Controlled STAR Note #106C

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PROGRAM - PROJECT - JOB

STAR Project

TITLE

Change Collaboration Drawing Control System

REV. A, ;	8/25/93
REV. B,	7/8/94
REV. C	Changed the Drawing Number Request procedure to be conducted on the WWW

Required Signatures:

Jay Marx, Project Director

Bill Edwards, Project Manager

Contents:

1.0 Introduction

The design and fabrication of the STAR Detector will be a collaborative effort with 100's of participants. Given the size and scope of the Collaboration, a system to promote and facilitate the interaction of the participants is crucial to the success of STAR.

This STAR Note explains three items that are necessary to facilitate the easy exchange of information dealing specifically with engineering drawings.

1) a baseline format for all engineering drawings in the Project.
2) the global "STAR" numbering system and STAR drawing index.
3) the system that will be used to transfer files electronically.

The STAR detector is composed of many different subsystems. Most of these subsystems will be designed, and to some extent fabricated at an institution other than Brookhaven (i.e. ANL, UC-Space Sciences Lab, etc.). For the purposes of this document, these institutions are referred to as "local institutions".

2.0 Engineering Drawing Format

In order to maintain a consistent drawing format for the STAR Project, the following guidelines have been established:

Dimensioning and Tolerancing

ANSI Y14.5M - 1982 shall be used as a guideline. Copies of this document can be obtained from ASME, 345 East 47th Street, New York, NY. 10017 or ANSI, 1430 Broadway, New York, NY. 10018.

Dimension Units

A dimensioning system of both inches and cm shall be used on all drawings. The inch dimension shall be stated first or above the cm dimension. If a CAD system dimensions in only one unit, inches are to be used.

Revisions

Revisions to drawings prior to release for production shall be designated using sequential numbers (1, 2, 3 ...). Revisions to drawings after release shall be designated using sequential letters (A, B, C ...). All drawings shall be initially released with a revision letter A. See further discussion in section 3.0, "Drawing Numbering Schemes".

Drawing Sizes

Drawing sizes shall be referred to using letters in the following manner.
A - 8.5" X 11"
B - 11" X 17"
C - 17" X 22"
D - 22" X 34"
E - 34" X 44"
J - 34" X N (55" min., 176" max.")

Titles

Engineering drawings should include a title block containing a three-line title. The first line should identify the project (RHIC-STAR) and major element or subsystem (STAR WBS level 2),

e.g. RHIC-STAR TIME PROJECTION CHAMBER.

The second line should identify the STAR WBS level 3,

e.g. OUTER FIELD CAGE.

The third line should identify the content or a description of the drawing.

See STAR Note 0019 for the STAR WBS and category code listings.

Title Blocks
The local institution shall use its own style title block. However, it must contain, as a minimum, locations for the following information:

1) institution drawing number
2) STAR drawing number (to be issued by the STAR Project Office)
3) revision
4) revision date
5) drawing size
6) title line 1
7) title line 2
8) title line 3
9) institution
10) drawn by (draftsperson / designer)
11) cognizant engineer
12) production approval by (cognizant engineer or physicist)
13) category code or STAR WBS to level 3 (see STAR Note 0019)

3.0 Drawing Numbering Schemes

Because of the nature of the STAR Collaboration, drawings created for this project may contain up to three separate drawing numbers. First, they should utilize the local institution's title block and drawing numbering system. Second, they may have a STAR drawing number (especially if the drawing represents something that may be of interest to other parts of the Collaboration, or that will eventually end up at RHIC). Finally, a RHIC drawing number will be assigned to all drawings of hardware that will be installed at RHIC or used in the handling or installation process. The following paragraphs describe these numbering schemes.

1. The local institution shall use its own drawing numbering scheme on drawings it creates.

2. A STAR drawing number will be issued by the STAR Project Office at the request of a local institution. As a minimum, STAR drawing numbers should be issued to drawings that the local institution intends to turn over to RHIC as part of the as-built drawing package or to drawings that are considered to be of interest to integration, other subsystems or institutions. The STAR drawing number will be used in a database of drawing information which will be updated at least twice monthly and will be available to all collaborators to facilitate the efficient transfer of information. In order for a STAR drawing number to be issued, the following information must be known:

1) local institution drawing number
2) revision
3) drawing size
4) revision date
5) title line 1
6) title line 2
7) title line 3
8) institution (ANL, UT Austin, etc.)

A STAR drawing number can be issued even if the drawing is yet to be completed as long as the above information is known. STAR drawing numbers can be obtained by doing the following four steps:

1. Access the STAR Home Page.
   The address is: http://www.rhic.bnl.gov/STAR/.

2. From the Table of Contents select Documents, and under Engineering Documents click-on STAR Drawings.

3. From the list of options, choose STAR Drawing Number Request Form and fill out the form that appears.

4. Submit the Drawing Number Request Form to STAR Project Management by clicking on the Submit button at the bottom of the form.

When Project Management receives the request, a STAR Drawing Number will be issued and the requestor will be notified. If there are questions concerning this process, please contact Rich Meyer (rich_meyer@lbl.gov)

The format of the STAR drawing number is as follows. A eight character (alpha-numeric) STAR drawing number will be intelligent, meaning that information can be derived from the number itself. The number will begin with a three-letter code identifying the STAR major subsystem. The three-letter codes are as follows:

TPC - time projection chamber
MAG - solenoid magnet
FEE - front end electronics
DAQ - data acquisition
TRG - trigger
SC - slow controls
CNV - conventional systems
I&T - installation & test

SIM - system integration mechanical
SIE - system integration electrical
SIF - system integration facilities
SVT - silicon vertex tracker
TOF - time of flight
EMC - electromagnetic calorimeter
XTP - external time projection chamber

Additional three-letter codes will be added as necessary.

The next three characters after the three-letter code will be used to number the drawings. This block of numbers (001-999) will be subdivided to provide additional information. For example MAG001-MAG099 might be reserved for coils while MAG100-MAG199 might be reserved for iron. The allocation of these numbers is to be determined by the Subsystem Manager and reported to the STAR Project Office for inclusion in a later revision of this note. (See appendix A for an example)

The final two characters will designate drawing size and sheet number and will be separated by dashes. The drawing size character shall be a letter corresponding to the sizes discussed in section 2.0. The sheet number character will designate the sheet number for drawings that contain multiple sheets. If the drawing contains only a single sheet the sheet number will be "1".

All drawings will contain a letter that indicates the revision.

Examples of a STAR drawing numbers:

MAG201-D-2 Magnet drawing number 201, size D, sheet 2

CNV001 -A-1 Conventional System drawing number 001, size A, sheet 1

3. The RHIC detector drawing numbering scheme was developed to emulate the rest of the RHIC drawing numbering system, and to allow for a large number of future experiments at RHIC. In this system, drawings associated with a specific experiment will use a ten register numbering scheme with the following assignments for each location.

A	B	C	D	E	F	G	H	I	J
___	___	___	___	___	___	___	___	___	___

A, B, C The first three registers would represent the experiment number, as assigned by the head of the RHIC Detector Group.

D & E Represent a two digit number that corresponds to a BNS level three (3) description.

F & G Represent a two digit number that corresponds to a BNS level four (4) description.

H, I, J The last three registers would represent the numerical identification that references a specific drawing.

This numbering system will provide the capability of tracking:

999 Experiments
99 BNS level 3 items for each experiment
99 BNS level 4 items for each level 3 group
999 drawings for each level 4 item

There will be more specifics to report about the RHIC numbering system in the future. For now, the local institution and STAR numbering systems above will serve our purposes.

On each drawing, space should be left for both STAR and RHIC drawing numbers. This space shall be located above the top and to the right side of the local institutions title block, in an enclosed box, as shown in figure 1.

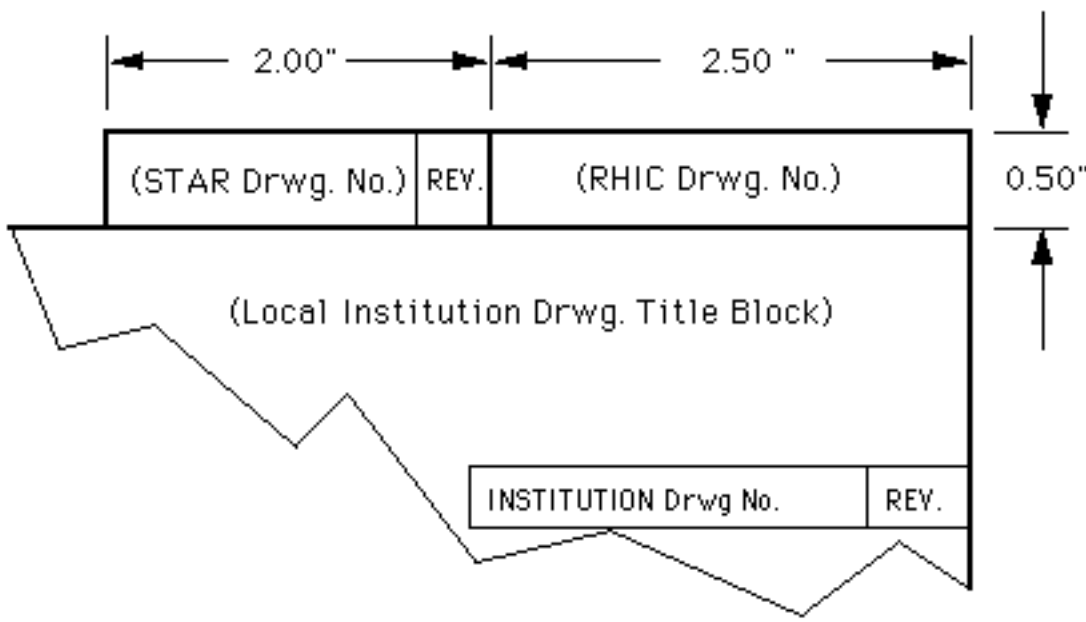

Figure 1. Location of STAR and RHIC drawing numbers with respect to local institution's drawing title block.

4.0 Drawing Database

A database of all STAR drawings, parts lists/purchase order, and engineering change notices has been established to facilitate the transfer of information between collaborators. An example of why this is beneficial might be the following. The EMC group might want to determine what type of electronic racks the TPC group selected to use on the platforms. This information would be available by accessing the Parts List / Purchase Order Template and perform a search for "racks". Subsystem managers should make it a priority to input relevant information into the database for others to use.

The database will be maintained by John Sterling in the STAR Project Office. The database will utilize Claris FileMaker Pro software. Information for the database should be provided to John electronically in the form of a Bin Hexed Filemaker Pro or Microsoft Excel document. A database index will be accessible via the WWW sometime in the near future.

The database will work in the following manner:
There will be one large master database that will contain all of the data fields. Information can be input or retrieved using the master template which contains all data fields or one of the smaller more specific templates that have been tailored for a particular need. The templates are available from John Sterling in both FileMaker Pro and Excel format. The breakdown of the templates are as follows:

STAR Drawing Template

	DATA FIELD	EXAMPLE	COMMENTS
1	STAR Drawing Number	MAG100-E-3	
2	Drawing Size	E	
3	Number of sheets	3	used only on multisheet drawings
4	Revision	B	
5	Revision Date	2/22/99	
6	Title Line 1	RHIC STAR MAG	
7	Title Line 2	Main Coil Assembly	
8	Title Line 3	Main Coil Pancake Assy. West	
9	Institution	BNL	
10	Institution Drawing Number		
11	Used on Drawing Number	MAG300-E-1	
12	Designer	John Scheblein	
13	Cognizant Engineer	Bill Leonhardt	
14	Production Approval	Bill Edwards	person with production signature authority, possibly cognizant engineer
15	Specification Number	ST130, ST132, ST134	
16	Purchase or Job Order Number		
17	QA Comments		
18	Date Entered or Updated	5/10/99	

Engineering Change Notice Template

DATA FIELD	EXAMPLE	COMMENTS
ECN Number	1110	4 digit serial number issued by STAR project office
STAR Drawing Number	MAG100-E-3	not required if <u>only</u> a specification is to be changed
Specification Number	ST130	not required if <u>only</u> a drawing is to be changed
Revision From	B	
Revision To	C	
Revision Date	2/22/99	
Institution	BNL	
Used on Drawing Number	MAG300-E-1	
Description of Change		
Change Requested By	Doug Fritz	
ECN Approved By		
Date ECN Approved		

Note:
Please refer to STAR Note OO95 detailed description of the ECN process.

Parts List / Purchase Order Template

DATA FIELD	EXAMPLE	COMMENTS
Institution		
Institution Purchase Order Number		
STAR Drawing Number	MAG100	used for fabricated parts
Description	Main Coil Pancake	line 3 of title block
Revision	A	
Used on Drawing Number	MAG300-E-1	
Vendor	The Pancake House	for purchased / fabricated parts
Vendor Part Number	xxx-xx-xxx	
Item Number	12	from used on (assembly) drawing
Vendor List		optional list used for RFQ's
Award Vendor		vendor selected
Quantity	12	
Promised Delivery Date		
Actual Delivery Date		
Storage Location of Received Parts	Brookhaven Bldg. 911 Rm. 100	will be used by the STAR assembly engineer

This database will help individuals locate information that relates to components of individual subsystem. An index to the STAR drawings can be found via computer network in a world read-accessible directory called *STARDOC* on a computer named *ribm00.rhic.bnl.gov* at RHIC. For more information on how to access the *STARDOC* directory, please refer to STAR Note 0019. The STAR drawing index will also be available on the WWW in the near future.

5.0 Drawing Storage

All drawing originals will be stored at the local institution during the design and fabrication phases. Prior to the commencement of RHIC operations, a full set of as-built drawings will be turned over to RHIC in the form of both hard copy and electronic copy. The electronic copies must be formatted as to be compatible with Autocad release 11 or higher as mandated by RHIC. RHIC Drawing numbers will be assigned by the STAR Project Office to all drawings prior to their being turned over to RHIC.

6.0 Integration Envelope Drawings

The integration envelope drawings define volumes subsystems are allowed to occupy in and around the STAR detector. Machining, assembly, etc. tolerances must be considered so that when the subsystem is completed the volume it occupies falls completely within its envelope. Because of the importance of these drawings they will always be available electronically in a .dxf format in the RETRIEVE directory (see electronic documents in section 7.0)

7.0 Electronic Documents

One of the two systems in place which allows STAR collaborators to communicate electronic documents (CAD files, plain ASCII text files, PostScript plots, etc.) is the two directory system housed on *me10.lbl.gov* at LBL. This system is group writeable for depositing drawings (DROPOFF) and group readable for retrieving drawings (RETRIEVE). The DROPOFF directory will be used to accept files from collaborators. The RETRIEVE directory will contain the files that are available to collaborators. This two directory system will allow the integration group to review drawings and prevent drawings from being tampered with or deleted. The system will utilize a program called File Transfer Protocol (FTP) and will be available to users connected to Internet. The FTP program is used for file transfer and collaborators can deposit or copy files freely from the directories using the FTP program. Questions about this procedure should be directed to Chuck Lawrence (510) 486-4682 or e-mail at celawrence@lbl.gov or to Doug Fritz (510)-486-4933 or e-mail dcfritz@lbl.gov. The procedure is as follows:

You must be logged in on a terminal connected to Internet. Your system must have FTP (File Transfer Protocol) capability in order for the following procedures to work. These procedures work at LBL, but may not be quite the same for other systems.

<u>From any UNIX based computer connected to Internet:</u>

At your system prompt, type: *ftp me10.lbl.gov* <return>.
If your system does not recognize me10.lbl.gov, you may type:
ftp 128.3.128.110<return>

At the name> prompt type: *ftp* <return>. ("anonymous" works as well)

At the password> prompt type: [your login name] <return>.
(note: at this stage you may have to wait 10-15 seconds while ignoring the "password please" prompt).

At the next ftp prompt type: *user star* <return>

At the next password prompt type: *star* <return>

You will be in the subdirectory "/star"; this is the remote exchange subdirectory.

If you type: *ls* <return> at this point, you will see to further subdirectories, DROPOFF and RETRIEVE.

If you wish to drop off a file, at the next prompt type: *cd DROPOFF*
If you wish to retrieve a file, at the next prompt type: *cd RETRIEVE*

To return to the STAR directory type: *cd /star* <return>

You can list the files in either remote directory by typing: *ls* <return>.

You can put a file into the remote directory by typing: *put* [filename] <return>.

You can get a file from the remote directory by typing: *get* [filename] <return>.

If you are sending a non-ASCII file, e.g. a Sun raster file or other bitmap (Postscript files are ASCII), set the binary mode first by typing: bin <return>

To delete a file type: *del* [filename] <return>.

Type: ? <return> for a list of commands.

Type: *help* [command] <return>.

Type: *quit* <return> to exit the program.

There is an 8 character limitation (not including the extension) for some users of IBM-PC based CAD programs so please use only (8) letters or digits and under_scores in your CAD filenames.

<u>From any VAX based computer connected to Internet:</u>

At the system prompt, type: *ftp me10.lbl.gov* <return>.

At the ftp prompt (me10.lbl.gov >) type: *user ftp* <return>.

At the password prompt, type: [your login name] <return>. (you may have to wait several seconds and ignore the “password please” prompt).

When the ftp prompt comes back, proceed as with the UNIX based procedure above.

APPENDIX A

TPC DRAWING NUMBERS

Start #	Topic	WBS	Nominal Num. Dwg	Total number of drawings
TPC000	TPC000-009 TPC Top assemblies	4.2.0	10	
	TPC010-059 LBL Conceptual		50	
	TPC060-079 Laser conceptual		20	
	TPC080-099 Gas Conceptual		20	
	TPC100-124 Misc. conceptual		25	
				125
TPC125	Outer field cage (OFC)	4.2.1	150	275
TPC275	Inner field cage (IFC)	4.2.2	50	325
TPC325	Central membrane	4.2.3	25	350
TPC350	Sector	4.2.4	150	500
TPC500	Sector support (Wheel)	4.2.5	25	525
TPC525	Laser system (Davis)	4.2.6	50	575
TPC575	Gas system (BNL)	4.2.7	50	625
TPC625	Cooling system	4.2.8	50	675
TPC675	Transport fixtures/shipping	4.2.9	75	750
TPC750	TPC assemble & test	4.2.10	100	850
TPC850	PM/Unassigned	4.2.11	150	1000
		TOTAL	1000	

	Condensed WBS
4.2.1	Outer field cage (OFC)
4.2.2	Inner field cage (IFC)
4.2.3	Central membrane
4.2.4	Sector
4.2.5	Sector support (Wheel)
4.2.6	Laser system (Davis)
4.2.7	Gas system (BNL)
4.2.8	Cooling system
4.2.9	Transport fixtures/shipping
4.2.10	TPC assemble & test
4.2.11	TPC PM