VLBA CC Memo No. 10

NATIONAL RADIO ASTRONOMY OBSERVATORY
Green Bank, West Virginia

November 2, 1983

TO: Coordinating Committee

FROM: B. Peery

SUBJECT: Drawing Numbering System for the VLBA

I was in error in the last paragraph of Memo VLBA CC No. 3. The VLA electronics division does have definite procedure for numbering their electronics drawings.

Attached are pages 3-1, 3-2, 4-1, 4-2 and 4-3 from "VLA Technical Report No. 31" briefly describing the procedure.

"VLA Technical Report No. 31" dated February 1978 (approximately 110 pages) and "VLA Electronics Drafting Guideline" dated July 1982 (approximately 40 pages) give details of the procedure.

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3.0 VLA DRAWING NUMBERING SYSTEMS

Two different drawing numbering systems are used in VLA drawings: Electronic and Antenna/Mechanical.

3.1 The following is an example of an Electronics Drawing Number and the associated coding scheme:

A13770M66-1

A	- drawing size, single character
13770	- project number, 5 digits
M	- drawing type
66	- drawing number, unique ranging from 1 to 99
-1	- dash number (optional), usually used to define two or more varients of a basic item

3.2 The VLA Antenna/Mechanical drawing numbering scheme is slightly different, as shown here:

9XC19XXX-XX

9X	- usage code
C	- drawing size
19XXX	- antenna drawing number block
-XX	- dash number

Parts lists are A size drawings, but A size drawings are not restricted to parts lists.

Usage codes are:

91 - Civil and concrete
92 - Transporter and heavy equipment
93 - Electrical, site
94 - Architectural
95 - Not used
96 - Antenna structural, E-Systems
97 - Fixtures and tooling
98 - Antenna mechanical and electrical, VLA generated drawings
99 - Railroad equipment

Specifications:

91SXXXXX - site, rail, the equipment telephone cable, communications systems, etc.

98SXXXXX - buildings and other site features

E Systems Generation Breakdown, Antenna Drawings - 96E20167

This generation breakdown is very comprehensive and covers the Electrospace Servo, ACU and NPL equipment.

4.0 VLA DRAWING TYPES

Nearly all VLA electronic drawings are one of the following types:

4.1 Assembly Drawings

Type symbol P -- These graphically illustrate the physical orientation, shape and mounting of the components which make up the assembly. Item numbers in balloons link the components to a Bill of Materials which contain the part number, value, reference designator and manufacturers' name. Note references in boxes convey general or specific instructions regarding assembly practices or instructions.

Assembly drawings are used for a wide variety of applications such as modules, PC boards, racks, bins, cables, antennas, subsystems, systems, etc.

4.2 Bill of Materials (BOM)

Type symbol Z -- The BOM lists all important data about the assembly drawing items such as part or drawing number, reference designator, value and tolerance, manufacturers' name, quantity required per assembly and so forth.

BOM's should be prepared for each assembly drawing and should reference that drawing and the next higher assembly drawing and BOM, as well as the top assembly drawing and BOM.

4.3 Schematic Diagrams

Type symbol S -- Schematics illustrate circuit design relationships, signal flow, component reference designators, location designators, values and tolerances, input and output connections, sheet to sheet references and any notes which may be useful for construction, testing or alignment. Phantom lines should enclose portions of a schematic which are contained on more than one subassembly. ANSI and IEEE symbology should be used.

4.4 Logic Diagrams

Type symbol L -- These drawings illustrate digital logic design relationships and are functionally similar to schematic diagrams. The logic diagram should show input/output connections, sheet to sheet references, reference designators, location designators, and any notes which may be useful for construction, testing or alignment. Again, phantom lines should enclose portions of circuitry which contain more than one assembly. ANSI and IEEE digital logic symbols should be used.

4.5 Printed Circuit Board Masters

Type symbol A -- These are precision-drawn tape or ink masters which depict single sided, double sided or multilayer circuit paths. An additional code letter A, B, C, etc. denotes the artwork scale of 1:1, 2:1, 3:1, respectively. Thus, B13720AB17 denotes a 2:1 scale master. Wherever possible, standard pre-cut commercial tape components shall be used in generating a master. The master contains scaling information and alignment targets for photo reduction and fabrication usage.

4.6 Printed Circuit Board Mechanical Drawings

Type symbol M -- These drawings define the requirements for drilling, plating, profiling and other mechanical fabrication processes. These drawings are sometime called Drill Drawings.

This type of drawing is distinguished from the Mechanical and Miscellaneous type (also M) by the different nature of the fabrication process so it is treated as a separate type by the Drawing Listing program discussed in Section 9.5.

4.7 Silkscreen Masters

Type symbol A -- Silkscreen masters may be drawn to mark panels and printed circuit cards.

4.8 Block Diagrams

Type symbol B -- Block diagrams depict signal flow through elements rendered as simple blocks whose detailed internal properties may not be vital for the emphasis of the drawing. Signal levels, frequencies, etc. and notes which are useful as maintenance information may be included on the block diagrams.

4.9 Wire Lists

Type symbol W -- Wire lists define wire paths, connections, wire size, color code, signal names, I/O connections, etc. and are used for rack, module and cable drawings. Special emphasis should be given to the preparation of wire lists so that both the construction and maintenance aspects of wire lists are clearly stated. Mnemonic signal names which are related to circuit function should be used wherever possible.

Wire lists are also generated by computer programs which analyze input data to produce wire lists and wiring machine drive data in several formats.

4.10 Mechanical or Miscellaneous Parts

Type symbol M -- This type encompasses all mechanical piece parts and miscellaneous items.

4.11 Tool Drawings

Type symbol T -- This drawing depicts any special tools, jigs, fixtures, etc. which may be used in building or maintaining VLA electronics.

4.12 Data Lists

Type symbol D -- This drawing contains any relevant physical or functional data.