

APPENDIX A

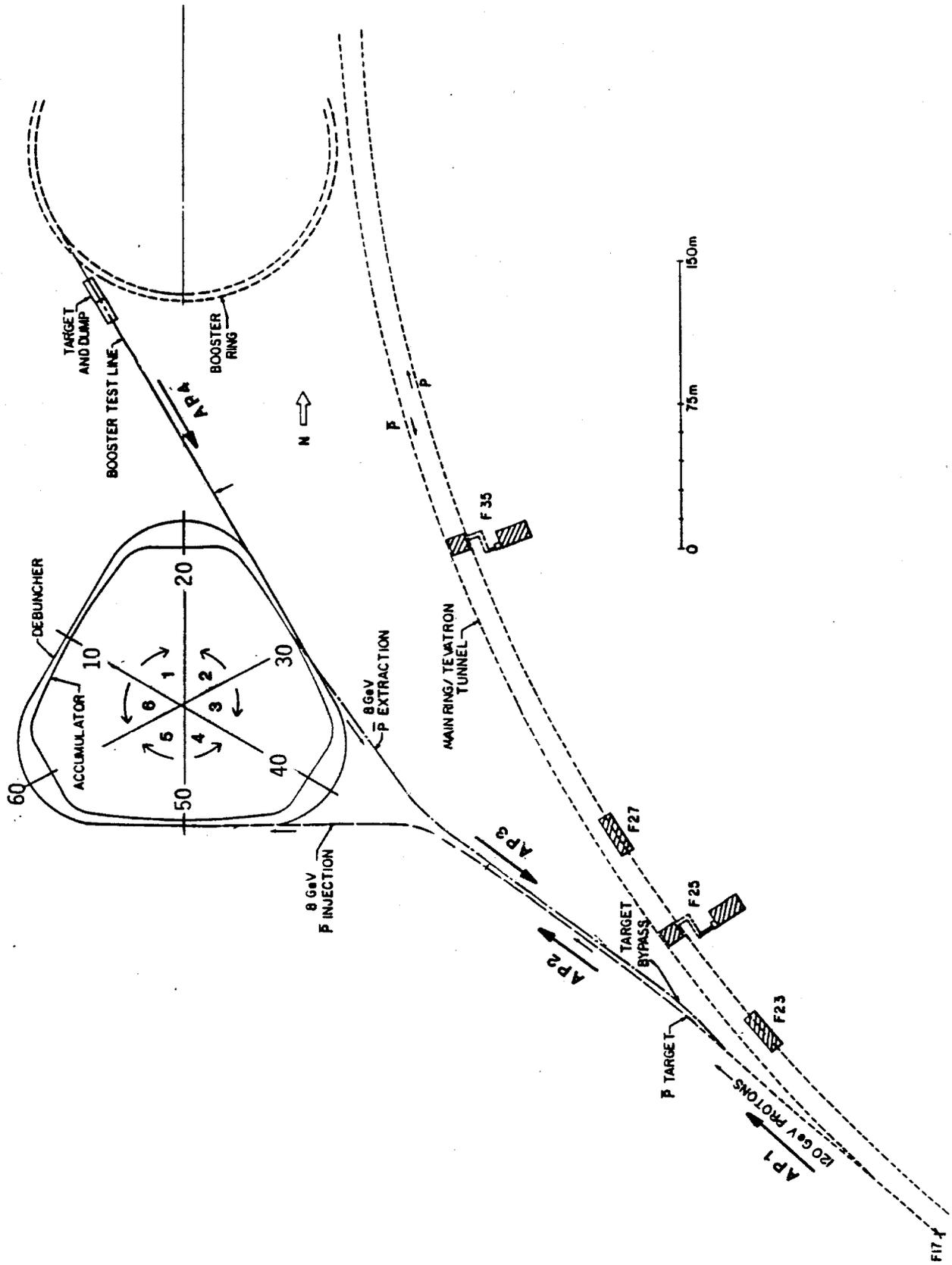


Figure A-1

## APPENDIX A. BEAM LINE, ACCUMULATOR, AND DEBUNCHER MAGNET NOTATION

The Tevatron I Antiproton Source consists, in part, of five beam transfer lines and the two rings. Lists of element names for each of these are given below.

### 1. BEAM TRANSFER LINES

Each transfer line is numbered along the beam direction. (See Fig. A-1) Each element is designated by a three to five character label consisting of a line label, magnet label, and magnet number. The following magnet codes are used:

B	horizontal	dipole
BV	vertical	dipole
BR	rotated	dipole (45°)
Q	quadrupole	
S	sextupole,	when used.

- A. 120-GeV proton line, MR to Target Line AP-1 (Antiproton 1, similar to N1, M1, M2, etc.)

All elements in this line start with "P" for proton. The elements in this line, in sequential order are:

<u>NAME</u>	<u>DESCRIPTION</u>
Main Ring F17	Extraction Location
PLAM1	Extraction Lambertsens
PLAM2	
PB1	Horizontal Dipoles
PB2	
PBR1	Rotated Dipoles
PBR2	
PQ1	Quadrupoles
PQ2	
PBR3	
PB3	
PB4	
PB5	
PQ3	
PQ4	
PQ5A	Pair of quadrupoles run as one
PQ5B	
PBV1	Vertical Dipoles
PBV2	
PQ6A	
PQ6B	
PQ7A	
PQ7B	
PQ8A	



ELamb	Extraction lambertson
EQ1	
EBV1	Vertical dipole
EQ2	
EQ3A, EQ3B	Pair of quadrupoles run as one
EQ4	
EBV2	Second vertical dipole
EQ5-EQ15	String of quadrupoles
EB1	
EQ16	
EB2	
EQ17	
EB3	
EQ18-EQ26	
EB4	Horizontal dipole to bypass target
EQ27	
EB5	
EQ28, EQ29	
EB6	Last element in this line
PQ7B	Quadrupole in line AP-1 into which this line merges

D. 8-GeV proton test line, Booster to Debuncher. Line AP-4

All elements in this line begin with "B" for Booster. The elements in this line, in order, are:

<u>NAME</u>	<u>DESCRIPTION</u>
Booster LS3	Extraction station, beginning of line
BSEPT	Extraction septum
BQ1	Dipoles
BBV1	All dipoles in this line are vertical
BQ2; BQ3	
BBV2, BBV3	Angle varying dipoles
Target	Target to produce secondary protons
BBV4	
BQ4, BQ5	
BBV5	
BQ6, BQ7	
BQ8-BQ10	
BBV6	
D2Q5	Large aperture quadrupole in Debuncher lattice
BDSEP	Injection septum in Debuncher
Debuncher	End of line

E. Transfer line from Debuncher to Accumulator. Line D-to-A.

All elements in this line begin with "T" for transfer. The elements in this line, in order, are:

<u>NAME</u>	<u>DESCRIPTION</u>
Debuncher	Beginning of line
TDSEP	Extraction septum in Debuncher
D6Q6	Large aperture quadrupole in Debuncher lattice
TQ1-TQ7	
TASEP	Injection septum in Accumulator

## 2. ACCUMULATOR AND DEBUNCHER RINGS

The Accumulator and Debuncher ring elements are designated by a four to five character name, determined by ring stations. There are six primary stations in each machine, defined by the symmetry points. These sectors are:

Accumulator: A10, A20, A30, A40, A50, A60  
 Debuncher: D10, D20, D30, D40, D50, D60

The meaning of A10, for example is

Accumulator, sector 1, station zero, etc.

See Fig. A-1 for the primary stations and sector numbers.

In the Accumulator, all elements begin with "A" and similarly "D" in the Debuncher. In both machines, a station goes from the station marker to the leading edge of a quadrupole, and from the leading edge of a quadrupole to the leading edge of the next quadrupole. All elements downstream of the quadrupole are labeled by the station designation of that quadrupole. Thus a typical position in the Accumulator might be "A1Q4", meaning Accumulator, sector one, quadrupole at station 4. Everything between A1Q4 and the next station, A1Q5 is in station A1Q4.

The elements and stations in the Accumulator start at A10 and go toward A20. They are:

<u>NAME</u>	<u>DESCRIPTION</u>
A10	Station marker for sector 1
A1Q1	Quadrupole beginning station 1
A1Q2	Quadrupole beginning station 2
A1Q3	Quadrupole beginning station 3
A1B3	Dipole after station 3
A1Q4	Quadrupole beginning station 4
A1Q5	
A1Q6	
A1Q7	
A1S7	Sextupole after station 7
A1B7	Dipole after station 7
A1Q8	
A1B8	
A1Q9	Beginning of station 9
A1S9	

A1Q10	End of station 9, beginning of station 10
A1B10	
A1S10	
A1Q11	
A1Q12	
A1S12	
A1Q13	
A1Q14	
A20	Station marker for sector 2

Both the Accumulator and Debuncher have mirror symmetry about all zero station markers. In order to relate the magnets in one sector to their counterparts in the other sector, the magnets can not be numbered in order while moving about the rings in a clockwise manner. Rather, at each zero station the numbers reverse. Thus, the stations and elements from A20 to A30 are:

<u>NAME</u>	<u>DESCRIPTION</u>
A20	Station marker for sector 2
A2Q14	
A2Q13	
A2S12	
A2Q12	
A2Q11	
A2S10	
A2B10	
A2Q10	End of station 9, beginning of station 10
A2B9	
A2S9	
A2Q9	
A2B8	
A2Q8	
A2B7	Dipole after station 7
A2S7	Sextupole after station 7
A2Q7	
A2Q6	
A2Q5	
A2Q4	
A2B3	Dipole after station 3
A2Q3	Quadrupole beginning station 3
A2Q2	
A2Q1	
A30	Station marker for sector 3

To find all the rest of the stations, simply take the above and put in the appropriate sector numbers. (See arrows and station markers in Fig. A-1)

The magnet numbers increase in a clockwise manner in sectors 1, 3, 5, and increase in a counter-clockwise manner in sectors 2, 4, and 6.

The Debuncher is numbered in exactly the same manner, except that there is a quadrupole at the symmetry points. That is D10, D20, etc. is in the middle of a quadrupole. This special quadrupole is called D10Q, D20Q, etc. The list of stations and elements in sector 1 is:

<u>NAME</u>	<u>DESCRIPTION</u>
D10Q	Zero station marker quadrupole.
D1Q2	This quadrupole ends station 1 and begins station 2. Note that there is no Q1.
D1Q3	
D1Q4	
D1Q5	
D1Q6	
D1Q7	
D1B7	
D1Q8	
D1B8	
D1Q9	
D1Q10	
D1Q11	
D1B11	
D1Q12	
D1B12	
D1Q13	
D1B13	
D1Q14	
D1B14	
D1Q15	
D1B15	
D1Q16	
D1B16	
D1Q17	
D1B17	
D1Q18	
D1B18	
D1Q19	
D1B19	
D20Q	Zero station marker quadrupole. This ends station 19.

Again, from D20Q to D30Q is the reverse of the above, substituting sector 2 for sector 1:

In the Debuncher, the sextupoles are not explicitly listed, but said to be downstream of a particular magnet, for example, there is a focussing sextupole downstream of D1B8, just as well be vacuum valves, monitors, etc.

See Fig. A-2 for an almost readable diagram of all magnets.

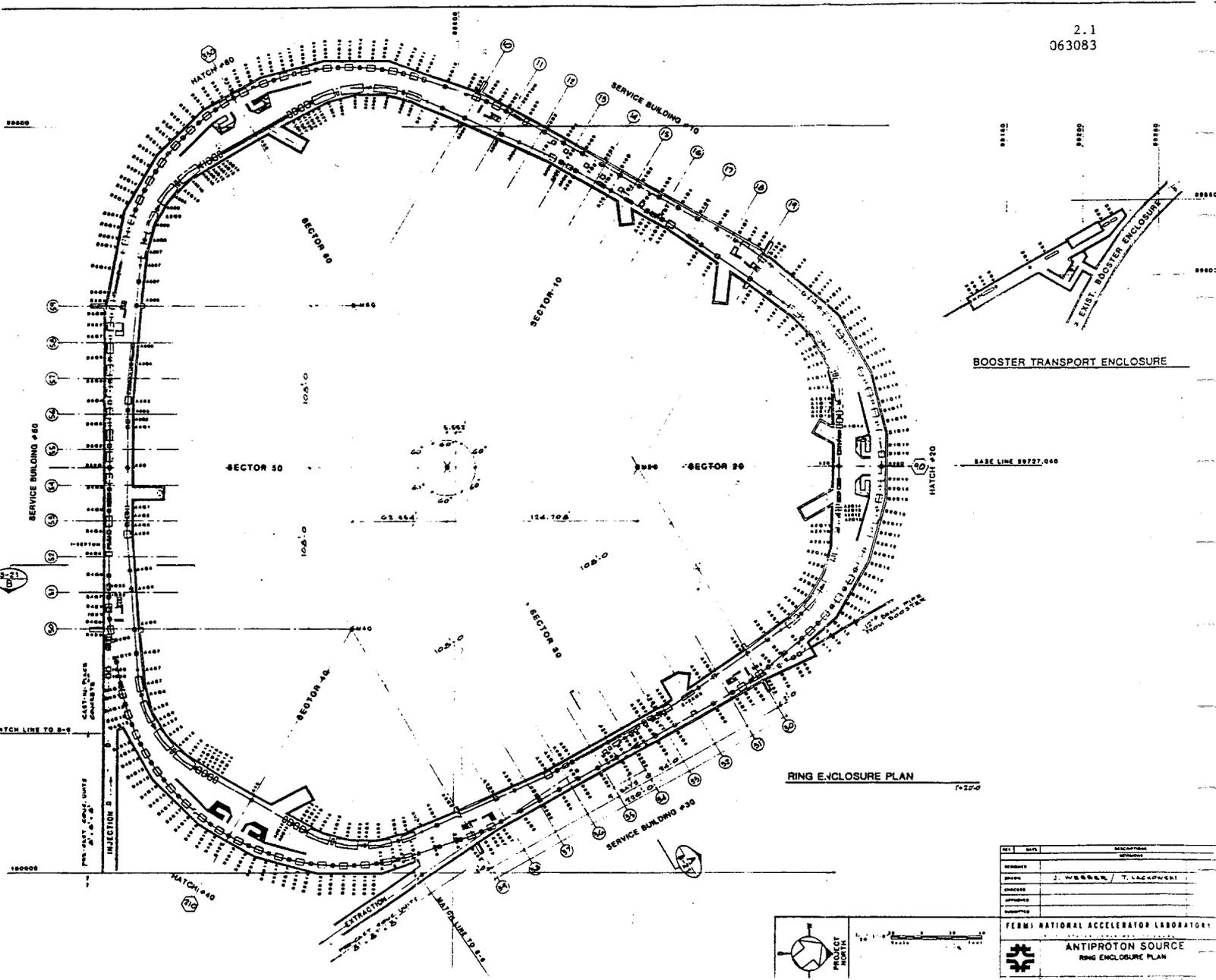


Figure A-2