B	ON	3200	212
Q78	252	2200?		B/A	ON	2400	220
Q09	420	2200		A	ON	2400	213
D07	307	1920.		B	ON	2000	221
D08	405	1867		B	ON	1900	217
D09	923	2666.		A	ON	2693	222
D10	450-5	3333		A	ON	3346	223
D10T	468	1500		A	ON	1800	224

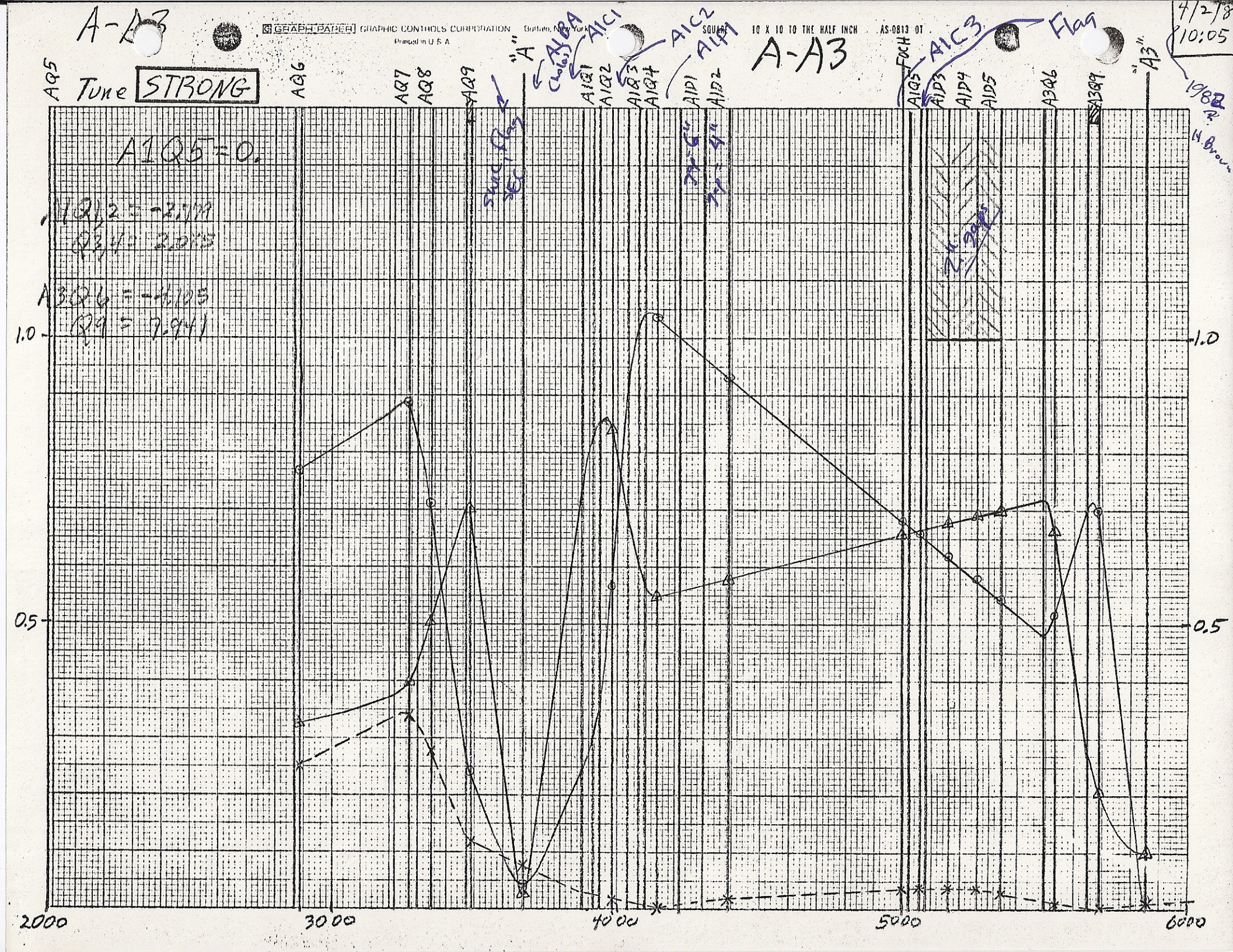
COMMENTS: HIGH POWER TUNE

SECURITY INTLK. P.S. 402, 436, 324

HIGH RISK ELEMENTS A3D6, A3D10, A3D10T

WATCH SUPERVISOR _____

12-76


A-A3
GRAPH PAPER GRAPHIC CONTROLS CORPORATION Buffalo, New York
Printed in U.S.A.
SQUARE 10 X 10 TO THE HALF INCH AS-0813 OT
A-A3
4/2/8
10:05
Tune STRONG
A1Q5=0.
A1Q1,2 = -2.779
Q3,4 = 2.085
A3Q6 = -4.105
Q9 = 7.941
AQ5
AQ6
AQ7
AQ8
AQ9
"A"
A1Q1
A1Q2
A1Q3
A1Q4
A1D1
A1D2
FOCH
A1Q5
A1D3
A1D4
A1D5
A3Q6
A3Q9
"A3"
Flag
1.0
0.5
2000
3000
4000
5000
6000

Danby

A1Q1-4, Q6

Multiply by kamps to get gradient

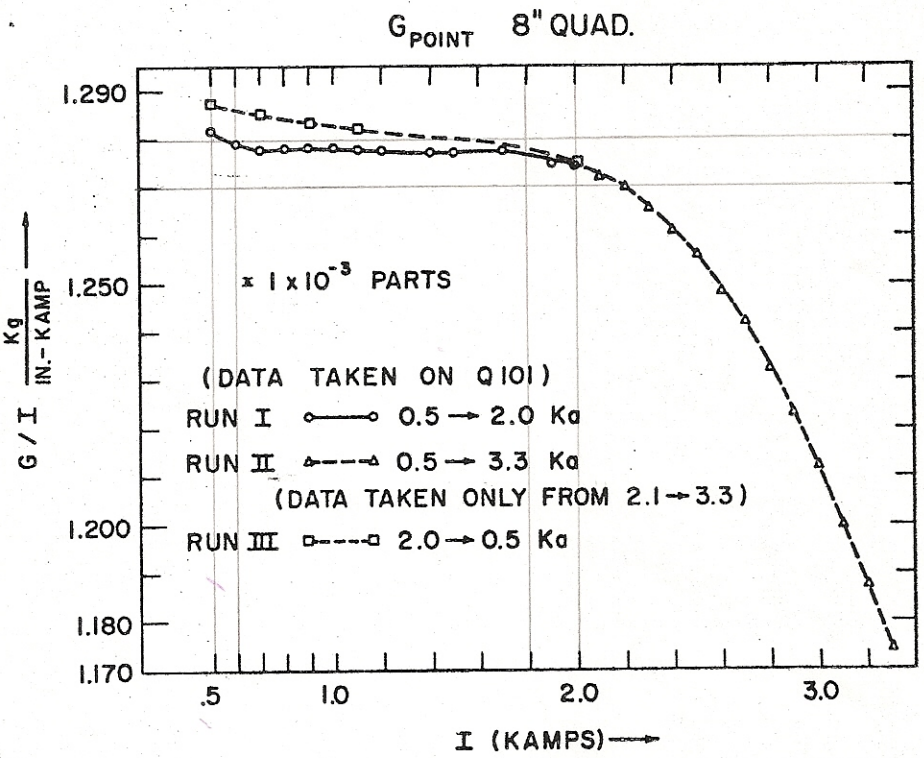


Fig. 6. Gradient, G point, vs I for 8 inch quadrupoles.

A1Q1-4, Q6

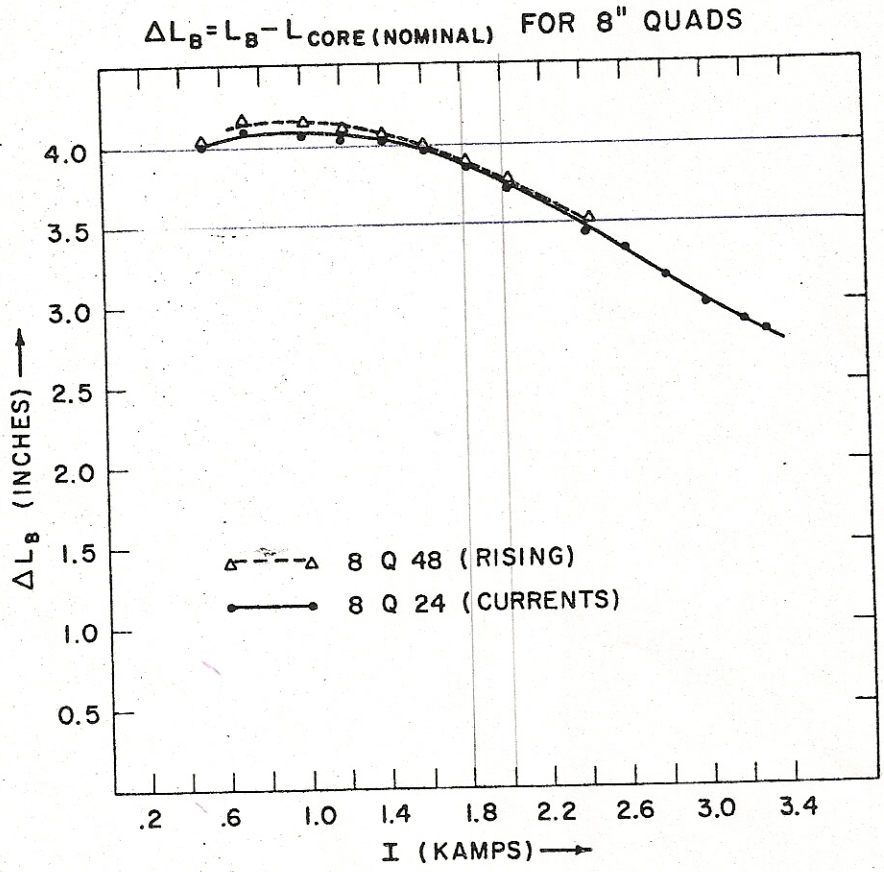
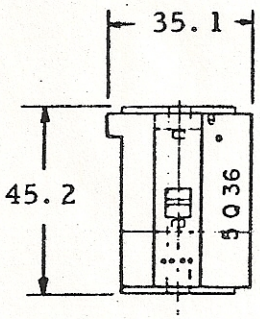


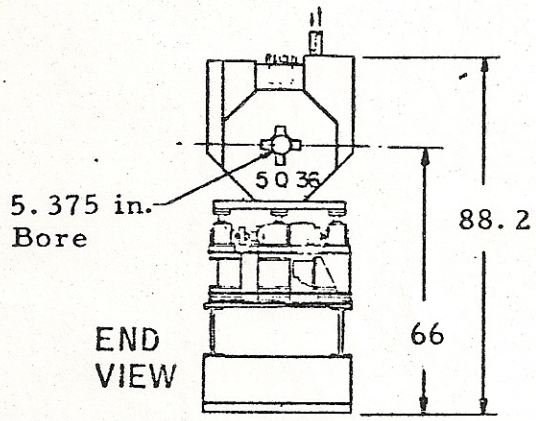
Fig. 7. Magnet length, L_B, vs I for 8 inch quadrupoles. ($L_B = \Delta L_B + L_{core}$).

5Q36

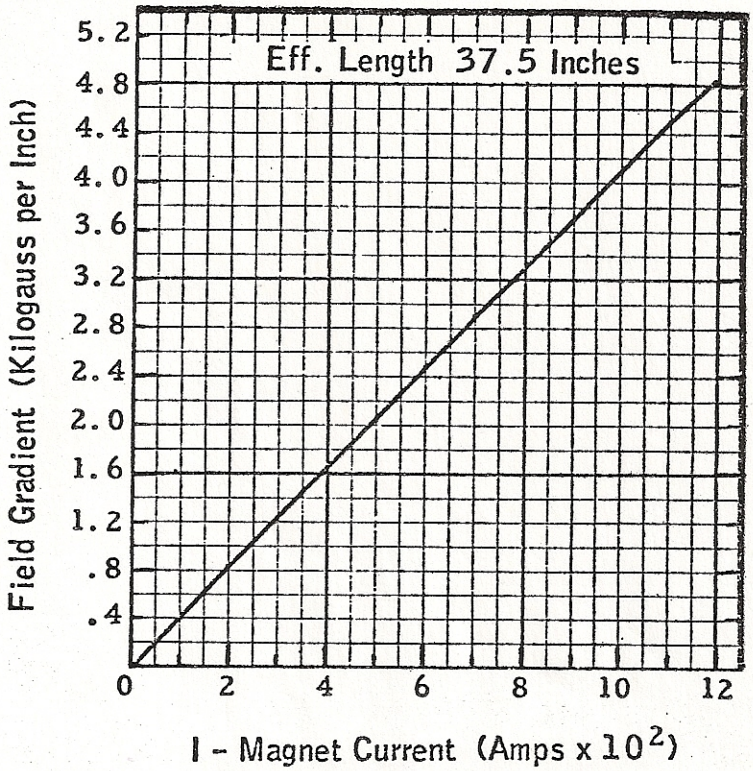
A3Q7, Q8

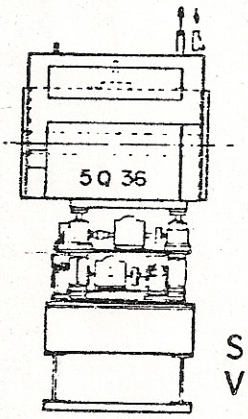


TOP VIEW



END VIEW





SIDE VIEW

Total Weight: 3.5 Tons

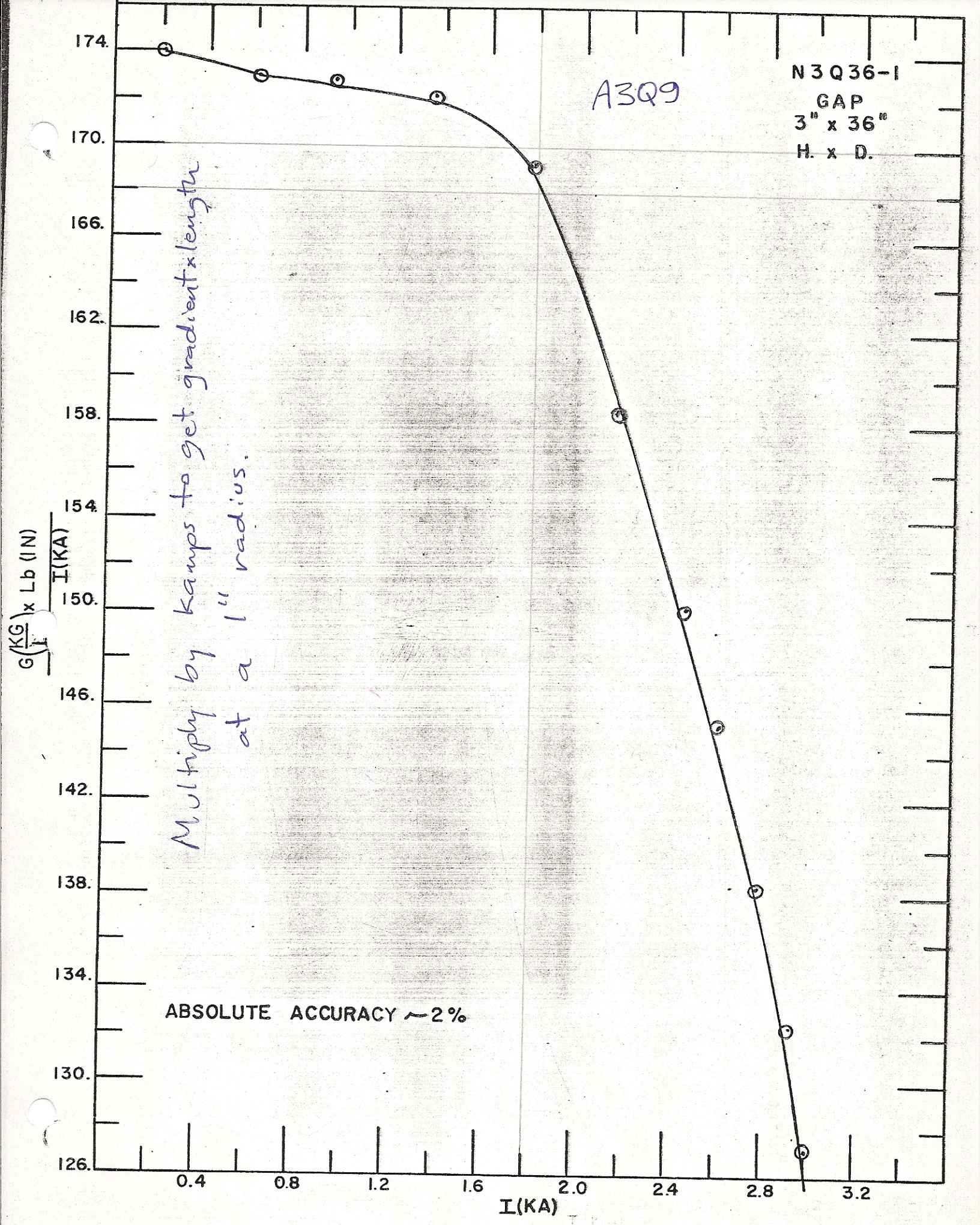
Measured Data:

Voltage	122 Volts dc
Current	1200 Amps dc
Power	146 kW
Field Strength	13.0 kG

Cooling Water
(System Pressure Drop 200 psi)

No. of Circuits	24
Pressure Drop	75 psi
Flow	14 gpm
Temp. Rise	72°F

Current (Amps)	Terminal Voltage (Volts)	Gauss/ Inch
200	19	831
300	28	1244
400	38	1658
500	48	2075
600	58	2488
700	68	2907
800	78	3317
900	90	3724
1000	101	4116
1100	112	4489
1200	122	4832
Errors	± 2%	+1 to +3%


A3Q9
N3Q36-1
GAP
3" x 36"
H. x D.
Multiply by kamps to get gradient x length at a 1" radius.
ABSOLUTE ACCURACY ~2%
$\frac{G(\frac{KG}{I})}{I(KA)} \times Lb\,(IN)$
174.
170.
166.
162.
158.
154.
150.
146.
142.
138.
134.
130.
126.
0.4
0.8
1.2
1.6
2.0
2.4
2.8
3.2
I(KA)

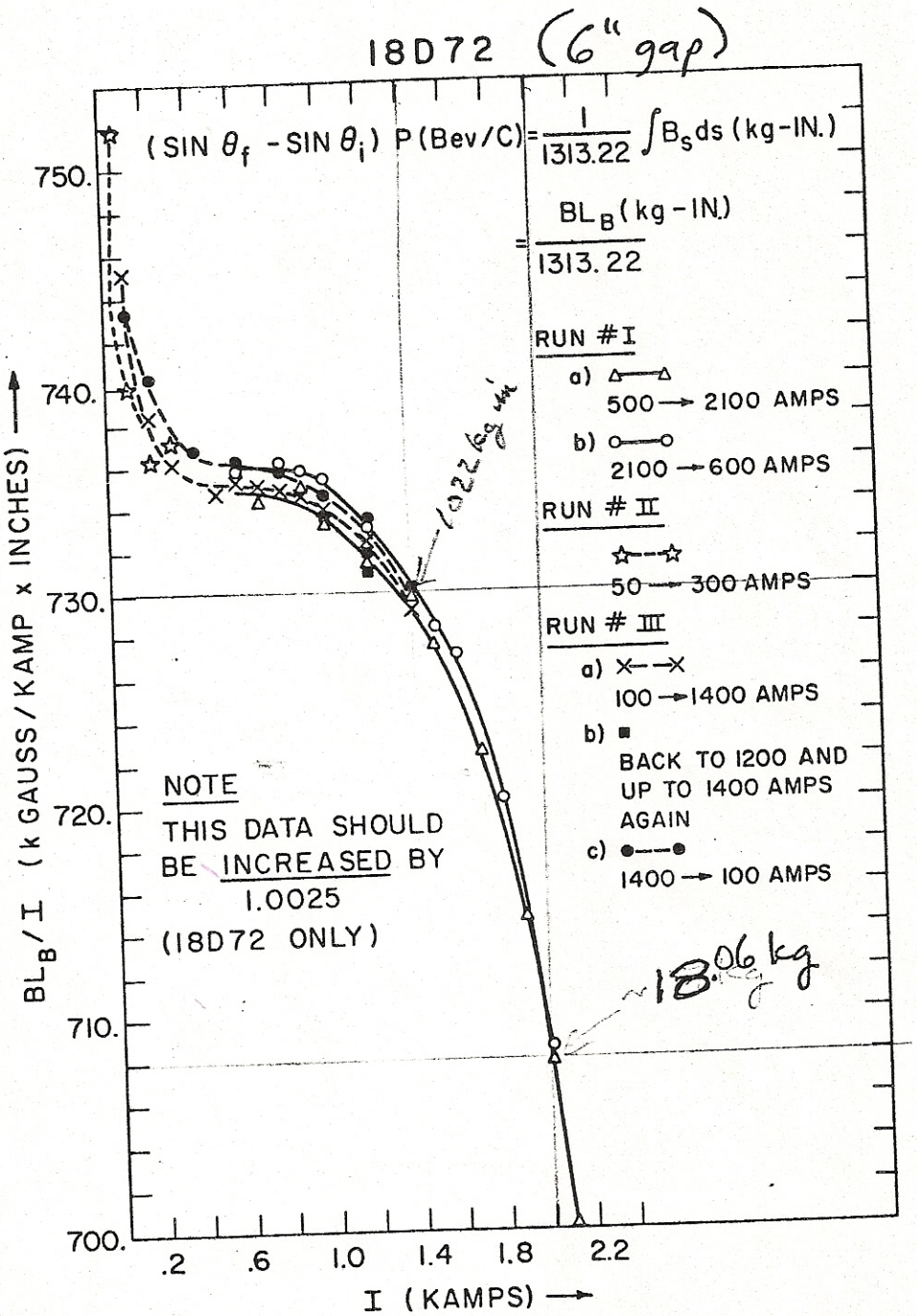


Fig. 2. $\int B_s ds$ vs I for 18D72 magnets.

1 kamp ⇒ 735 $\frac{kg}{kamp}$ x inches

Leff = 79,6

B ≃ 735/79,6 = 9.23 kg

Danby

AIDI

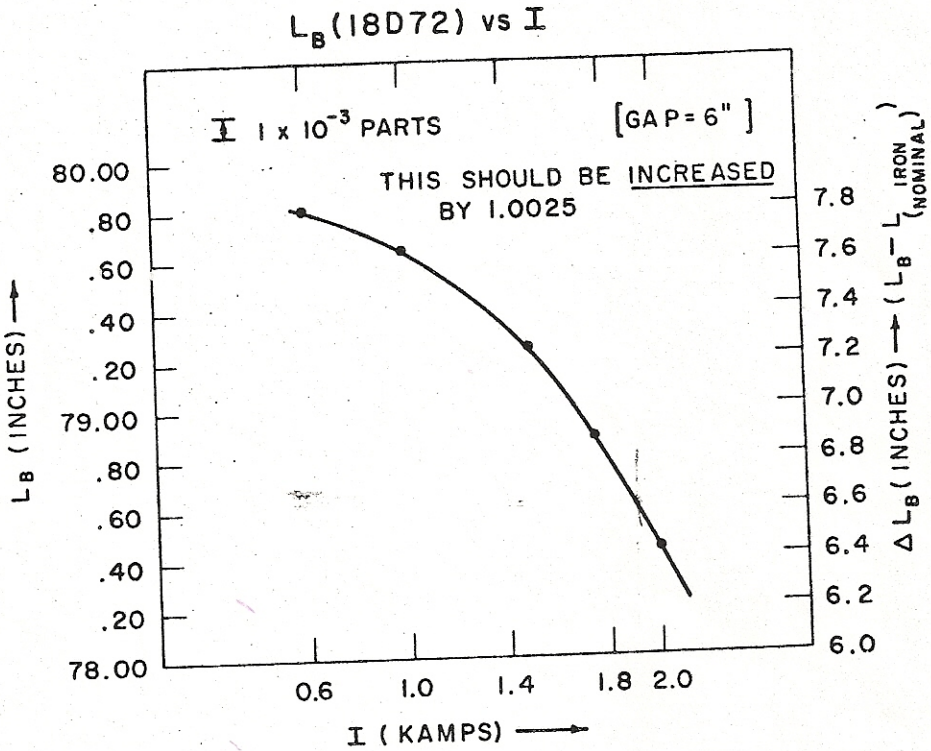


Fig. 3. Magnet length, L_B, vs I for 18D72 magnets.

(6" gap)