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Title: **Alignment Labeling Scheme for the Reverse Bends, Instrument Sections, and the Final Focus Beam Line Elements and their Supports**

This note documents the alignment naming convention for support systems and beam line elements in the special sections of the SLC arcs and in the final focus. The nomenclature follows by and large the system described in CN-293 and should be regarded as a supplement thereof. The main difference to CN-293 is the support oriented naming convention we use for the special sections.

A separate naming system for alignment purposes is needed because:

(a) it is important that the person doing the survey measurements and performing the alignment adjustment connects a specific physical object with a specific name in an obvious way, and not by way of the name of a microprocessor in an alcove far away, and, (b) of the requirements for efficient automated data taking and processing with lap computers in the field.

We tried to stay close to the usual designation of beamline elements. For the final focus we follow the beam direction into the IP, and not out from the IP, as the TRANSPORT derived component nomenclature does. In addition, the natural progress of work for alignment is from the BSY towards the IP. Furthermore, all of our support surveys are related to station numbers following a beam line in the direction of the beam.

I. Support Systems

The support systems have four digit designators as in the following example:

In deviation from CN-293 we have combined the section designators (which were the achromats) and the support numbers (pedestals) in order to make room for fiducial information (tooling balls) on each element.

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Names for Supports and their Location

Support type:	Girder	(G)
	Rail Stand	(E)
	Column Stand	(C)
Arcs:	North	(N)
	South	(S)
Section designator:	Beam Switch Yard	(1-10)
	Instrument section	(11-20)
	Reverse bend	(31-40)
	Final Focus	(41-80)
	Dump Lines	(81-90)

To find the support numbers in each section, the following numbers have to be subtracted from the section designators:

BSY	0
IS	10
RB	30
FF	40
DL	80

II. Foot Locations

For alignment purposes, it is necessary to also label foot locations for each type of support:

The feet are numbered in the following manner:

Again we want to emphasize that we choose to use the same convention for arcs and final focus; the numbering follows the beam direction towards the IP.

III. Beam Line Elements

Several different types of magnets and other components must be positioned in the special sections. Each one of these parts will be given a unique number which will be in units based on support systems. Each Beam Line Element designator can accommodate up to 26 fiducials (like tooling balls). An example would be as follows:

Names for Beam Line Elements

Element number: 1 $\rightarrow$ 9

This is the number of this kind of element starting at the upstream end of the support system, counting downstream to the end of the support.

Element type:

Element	Abbreviation
Bend:	BD
Collimator(adjustable):	CA
Collimator(clipper):	CC
Collimator(mask):	CM
Collimator(protection):	CP
Kicker:	KI
Monitor(beamstrahlung):	MB
Monitor(position):	MP
Monitor(profile):	MR
Polarimeter:	PO
Quadrupole:	QU
Septum:	ST
Sextupole:	SX
Toroid:	TO
Steering Corrector X :	XX
Steering Corrector Y :	YY

Fiducial letter: $A \rightarrow Z$

IV. Horizontal Control Points in the Final Focus

New control points have been added to the tunnel traverse network in the final focus region and the straight sections of the arcs. These points do not follow the physical layout scheme established in the regular arcs, but we retained the nomenclature. For the final focus the network has been set up in the following way:

A typical control point name will look like the following:

For the final focus section point numbers are assigned sequentially starting at the first point after the regular arc traverse. The pattern puts the even numbered points on the side of the tunnel away from the beamline, and the odd numbered near the beamline, as shown in the figure above. For the shorter special sections in the arcs the control points will fall more or less on a straight line, but have not been placed yet.

V. Examples

1. GN44QU2H is the H tooling ball on the second quadrupole downstream on girder number 4 (counted from the arcs) in the north.
2. ES32F2 is the downstream foot on the second railstand (counted from achromat 8A) in the reverse bend section in the south.

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