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DEVICE NAMES FOR THE AGS COMPLEX

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Technical Note

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INTRODUCTION:

The goal of this note is to describe a naming scheme that yields intuitive and consistent names, which are relevant to operations. Additionally, the rules developed for naming should be kept as simple as possible.

A limit of 18 characters has been placed on the length of any name. The freedom to create names up to 18 characters long gives the naming process a lot of flexibility. As well as having a positive side, this flexibility can lead to inconsistencies in the way devices are named. These inconsistencies result in an overall reduction in the understandability and conciseness of the names. A coherent naming scheme provides a method to root out these inconsistencies.

It is important to clearly define the conventions used in a device name, as well as what is meant by a device name. Once these ideas are expressed, they can more easily be checked to see if they are relevant, meaningful, and consistent. If they are, and they are used as a guideline for naming, the names should tend to reflect these qualities.

A few general remarks about devices and device names are necessary. Roughly speaking, a device can be defined as an object in the AGS complex whose action affects its operation. It can exist either as a physical object, or as some parameter or event, and its behavior must be dependent on some variable that can be controlled or observed. For example, a low field dipole magnet, that is controlled by the current that flows through the magnet. The device name refers not only to the device itself (a specific magnet), but a variable related to that device which is controlled or observed through the controls system (the current in the magnet). When assigning names to "devices" it is important to keep these distinctions in mind. It only makes sense to assign a device name to a device which is associated with at least one controlled or observed variable.

The raw material of a device name consists of undifferentiated information which needs to be sorted out, and put together in a consistent form. Confusion can occur with regard to which information belongs in which field. The information in each field should relate in a logical way to the information in the other fields. It is necessary to keep this in mind when sorting out the information.

AN OVERVIEW OF THE INFORMATION CONTAINED IN A DEVICE NAME:

Each device name will contain different pieces of information relevant to that device. This information falls into three major categories that are relevant to operations,

1) The physics or operational purpose of the device.
2) The physical location of the device.
3) The control of the device.

Each of the above categories will be called a field. Within each field there will be more information which needs to be sorted out in a consistent way.

The Purpose Field:

Four categories of information can be found in the purpose field.

1) The machine that contains the device.
2) The major system that contains the device.
3) The device.
4) The use(s) and number of the device.

The meaning of these 4 categories will be explained in greater detail later on in the note.

The Physical Location Field:

The location field describes the physical location of the device in the AGS complex. The format of this information will be described in greater detail later on in the note.

The Control Field:

This field contains three categories of information:

1) The control type: The manner in which the device is controlled or observed.
2) The controlled or observed variable that affects the behavior of the device.

3) Attributes: Contains information about the controlled or observed variable.

The meaning of this information will be discussed in greater detail later on in the note.

THE RULES FOR ORGANIZING THE CATEGORIES OF INFORMATION FOUND WITHIN THE DEVICE NAME:

The order in which fields may occur in a name will be the same for all names. This order is as follows:

a) The purpose field will be first (i.e.-on the left). It is the only field that must occur in every name.
b) If the location field is present it must follow the purpose field.
c) If the control field is present it appears as the last field in the name (i.e.-on the right).

The symbols ".", "<", and ">" will be used to separate the fields, and are called field delimiters. Summarizing the order of the fields in the name:

PURPOSE < PHYSICAL LOCATION > CONTROL

Remarks on Symbols Used as Field Delimiters:

a) A "<" will always precede the location field.
b) A ">" will always follow the location field.
c) If a location field is not present within the name, and there is a control field present, then the purpose and control fields will be separated from each other by a period.

In general, there are two symbols that can be used as delimiters within a field. They are:

1) Periods:
   a) A period must always be placed between the first three letters of the name ,which consists of the machine and major system (see below), and the device category. As an example consider, "ALF.DH<A02>", which is the name for the current in the horizontal dipole located at superperiod A, straight section #2 in the AGS low field magnet system.
   b) Periods may be placed in a name between two pieces of information that are in different categories (except between the machine and major system categories). As an example consider the name, "ALF.ADJ_ANG.H<A20>", where a period is placed between the device "ADJ_ANG = adjust angle" (in the basic device category) and "H = horizontal" (in the uses category).

c) A period is used to mark the separation between two categories of information within a name in order to make the name easier to understand. When it is believed that the separation between the two categories will be obvious to the user without a period, then there is no need to insert one between the two categories. This will occur most often for common names such as "ALF.DH<A02>". In this case there is no need to place a period between the "D" and the "H" because the separation is already implicitly understood by most users.

2). Underscores:

- Underscores are used in the same way as "spaces" are used in a language. In a name, underscores are used to help one distinguish between different pieces of information within the same category in much the same way as words are distinguished from each other in the same phrase by using spaces. Use underscores to make a name "easier on the eye" to read, and to avoid confusion between abbreviations for different pieces of information.

Example 1: (to avoid confusion between different pieces of information) "BTI.ION_GA<21.152>" is the name of an ion gauge in section 21 of the Tandem transport line. An underscore is used to separate "ION" from "GA" to help one to distinguish between the two pieces of information.

Example 2: (to make the name easier on the eye) "BTI.QV_1>STS" is the status of the first vertically focusing quad in the BTA line.

Organizing Categories of Information in the Purpose Field:

1) One letter is used to describe the 'machine'.
2) Two letters are used to describe the 'major system'.
3) The number of letters used to describe the basic device and its uses and number is not strictly limited.

The order within the purpose field that this information occurs is as follows:

MACHINE MAJOR SYSTEM "." DEVICE "." USE AND NUMBER

The 'use and number' category is optional.

Organizing Categories of Information in the Physical Location Field:

In general, the information in the physical location field is divided into two sections, as follows:

GENERAL LOCATION "." SPECIFIC LOCATION

The specific location category is optional. The rules for organizing this information are contained within the part entitled "Physical Location Field" within the "Definitions for the fields and information contained within the device name" section.

Organizing Categories of Information in the Control Field:

The order within the control field that the information occurs is as follows:

CONTROL TYPE "." CONTROLLED OR OBSERVED VARIABLE "." ATTRIBUTES

Of the control field categories, only the controlled or observed variable category generally appears in the name. However, even this category is not always required. In many cases the controlled or observed variable can be deduced easily from the units of the readback, or by the type of device. The control type may be included when the type of control over a device is unusual, and not knowing it might lead to confusion. For example, it might be important to know that a device has a metadevice control type. Attribute information is rarely included, but occasionally helpful.

DEFINITIONS FOR THE FIELDS AND INFORMATION CONTAINED WITHIN THE DEVICE NAME:

The Purpose Field:

The purpose field contains information relevant to the physical purpose of the device. This information is split up into four categories. The definitions of these four categories follow.

a) Machine (first character):
This is an abbreviation for the machine which contains the device. During processes such as extraction, injection, and transport it is often unclear which machine "contains" the device. The following guidelines are proposed:

a) All devices that pertain to the transport of particles after extraction from an accelerator ring, but not to another machine, may be classified in terms of the ring they are extracted from and the type of extraction used. These devices can be categorized as machines using these two criteria as a basis.
b) All devices that pertain to the transport of particles into one and only one accelerator will be grouped with that machine.
c) All devices that pertain to the transport of particles, other than those fitting the description in part "b", may be

grouped with the machine which, relative to the direction of the beam, immediately precedes the transport line.

d) All devices within the accelerator ring of a machine will be considered part of that machine (AGS or Booster).

The machines in the AGS complex and their abbreviations are:

A: Alternating Gradient Synchrotron
B: Booster
T: Tandem Van de Graaff
L: Linac
S: Slowly extracted beam
F: Fast extracted beam

b) Major System (2nd and 3rd Characters): In the course of operations one is generally concerned with accomplishing some goal by affecting the behavior of the beam. Generally, many devices are required to accomplish the desired goal. In these cases, a major system can be defined as a group of devices which act together to achieve this goal. Other operations related systems are required as well. These include a system to measure parameters, safety related devices, etc.

Some of these major systems are:

RF: Radiofrequency acceleration system
VF: Very High Frequency dilution system
LF: Low magnetic field corrections and adjustments
XT: Extraction related electric or magnetic elements
TM: Linac tank magnet system
MD: Measurement Device
IJ: Injection within a machine
PI: Preinjection within a machine
LI: Injection from Linac to one or more accelerators (all devices in a transport line from linac to one or more accelerators).
TI: Injection from Tandem to one or more accelerators (all devices in a transport line from Tandem to one or more accelerators).
BI: Injection from Booster to one or more accelerators (all devices in a transport line from the Booster to one or more accelerators).
VA: Vacuum related devices
SW: Electric or magnetic elements which are used directly in splitting up the extracted beam and switching it between extraction lines.
SF: Safety related devices
XP: Devices used in transport
MM: Main Magnets
MC: Magnetic corrections
S1: Linac source #1

c) Device (follows the major system): This information describes the device itself. A device is something that is intended to perform a function related to the operation of the AGS complex and is dependent on some variable that can be directly controlled or observed through the controls system. A device may be constructed from a physical object, a group of physical objects, a physical parameter, or a physical event. Generally, qualities of the device which do not refer directly to its application or use should be considered part of the "device" category, not part of the uses category. Take the name, ATI.ION_GA<21.152>, as an example, the descriptive term "ION", describes a characteristic of the device, but not the use that it serves (i.e.-that use being to measure pressure). Alternatively, in the name ALF.DH<A02>, the term, "H", which stands for "horizontal" refers directly to the fact that the dipole is used to bend the beam in the horizontal plane. Consequently, it is placed after the type of device (i.e.- "D" = dipole). This is not to say that the term used to describe the device cannot refer to its use (ex.- the device "ADJ_ANG" adjusts the orbit angle and the term "ADJ_ANG", which is the term used to describe the device, reflects this fact.).

Some examples of basic devices and their abbreviations are:

- ALL= Indicates all devices with limitations placed on them by other fields.
- D= Dipole
- Q= Quadrupole
- S = Sextupole
- K = Kicker magnet
- SET_NU = orthodevice for setting tune using the nu quads
- ADJ_ANG = adjusts angle of equilibrium orbit
- ADJ_POS = adjusts position of equilibrium orbit
- BMP= orbit bump
- BPM= Beam Position Monitor
- MW= Multiwire Beam Position Monitor
- FLAG = Beam Flag
- SPLTR = Beam Splitter
- ION_GA= Ionization Gauge
- TC_GA= Thermocouple Gauge
- FCUP = Faraday Cup
- I_XFR = Current Transformer
- VLV = Pneumatic or Sector Valve
- TRM = Trim Magnet (ex.- "SXP.TRM.DV1<B5>")
- INFL = Inflector
- CAV = RF Cavity
- PHBAK= Phaseback
- PS = Power Supply

d) Uses and Number: Each abbreviation following the basic device describes its uses (ex. DH: Dipole=basic device / Horizontal=

use). The Uses and Number category contains operations relevant information about how the device is used in the AGS complex. This information will also include information that relates one device directly to other(s) within a particular physical area. For example, the fact that a vertical quad is the second occurring within a section of HITL should be put here (i.e.-TTI.QV_2<20> where the purpose field is "TTI.QV_2", and which stands for: Tandem-tandem injection, quad, vertically focussing, number 2). For more information on the numbering of devices see the physical location field section below.

Some examples of device attributes and their abbreviations are:

H= Horizontal
V= Vertical
S= Skew
C= Used to make Corrections

The Physical Location Field:

The physical location field contains information about where a device is located. From an operations perspective this is best defined as the location where a device has its effect. For example, a power amplifier might be located in bldg. 914, but have its effect in the Booster or AGS ring.

The specific physical location of a device is often irrelevant from an operations standpoint (ex.-phaseback). Many times the physical location serves only to distinguish between devices, or to relate them to each other. In such cases, the set of devices within a "general location" should be numbered sequentially. This information should then be included in the Uses and Number section of the purpose field. The "general location" where the devices are located can be incorporated into the physical location field if it is relevant, but the "specific location" is omitted.

Some Symbols used in Describing Locations:

1) "-" is used as an abbreviation for "to", as in ALF.QH_NU<B-D>. This location is understood as "superperiods B to D".
2) "@" is used as an abbreviation for "at", as in ALF.Q.BETA<B-G@12>. This location is understood as "At straight section #12 in superperiods B to G".

a) Locations in the Booster and AGS Rings:

For a single device:

{superperiod X}   {straight section Y}
[General location]   [Specific location]

where X = superperiod letter, Y = straight section number ex. ALF.DH<A02>.

b) Transport Lines:

A transport line can be defined as a beam line which is not functionally within an accelerator, and which is designed to transport beam. It is useful to divide transport lines into three types:

1) Transport lines which are used to transfer particles from an accelerator to one or more accelerators.
2) Transport lines which transport particles to both accelerators and other destinations which are not accelerators.
3) Transport lines which transport particles only to destinations which are not accelerators.

Transport lines which are members of type "1" are also called transfer lines and their location is implicitly given in the prefix of the device name. For example, instead of indicating that a device is located in the LTB line in the location field, the prefix "BLI" is used to indicate that it is a transfer line from the Linac to the Booster.

Generally, the specific location of a device within a transport line should be described by the distance from the end of the preceding accelerator for 'minor' elements. This distance is given in feet, as a three digit number in the location field. Major elements are grouped together by device type, and ordered sequentially with respect to distance from the beginning of the transport line (exceptions to this format are common).

Generally, to identify a transport line, the device name only needs to specify two things:

1) That the device is located in a transport line.
2) The location to which particles are being transported.

For transfer lines this information is contained in the prefix. The following abbreviations are proposed to describe the general location in other transport lines (excluding extraction lines) in the location field.

XL: General transport line (before any splits)
P: Transport line to BLIP
R: Transport to REF
PR: Transport line to both BLIP and REF

(These abbreviations are used in the general location category of the location field.)

c). <u>Tandem Transport Lines:</u>

The Tandem transport lines are "transfer lines" and are divided into operational sections. The <u>general location</u> of a device is identified with the operational section it is in. Within each section devices (excluding vacuum related devices) are ordered sequentially <u>with respect to</u> their device types. The format is as follows:

For vacuum elements,

"<" {section number} "." {distance} ">"

-Where the general location is the "section number".
-Where "distance" is a three digit number in feet from the beginning of the section (distance = specific location).

For other elements,

"<" {section number} ">"

<u>Notes:</u> -The sections within the Tandem to AGS transport line should begin with section 1.
-The sections after the AGS-Booster split in the line that goes to the Booster should not skip sections 22 and 23 as they currently do.

examples: TTI.FCUP.1<11>
TTI.ION_GA<10.018>
TTI.QV_1<20>
ATI.DHC_1<21>
ATI.VLV<21.139>
BTI.ION_GA<21.152>
BTI.F_VLV<28.002>

2). <u>Linac Transport Lines</u>: The transport lines are not subdivided into sections as with the Tandem. Therefore, the standard convention can be used. The following notation is proposed:

For minor elements:

"<" {Transport line} {X} ">"

where - {Transport line} is omitted if the transport line is a transfer line.
- {X} is a three digit number which gives the footage from the beginning of the end of tank 9.

For major elements:

"<" {Transport line} ">"

In the case of <u>Transfer</u> lines the location field is left blank for major elements.

<u>EXAMPLES</u>

IN "XL":	NQ7	LXP.Q<XL007>
	NX14	LMD.I_XFR<XL014>
	NP16	LXP.DV<XL016>
IN "BA":	NX39	LMD.I_XFR<BA039>
	NV29	LVA.VLV<BA029>
	NQ29	LXP.Q<BA029>
IN "B"	BLI.DH1	BLI.DH1<BA>
	BLI.DH015	BLI.DH<015>
	BLI.MW35_CNTL	BLI.MW<079>POS
IN "A"	NP136	ALI.DV<136>
IN "PR"	PP35	LXP.DV<PR035>
	PD19	LXP.DH<PR019>
IN "P"	PX101	LMD.I_XFR<P101>
	PM95	LVA.ION_PU<P095>
	PQ71	LXP.Q<P071>
IN "R"	RQ20	LXP.Q<R020>
	RD28	LXP.DH<R028>

<u>Extraction Lines:</u> Extraction lines are a special case of transport lines.

Here are Some Definitions Regarding Extraction Lines:

1) Extraction lines are described in terms of their intended targets. For example, the "A" line is called that because it transports beam to the "A" target. The "BC" line may deliver beam to both the B and C targets. The "DABC" line is used to deliver beam to all four primary targets.
2) In the case of names involving splitters, a "/" is used to indicate that a beam line is being split at a location. (Ex.- SSW.SPLT<DAB/C>TR controls the transverse position of the splitter which splits the B and C line beams.)

3) - Primary extraction lines: Devices are ordered sequentially from the point where the beam is extracted from the accelerator (for SEB this is F13 in the AGS ring).

- Secondary extraction lines: Devices are ordered sequentially from the point where the secondary beam is created (i.e.- the primary target).

4) When a device is used to affect the beam intended for certain targets, but affects the beam destined for other targets as well, then these 'other' targets are separated by a colon, ":", from the 'intended' targets. For example, "SXP.Q2<C1:3>" is **used** for the C1 (and C5) beam, but **affects** the C3 beam as well. This example highlights another important point. In secondary beam lines where either one or another beam line can normally use beam, but not both at once, only one of those lines need be designated within the name. In the above example, C1 and C5 do not normally use beam simultaneously, so there is little risk of one beam line unintentionally affecting the other beam line. Consequently, both of these beam lines are not indicated in the name. Only the lower numbered of the two is indicated there.

5) Extraction lines normally follow the rule that dipoles without a plane in their "use and number" category bend the beam horizontally.

6) Sequentially numbering devices in a beam line can lead to complications when other devices of the same type are added to it at a later time. In this case, many of the devices would have to be renumbered. Therefore, when a device is added to a beam line which would cause this problem, it is described using the following convention in the "uses and number" category of the purpose field:

{preceding number (and auxiliary letters)} {auxiliary letter}

-"preceding number" is the number of the "like device" that precedes the device that is being named. For example, if a horizontal dipole is put between "SXM.D4<C1:3>" and "SXP.D5<C1:3>", then the "preceding number" would be "4".

-an "auxiliary letter" is used to sequentially **letter** the devices between two devices of the same type which are already named sequentially. For example, if two horizontal dipoles are put between "SXP.D4<C1:3>" and "SXP.D5<C1:3>" they are named "SXP.DH4A<C1:3>" and "SXP.D4B<C1:3>"

7) In the case of dipoles which are tilted and which do not act solely in one plane or the other, both planes **must** be specified in the "use and purpose" field. Generally, if the dipole acts more in one plane than the other, than the former plane should appear to the left of the latter in

the name. For example, the AGAST SLD "SEB AD4&9" becomes "SXP.DHV_4&9<A>".

The distance of each device is measured from F13 in the AGS ring. Otherwise, these names follow the same naming conventions described in the preceding section on Linac transport lines. Some examples follow:

AGAST NAMES (SEB AREA)	PROPOSED NEW NAME
CF011	SMD.FLAG<DABC011>
CP103	SXP.DV<DABC103>
AB1TR	SSW.SPLT<DA/BC>T
DB2SK	SSW.SPLT<D/ABC>S
BB3SK	SSW.SPLT<DAB/C>S
AP1	SSW.LAM_DV<DA>
CP1	SSW.LAM_DV<ABC>
AD2&3	SSW.LAM_DH<DA>
CP2	SSW.LAM_DV<C>
BD4	SSW.LAM_DS<B>
CP146	SXP.DV<BC146>
CF157	SMD.FLAG<BC157>
CD2&3	SXP.DH_2&3<BC>
CQ5&8	SXP.QH_3&4<BC>
CP185	SXP.DV<BC185>
BP282	SXP.DV<B282>
CD4	SXP.DH_4<C>
AF124	SMD.FLAG<DA124>
DD4&5	SXP.DH_4&5<DA>
DF146	SMD.FLAG<DA146>
DD6&7	SXP.DH_6&7<D>
AS158	SXP.DS<A158>
F10FG	AMD.FLAG<F10>
DD233	SXP.SV_DH<D233>I
D8POS	SXP.SV_DH8<D>POS
D8GN	SXP.SV_DH8<D>GN
AL304	SMD.LSMON<A304>

<u>The Control Field</u>:

a). <u>Control Type</u>: A control type description may contain operations relevant information about how a device is controlled or observed <u>through the controls system</u>. For instance, it may describe how the device is defined within the controls system (ex.- parametric device, metadevice, SLD, CLD). It may also contain information concerning what control structures are used to control or observe the device (ex.- gauss time line, real time line). This field is optional.

Examples of control types and their abbreviations:

M= Metadevice
P= Parametric device

O= Orthodevice
SL = Simple logical device
CL = Complex logical device
GT = Gauss Time Line Control
RT = Real Time Line Control

Example: BMD.KH_NU.GT.RD is the readtime for the horizontal tune measurement kicker magnet in the Booster.

b). Controlled or Observed Variables:

A controlled or observed variable should relate directly to the device. Some examples of variables, together with their abbreviations follow:

I = Current
V = Voltage
TP = Temperature
GN = Gain
POS = Position
AMP = Amplitude
AMP = Amplitude for function generator section
PH = Phase
TIM = Time for function generator section
RD = Read
SLP = Slope for function generator
P = Pressure
T = Transverse position
S = Skew position
ST = Sets the amount of time (real or gauss clock) after a particular event at which the device turns on.
SP = Sets the amount of time (real or gauss clock) after a particular event at which the device turns off.
DLY = general delay (not used only to start or stop a device).
SW = Two position switch (ON/OFF unless otherwise specified)
STS = Status
CRSE = Coarse
CTL = switches control of device ON/OFF
/ = per or divided by
COEF = coefficient
FD = Forward power
RV = reverse power

c). Variable Attributes:

This category may be used to provide further information about the variable in the control field. Generally speaking, a variable's use is to control or observe a device. Following this line of reasoning, a variable's use should not be described within the name because its use is already given by its being a variable. Therefore, variable attributes should not refer to how a variable relates to a device. Generally, they should only contain information which refers directly to the variable, and only indirectly (through the variable) to the device.

Examples:

1) AVF.F.COEF_A.ERFCN, variable: coefficient A.
   -the attribute refers to the fact that coef. A is a coefficient in an error function which directly relates to the control of the device. Therefore this is wrong: a more appropriate name is: "AVF.F.ERFCN_COEF_A"
2) BMC.DH<A2>I.AVG, variable: average current.
   -the attribute refers to the fact that the current is an average value ("Average" is not used to control/observe the device).
3) BMC.D<BC>CLK.MEAS, variable: measurement clock
   -the attribute refers to the fact that the clock is <u>used</u> to make measurements for the device. A more appropriate name is: BMC.D<BC>MEAS_CLK
4) BMC.D>ST.CTLR, variable: Start time.
   -the attribute "controller" is used to control the device-this name is wrong. A more appropriate name is: BMC.D>ST_CTLR
5) ABI.DV<007>I.SET variable: current
   - The attribute refers to the fact that the setpoint value is read back (i.e.- not a readback of a physical quantity).

FIN= Fine
CSE= coarse
SET = setpoint readback only
PHY = readback of real physical variable
G = gauss time
R = real time
AVG = average
U/S = Upstream

Some More Examples:

CURRENT NAME FORMAT	PROPOSED
1) ags/lf/hor,vert dipoles	
ARI.HDABCD.DO	ALF.DHC<A-D>CTL
ARI.A02TDH	ALF.DHC<A02>
2) ags/lf/nu_quads	
ARI.NUQH.CNTRL	ALF.QH_NU.PCTL
.NUQH.TIM.01	ALF.QH_NU.TIM1
.NUQH.AMP.01	ALF.QH_NU.AMP1
.NUQH.SLP.01	ALF.QH_NU.SLP1
.READBACK	ALF.QH_NU.READ
.NUQHB	ALF.QH_NU<B-D>I

.NUQHE	ALF.QH_NU<E-G>I
.NUQHH	ALF.QH_NU<H-J>I
.NUQHK	ALF.QH_NU<K-A>I

3) ags/lf/beta_quads

ARI.BQB12	ALF.Q.BETA<B-G@12>
.BQH12	ALF.Q.BETA<H-A@12>
.READBACK	ALF.Q.BETA.READ

4) ags/lf/zero_theta_skew_quads

ARI.ZSQ16.CNTRL	ALF.QSZERO<16>PCTL
.ZSQ6.CNTRL	ALF.QS_ZERO<6>PCTL
.ZSQ16.AMP.01	ALF.QSZERO<16>AMP1
.ZSQ16.TIM.1	ALF.QSZERO<16>TIM1
.ZSQ16.SLP.01	ALF.QSZERO<16>SLP1
.ZSQ16	ALF.QSZERO<16>I
.READBACK	ALF.QSZERO<16>READ

5) ags/lf/injection_tune

ARI.NUH.A01	ALF.SET_NU.H>AMP1
ARI.READBACK	ALF.SET_NU.READ

6) ags/lf/#20_bumps

ALF.A20H_ANGLE	ALF.ADJ_ANG.H<A20>
.A20H_POSITION	ALF.ADJ_POS.H<A20>

7) ags/lf/#15_bumps

ALF.A15H.1/2.LAM	ALF.1/2_BMP.H<A15>

8) ags/lf/pue

ARI.PUE.DO	AMD.BPM.CTL
.PUE.GAIN_DIFF	AMD.BPM.DIFF_GN
.PUE.GAIN_SUM	AMD.BPM.SUM_GN
.PUE.READ_MODE	AMD.BPM.RDMODE

9) ags/rf/vhf

ARF.VHF_HI_LEVEL.DO	AVF.TUNER.CTL
.VHF_TUNER_MODE	AVF.TUNER.MODE
.VHF_FREQ_FINE	AVF.CAV.F_ADJ.FIN
.VHF_CAVITY	AVF.CAV.STS
.VHF.PA	AVF.PA.TRANSMTR.SW
.VHF_PHASE_ADJ	AVF.CAV.PH_ADJ
.VHF_DE_Q_SWITCH	AVF.DE_Q.SW
.VHF_BACK_BIAS	AVF.BACKBIAS.SW
.VHF_FREQ_COARSE	AVF.CAV.F_ADJ.CRSE

.VHF_PH_ERR_VOLT	AVF.PH_ERR.V
.VHF_PH_ERR_FREQ	AVF.PH_ERR.F
ARF.VHF_ERFCN_COFA	AVF.F.ERFCN_COEF_A
ARF.VHF_DEAD_BAND	AVF.CAV.DEADBAND
ARF.VHF_HZ/STP_CAL	AVF.MOTOR.CALIB
ARF.VHF_#_CYCLE_AVG	AVF.CAV.READ_INTVL
ARF.VHF_%CORR_CYCLE	AVF.CAV.CORR/CYCL

10) tandem/cup_harp

TTL.11FC010	TTI.FCUP_1<11>
ATI.22FC115	TTI.FCUP_1<22>
TTL.10MW020	TTI.MW<10>
ATI.22MW058	ATI.MW_1<22>
TTL.11XF017	TTI.I_XFMR<11>

11) tandem/section11-section20

TTL.11TDH1	TTI.DHC_1<11>
TTL.18DH1.NMR1	TTI.DH_1<18>NMR

12) tandem/section21-23

ATI.22DS1	ATI.DS_1<21>I
TTL.21TDH1	ATI.DHC_1<21>
ATI.22DS1.NMR1	ATI.DS_1<22>NMR

13) tandem/vacuum0,1,2

TVC.ALCOVE_VAC1.DO	TTI.VAC<10-11>CTL
TVA.ALCOVE_VAC2.DO	TTI.VAC<12-14>CTL
TVC.10GI018	TTI.ION_GA<10.018>
TVC.HITL1_VAC.DO	TTI.VAC<14-19>CTL
TVC.HITL2_VAC.DO	ATI.VAC.CTL
HTB.HITL3_VAC.DO	BTI.VAC<19-B>CTL
HTB.21GI152	BTI.ION_GA<21.152>
TVC.12VP166	TTI.VLV<12.166>
HTB.24VP154	BTI.VLV<24.154>
HTB.28VA002	BTI.VLV.F<28.002>
TVC.10GT018	TTI.TC_GA<10.018>
HTB.21GT152	BTI.TC_GA<21.152>

14) ags/tandem_injection

ATI.HIIJ.DO	ATI.BMPS&INFL.CTL
ATI.C_BMP.V	ATI.BMP<C>V
ATI.CBUMP.CNTRL	ATI.BMP<C>P.CTL
ATI.CBUMP.AMP.01	ATI.BMP<C>AMP1

15) ags/tandem_injection/section23

ATI.C20INFL.V	ATI.INFL<C20>V

ATI.C20INFL.US	ATI.INFL<C20>U/S
ATI.C20INFL.I	ATI.INFL<C20>I
ATI.C20INFL.PSI	ATI.INFL<C20>PS_I

16) AGAST NAMES:

RIN RS7A	ARF.R_SHFT.AMP7
SEB B1Q1	SXP.QH1<B1>
SEB B5P45	SXP.DV_4&5<B5>
SEB BP471	SXP.DV<B471>
SEB B5P1T	SXP.TRM.DV_1<B5>

17) linac/source_1

LS1.SOURCE.DO	LS1.ALL.CTL
LS1.DISCHARGE_PS	LS1.DISCHARGE.PS_V
LS1.DISCHARGE_VOLTS	LS1.DISCHARGE.V
LS1.DISCHARGE_CUR	LS1.DISCHARGE.I
LS1.SOURCE_VACUUM	LS1.VACUUM.P
LS1.EXTRACTOR_VOLTS	LS1.XTRACTR.V
LS1.CS_BOILER_TEMP	LS1.CS_BOILER.TP
LS1.ANODE_TEMP	LS1.ANODE.TP
LS1.CATHODE_TEMP	LS1.CATHODE.TP
LS1.CS_FTUBE_TEMP	LS1.CS_FTUBE.TP
LS1.CS_VALVE_TEMP	LS1.CS_VALVE.TP
LS1.GAS_VALVE_DELAY	LS1.GAS_VLV.DLY
LS1.GAS_VALVE_WIDTH	LS1.GAS_VALVE.WDTH
LS1.DISCHARGE_START	LS1.DISCHARGE.ST
LS1.DISCHARGE_WIDTH	LS1.DISCHARGE.WDTH
LS1.EXTRACTOR_DELAY	LS1.XTRACTR.ST
LS1.SOURCE_BEAM_CUR	LS1.BEAM.I.PHY
LS1.SOLENOID_DELAY	LS1.SOLENOID.ST
LS1.SOLENOID_WIDTH	LS1.SOLENOID.WDTH
LS1.SAMPLE_B_DELAY	LS1.SAMPLE_B.ST
LS1.CS_BOILER_CUR	LS1.CS_BOILER.I
LS1.ANODE_CUR	LS1.ANODE.I
LS1.PFN_VOLTS	LS1.PFN.V
LS1.EXTRACTOR_TEMP	LS1.EXTRACTOR.TP
LS1.EXTRACTOR_LOAD	LS1.LOAD.XTRACTR.I