AUTOCAD STANDARDS

Level 3 Audio Visual

07/19/2017

CONTENTS

1. INTRODUCTION

1.1. WHY CAD STANDARDS

L3AV has adopted and shall adhere to the NCS (National CAD Standards) V.5 as well as UDS (Uniform Drawing Systems). These standards have been modified to meet the unique set of requirements presented in the Audio-Visual discipline.

The purpose of these standards is to provide a consistent, quality and easy to use drawing set for the end user(s). The main end users for the drawing set are:

- L3AV Operations Team
- L3AV Service Department
- General Contractors
- Electrical Contractors
- AV Department Managers
- Client
- Other Decision Makers

1.2. GOALS

The four main goals of these standards are:

- Quality
- Control
- Uniformity
- Training

1.2.1. Quality

The quality of a drawing set will be defined by two areas: User Experience and Accuracy. A quality user experience is paramount. The drawing set may be accurate, but if it cannot be read or understood, it is useless. The opposite is also true. If the drawing set is easy to use and pleasing to the eye, but the information contained in the drawing set is inaccurate or too vague, it is useless. Making quality the primary goal of these standards will ensure the delivery of an easy to use and accurate drawing set.

1.2.2. Control

While these standards will be used to produce a quality product, they will also be used to determine when errors are present. These standards will provide an objective baseline for a drawing set. This in turn will help L3AV use these standards as a QMS (Quality Management System) that can be used to verify/audit the drawing set by the CAD Manager and other qualified persons.

1.2.3. Uniformity

Another critical goal for these standards is to help produce uniform drawing sets. When drawing sets are uniform, it helps reduce the time it takes during the review process. It will also reduce the time it takes for an engineer to draft a complete drawing set because there is no "reinventing the wheel" for each new project. Clients will also reap the benefits of having uniform drawing sets in that they can more easily and efficiently review the drawing set as sheet numbering schemes and other nomenclature will be consistent.

1.2.4. Training

The final goal of these standards is to reduce the time and manpower it takes to train an engineer in the drafting process. These standards will provide a consistent curriculum that can be taught more efficiently as well as ensure that certain aspects of the drafting process aren't overlooked in the training process.

1.3. UNIFORM DRAWING SYSTEMS (UDS)

As stated above, L3AV has adopted the use of UDS. UDS is composed of interrelated modules consisting of standards, guidelines, and other tools for the organization and presentation of drawing information used for the planning, design, construction, and operation of facilities.

1.3.1. UDS organizes drawings and:

- Establishes a uniform set of standards for all drawing types.
- Functions for all drawing users involved in the project life cycle.
- Organizes project information needed for drawings and allows it to be integrated with other information sources involved in a project.
- Establishes a standard drawing format that users can recognize and understand, resulting in more efficient production, reduced errors and omissions, and better coordination among all project documents.
- Promotes effective communication among drawing users as graphical information is more consistently organized and presented.
- Allows drawing users to capture evolving information for use throughout the project cycle and for future projects.
- Fosters integration and accuracy of facility information while providing for new and improved project delivery methodologies.
- Aids electronic organization, storage, and transfer of graphical information related to facilities.

1.3.2. UDS is an open system composed of a series of application modules organized around the phases of a facility cycle. The modular structure of UDS provides a place for the integration of existing non-drawing formats, such as MasterFormat™ and UniFormat™, for keynoting, specifications, and other customized applications. UDS, because of its open structure, allows the integration of new drawing techniques and information types. UDS modules provide a framework for the location and organization of information and the presentation of drawings appropriate to the context of drawing users and their tasks relative to the project cycle.

1.3.3. The modular precept extends to the organizational standards and formats in each module. The organization of drawings on a sheet is based on a standard module, providing a framework for locating and retrieving information contained in drawings.

1.4. UDS MODULES

1.4.1. Drawing Set Organization

Organizing a set of drawings is influenced by many factors, including project size, complexity, regulatory and client requirements, and the type and number of contracts. UDS provides guidelines for organizing drawing sets to accommodate these influences. The basic method for organizing drawing sets is based on use by the traditional architectural/engineering disciplines. The *Drawing Set Organization* module establishes standard discipline designators for each discipline, such as **A** for Architectural or **TA** for Audio Visual, as well as for unique types of construction elements. UDS also establishes modifiers for each designator, allowing for more detail if required by project needs. UDS establishes the order of presentation of these disciplines within a drawing set.

UDS establishes consistency using standard sheet types that are common to all disciplines. Sheet types are classified as plans, elevations, sections, large-scale views, details, schedules/diagrams, and three dimensional (3D) representations. These classifications create consistency and facilitate use of the drawing set. A numerical sheet type designator is assigned to each sheet type classification.

The identification of sheets within a set is based on a discipline designator and a sheet type designator. The UDS system accommodates both simple and complex projects. This module includes a file naming system for project files and for library files. Project file names are based on the sheet identifier. Detail library file names are based on MasterFormat™ and/or UniFormat™ numbers.

1.4.2. Sheet Organization

The most important aspect of the *Sheet Organization* module is the sheet format. UDS provides standards for sheet sizes for both metric (SI) and imperial measurement systems. UDS establishes a graphic layout that divides the sheet into the drawing area, the title block area, and the production data area. The *Sheet Organization* module includes a grid system of blocks or modules for organizing drawing information on a sheet. The system for identifying each drawing on the sheet is based on the location of the drawing relative to this sheet module.

UDS also provides a format for title blocks that includes locations and content of data areas. The format is intentionally flexible, allowing design professionals to continue to create their own distinctive title block designs consistent with UDS principles.

1.4.3. Schedules

The *Schedules* module provides standard formats for numerous schedules used in construction documents. These formats provide consistent format, heading terminology, and organization of content.

Additionally, UDS provides guidelines on creating project-specific schedules. These guidelines allow users to tailor standard schedule formats to accommodate the unique needs of individual projects.

Just as the *Drawings Set Organization* module provides a system for identifying sheets and drawings, the *Schedules* module provides an organizational system for identifying and filing schedules. This system groups and identifies schedule types and is based on MasterFormat™ numbers with cross-references to UniFormat™.

1.4.4. Drafting Conventions

The *Drafting Conventions* module is a joint effort of CSI and the CADD/GIS Technology Center. It provides a standard format for both graphic and textual information within drawings. Subjects covered include drawing standards, scale, lines, dimensions, material indications, notations, sheet types, and mock-up drawing sets.

1.4.5. Terms and Abbreviations

The *Terms and Abbreviations* module establishes guidelines for consistent terminology used in the construction industry. Consistent terms ensure clear and concise communication among the lead designer, owner, contractor, and consultants. The purpose of this module is to provide a standard for preferred construction document terms and abbreviations.

1.4.6. Symbols

The *Symbols* module compiles a full range of standard symbols used throughout the construction industry. Covered in this module are standard symbols, their graphic representation, and their role in creating, understanding, and fulfilling the intent of construction documents. Standard symbols ensure clear and concise communication among the lead designer, owner, contractor, and consultants. This module is a joint effort of CSI, ANSI, CEA, the CADD/GIS Technology Center, and InfoCOMM International.

1.4.7. Notations

The *Notations* module establishes guidelines for the systematic presentation of textual information on drawings. Subjects covered include note types, use of notes, placement of notes, formats for notes, note terminology, and linking notes to specifications.

2. AUTOCAD SETUP

2.1. INTRODUCTION

To ensure that all the functions and features that L3AV utilizes work properly, the following setup specifications shall be adhered to.

2.1.1. Templates

- Templates are part of the core of how a new sheet is created.
- Template drawings are updated periodically and are stored in a shared file location.
- Templates shall be used for all new sheets.
- The CAD manager shall be responsible for updating and backing up the sheet templates.
- Refer to the L3AV AutoCAD Setup Guide for using these templates.

2.1.2. Plot Styles

A plot style is an object property, like linetype and color. Using plot styles gives great flexibility because they can be used to override other object properties or turn off the override as needed. A plot style controls an object's plotted properties, including:

- Color
- Dither
- Grayscale
- Pen number
- Virtual pen
- Screening
- Linetype
- Lineweight
- Transparency

Refer to the L3AV AutoCAD Setup Guide for using this plot style.

2.1.3. Tool Pallets

In AutoCAD, Tool Palettes provide the flexibility to have quick access to Blocks, Tools, and Commands, etc. These can be docked, undocked, resized and moved to different locations in the AutoCAD UI.

- The CAD manager shall maintain a tool palette group that contains all standard L3AV Annotation blocks, Symbols, Drawing Elements & Macros.
- The L3AV tool pallets shall be installed on all engineering computers.
- Refer to the L3AV AutoCAD Setup Guide to install the L3AV Tool Palettes.

3. DRAWING SET ORGANIZATION

3.1. SHEET IDENTIFICATION

The sheet identification format has its roots in traditional construction drawing techniques. However, the advent of systems methods, overlay drafting, and CAD has demanded more consistency in labeling and organizing sheets. These technologies have also provided an opportunity to expand the role of the sheet identifier. Accordingly, the sheet identification format is a key part of the UDS.

3.1.1. **Discipline Designator** - consisting of one alphabetical character and a hyphen or two alphabetical characters.

A	**A**	N	N	N

Discipline Designator

3.1.2. **Sheet Type Designator** – consisting of one numerical character.

A	A	**N**	N	N

Sheet Type Designator

3.1.3. **Sheet Sequence Number** – consisting of two numerical characters.

A	A	N	**N**	**N**

Sheet Sequence Number

***A** = alphabetical character*

***N** = numerical character*

3.2. DISCIPLINE DESIGNATORS

3.2.1. The discipline designator for L3AV is – **TA**

3.2.2. All sheets shall be prefaced with the TA discipline designator.

3.3. SHEET TYPES

Sheet Type	Description
0	General (cover, index, symbols legend, notes, etc.)
1	Plans (key plans)
2	Enlarged Views (plans, RCPs that are not details)
3	Riser Diagrams (conduit, free run cable)
4	Elevations & Sections (display mounting details)
5	Details (room, furniture, mounting, custom plates, etc.)
6	Diagrams (Termination schedules, schematics, signal flows)
7	Equipment Rack Details (Elevations, thermal diagrams)
8	System Notes (EDID plans, DSP plans, programing notes)
9	Isometrics & Perspectives

3.4. SHEET SEQUENCE NUMBER

The sheet sequence number is a two-digit number that identifies each sheet in a series of the same discipline and sheet type.

3.4.1. Sequence numbering starts with 01

A	A	N	**N**	**N**

Sheet Sequence Number

3.4.2. The first sheet of each series shall be numbered 01, followed by 02 through 99.

3.4.3. Sequence numbers need **not** be sequential, to permit future insertion of sheets during design.

A	A	N	N	N	-	**U**	**U**	**U**

User-Defined Designators

3.4.4. While many projects may not require more than a single digit, standardization of a two-digit sequence number allows for efficient electronic file sorting and facility management databases.

***A** = alphabetical character*

***N** = numerical character*

***U** = user-defined character*

3.4.5. When additional drawings are inserted in a set of drawings after a sheet identification organization has already been established, or if a drawing needs additional clarification, it can be identified with a suffix. This suffix may be comprised of three user-defined designators.

T	A	6	0	1	-	V	1

Used for a video only schematic

T	A	6	0	1	-	A	1

Used for an audio only schematic

T	A	6	0	1	-	C	1

Used for a control only schematic

3.4.6. Signal flows shall use a suffix when the drawing has been broken up by subsystem so that the same page number may be used for one room type.

3.5. FILE NAMING

3.5.1. Sheet filenames shall be as follows:

- TAx00 – Sheet Name (x=Discipline Designator Number)
- Example: TA101 – AV KEY PLAN.dwg

NOTE: Sheet file names will be handled automatically when using Sheet Set Manager. For more information on using Sheet Set Manager refer to the L3AV Sheet Set Manager Manual.

3.5.2. External Reference drawings (XREFS) filenames shall be as follows:

- **TA-XREF**-XX-YYYY
- **XX**= BLDG/FLOOR
  - Succinct location description
  - 10 character limit
- **YYYY**=VIEW
- VIEWS=
  - PLAN
  - RCP
  - FURN
  - ELEV
  - SECT
- Example: TA-XREF-01-PLAN.dwg

3.6. FOLDER STRUCTURE

3.6.1. The project folder structure shall be as follows:

- **0000-TEMPLATE_PROJ_FOLDER**
  - **DRAWINGS**
    - **_OLD**
    - **TA0** – *All TA0 series drawings are placed here*
      - _OLD
      - MASTER MODEL SPACE
    - **TA1** – *All TA1 series drawings are placed here*
      - _OLD
      - MASTER MODEL SPACE
    - **TA2** – *All TA2 series drawings are placed here*
      - _OLD
      - MASTER MODEL SPACE
    - **TA3** – *All TA3 series drawings are placed here*
      - _OLD
      - MASTER MODEL SPACE
    - **TA4** – *All TA4 series drawings are placed here*
      - _OLD
      - MASTER MODEL SPACE
    - **TA5** – *All TA5 series drawings are placed here*
      - _OLD
      - MASTER MODEL SPACE
    - **TA6** – *All TA6 series drawings are placed here*
      - _OLD
      - MASTER MODEL SPACE
    - **TA7** – *All TA7 series drawings are placed here*
      - _OLD
      - MASTER MODEL SPACE
    - **TA8** – *All TA8 series drawings are placed here*
      - _OLD
      - MASTER MODEL SPACE
    - **TA9** – *All TA9 series drawings are placed here*
      - _OLD
      - MASTER MODEL SPACE
  - **INTERNAL**
    - _OLD
    - XXXX-PROJECT_NAME-DCS.xlsx – *Drawing Completion Summary*
    - XXXX-PROJECT_NAME-RFC.xlsx – *Request for Change*
    - XXXX-PROJECT_NAME-NAQ.docx – *Notes & Questions*
  - **PLOT_PREVIEW**
    - _OLD
  - **RECEIVED**
    - ARCHITECTURALS
      - _OLD
    - FROM_CLIENT
      - _OLD
  - **XREFS**
    - AAA-LOGOS – *Folder for Client Logos*
    - TA-XREF-TTLB-36X24.dwg – *Arch size "D" Title Block*
  - 0000-L3AV_DRAWING_SET.dst – *Default drawing sheet set*

3.7. PROJECT FOLDER SETUP

3.7.1. The project folder shall be named to match the corresponding ***NetSuite opportunity and/or project***.

3.7.2. All documents and the sheet set file shall be renamed to match the project folder name.

3.7.3. Refer to the L3AV AutoCAD Drafting Manual for more information.

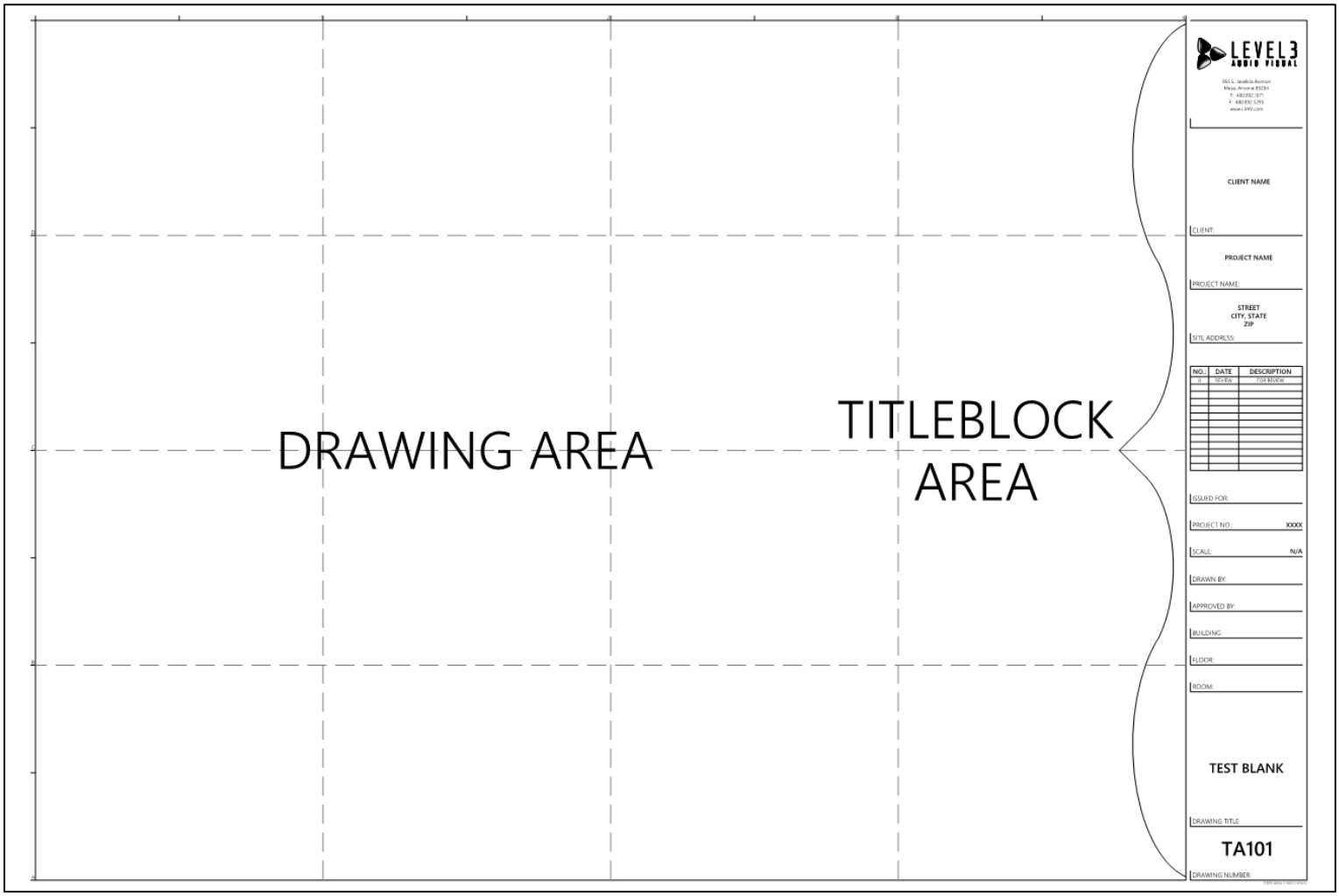
4. SHEET ORGANIZATION

4.1. SHEET SIZE

SHEET SIZES						
ANSI		**ISO**		**Architectural**		
MARK	SIZE (inches)	MARK	SIZE (inches)	MARK	SIZE (inches)	TYPICAL USES
A	8.5 x 11	**A4**	8.3 x 11.7	**A**	9 x 12	Project book. Supplemental drawings. Mock-up sheets.
B	11 x 17	**A3**	11.7 x 16.5	**B**	12 x 18	Reduced drawings from "D" size and "A1" originals. Supplemental drawings. Mock-up sheets.
C	17 x 22	**A2**	16. x 23.4	**C**	18 x 24	Small projects accommodating preferred plan scale.
D	22 x 34	**A1**	23.4 x 331	**D**	24 x 36	Projects accommodating preferred plan scale. Government projects.
E	34 x 44	**A0**	33.1 x 46.8	**E**	36 x 48	Large projects accommodating preferred plan scale. Mapping and GIS.
-	-	-	-	**F**	30 x 42	Alternate size for projects accommodating preferred plan scale.

4.1.1. L3AV drawings shall use the **Architectural D** sheet size.

4.2. SHEET LAYOUT



5. DRAWING STANDARDS

5.1. DRAWING COORDINATE SYSTEM

5.1.1. The drawing modules are arranged in columns and rows. Columns are identified with numerical characters starting with **1** and increasing to the right. Rows are identified with alphabetical characters beginning at the bottom starting with **A** and increasing toward the top of the sheet. Each module is therefore identified by a letter and a number. A drawing block may be composed of one or more drawing area modules and is identified based on the lower left hand location. Therefore, a drawing located in the lower left hand corner of the drawing area, two modules high by two modules wide, would be identified as **A1**.

5.2. DRAWING LAYOUT

5.2.1. All drawings shall use the coordinate system for placing views onto a sheet.

5.2.2. Views shall not be placed haphazardly, but shall use the coordinate system for placements.

5.2.3. Any combination of the coordination system is acceptable:

- 1/16 of the drawing area through 16/16 (full page) of the drawing area.

5.3. SHEET NUMBERS

5.3.1. A standard drawing set shall follow this sheet numbering structure:

Sheet Type	Description
TA001	COVER PAGE
TA002	SHEET INDEX
TA003	SYMBOLS & REFERENCES
TA004	PROJECT NOTES
TA101	KEY PLANS
TA201	FACILITY ENLARGEMENTS (Equip. & Elec. Layouts for Plans & RCPs)
TA301	CONDUIT RISERS
TA401	DISPLAY ELEVATIONS & SECTIONS
TA501	DETAILS (Equipment, Furniture, Mounting, Room & Terminations)
TA601	SIGNAL FLOWS
TA701	RACK ELEVATIONS
TA801	SYSTEM NOTES (EDID Plans, DSP Notes & Programing Notes)
TA901	ISOMETRICS & PERSPECTIVES

5.3.2. Refer to section 3.1.3 for more information regarding sheet number structure and exceptions.

5.4. SHEET NAMING

5.4.1. Sheet names shall be generic in nature. Sheet names determine the file name. These names should be kept to a reasonable length.

5.4.2. Sheet names shall include the prefix of “AV”.

- Example: AV EQUIPMENT LAYOUT-PLAN VIEW

5.4.3. ***Note:*** All in One Schematics and Signal flows (Video, Audio, Control/Network) use the AV prefix. However, when Schematics and Signal Flows are broken up by subsystem, the sheet name shall be prefaced with what subsystem is being represented.

- Example: VIDEO SUBSYSTEM SIGNAL FLOWS

5.5. CORPORATE LOGOS

5.5.1. Corporate logos exist for most of L3AV’s “AAA” clients.

5.5.2. These logos shall always replace the typed client name when available.

5.5.3. Requests for new corporate logos shall be made to the CAD manager via email.

5.5.4. Refer to the L3AV AutoCAD drafting manual for how to implement a client logo.

5.6. COVER PAGE

5.6.1. The Key Project Staff area shall always be completed with the proper project staff personnel.

5.6.2. The CAD manager shall be responsible for maintaining and updating these blocks with current and active staff.

5.6.3. Requests for staff updates shall be made to the CAD manager via email.

5.7. ISSUES

5.7.1. Issues tell the end user the current status of the drawing set.

5.7.2. The default issue is “FOR REVIEW”. In general, internal changes to the drawing set shall not be tracked using issues.

5.7.3. Once the drawing set is ready for Engineering Review, the issue date shall be changed to the current date, but the issue description shall be left as “FOR REVIEW”.

5.7.4. After the Engineering Review and consequent changes are completed, the drawing set shall be placed in the “DRAWINGS” folder located in the corresponding project folder on the **Y:** drive. The Project Manager can then perform a PM Review.

5.7.5. Once the Project Manager approves the drawing set for publishing, the issue date shall be changed to the current date **and** the issue description shall be changed to: “FOR CONSTRUCTION”.

5.7.6. The general rule is:

- Issue 0 shall always be “FOR REVIEW” while being worked on internally.
- Issue 0 shall be changed to “FOR CONSTRUCTION” for integration projects, and “FOR DESIGN REVIEW” for design services projects once it has been approved by the Project Manager.
- All other changes to the drawing set after the “FOR CONSTRUCTION” issue shall use issue # 1-16

5.8. SHEET SCALE

5.8.1. The sheet scale block shall be used for all sheets.

5.8.2. All sheets that don’t have drawings on them (cover page, index, notes, schedules) will use the **N/A** option

5.8.3. Sheets that are not to scale, the **NTS** (Not To Scale) option shall be used. (This includes **schematics, risers** and **signal flows**)

5.8.4. Sheets that are to scale shall have the appropriate scale in this field.

5.8.5. If more scales are needed, request that it be included as a standard and it will be taken under consideration.

5.9. DRAWN BY

5.9.1. This is the field where the drafting engineer shall identify themselves.

5.9.2. The standard nomenclature that shall be adhered to is:

5.9.3. First initial

5.9.4. Last name

5.10. Approved By

5.10.1. This field shall be filled out when the drawing set is published and ready to leave the engineering department.

5.10.2. This field shall be filled out by the Build Engineering Department Manager or approved reviewer.

5.11. Building

5.11.1. The building field is a sheet specific property that will help identify the building that is being represented on the current sheet. This property should be used when applicable.

5.12. Floor

5.12.1. The Floor field is a sheet specific property that will help identify the floor that is being represented on the current sheet. This property should be used when applicable

5.13. Room

5.13.1. The Room field is a sheet specific description field to help identify the room(s) that are on the current sheet. This property **shall** be used on all applicable sheets.

5.14. Facility Drafting Basics

5.14.1. When finishing a drawing (model or layout space), the drawing shall be zoomed to extents before closing.

5.14.2. The engineer shall purge blocks and audit drawings when completed.

5.14.3. Exploding blocks should be avoided when possible.

5.14.4. The ***Master Model Space*** drawing shall always be used for drafting.

5.14.5. There shall be only one layout per sheet.

5.14.6. Layer 0 shall never be drafted on.

5.14.7. Blocks should always be built on layer 0. This is so the block will take on the attributes of the layer it is assigned to.

5.14.8. When drafting, objects should not be placed, created or moved at random distances. Specific distances should be used.

5.16. Signal Flow Drafting Basics

5.16.1. When finishing a drawing (model or layout space), the drawing shall be zoomed to extents before closing.

5.16.2. The engineer shall purge blocks and audit drawings when completed.

5.16.3. The Master Model Space drawing shall always be used for drafting.

5.16.4. There shall be only one layout per sheet.

5.16.5. The grid shall be set to .375.

5.16.6. All blocks, cable labels, flags and room borders shall be snapped to the grid.

5.16.7. Signal Flow blocks shall always be built on the **TA-FLOW-DEVC** layer.

5.16.8. All text in a signal flow block shall be on the **TA-FLOW-ANNO** layer.

5.16.9. Signal flow blocks shall be inserted on the **TA-FLOW-DEVC** layer.

5.16.10. PLINES shall be used for drawing connections between devices. These shall always be on the **TA-FLOW-CABL** layer.

5.16.11. Cable label blocks shall be on the **TA-FLOW-LABL** layer.

5.16.12. On/Off page flags shall be on the **TA-FLOW-FLAG** layer.

5.16.13. Notes or other annotations shall be on the **TA-FLOW-ANNO** layer.

5.17. Scale

5.17.1. The model space scale shall be to the scale that is being drafting for.

5.17.2. This is critical for placing model views on sheets

5.17.3. This is critical for eliminating confusion and errors when using annotative objects

5.17.4. Turn off the AutoScale system variable.

5.17.5. Refer to the L3AV AutoCAD Setup Guide for more information.

5.18. Lines

5.18.1. Polylines (PLINES) shall always be used for drawing.

5.18.2. Lines shall not be used.

5.19. Dimensions

5.19.1. The “**L3AV”** dimension style shall be used for all dimensioning.

5.19.2. If there are questions about when not to use annotative objects, ask the CAD Manager.

5.19.3. Refer to the L3AV AutoCAD Setup Guide for more information.

5.20. NOTATIONS

5.20.1. Notations shall be used for the following reasons:
5.20.2. Inform users as to the execution of the design.
5.20.3. Provide additional information about the design.
5.20.4. Identify products, materials, components, or assemblies in the design.
5.20.5. Brevity should be a guideline for writing notations.
5.20.6. The text style "**L3AV**" shall be the default text style.
5.20.7. The font shall be "Segoe UI Semi-Light".
5.20.8. Text size for standard notation shall not exceed 1/4" (0.25) annotative.
5.20.9. Text size shall not be smaller than 3/32" (0.09375) annotative.
5.20.10. Refer to the L3AV AutoCAD Setup Guide for more information.

5.21. LEADERS

5.21.1. Leaders shall be used when identifying equipment/components, calling out notes for specific area & identifying locations on plans
5.21.2. The "**L3AV**" leader style shall be the default leader style.
5.21.3. Always used closed arrowhead at 1/8" (0.125)
5.21.4. Breaks and landings should be 3/32" (0.09375)
5.21.5. Text size shall be 1/8" (.125)
5.21.6. Positioning should be middle of text for either side.
5.21.7. Refer to the L3AV AutoCAD Setup Guide for more information.

5.22. CROSS-REFERENCING

5.22.1. Cross-referencing refers to the use of callout symbols on one page to point to a different view or detail that is located on another page.
5.22.2. The use of sheet set manager will automate the information in these call out symbols but will still require the draftsperson to place them.
5.22.3. Refer to section 7 for a full list of symbols

5.23. XREFS

5.23.1. XREFS (External References) are separate .dwg files that are inserted into the current drawing.
5.23.2. The two main XREF files that are used are:

- The "TA-XREF-TTLB-36X24.dwg" file (the L3AV TitleBlock drawing file).
- Facility CAD drawings provided by an architect/client.

5.23.3. The "TA-XREF-TTLB-36X24.dwg" file shall not be renamed.
5.23.4. CAD files that are provided by an architect/client shall be "cleaned".
5.23.5. Refer to the L3AV AutoCAD Drafting Manual for more information.

6. TERMS AND ABBREVIATIONS

6.1. PURPOSE

6.1.1. The Terms and Abbreviations Module establishes guidelines for consistent terminology used in the construction industry. Consistent terms ensure clear and concise communication among the architect, owner, contractor, and consultants. The purpose of this section is to provide a standard list of terms and abbreviations.

6.2. OBJECTIVE

6.2.1. The objective of this section to provide a standardized resource for construction terms and their abbreviations. It is not the objective of this Mmodule to encourage the use of abbreviations. Whenever possible, terms should be spelled out and abbreviations should be used only to reduce time and space or where appropriate to improve clarity.

6.2.2. The increased use of computer aided drafting (CAD) has reduced the time required for writing text and notes on drawings, and the need for abbreviations.

6.2.3. The use of obscure or undefined abbreviations results in a flawed project.

6.2.4. When the meaning of an abbreviation is in doubt, spell it out!

7. SYMBOLS

7.1. INTRODUCTION

7.1.1. This section compiles a full range of standard symbols used by L3AV on a consistent basis. Covered in this section are standard symbols, their graphic representation, and their role in creating, understanding, and fulfilling the intent of the drawing set. These symbols are modified versions of the Standard NCS (National CAD Standard) symbols. The modifications are mainly cosmetic and the core structure of the symbols still meets the standard.

7.2. OBJECTIVE

7.2.1. The objective of this section is to provide a standardized resource for L3AV's symbols as well as standard construction symbols, with emphasis on the benefits of consistent graphic representation. The increased use of computer-aided drafting (CAD) has assisted in reducing the time required for managing and creating construction documents and the symbols used.

7.3. DEFINITIONS

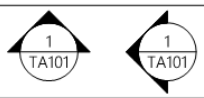
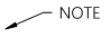
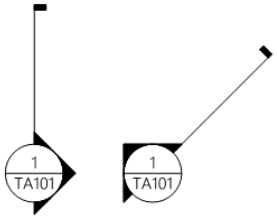
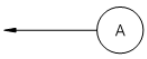
7.3.1. Symbols used in drawings are scale dependent, independent, or both.

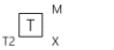
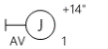
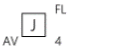
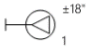
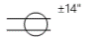
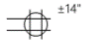
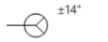
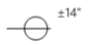
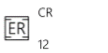
- Scale Dependent: Actual printed size of the symbol depends on the scale of the drawing or view of the model.
- Scale Independent: Actual printed size of the symbol is consistent no matter what the drawing scale. The size is related only to clarity and interpretation.

7.3.2. All the symbols that L3AV uses are scale dependent and are annotative.

7.4. SYMBOLS LIST

O = OBJECT R = REFERENCE T = TEXT

DESCRIPTION	TYPE	SYMBOL
DRAWING BLOCK TITLE, TYPICAL	R	
ELEVATION INDICATOR	R	
KEYNOTE INDICATOR; TYPICAL FOR GENERAL NOTES	R	
REVISION INDICATOR, DELTA	R	
LEADER; CLOSED FILLED ARROW; 1/8" TEXT; TYPICAL FOR SPECIAL NOTES	T	
NORTH INDICATOR	R	
SECTION INDICATOR	R	
DETAIL CALLOUT; STANDARD/XL; TYPICAL FOR OFF PAGE DETAILS	R	
TAG; TYPICAL FOR ON PAGE DETAILS	R	
SHEET CALLOUT; TYPICAL FOR KEY PLANS	R	
STANDARD BREAK LINK	R	
BREAK, ROUND; TYPICAL FOR CONDUIT BREAKS	R	

TYPICAL MOUNTED DEVICE	R	 WALL MOUNTED	 CEILING MOUNTED	 FLOOR MOUNTED	M = MOUNTING TYPE/HEIGHT T = PRIMARY TECHNOLOGY T2 = SECONDARY TECHNOLOGY X = SCHEDULE REFENCE
JUNCTION BOX; FOR AV; TYPICAL	R	 WALL MOUNTED	 CEILING MOUNTED	 FLOOR MOUNTED	
DATA CONNECTION; SCHEDULE REFERENCE = # PORTS; TYPICAL	R	 WALL MOUNTED	 CEILING MOUNTED	 FLOOR MOUNTED	
TEL/DATA CONNECTION; SCHEDULE REFERENCE = # PORTS; TYPICAL	R	 WALL MOUNTED	 CEILING MOUNTED	 FLOOR MOUNTED	
TEL CONNECTION; SCHEDULE REFERENCE = # PORTS; TYPICAL	R	 WALL MOUNTED	 CEILING MOUNTED	 FLOOR MOUNTED	
ELECTRICAL, RECEPTACLE, DUPLEX; # = MOUNTING HEIGHT; TYPICAL	O	 WALL MOUNTED	 CEILING MOUNTED	 FLOOR MOUNTED	
ELECTRICAL, RECEPTACLE, QUADREPLEX; # = MOUNTING HEIGHT; TYPICAL	O	 WALL MOUNTED	 CEILING MOUNTED	 FLOOR MOUNTED	
ELECTRICAL, RECEPTACLE, TWIST LOCK; # = MOUNTING HEIGHT; TYPICAL	O	 WALL MOUNTED	 CEILING MOUNTED	 FLOOR MOUNTED	
ELECTRICAL, RECEPTACLE, SINGLE; # = MOUNTING HEIGHT; TYPICAL	O	 WALL MOUNTED	 CEILING MOUNTED	 FLOOR MOUNTED	
ELECTRICAL, 120 VAC, TO MOTOR POWER FEED; TYPICAL FOR PROJECTION SCREENS	R				
FLOOR POKE THROUGH; TYPICAL	O				
EQUIPMENT RACK; M = MOUNTING TYPE; X = RACK UNITS; TYPICAL	O	 TYPICAL	 FREE STANDING	 CREDENZA	

8. LAYERS

8.1. OVERVIEW

8.1.1. Virtually all vector-based CAD systems support the concept of layers. This function allows building design information to be organized in a systematic fashion, facilitates the visual display of the information on a computer screen, and allows the information to be efficiently converted to the conventional print media of drawings. Efficient use of layers can reduce document preparation time and improve document coordination. Organizing data by layers allows a single CAD file to contain a wealth of information about a building or facility. By turning selected layers on or off, data can be created, reviewed and edited per a hierarchy that simulates the physical organization of building systems, the relative position of building elements, or the sequence of construction.

8.2. LAYER NAMING FORMAT

8.2.1. There are three defined layer name data fields:

- **Discipline Designator**

A	**A**	-	D	D	D	D	-	M	M	M	M	-	U	U	U	U

Discipline Designator

- **Major Group**

A	A	-	**D**	**D**	**D**	**D**	-	M	M	M	M	-	U	U	U	U

Major Group

- **Two (2) Minor Groups**

A	A	-	D	D	D	D	-	**M**	**M**	**M**	**M**	-	U	U	U	U

Minor Group 1

A	A	-	D	D	D	D	-	M	M	M	M	-	**U**	**U**	**U**	**U**

Minor Group 2

T	A	-	C	L	N	G	-	E	Q	P	M	-	A	N	N	O

Example layer name

***A** = discipline designator*

***D** = major group*

***M** = minor group 1*

***U** = minor group*

8.2.1. The Discipline Designator and Major Group fields are mandatory. The Minor Group and Status fields are optional. Each data field is separated from adjacent fields by a dash ("-") for clarity.

8.3. LAYER LIST

Name	Color	Linetype	Plot
0	white	Continuous	TRUE
Defpoints	white	Continuous	FALSE
TA-ANNO	white	Continuous	TRUE
TA-ANNO-DIMS	red	Continuous	TRUE
TA-ANNO-NOTE	magenta	Continuous	TRUE
TA-ANNO-SYMB	120	Continuous	TRUE
TA-CLNG	8	Continuous	TRUE
TA-CLNG-ANNO	white	Continuous	TRUE
TA-CLNG-ELEC-ANNO	cyan	Continuous	TRUE
TA-CLNG-ELEC-DIMS	red	Continuous	TRUE
TA-CLNG-ELEC-SYMB	cyan	Continuous	TRUE
TA-CLNG-EQPM-ANNO	green	Continuous	TRUE
TA-CLNG-EQPM-DEVC	green	Continuous	TRUE
TA-CLNG-EQPM-DIMS	red	Continuous	TRUE
TA-ELEC-ANNO	cyan	Continuous	TRUE
TA-ELEC-COND	cyan	Continuous	TRUE
TA-ELEC-DEVC	cyan	Continuous	TRUE
TA-ELEC-DIMS	red	Continuous	TRUE
TA-ELEC-FRRN-CABL	red	DASHED2	TRUE
TA-ELEC-SYMB	cyan	Continuous	TRUE
TA-ELEC-WHIP	cyan	Continuous	TRUE
TA-ELEV-BASE	8	Continuous	TRUE
TA-ELEV-FURN	9	Continuous	TRUE
TA-EQPM-ANNO	green	Continuous	TRUE
TA-EQPM-DEVC	green	Continuous	TRUE
TA-EQPM-DIMS	red	Continuous	TRUE
TA-FLOR	8	Continuous	TRUE
TA-FLOR-ANNO	white	Continuous	TRUE
TA-FLOR-ELEC-ANNO	cyan	Continuous	TRUE
TA-FLOR-ELEC-DIMS	red	Continuous	TRUE
TA-FLOR-ELEC-SYMB	cyan	Continuous	TRUE
TA-FLOR-EQPM-ANNO	green	Continuous	TRUE
TA-FLOR-EQPM-DEVC	green	Continuous	TRUE
TA-FLOR-EQPM-DIMS	red	Continuous	TRUE

TA-FLOW-ANNO	white	Continuous	TRUE
TA-FLOW-CABL	cyan	Continuous	TRUE
TA-FLOW-DASH	241	DASHED2	TRUE
TA-FLOW-DEVC	green	Continuous	TRUE
TA-FLOW-EQPM	green	Continuous	TRUE
TA-FLOW-FLAG	150	Continuous	TRUE
TA-FLOW-LABL	magenta	Continuous	TRUE
TA-NPLT	yellow	Continuous	FALSE
TA-REVS-001	244	Continuous	TRUE
TA-SPKR-COVR	141	PHANTOM2	TRUE
TA-SPKR-LINE	141	Continuous	TRUE
TA-TTLB	white	Continuous	TRUE
TA-TTLB-CPEL	white	Continuous	TRUE
TA-TTLB-LOGO	255,255,255	Continuous	TRUE
TA-TTLB-TEXT	white	Continuous	TRUE
TA-VPRT-NPLT	140	Continuous	FALSE
TA-VPRT-PLOT	magenta	Continuous	TRUE
TA-XREF	8	Continuous	TRUE
TA-XREF-ANNO	9	Continuous	TRUE
TA-XREF-CLNG	8	Continuous	TRUE
TA-XREF-DATA	9	Continuous	TRUE
TA-XREF-ELEC	9	Continuous	TRUE
TA-XREF-FLOR	8	Continuous	TRUE
TA-XREF-FURN	9	Continuous	TRUE
TA-XREF-OTLN	magenta	DASHED	TRUE

9. SHEET SET MANAGER

9.1. OVERVIEW

9.1.1. Sheet Set Manager is a project management tool that organizes and automates many aspects of the drawing set. The best way to think of Sheet Set Manager is to imagine it as a database where all the project meta data is stored. Everything from the client name to sheet titles to elevation callouts will be handled by Sheet Set Manager. This is all done through text fields and sheet set properties.

9.1.2. Sheet Set Manager shall be used exclusively for all drawing sets.

9.1.3. Refer to the L3AV AutoCAD Drafting Guide for more information.

9.2. MAIN FUNCTIONS

9.2.1. Sheet Set Manager shall be used to:

- Create all sheets and master model spaces.
- Manage all meta information in the drawing set. (Client Name, Project Name, Project Number, etc.)
- Manage the sheet index(es).
- Manage all view titles and cross-referencing symbols.
- Manage all model views.
  - Model views shall be named in a logical manner.
- Manage all sheet views.
  - Sheet views shall be organized using the predefined categories.
  - More categories may be created to provide more accurate organization.

9.2.2. All blank sheet set/sheet property fields shall use the "_BLANK CELL-COPYTHIS" field.