

ANSI/CEA/CEDIA/InfoComm Standard

Audio, Video and Control Architectural
Drawing Symbols Standard

ANSI-J-STD-710
(CEA/CEDIA-2039)

January 2015



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FOREWORD

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Contents

1. Scope	1
2. References.....	1
2.1. Normative References.....	1
2.1.1. Normative Reference List.....	1
2.1.2. Normative Reference Acquisition.....	1
2.2. Informative References.....	1
2.2.1. Informative Reference List	1
2.2.2. Informative Reference Acquisition.....	2
2.3. Compliance Notice	2
2.4. Abbreviations.....	3
2.5. Definitions	3
3. Symbols	7
3.1. Overview.....	7
3.2. Categories	8
3.3. Optional Attributes	9
3.4. Symbol Alignment and Attribute Interference.....	9
3.4.1. Mounting Attribute Guidelines.....	10
3.4.2. Other Methods to Show Device Mounting.....	11
3.4.3. Wall Leader Lines.....	11
3.4.4. Optional Callout Tags	11
3.5. Symbol Stretching	13
3.6. Legends and Schedules	13
3.6.1. Legend Guidelines	14
3.6.2. Schedule Guidelines.....	14
3.7. Symbols Summary	15
ANNEX A. Symbols Table.....	17
ANNEX B. Sample Drawings	29
ANNEX C. Abbreviations	43
ANNEX D. Design Principles for Symbol Usage (Normative)	54
D.1. General Design Principles for CAD and Hand Drawings.....	54
D.1.1. The Architectural Plan	54
D.1.2. Other Architectural Scale Principles.....	56
D.1.3. Drawing Paper Sizes.....	57
D.1.4 Drawing Scale.....	57
D.1.5. Summary of Scale Factors and Text Size for Common Paper Sizes	58
D.1.6. Examples Using Architectural Scale Principles	59
D.1.7. Symbol Stretch	61
D.1.8. Symbol Insertion Base Point Guideline	62
D.1.9. CAD Principles for Symbol Creation.....	63

Audio, Video and Control Architectural Drawing Symbols Standard

1. Scope

This document provides a standardized set of architectural floor plan and reflected ceiling plan symbols for audio, video and control systems, with associated technologies such as environmental control and communication networks. It also includes descriptions and guidelines for the use of these symbols.

2. References

2.1. Normative References

The following specifications and documents contain provisions that, through reference in this text, constitute normative provisions of this standard. At the time of publication, the editions indicated were valid. All specifications and documents are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the specifications and documents listed here.

2.1.1. Normative Reference List

CSI MasterFormat (2012)

ISO 13567-2: 1998, Technical product documentation – Organization and naming of layers for CAD – Part 2: Concepts, format and codes used in construction documentation

U.S. National CAD Standard, V5, Uniform Drawing System Module 3 – Schedules, Module 5 – Terms and Abbreviations, Module 6 – Symbols (2011)

2.1.2. Normative Reference Acquisition

The Construction Specifications Institute (CSI); 110 South Union Street, Suite 100, Alexandria, VA 22314; Phone: 800-689-2900; Fax: 703-236-4600; www.csinet.org

International Organization for Standardization, ISO Central Secretariat, 1, ch. de la Voie-Creuse, CP 56 - CH-1211 Geneva 20, Switzerland; Phone: +41 22 749 01 11; Fax: +41 22 733 34 30; www.iso.org

National Institute of Building Sciences, 1090 Vermont Avenue N.W., Suite 700, Washington, DC 20005; Phone: 202-289-7000; Fax: 202-289-1092; www.nibs.org

2.2. Informative References

The following specifications and documents contain provisions that, through reference in this text, constitute informative provisions of this standard. At the time of publication, the editions indicated were valid. All specifications and documents are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the specifications and documents listed here.

2.2.1. Informative Reference List

ANSI/TIA/EIA-606-A, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings, May (2002)

ANSI/ASHRAE-134-2005, Ventilating, Air-Conditioning, and Refrigerating Systems, February (2005)

BICSI ITS Dictionary, Third Edition, (2006)

CEA TechHome Planning Symbols, (2009)

IEC 60617-DB-12M – Graphical Symbols for Diagrams, May 2012

ISO 81714-1:2010 Design of graphical symbols for use in the technical documentation of products - Part 1: Basic rules

ISO 5455:1979 Technical drawings -- Scales

ISO 3098-0:1997 Technical product documentation -- Lettering.

NECA 100-2013 Symbols for Electrical Construction Drawings (ANSI)

Security Industry Association, Architectural Graphics Standard-CAD Symbols for Security System Layout Release 2.0, (2000)¹

U.S. National CAD Standard, V4, Uniform Drawing System, pg. UDS-04.34, (2007)

U.S. National CAD Standard, V5, Uniform Drawing System Module 3 and 5 – Schedules; Module 6, Div. 28 Symbols, (2011)

2.2.2. Informative Reference Acquisition

American National Standards Institute (ANSI), 25 West 43rd Street, 4th Floor, New York, NY 10036; Phone: 212-642-4900; Fax: 212-398-0023; www.ansi.org

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), 1791 Tullie Circle, N.E., Atlanta, GA 30329; Phone: 404-636-8400; Fax: 404-321-5478; www.ashrae.org

BICSI, 8610 Hidden River Parkway, Tampa, FL 33637; Phone: 813-979-1991; www.bicsi.org

Consumer Electronics Association (CEA), 1919 S. Eads St., Arlington, VA 22202; Phone: 703-907-7060; www.ce.org

IEC, IEC Webstore <http://webstore.iec.ch/>

International Organization for Standardization, ISO Central Secretariat, 1, ch. de la Voie-Creuse, CP 56 - CH-1211 Geneva 20, Switzerland; Phone: +41 22 749 01 11; Fax: +41 22 733 34 30; www.iso.org

NEIS, NECA Order Desk at (301) 215-4504 tel, (301) 215-4500 fax, or orderdesk@necanet.org, or www.neca-neis.org/standards

Security Industry Association (SIA), 635 Slaters Lane, Suite 110, Alexandria, VA 22314; Phone: 703-683-2075; Fax: (703) 683-2469; www.siaonline.org

National Institute of Building Sciences (NIBS), 1090 Vermont Avenue N.W., Suite 700, Washington, DC 20005; Phone: 202-289-7000; Fax: 202-289-1092; www.nibs.org

2.3. Compliance Notice

As used in this document, “shall” and “must” denote mandatory provisions of the standard. “Should” denotes a provision that is recommended but not mandatory. “May” denotes a feature whose presence does not preclude compliance, and implementation of which is optional. “Optional” denotes items that may or may not be present in a compliant symbol.

¹ Reprinted from the Security Industry Association, Architectural Graphics Standard-CAD Symbols for Security System Layout Release® with permission from the Security Industry Association; SIA Copyright 2011

2.4. Abbreviations

ANSI – American National Standards Institute
BIM – Building Information Modeling
CAD – Computer Aided Design
CADD – Computer Aided Design and Drafting
CEA – Consumer Electronics Association
CEDIA – Custom Electronic Design and Installation Association
CSI – Construction Specifications Institute
ISO – International Organization for Standardization
NCS – National CAD Standard
NIBS – National Institute of Building Sciences
RCP – Reflected Ceiling Plan
SIA – Security Industry Association
UDS – Uniform Drawing System

2.5. Definitions

American National Standards Institute (ANSI) – a private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems and personnel in the United States.

Architectural Drawing – a technical drawing of a building or space that indicates structure and makeup with reference to dimensions, material types and relationships between different installed elements.

Attribute – a specific characteristic of a construction element or device that can be represented by abbreviated text placed next to the device's symbol. For example, the letter "C" could indicate a ceiling-mounted loudspeaker. In this standard, the four primary symbol attributes are: M for Mount, T for Primary Technology, T2 for Secondary Technology and X for Legend or Schedule Reference.

AutoCAD® – a software program for creating 2D and 3D drawings developed and marketed by Autodesk®, Inc.

Building Information Modeling (BIM) – the process of generating and managing building data during the building's life-cycle. BIM involves representing a design as objects that carry their geometry, relations and attributes. BIM software design tools allow for extracting different views from a building model for drawing production and other uses. More than just a collection of drawings, it includes product specifications, team schedules, costing, collision detection and information for maintenance. www.nibs.org

Building Model – refers to an electronic representation of a building.

buildingSMART Alliance – an industry consensus-driven organization responsible for establishing and maintaining the U.S. National CAD Standard and U.S. National BIM Standards. They are also responsible to work with other countries in building documentation. Formerly was known as the Facilities Information Council.

Computer Aided Design (CAD) or Computer Aided Design and Drafting (CADD) – refers to the use of a computer to create design documents in fields such as engineering or architecture. The computer's graphics capabilities replace work traditionally done with pencil and paper.

Callout Tag – a shape containing abbreviated or explanatory text that references symbols or architectural details via a leader line.

Construction Documents – the drawings and written specification documents assembled to communicate project design for construction and administration of the construction contract.

Construction Specifications Institute (CSI) – an organization that maintains and advances the standardization of building information management and education of project teams to improve facility performance.

Drawing Area – refers to the portion of a drawing sheet containing the scaled representation of the model. In **AutoCAD®** this is often called a Viewport. A single drawing sheet may have several drawing areas. This technique is often used to show details and each drawing area will have its own drawing scale.

Drawing Layer – a component of CAD software that enables the user to organize information in a drawing on different virtual drawing overlays so they can be viewed separately. For example, separate layers might be made for AV equipment, light fixtures and HVAC ducts.

Drawing Program – a computer program or hand drawing where the paper size is selected and all other objects are scaled down to fit on the paper.

Drawing Scale – defines the specific ratio between the dimensions of an object or structure drawn on paper and the full-scale dimensions. The drawing scale relationship is presented as one drawing unit = one full-scale unit (e.g., ANSI: $\frac{1}{4}" = 1' 0"$ or ISO: 1:50).

Drawing Scale Marker – a linear marker or symbol placed on a drawing to graphically show $\frac{1}{2}$, 1 and 2 times the scale based upon the drawing dimension units (e.g., mm, cm, inches or feet).

For example, when using the US Customary system (ANSI), $\frac{1}{8}" = 1$ foot, this means $\frac{1}{8}"$ length on the drawing is equal to a one foot length in reality.

When using the metric system (ISO or SIA), 1/100 is the most common scale for architectural drawings, where one unit of length on a drawing equals 100 units of the same length in reality.

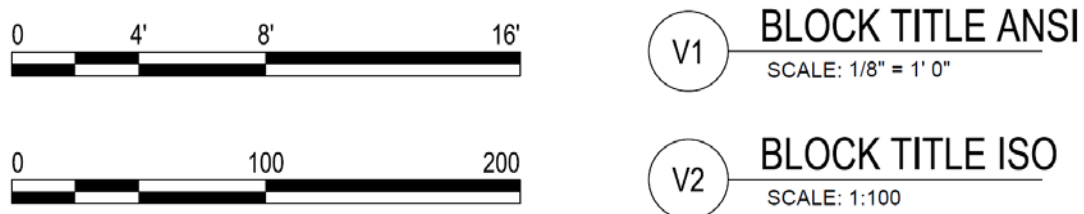


Figure 1: Drawing Scale Marker Examples

Drawing Schedule – a document identifying all the architectural drawings in a package of information for the construction of a building, system or other element. Typically the schedule will define a numbering system, titles of drawings, revision status and other core information to assist the reader in finding the drawing they wish to review.

Drawing Set – the set of drawing sheets included in the construction contract documents.

Elevation – an architectural drawing type representing a horizontal view of a vertical wall or element in a building. Typically used to indicate the height devices are mounted and specific construction details for items such as built-in furniture, windows and doors.

Floor Plan – an architectural drawing representing the vertical view (from above) of the floor of a building, including indications of all walls, doors, windows and other items. Depending on the type of floor plan (General Arrangement, Partitions, etc.), portable items such as desks, chairs and the like may or may not be shown.

Icon – a drawing, picture or symbol resembling and representing a device, object or concept. The word icon is often interchangeable with symbol.

International Organization for Standardization (ISO) – a non-governmental network made up of one representative from the National Standards Institute of 148 countries. ISO publishes worldwide proprietary, industrial and commercial standards.

J-STD 710 – refers to this standard of Audio, Video and Control Architectural Drawing Symbols, a joint standard with a set of symbols created and owned by CEA, CEDIA and InfoComm International.

Leader – a line or a spline (curved line) that connects a note, dimension or symbol to a point or item. A leader line **may** have an optional arrowhead.

Legend – a table or list on an architectural drawing identifying what each symbol represents. It often is placed in the drawing title block. A legend normally has two columns of paired information, the symbol and the description, but may also include a reference column with a link to more information located elsewhere in the drawing. A legend is also known as a key, list or index. Legends are not schedules.

MasterFormat® – a classification and indexing system for organizing construction data, particularly construction specifications. This master list of numbers and titles classified by work results or construction practices is used primarily to organize project manuals, detailed cost information and relate drawing notations to specification sections.

Master Format Number – a classification and indexing system for organizing construction data, particularly construction specifications. This master list of numbers and titles classified by work results or construction practices is used primarily to organize project manuals, detailed cost information and relate drawing notations to specification sections.

Model Space – refers to drawing an object or structure in AutoCAD at full-scale where one drawing unit represents the actual size unit (e.g., one inch drawing unit = one inch actual dimension). For example, a 20' x 30' (6m x 0.9m) room would be drawn using one-foot drawing units. There is no scaling within Model Space.

Mounting Type – the method of attaching a device and may be identified on an architectural drawing by the abbreviated text of an attribute of a symbol (e.g., W-Wall, C-Ceiling, F-Floor)

National CAD Standard (NCS) – a collaborative effort in the United States between the National Institute of Building Sciences (NIBS), the American Institute of Architects (AIA), and the Construction Specifications Institute (CSI). The result is a unified approach to the organization, classification and collaboration of electronic building design data integrated into CAD software and Building Information Modeling, BIM. The complete name of the NCS is the U. S. National CAD Standard for Architecture, Engineering and Construction (A/E/C).

National Institute of Building Sciences (NIBS) – a non-profit, non-governmental organization that successfully brings together representatives of government, the professions, industry, labor and consumer interests and regulatory agencies to focus on the identification and resolution of problems and potential problems that hamper the construction of safe, affordable structures for housing, commerce and industry in the United States.

Paper Space – refers to the scaled representation of an AutoCAD model on paper, known as the layout view. For example, a 20' x 30' (6m x 9m) room in Model Space (actual size) would need to be scaled down significantly to fit on E-Size --34" x 44" (860x1120 mm) paper.

Port – a wired interface. In a building it is usually a wall, floor or ceiling-mounted plate used for connecting external electronic equipment.

Primary Technology – an abbreviated text attribute of a symbol representing the device's most important feature or type. For example, the primary technology attribute of a loudspeaker symbol could be M for Monitor or S for Subwoofer.

Reflected Ceiling Plan (RCP) – a drawing which shows the items located on the ceiling of a room or space. It is called "reflected" because it is drawn to display a view of the ceiling as if it was reflected onto a mirror on the floor. The RCP has the same orientation as the floor plan associated with it.

Scale – the ratio of measuring units expressing a proportional relationship between a drawing and the full-size item it represents. Common drawing scales used on architectural drawings from ANSI are $1/4" = 1' 0"$ or $1/8" = 1' 0"$, and from ISO are 1:50 or 1:100.

Schedule – a grouping of related devices or materials presented in table form with a heading. The information is organized in rows and at least three columns to easily present related information. Schedules are typically placed in the General Schedules section in a drawing set or in a separate document from the drawing set. If the schedule is small, it **may** be placed directly on the drawing page.

Secondary Technology – an abbreviated text attribute of a symbol representing the device's second most important feature or type. For example, the secondary technology attribute of a loudspeaker symbol could be P for Powered or WLS for Wireless.

Security Industry Association (SIA) – a trade association representing the manufacturers, service providers and integrators of electronic physical security equipment.

Symbol – a graphical representation of a device or object by association, resemblance or convention used in a diagram or architectural drawing.

Symbol Model Size – refers to the floor plan symbol which has been scaled In Model Space (where $1" = 1"$ or 25.4mm x 25.4mm) using the scaling factor so that the symbol will be $1/4" \times 1/4"$ (6.35mm x 6.35mm) in paper space [e.g., in $1/8"$ scale, the symbol is scaled by 96X and 96Y (@1:100, the symbol is scaled by 100X and 100Y)].

Symbol Stretch – refers to adjusting the Floor Plan Symbol to appear more closely to the actual shape or size of the object the symbol represents, along either the X or Y plane, or both the X and Y planes.

Tag – an abbreviated way to communicate additional properties for a drawing object on an architectural drawing. The tag is normally a square, hexagon or circle shape with three attributes plus a leader line connecting the tag to the drawing object.

Text Height – the height of the text in a symbol block or shape on a printed architectural drawing. Dependent upon the selected drawing software and the font type, printed text height will vary. For example, in Visio CAD software, an Arial Standard 9 pt font gives the text height of $3/32"$.

Title Block Area – the portion of a drawing sheet containing project, client, designer, sheet identification, sheet revision and sheet management information. The title block area is normally on the right side border of the sheet.

Uniform Drawing System (UDS) – a uniform set of standards made up of eight 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. UDS includes such information as title blocks, drawing naming, schedules, line widths and terms/abbreviations.

Visio® – a Microsoft Windows software program that uses vector graphics to create 2D technical diagrams.

3. Symbols

3.1. Overview

Standardized symbols offer a simple, yet powerful, way to communicate technologies in architectural drawings for use by architects, designers, builders, integrators and installation contractors. Symbols were created to be hand-drawn and implemented in CAD or BIM software.

Architects, designers and installation contractors should use these symbols to indicate device locations on all floor plan and reflected ceiling plan documentation. Sample plans are included in this standard to demonstrate use of the symbols.

Manufacturers should incorporate symbols in their documentation and training where applicable.

Manufacturer user manuals should indicate the use of symbols and reinforce this standard.

It is recognized that while a set of symbols is included in this standard, there may be circumstances in which the defined symbols are inappropriate for project requirements. This type of situation may relate to technologies developed after this standard's release or to particular approaches to project documentation in a given region, country, project or design process.

In such circumstances, it is acceptable to use alternative symbol representations, provided the following guidelines defined in this standard regarding Scale, Scaling, Attributes, Tags, Legends and Schedules are followed.

Some existing symbols from the National CAD Standard (NCS)² are included as a service to the audio/video industry to provide a baseline of commonly used symbols from affiliated industries. New symbols in this standard were designed based on the following criteria:

- Compliant with the National CAD Standard
- Simple and recognizable shapes
- Easily CAD-drawn, and hand-drawn for use in the field
- Flexible text attributes to allow for an unlimited number of device variations
- Flexible callout tags to allow for extensive installation information
- Use of common industry terms and abbreviations

A symbol consists of a circle, square or distinctive shape. All distinctive shaped symbols **must** fit within the boundaries of a 3/8" (10mm) circle.

See **Annex D** for additional information on use of symbols in CAD software.

All symbols, line weights and text, as identified in **Figure 2** below, **must** appear at these specifications when drawn or printed at the original drawing scale.

Dependent upon the selected drawing software and the font type, printed text height will vary. For example, in Visio CAD software, an Arial Standard 9 point font gives the text height of 3/32".

Symbols and text height **must** conform to the following parameters as shown in **Figure 2**.

² Reprinted from the United States National CAD Standard® with permission from the National Institute of Building Sciences; NIBS Copyright 2011

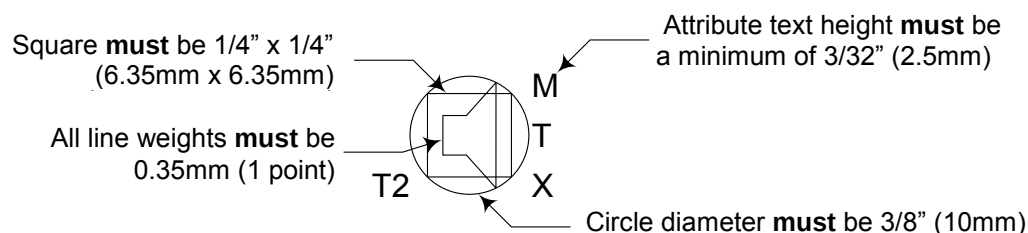


Figure 2: Basic Symbol Geometry

3.2. Categories

Each symbol belongs to a category and represents a unique device or technology. A total of eight categories are used to organize the symbols as shown in **Table 1** below.

The symbols included here represent the common ones used in audio, video and control technologies. For additional electrical, security and other technology symbols not shown here, refer to the appropriate industry associations.

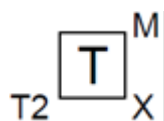
Category	Category Name	MasterFormat #
1	Audio – Video Systems	27 41 00
2	Communications	27 00 00
3	Electronic Safety and Security	28 00 00
4	Heating, Ventilating and Air Conditioning (HVAC) / AIRCON	23 00 00 23 09 00
5	Control	25 00 00 Integrated Automation 27 00 00 Audio – Video Systems 28 00 00 Electronic Safety and Security
6	Vacuum Cleaning Systems	11 24 19
7	Furnishings	12 00 00 27 00 00
8	Electrical	26 00 00

Table 1: Symbol Categories

3.3. Optional Attributes

Special characteristics of a device, called attributes, may be represented by abbreviated text inside or near the symbol. The use of any attributes is optional but can be helpful to quickly and easily show certain device characteristics on the plans. Attributes may also be applied to symbols not included in this standard, such as electrical or international symbols.

Up to four text attributes may be used. Text attributes may be positioned as shown in **Figure 3**.



M = Mounting Type

T = Primary Technology -- key description of the symbol

T2 = Secondary Technology -- attribute to further explain the technology

X = Legend or Schedule Reference -- alphanumeric characters linking the symbol to a drawing legend or schedule

Optional placement of Primary Technology attribute may be centered in the symbol as shown in **Figure 4**.



Figure 4: Optional Placement

When attributes are used, a Legend **must** clearly define the abbreviated text. For example, if a loudspeaker symbol has attribute "C" for Mount, the Legend **must** indicate "C" means "Ceiling." See **Figure 5** for symbol without attributes and **Figure 6** for a symbol with attributes.

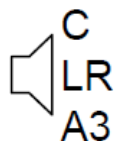


Figure 5: Loudspeaker without Attributes

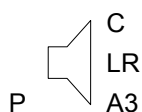


Figure 6: Loudspeaker with All 4 Attributes

Mounting type: C = Ceiling
 Primary Technology: LR = LR Bar Speaker
 Schedule Reference: A3 = Refer to Schedule
 Secondary Technology: P = Powered

See **Section 3.6 Legends and Schedules**

See **Annex C** for detailed information on Abbreviations

3.4. Symbol Alignment and Attribute Interference

Each symbol is typically aligned with the associated architectural element. For example, a masking screen would be aligned with the wall as shown in **Figure 7**.

Attributes should not overlap elements on floor plan drawings such as walls, borders or other graphic objects. Attributes may be mirrored or moved away from overlapping objects, and may also be rotated as shown in **Figure 7**.

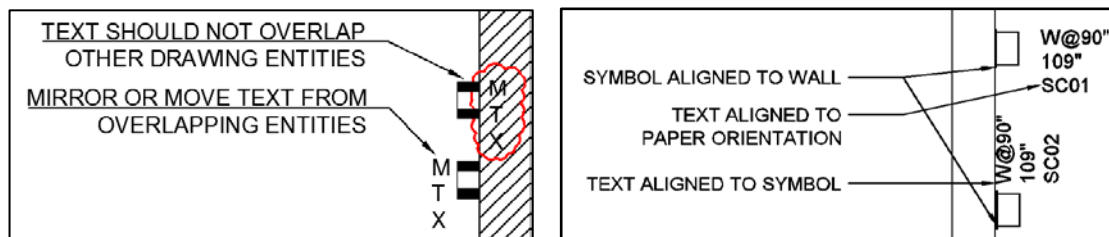


Figure 7: Symbol Alignment to Architectural Elements and Alternate Text Placement

3.4.1. Mounting Attribute Guidelines

Mount attributes may include the placement and position of mounting. For example, a thermostat uses “W48” as a Mount attribute, referencing “Wall-mounted at 48 inches above floor level”.

Avoid using the same abbreviated text or reference for different attributes. For example, if “C” is used as a Mount attribute for “Ceiling” loudspeaker, avoid using “C” for “Concealed” camera and instead consider “REC” for “Recessed.”

Mount Type	Abbreviation	Mount Type	Abbreviation
CEILING	C	OUTDOOR	O
DESK/TABLE	D	PEDESTAL	P
FLUSH	F	RACK	RK
FLOOR	FL	ROOF	R
GROUND	G	RECESSED	REC
HIDDEN	H	SURFACE	S
MULLION	M	WALL	W

Table 2: Common Mounting Abbreviations

While many engineers include additional mounting information on legends or schedules, it is also possible to add the elevations in the attribute, see **Table 3**.

Device and Mount Type	ANSI Example	ISO Example
Wall plate	W18 or W18AFF	W300
Wall-mount speakers <i>Measured to center of speaker</i>	W60 or W60AFF or W60OC	W1800
Wall-mount keypad <i>Measured to center of keypad</i>	W48 or W48OC	W850
Wall-mount display <i>measured from underside edge to floor</i>	W84 or W84U	W2100U
Abbreviations used above: • AFF – Above Finished Floor • OC – On Center • U – Underside Edge		

Table 3: Additional Mounting Abbreviations

3.4.2. Other Methods to Show Device Mounting

Any of these techniques may be used to communicate device mounting information. Examples include:

1. Rectangle around the symbol to show floor-mounted device
2. Circle around the symbol to show ceiling-mounted device
3. Wall leader line to show wall-mounted device

3.4.3. Wall Leader Lines

A wall leader line is used to connect a symbol to a point on a wall. See **Figure 8**. The line helps to more accurately locate a wall-mounted device on the floor plan.

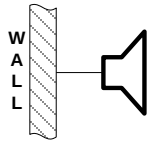


Figure 8: Single Wall-Mounted Device

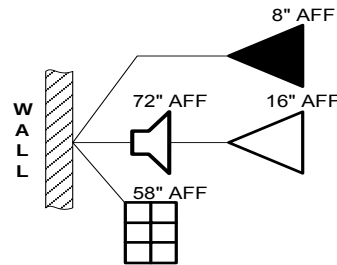


Figure 9: Multiple Wall-Mounted Devices in a Vertical Array

Figure 9 shows acceptable ways to use wall leader lines for a vertical array of two or more devices. The four leader lines vertically locate each device on the wall, one on top of the other.

To clarify the distance between devices, use attributes as shown above, or refer to the architectural drawings.

3.4.4. Optional Callout Tags

To identify supplemental device information, a callout tag (rectangle, circle or hexagon shape) may be used. A callout tag has three abbreviated identifiers used to reference in-depth data in a section of the drawing legend and a leader line **must** be drawn from the symbol to the callout tag. The leader line can be straight or curved and may end with a closed arrow or circle.

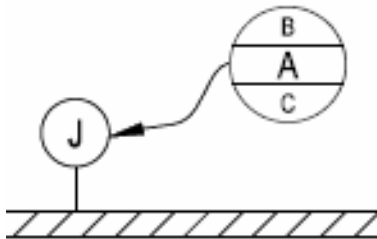
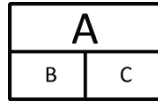


Figure 10: Callout Tag with Leader Line Indicating Further Information about the Junction Box Location

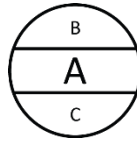
The three callout tag shapes are shown below. Different tag shapes may be utilized to provide a further level of identification but each type **must** be consistently applied throughout the entire drawing set. For example, the circular shape may be used to communicate 'home run' cables and the square shape may be used to communicate locally-run cables. Such application rules **must** be clearly documented in the legend, schedule or both.

Tag Rectangle

Box width = 0.6" (15mm)
Box height = 0.38" (10mm)

**Tag Circle**

Circle diameter = 0.6" (15mm)

**Tag Hexagon**

Hexagon width = 0.6" (15mm)
Hexagon height = 0.52" (13mm)

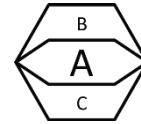


Figure 11: Callout Tag Shapes

Identifier text **must** be a minimum of 3/32" (2.5mm). The Primary Identifier text may be 3/16" (5mm).

Common uses of tags include:

1. Attributes for floor plan symbols
 - Reference a particular system or device name of an object (i.e., SCN4 = screen 4)
 - Identify junction box size
 - Show elevation above finished floor of junction box, control or connection
 - Share installation instructions such as type of cable and destinations
2. Detailed description
 - Provide more features, such as voltage or control requirements
3. Information from other disciplines
 - Annotate grounding on an electrical symbol
 - Note potential conflict between AV conduit path and HVAC ducts
4. Clarification
 - List symbol attributes when the area around the symbol is too crowded for normal attributes to work

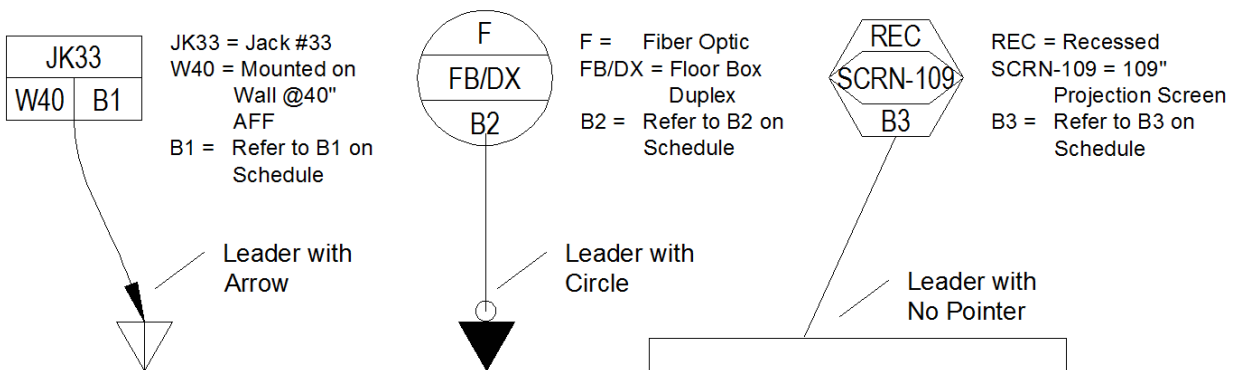


Figure 12: Callout Tag Examples

When using callout tags, different tag shapes may be used and each type **must** be consistently applied throughout the entire drawing set.

3.5. Symbol Stretching

Symbols are used to indicate the location of a device. However, some symbols, as identified in **Annex A**, may be “stretched” to one or more of the actual dimensions of the device.

Figure 13 shows a projection screen symbol representing the location of the screen. **Figure 14** shows the symbol “stretched” to represent the actual width dimension of the screen. Here the stretched symbol represents a 109” wide screen.

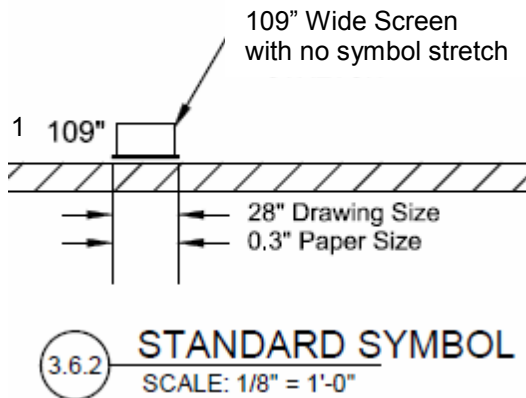


Figure 13: Symbol – Standard Sized

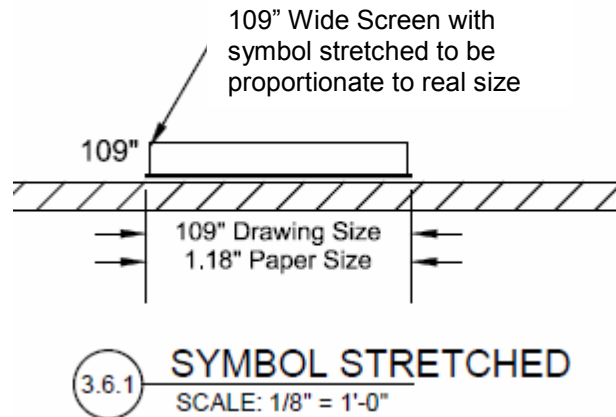


Figure 14: Symbol – Stretched to Actual Size

In addition, a symbol may be stretched proportionately in both directions to represent the actual dimensions of the device, e.g., rack, photovoltaic array or stage-stacked or flown loudspeakers.

See **Annex D** for Design Principles for Symbol Usage

3.6. Legends and Schedules

Legends and schedules provide the ability to easily interpret the specific symbols, attributes and other information presented on drawings. These **must** be shown directly on the architectural drawing or on supplemental pages. Any architectural drawing pages which do not include the legend **must** include a note indicating where the symbol legend is shown.

A legend is a table or list identifying the symbols used in the drawing. Typically a legend has two columns but may also include a third column referencing specific devices identified in a schedule.

A schedule is a grouping of related information and does not replace the legend. A schedule is presented in table format with a heading and a minimum of three columns of related information. A schedule is typically provided as a separate set of detailed information regarding particular equipment manufacturers and models numbers plus other data. The schedule documentation may be a document separated from the drawing set, or the schedule may be placed in the General Schedules section of a large drawing set.

LEGEND		
REF	SYMBOL	DESCRIPTION
AV01		LINE ARRAY SPKR
AV02		LCR BAR SPKR
AV03		14" SUBWOOFER SPKR
AV04		NEC PROJECTOR, CEILING, NS
AV09		DRAPER 110" SCRNM, REC, CEILING
C10		FW PORT, WALL
C11		IP PORT, WALL
C12		IP/TEL PORT, FLOOR BOX
S03		INFRARED RECEIVER
S03		BIOMETRIC CONTROL, EYE, WALL@50"

Figure 15: Example of a Legend Placed within the Title Block

3.6.1. Legend Guidelines

A legend **must** include the following information:

- Legend reference number (may be included with the description)
- Image of each symbol used in the drawing set
- Description

A legend may include the following information:

- Symbol with attributes (i.e., different speaker types as shown in **Figure 15** above)
- Symbol may repeat with different reference numbers and the attribute/unique characteristic identified in the description (i.e., different data port types as shown in **Figure 15** above)
- Equipment type
- Scaling information

Legends are normally placed on a drawing. The legend may be placed within the title block area or in a separate rectangle in the drawing area. See U.S. National CAD Standard V5 for placement of a legend.

If there is adequate room on the drawing sheet, the floor plan and reflected ceiling plan legends should be placed on the same sheet. A notation block, or box, may be used elsewhere on the drawing as long as it does not interfere with the drawing area.

3.6.2. Schedule Guidelines

A schedule typically includes the following information:

- Master list of symbols identifying the icons and names used in the drawing set, along with a definition of the data used in the attributes
- Abbreviations used in the drawing set
- Equipment name, manufacturer and model, description and scaling
- Power requirements
- Additional notes to explain the specific use of each device represented by a symbol

<i>Floor Plan Device Schedule</i>			
Area Name	Reference	Item	Item Description
BATH	DIM1	Manufacturer 1 / Model	Wireless In Wall Dimmer
BATH	TPANEL4	Manufacturer 1 / Model	3.7" (94mm) Wall-Mount Touch Panel
BATH	MED2	Manufacturer 2 / Model	Medication Dispenser
BATH	TV1	Manufacturer 3 / Model	19" (482.6mm) Mirror TV
BATH	P4	Manufacturer 4 / Model	1-Gang Bulk Cable Wall Plate – White
BATH	P4	Manufacturer 4 / Model	1-Gang Bulk Cable Wall Plate – White
BATH	P2	Manufacturer 5 / Model	MoCA Ethernet Port

Figure 16: Sample Schedule

See Annex B Sample Drawings B.1 and B.2 Use of a Schedule

3.7. Symbols Summary

J-STD-710

Audio, Video and Control Architectural Drawing Symbols Standard

ELECTRONIC SYMBOL FILES


www.ce.org

www.cedia.net

www.infocomm.org
1. AUDIO / VIDEO

Loudspeaker



Display Monitor



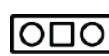
Video Projector



Projection Screen



Video Camera



Remote AV Source



White Board



Microphone



Junction Box

2. COMMUNICATIONS

Phone Port



Data Port



Phone and Data Port



Miscellaneous Port



Touch Pad



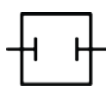
Clock



Intercom Station



Keyboard



Demarcation for All Services



Antenna



Dish Antenna



CPU/Server



Wired Repeater / Processor



RF Repeater or Access Point



Fax / Printer / Copier



Junction Box

3. ELECTRONIC SAFETY AND SECURITY

Keypad



Card Reader



Biometric Control



Button



Contact Switch



Control Panel



Video Camera



Audio Device



Detector



Glass Break Sensor



Electronic Lock



Vehicle Sensor

4. ENVIRONMENTAL

Thermostat



Humidistat



Thermostat and Humidistat



Temperature Sensor



Humidity Sensor



Temperature and Humidity Sensor



Miscellaneous Environmental Sensor



Junction Box

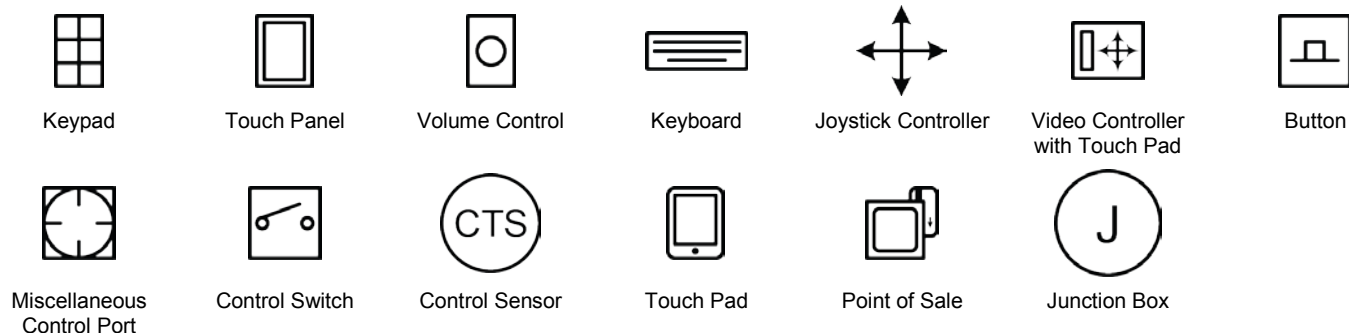
*Note: Symbols size and line weight are shown at 150% in this summary.

J-STD-710

Audio, Video and Control Architectural Drawing Symbols Standard

ELECTRONIC SYMBOL FILES

5. CONTROL



6. CENTRAL VACUUM



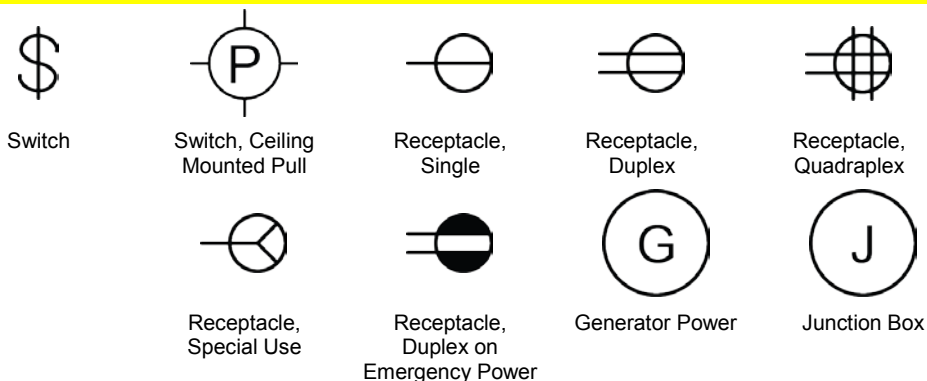
7. FURNISHINGS



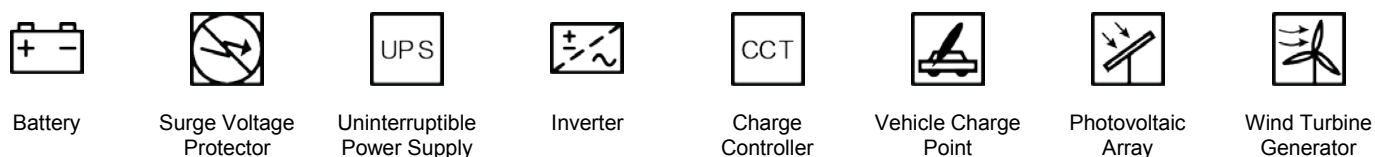
8. ELECTRICAL

The first nine Symbols are standard US electrical symbols.

For other regions consult local electrical standards.

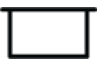
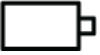


The following symbols are suitable for all regions.



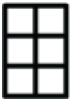
*Note: Symbols size and line weight are shown at 150% in this summary.

ANNEX A. Symbols Table

1	Audio - Video Systems MasterFormat 27 41 00				
Category-Symbol #	Name (Abbreviation)	Symbol	Technology Attribute Abbreviation Examples <i>For more abbreviations see Annex C</i>	Stretchable	Source
1-1	Loudspeaker (SPKR)		HF – HIGH FREQUENCY LAR – LINE ARRAY SPEAKER LCR – LCR BAR LR – LR BAR M – MONITOR P – POWERED S – SUBWOOFER ST – STEREO	Yes	CEA
1-2	Display Monitor (VMON) (TV)		M – MIRROR TV TV – TELEVISION VM – VIDEO MONITOR WP – WEATHERPROOF TV	Yes	J-STD 710
1-3	Video Projector (PROJ)		LCD – LIQUID CRYSTAL DISPLAY DLP – DIGITAL LIGHT PROCESSING LED – LIGHT EMITTING DIODE LCOS – LIQUID CRYSTAL ON SILICON	No	CEA
1-4	Projection Screen (SCRN)		F – FIXED M – MOTORIZED R – REAR PD – PULL-DOWN PU – PULL-UP MLB – MOBILE	Yes	CEA
1-5	Video Camera (CAM)		D – DOCUMENT IP – IP CAM PT – PAN/TILT PTZ – PAN/TILT/ZOOM	No	CEA
1-6	Remote AV Source (R-AV)		A – AUDIO SOURCE AV – AUDIO VIDEO SOURCE V – VIDEO SOURCE	No	J-STD 710
1-7	White Board (WB)		A – ACTIVE I – INTERACTIVE OVLY – OVERLAY PAS – PASSIVE	Yes	J-STD 710
1-8	Microphone (MIC)		B – BOUNDARY CLP – CLIP GNK – GOOSENECK HH – HANDHELD SGN – SHOTGUN ST – STEREO WLS – WIRELESS	No	J-STD 710
1-9	Junction Box (JBOX)		AV – AUDIO VIDEO D – DATA J – JUNCTION BOX WP – WEATHER PROOF	No	NCS

2	Communications				MasterFormat 27 00 00
Category-Symbol #	Name (Abbreviation)	Symbol	Technology Attribute Abbreviation Examples <i>For more abbreviations see Annex C</i>	Stretchable	Source
2-1	Phone Port (TEL)		P – PHONE FX – FAX/FACSIMILE	No	CEA
2-2	Data Port (DAT)		IP – INTERNET PROTOCOL (RJ45) F – FIBER OPTIC	No	CEA
2-3	Phone and Data Port (WP)		D – DATA F – FIBER OPTIC P – PHONE FX – FAX/FACSIMILE	No	CEA
2-4	Miscellaneous Port <i>Any multiples of phone or data or combinations of phone, data, audio, video, control, and RF</i>		A – AUDIO AV – AUDIO VIDEO CT – CONTROL D – DATA M – MICROPHONE RF – RADIO FREQUENCY V – VIDEO	No	CEA
2-5	Touch Pad (TPAD)		F – FIXED MBL – MOBILE TB – TABLET WLS – WIRELESS	No	CEA
2-6	Clock (CLK)		MC – MASTER CLOCK SCL – SLAVE CLOCK GC – GAME CLOCK TC – TIME CLOCK	No	J-STD 710
2-7	Intercom Station (IC)		D – DOOR PHONE M – MASTER INTERCOM S – SUBSTATION INTERCOM	No	CEA
2-8	Keyboard (KYBD)		WLS – WIRELESS KBM – KEYBOARD AND MOUSE	No	NCS SIA
2-9	Demarcation for All Services (DMARC)		CTV – CABLE TV P – PHONE RF – RADIO FREQUENCY S – SATELLITE	No	J-STD 710
2-10	Antenna (ANT)		AM – AM C – CELLULAR REPEATER FM – FM P – PHONE SYSTEM U – UHF V – VHF	Yes	CEA

2	Communications - continued				MasterFormat 27 00 00
Category-Symbol #	Name (Abbreviation)	Symbol	Technology Attribute Abbreviation Examples <i>For more abbreviations see Annex C</i>	Stretchable	Source
2-11	Dish Antenna (DISH) (SAT)		MW – MICROWAVE S – SATELLITE RX – RECEIVE TR – TRANSCEIVE TX – TRANSMIT	Yes	J-STD 710
2-12	CPU/Server (CPU) (SVR)		AS – AUDIO SERVER AVS – AUDIO VIDEO SERVER CPU – CENTRAL PROCESSING UNIT DAT – DATA SVR – SERVER VS – VIDEO SERVER	No	NCS SIA
2-13	Wired Repeater / Processor		A – AUDIO CT – CONTROL LTG - LIGHTING RF – RADIO FREQUENCY VID – VIDEO	No	J-STD 710
2-14	RF Repeater or Access Point (WAP)		CR – CELLULAR REPEATER PR – PHONE REPEATER WAP – WIRELESS ACCESS POINT WP – WIRELESS PROCESSOR REPEATER RX – RECEIVER TR – TRANSCEIVER TX – TRANSMITTER	No	CEA
2-15	Fax/Printer/Copier (FAX) (PRN)		CP – COPIER FAX – FAX/FACSIMILE MFD – MULTI FUNCTION DEVICE PRN – PRINTER	No	J-STD 710
2-16	Junction Box (JBOX)		AV – AUDIO VIDEO CT – CONTROL D – DATA J – JUNCTION BOX WP – WEATHER PROOF	No	NCS

3		Electronic Safety and Security				MasterFormat 28 00 00	
Category-Symbol #	Name (Abbreviation)	Symbol	Technology Attribute Abbreviation Examples <i>For more abbreviations see Annex C</i>		Stretchable	Source	
3-1	Keypad (KPAD)		WLS – WIRELESS		No	CEA	
3-2	Card Reader		BC – BAR CODE F – ELEVATOR FLOOR CALL H – ELEVATOR HALL CALL M – MAGNETIC STRIP PX – PROXIMITY SC – SMART CARD TK – TOKEN		No	NCS SIA	
3-3	Biometric Control		F – FINGER H – HAND GEOMETRY I – EYE IRIS R – EYE RETINA V – VOICE		No	NCS SIA	
3-4	Button		BL – BELL C – CHIME D – DURESS X – REQUEST FOR EXIT P – PANIC R – DOOR RELEASE		No	NCS SIA	
3-5	Contact Switch (SW)		A – ALARM BK – BREAK CONTROL FA – FIRE ALARM RC – REMOTE		No	J-STD 710	
3-6	Control Panel (CP)		B – BURGLAR ALARM D – DOOR FA – FIRE ALARM P – PERIMETER		No	NCS SIA	
3-7	Video Camera (CAM)		IP – IP CAM I – INFRARED PT – PAN/TILT OR PAN PTZ – PAN/TILT/ZOOM		No	CEA	
3-8	Audio Device		A – AUDIO C – CHIME H – HORN K – KLAXON L – LISTEN-IN M – MICROPHONE SP – SPEAKER Z – BUZZER		No	NCS SIA	
3-9	Detector (DTK) (PIR)		I – PASSIVE INFRARED DETECTOR MW – MICROWAVE 360 – 360 degrees ## – ## degrees		No	NCS SIA	
3-10	Glass Break Sensor (GBRK)		A – AUDIO SHK – SHOCK		No	NCS	
3-11	Electronic Lock		WIFI – WIRELESS NETWORK WLS – WIRELESS ZB – ZigBee ZW – Z-WAVE		No	NCS	
3-12	Vehicle Sensor (VEH)		L – LOOP M – MAGNETIC PICKUP PX – PROXIMITY		Yes	J-STD 710	

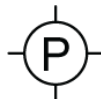
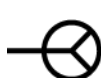
4		Environmental Heating, Ventilating and Air Conditioning (HVAC) / AIRCON			MasterFormat 23 00 00 23 09 00	
Category-Symbol #	Name (Abbreviation)	Symbol	Technology Attribute Abbreviation Examples <i>For more abbreviations see Annex C</i>	Stretchable	Source	
4-1	Thermostat (T)		WIFI – WIRELESS NETWORK WLS – WIRELESS ZB – ZigBee ZW – Z-WAVE	No	NCS	
4-2	Humidistat (H)		WIFI – WIRELESS NETWORK WLS – WIRELESS ZB – ZigBee ZW – Z-WAVE	No	CEA	
4-3	Thermostat and Humidistat (TH)		WIFI – WIRELESS NETWORK WLS – WIRELESS ZB – ZigBee ZW – Z-WAVE	No	CEA	
4-4	Temperature Sensor (TS)		WIFI – WIRELESS NETWORK WLS – WIRELESS ZB – ZigBee ZW – Z-WAVE O – OUTDOOR	No	CEA	
4-5	Humidity Sensor (HS)		WIFI – WIRELESS NETWORK WLS – WIRELESS ZB – ZigBee ZW – Z-WAVE O – OUTDOOR	No	CEA	
4-6	Temperature and Humidity Sensor (THS)		WIFI – WIRELESS NETWORK WLS – WIRELESS ZB – ZigBee ZW – Z-WAVE O – OUTDOOR	No	CEA	
4-7	Miscellaneous Environmental Sensor (ES) <i>See also Symbol 5-10 Control Sensor</i>		FS – FLOOD MS – MOTION OY – OCCUPANCY OT – OVER TEMPERATURE RS – RAIN UT – UNDER TEMPERATURE	No	J-STD 710	
4-8	Junction Box (JBOX)		AV – AUDIO VIDEO CT – CONTROL D – DATA J – JUNCTION BOX WP – WEATHER PROOF	No	NCS	

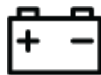
5	MasterFormat 25 00 00 27 00 00 28 00 00				
	Control				
Category-Symbol #	Name (Abbreviation)	Symbol	Technology Attribute Abbreviation Examples <i>For more abbreviations see Annex C</i>	Stretchable	Source
5-1	Keypad (KPAD)		FCN – FUNCTION M – MASTER NUM – NUMERIC R – REMOTE WLS – WIRELESS	No	J-STD 710
5-2	Touch Panel (TPAN)		FT – FLIP TOP TT – TILT WLS – WIRELESS	No	CEA
5-3	Volume Control (VOL)		AT – AUTOTRANSFORMER PB – PUSHBUTTON R – ROTARY S – SLIDER	No	NCS
5-4	Keyboard (KYBD)		WLS – WIRELESS KBM – KEYBOARD AND MOUSE	No	NCS SIA
5-5	Joystick Controller (JOY)		CC – CAMERA CONTROL GCT – GAME CONTROL RC – REMOTE CONTROL WLS – WIRELESS	No	J-STD 710
5-6	Video Controller with Touch Pad (VCPAD)		RC – REMOTE CONTROL V – VIDEO WLS – WIRELESS	No	NCS
5-7	Button		BL – BELL C – CHIME D – DURESS DB – DOOR BELL P – PANIC R – DOOR RELEASE X – REQUEST FOR EXIT	No	NCS
5-8	Miscellaneous Control Port <i>For devices provided by other disciplines</i> (CTRL)		BLW – BLOWER DR – DOOR RELEASE FTN – FOUNTAIN G – GATE IRR – IRRIGATION J – JACUZZI OHD – OVERHEAD DOOR SM – SNOW MELT	No	CEA
5-9	Control Switch (SW)		A – ALARM D – DOOR DB – DOOR BELL FA – FIRE ALARM FM – FLOOR MAT M – MOISTURE GD – GARAGE DOOR WS – WINDOW	No	J-STD 710

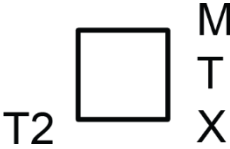
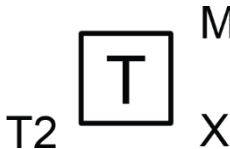
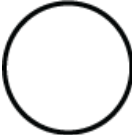
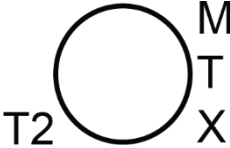
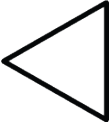
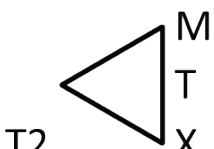
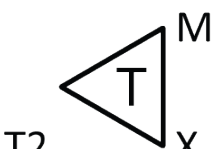
5	Control – <i>continued</i>				MasterFormat 25 00 00 27 00 00 28 00 00
Category-Symbol #	Name (Abbreviation)	Symbol	Technology Attribute Abbreviation Examples <i>For more abbreviations see Annex C</i>	Stretchable	Source
5-10	Control Sensor (CTS) <i>See also Symbol 4-7</i> Miscellaneous Environmental Sensor		CT – CURRENT TRANSFORMER FS – FLOOD IR – INFRARED L – LIGHT MS – MOTION OY – OCCUPANCY PX – PROXIMITY SS – STRESS	No	J-STD 710
5-11	Touch Pad (TPAD)		F – FIXED MBL – MOBILE TB – TABLET CEL – CELLULAR PHONE	No	J-STD 710
5-12	Point of Sale (POS)		BC – BAR CODE CSH – CASH DRAWER CC – CREDIT CARD M – MAGNETIC STRIP PRN – PRINTER TPAN – TOUCH PANEL WLS – WIRELESS	No	J-STD 710
5-13	Junction Box (JBOX)		AV – AUDIO VIDEO CT – CONTROL D – DATA J – JUNCTION BOX WP – WEATHER PROOF	No	NCS

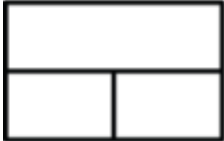
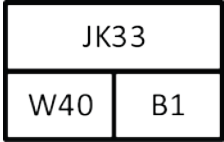
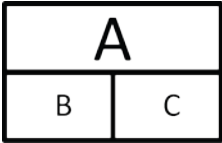
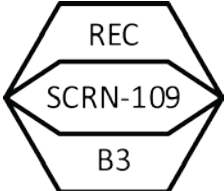
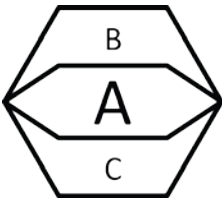
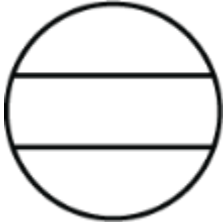
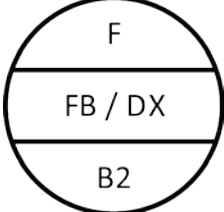
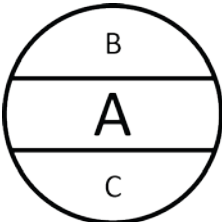
6	Central Vacuum / Cleaning Systems				MasterFormat 11 24 19
Category-Symbol #	Name (Abbreviation)	Symbol	Technology Attribute Abbreviation Examples <i>For more abbreviations see Annex C</i>	Stretchable	Source
6-1	Vacuum Power Unit (VAC)		BT – BAG TYPE BGL – BAGLESS TYPE CY – CYCLONIC	No	CEA
6-2	Vacuum Inlet (VACIN)		L – LOW VOLTAGE ONLY H – HIDE-A-HOSE S – SPOT (10' HOSE IN CLOSET) V – VROOM (HOSE IN CLOSET) U – UTILITY	No	CEA
6-3	Vacuum Toe-Kick Inlet (VACTK)		TKK – TOE KICK RF – RF CONTROLLED	No	CEA

7	Furnishings				MasterFormat 12 00 00 27 00 00
Category-Symbol #	Name (Abbreviation)	Symbol	Technology Attribute Abbreviation Examples <i>For more abbreviations see Annex C</i>	Stretchable	Source
7-1	Rack or Head End <i>Used for all disciplines</i> (RK)		A – AUDIO AV – AUDIO VIDEO C – CONTROL D - DATA M - MAIN TEL – TELEPHONE SEC - SECONDARY VID – VIDEO	Yes	J-STD 710
7-2	Lift/Mount (LIFT)		A – ARTICULATING M - MOTORIZED DN – DOWN (DIRECTION) F – FIXED UP – UP (DIRECTION) UB – UNDER BED TT – TILT	Yes	J-STD 710
7-3	Curtain (CURT)		C – CENTER DRAW CV - CURVED LDRW – LEFT DRAW M – MOTORIZED RDRW – RIGHT DRAW	Yes	J-STD 710
7-4	Shade (SHADE)		M – MOTORIZED SKLT – SKYLIGHT	Yes	J-STD 710
7-5	Masking Screen <i>May include aspect ratios</i> (MASK)		CV – CURVED M – MOTORIZED VHW – VARIABLE HEIGHT AND WIDTH VH – VARIABLE HEIGHT VW– VARIABLE WIDTH	Yes	J-STD 710
7-6	Theater Seat (SEAT) (TSEAT)		DS – DOUBLE SEAT S – SEAT SOF – SOFA GM - GAMING M – MOTORIZED	Yes	J-STD 710
7-7	Seat Actuator (SEAT ACTR)		DS – DOUBLE SEAT S – SEAT SOF – SOFA	Yes	J-STD 710

8	Electrical					MasterFormat 26 00 00
Symbols 8-1 through 8-9 are US electrical symbols. For other regions consult local electrical standards.						
Category-Symbol #	Name (Abbreviation)	Symbol	Technology Attribute Abbreviation Examples For more abbreviations see Annex C	Stretchable	Source	
8-1	Switch (SW)		1P – SINGLE POLE 2P– DOUBLE POLE 3W – THREE WAY 4W – FOUR WAY DMR – DIMMER K – KEY OPERATED 3DMR – DIMMER, 3-WAY T – TIMER OPERATED	No	NCS	
8-2	Switch, Ceiling Mounted Pull			No	NCS	
8-3	Receptacle, Single		C – CLOCK S – SWITCHED	No	NCS	
8-4	Receptacle, Duplex (DX) (DX OUT)		AFCI – ARC FAULT CIRCUIT INTERRUPTER GFCI – GROUND FAULT CIRCUIT INTERRUPTER IG – ISOLATED GROUND S – SWITCHED WP – WEATHER PROOF	No	NCS	
8-5	Receptacle, Quadraplex (QX)		S – SWITCHED WP – WEATHER PROOF	No	NCS	
8-6	Receptacle, Special Use (SPCL)		S – SWITCHED WP – WEATHER PROOF	No	NCS	
8-7	Receptacle, Duplex on Emergency Power (EMER)			No	NCS	
8-8	Generator Power (GEN)		PI – PORTABLE SY – STANDBY	Yes	NCS	
8-9	Junction Box (JBOX)		AV – AUDIO VIDEO CT – CONTROL D – DATA J – JUNCTION BOX WP – WEATHER PROOF	No	NCS	

8	Electrical – continued				MasterFormat 26 00 00
Electrical symbols 8-10 through 8-17 are suitable for all regions.					
Category-Symbol #	Name (Abbreviation)	Symbol	Technology Attribute Abbreviation Examples <i>For more abbreviations see Annex C</i>	Stretchable	Source
8-10	Battery (BAT)		PRI – PRIMARY SEC – SECONDARY BU – BACK UP	Yes	J-STD 710
8-11	Surge Voltage Protector (TVSS)		LA –LIGHTING ARRESTOR C – CONDITIONER/FILTER HW – HARDWIRED SVP – SURGE PROTECTOR VR – VOLTAGE REGULATOR	No	CEA
8-12	Uninterruptible Power Supply (UPS)		OL OFF-LINE ONL – ON-LINE LNI – LINE INTERACTIVE	Yes	J-STD 710
8-13	Inverter (INVR)		MS – MODIFIED SINE PS – PURE SINE	No	J-STD 710
8-14	Charge Controller (CCT)		1S – SINGLE STAGE 2S – TWO STAGE 3S – THREE-STAGE PWM – PULSE WIDTH MODULATION MPPT – MAXIMUM POWER POINT TRACKING	No	J-STD 710
8-15	Vehicle Charge Point <i>Leaf is normally green</i> (VCP)		MC – MAINS-CONNECTED CHARGER OC – ON-BOARD CHARGER DDC – DEDICATED CHARGER	No	J-STD 710
8-16	Photovoltaic Array (PV)		GDC – GRID-CONNECTED SA – STAND-ALONE	Yes	J-STD 710
8-17	Wind Turbine Generator (WG)		HX – HORIZONTAL AXIS VX – VERTICAL AXIS IDT – INDUCTION TYPE PM – PERMANENT MAGNET TYPE BDC – BRUSHED DC MOTOR TYPE	Yes	J-STD 710

0 Generic CAD Symbols					
Category-Symbol #	Name and Description	Symbol	Symbol with Four Attributes <i>For Abbreviations see Annex C</i>	Stretchable	Source
0-1	Generic Block Symbol A box is sometimes used to indicate floor mount			Yes	NCS
0-2	Generic Block Symbol with centered technology attribute	Example: Floor Box 		Yes	NCS
0-3	Generic Circle Symbol A circle is sometimes used to indicate ceiling mount			No	NCS
0-4	Generic Circle Symbol with centered technology attribute	Example: Ceiling Mic with smaller text 		No	NCS
0-5	Generic Port Symbol			No	NCS
0-6	Generic Port Symbol with centered Technology attribute	Example: Fax Port with smaller text 		No	NCS

0 Generic CAD Symbols – <i>continued</i>					
Category-Symbol #	Name and Description	Symbol	Symbol with Identifiers <i>For Abbreviations see Annex C</i>	Stretchable	Source
0-7	Callout Tag - Rectangle	 Example:  JK33 = Jack #33 W40 = Mounted on Wall 40" AFF B1 = Refer to B1 on Schedule	 A = Primary Identifier B = Secondary Identifier C = Tertiary Identifier	No	NCS
0-8	Callout Tag - Hexagon	 Example:  F = Fiber Optic FB/DX = Floor Box Duplex B3 = Refer to B3 on Schedule	 A = Primary Identifier B = Secondary Identifier C = Tertiary Identifier	No	Info Comm
0-9	Callout Tag - Circle	 Example:  REC = Recessed SCRN-109 = 109" Projection Screen B2 = Refer to B2 on Schedule	 A = Primary Identifier B = Secondary Identifier C = Tertiary Identifier	No	NCS

ANNEX B. Sample Drawings

The following drawings were created during the testing of this standard by members of CEA, CEDIA, and the InfoComm International Standards and Practice Group.

B.1 Model Home Floor Plan

Drawing supplied by: **SymbolLogic**
 125 Pond Road
 Burnham, ME 04922
www.symbollogic.com

B.2 Home Theater Floor Plan

Drawing supplied by: **SymbolLogic**
 125 Pond Road
 Burnham, ME 04922
www.symbollogic.com

B.3 Commercial Training Room Floor Plan³

Drawing supplied by: **VidCAD LLC**
 2010 E. Lohman Ave. Suite 2
 Las Cruces, NM 88001
www.vidcad.com

B.4 Commercial Training Room Reflected Ceiling Floor Plan⁴

Drawing supplied by: **VidCAD LLC**
 2010 E. Lohman Ave. Suite 2
 Las Cruces, NM 88001
www.vidcad.com

B.5 Classroom Reflected Ceiling Floor Plan

Drawing supplied by: **AEI – Affiliated Engineers NW, Inc.**
 Westlake Center Office Tower
 1601 Fifth Avenue, Suite 1400
 Seattle, WA 98101-1642
www.aeieng.com

B.6 Lab/Computer Room Floor Plan

Drawing supplied by: **The Sextant Group, Inc.**
 700 Waterfront Drive
 Pittsburgh, PA 15222
www.thesextantgroup.com

B.7 Audio/Video Floor Plan

Drawing supplied by: **The Clariant Group**
 630 Ninth Avenue, Suite 1212
 New York, NY 10036
www.theclariantgroup.com

³ Reprinted from the VidCAD Sample Floor Plan Drawing® with permission from the VidCAD LLC; Copyright 2011

⁴ Reprinted from the VidCAD Sample Floor Plan Drawing® with permission from the VidCAD LLC; Copyright 2011

B.8 Security and Communications Floor Plan

Drawing supplied by: **PlayNetwork Inc.**
8727 148th Avenue NE
Redmond, WA 98052
www.playnetwork.com

B.9 Security and Communications Reflected Ceiling Floor Plan

Drawing supplied by: **The Clariant Group**
630 Ninth Avenue, Suite 1212
New York, NY 10036
www.theclariantgroup.com

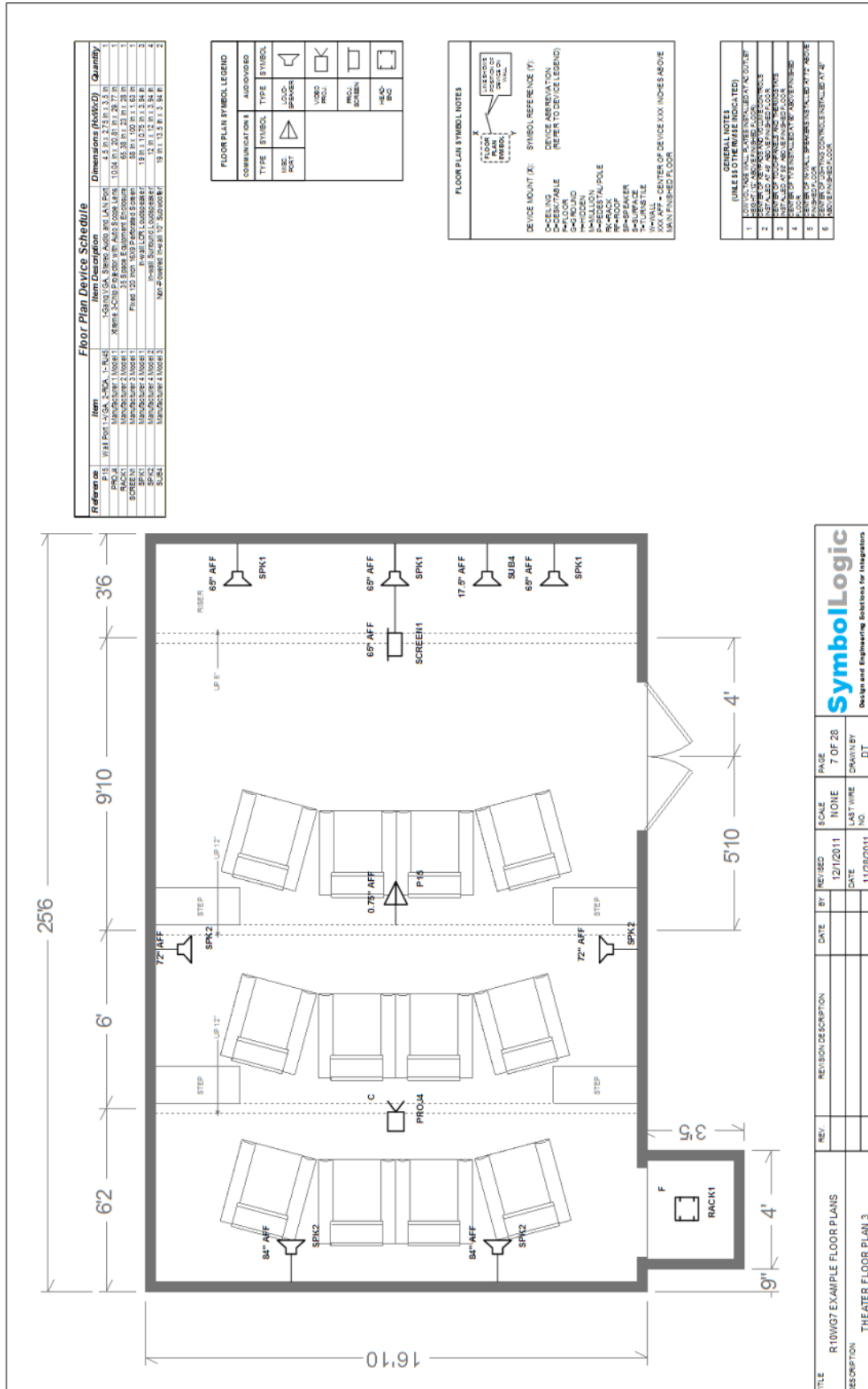
B.10 Office Building Floor Plan

Drawing supplied by: **PlayNetwork Inc.**
8727 148th Avenue NE
Redmond, WA 98052
www.playnetwork.com

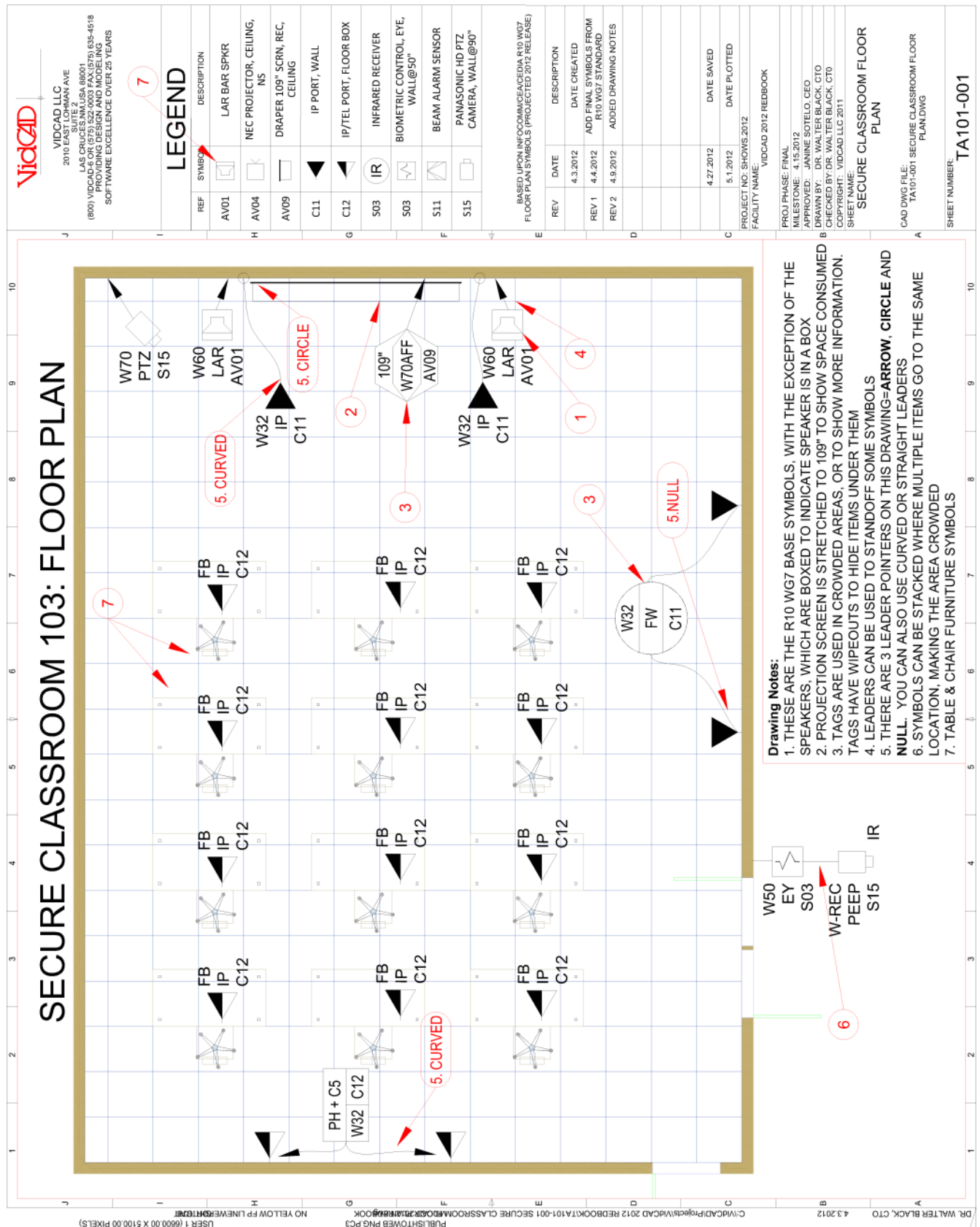
B.1 Model Home Floor Plan



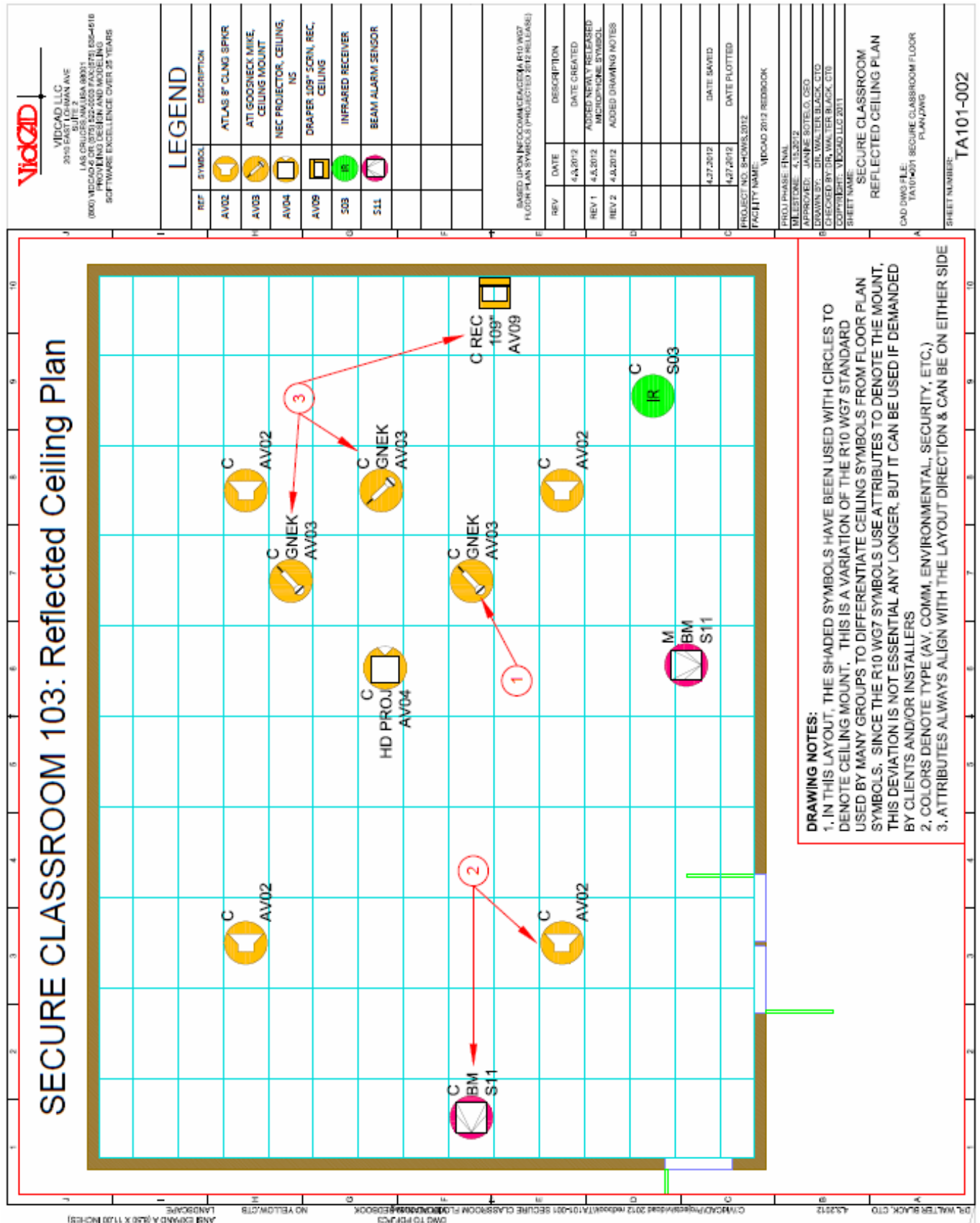
B.2 Home Theater Floor Plan

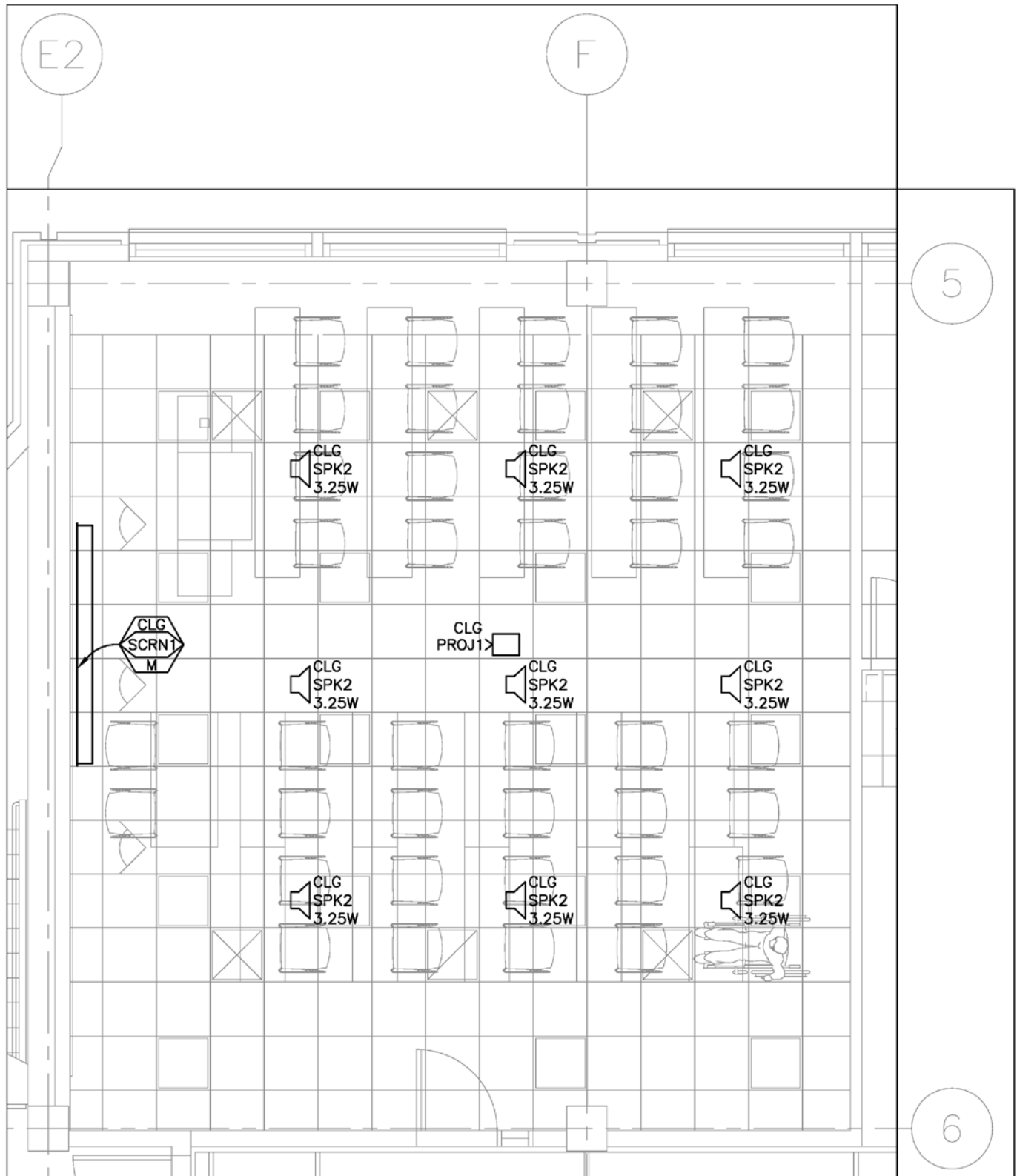


B.3 Commercial Training Room Floor Plan



B.4 Commercial Training Room Reflected Ceiling Floor Plan



B.5 Classroom Reflected Ceiling Floor Plan**2****CLASSROOM EQUIPMENT REFLECTED CEILING PLAN**

SCALE: 1/4"=1'-0"

B.5 Classroom Reflected Ceiling Floor Plan (Continued)

Abbreviation	Definition
ACLG	ABOVE CEILING
CAM	CAMERA
CBX	CEILING BOX
CLG	CEILING
EQPT	EQUIPMENT
F/FC	FLUSH WITH FINISHED CEILING
F/FF	FLUSH WITH FINISHED FLOOR
F/FW	FLUSH WITH FINISHED WALL
FBX	FLOOR BOX
FL	FLUSH
ID	IDENTIFICATION
L	LEFT
M	MOTORIZED
MFG	MANUFACTURER
PROJ	PROJECTOR
PTZ	PAN, TILT, ZOOM
QTY	QUANTITY
R	RIGHT
RU	RACK UNIT
SCRN	SCREEN
SPK	SPEAKER
W	WALL
WBX	WALL BOX

5 ABBREVIATIONS LEGEND

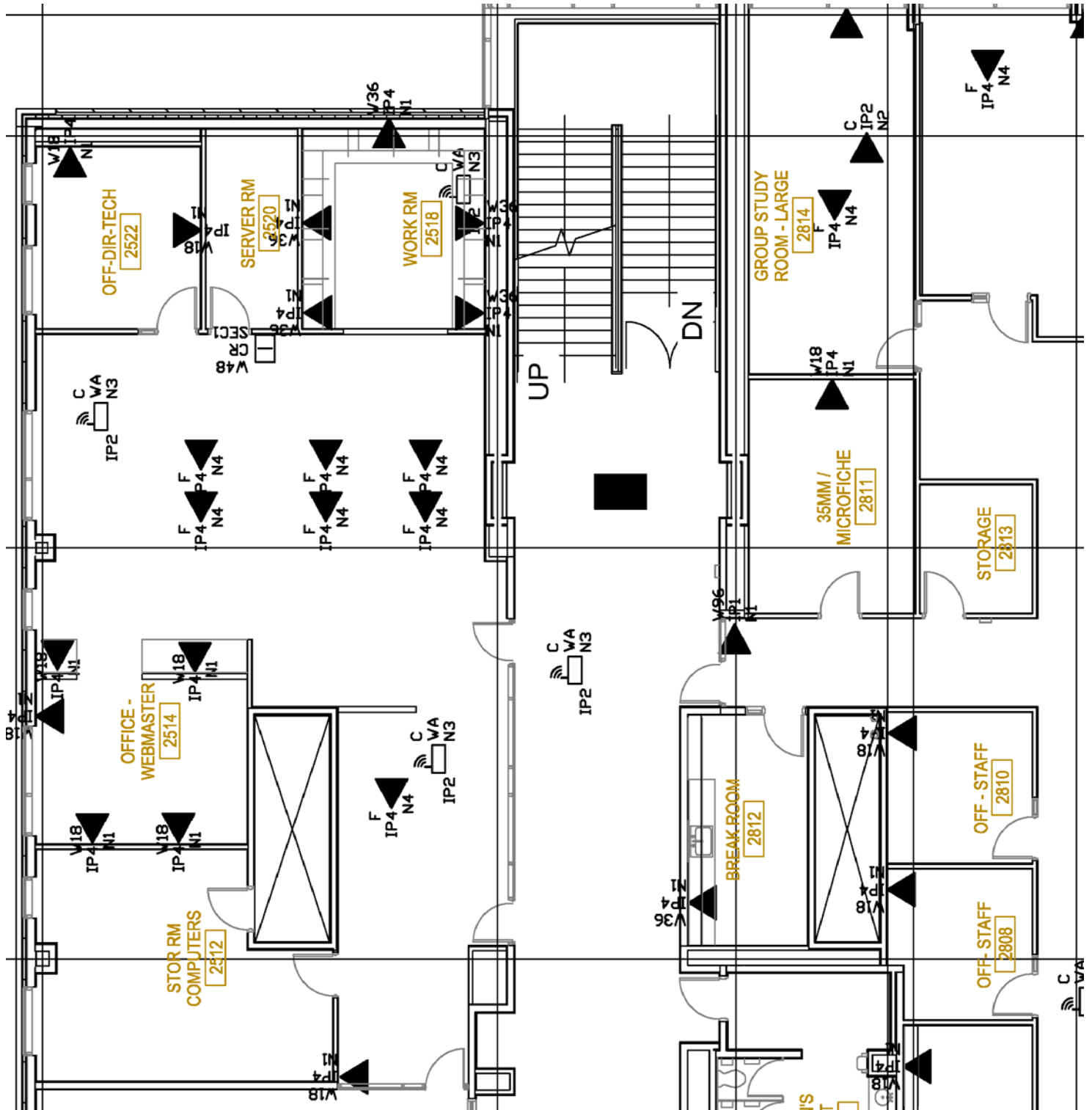
SCALE: NA

EQPT	ID	MANUFACTURER	MODEL	QTY	COMMENTS
SPK1		COMMUNITY	I/O5	2	SURFACE MOUNT
SPK2		COMMUNITY	D4	9	
RACK1		MIDDLE ATLANTIC	SRSR-15	1	RECESS INTO PODIUM. COORDINATE WITH INTERIORS
CAM1		VADDIO	CLEARVIEW	1	SURFACE MOUNT
SCRN1		DA-LITE	TENSIONED ADVANTAGE ELECTROL	1	108 X 60
PROJ1		EPSON	G5750	1	PROVIDE MOUNTING HARDWARE

6 AUDIOVISUAL EQUIPMENT SCHEDULE

SCALE: NA

B.6 Lab/Computer Room Floor Plan



B.7 Audio/Video Floor Plan

EQUIPMENT SYMBOLS

SYMBOL	DESCRIPTION
	Misc. Control Port
	Phone
	Fax/Printer/Copier
	Wireless Access Point
	Point of Sale
	Control Panel
	CPU/Server
	Dash Antenna
	Antenna
	Internal Antenna
	Misc.
	Cord Reader
	Intercom
	Lock
	Push Button
	Request to Exit
	Transfer Hinge
	Keypad
	Demarc
	Thermostat
	Rack or Head End
	Running AV Source
	Speaker
	Touch Panel
	Video Display

SHEET NOTES

- 1 LOCATIONS FOR AV DEVICES ARE RECOMMENDED. TO BE COORDINATED WITH ARCHITECT AND FURNITURE.
- 2 REFER TO AV OUTLET SCHEDULE FOR WIRE AND CABLING QUANTITIES.
- 3 REFER TO AV SPEC FOR AV WIRE AND CABLING TYPES.

Equipment Schedule

Equipment Schedule								
Count	Equipment tag	Equipment Description	Manufacturer	Model	Watts	Extended Watts	Heat Output (BTU/hr)	Extended BTUs
1	MIT-PAD	Wall Mount Interface for Apple iPad	Crestion	IDOC-PA0-D5WC	15	15.00	35.8	35.80
1	NSC-20	Pre-construction Back Box for the TPMC-9L Touchscreen	Crestion	B8-9L	N/A	N/A	N/A	N/A
1	NSC-BB1	Pre- Construction Wall Mount Back Box forCEN-IDOCV-D5W	Crestion	B8-IDOCV-D5W	N/A	N/A	N/A	N/A
2	SPLIC6	Excite 6" 2-way In-Ceiling Speakers (ea.)	Crestion	EXCITE IC6	N/A	N/A	N/A	N/A
8	SPLIC8	Excite 8" 2-way In-Ceiling Speakers (ea.)	Crestion	EXCITE IC8	N/A	N/A	N/A	N/A
4	TPLCBD	Cornea Keypad- Standard mount	Crestion	C2N-CBD-IS	N/A	N/A	N/A	N/A
1	TPL19L	bay 9" Wall Mount Touch Panel- Wired	Crestion	TPMC-9L	23	23.00	78	78.00
1	VSDLD5W	Wall Mount interface for Apple iPod®	Crestion	C2N-IDOCV-D5W	6	6.00	14.4	14.40
						44.00		128.30

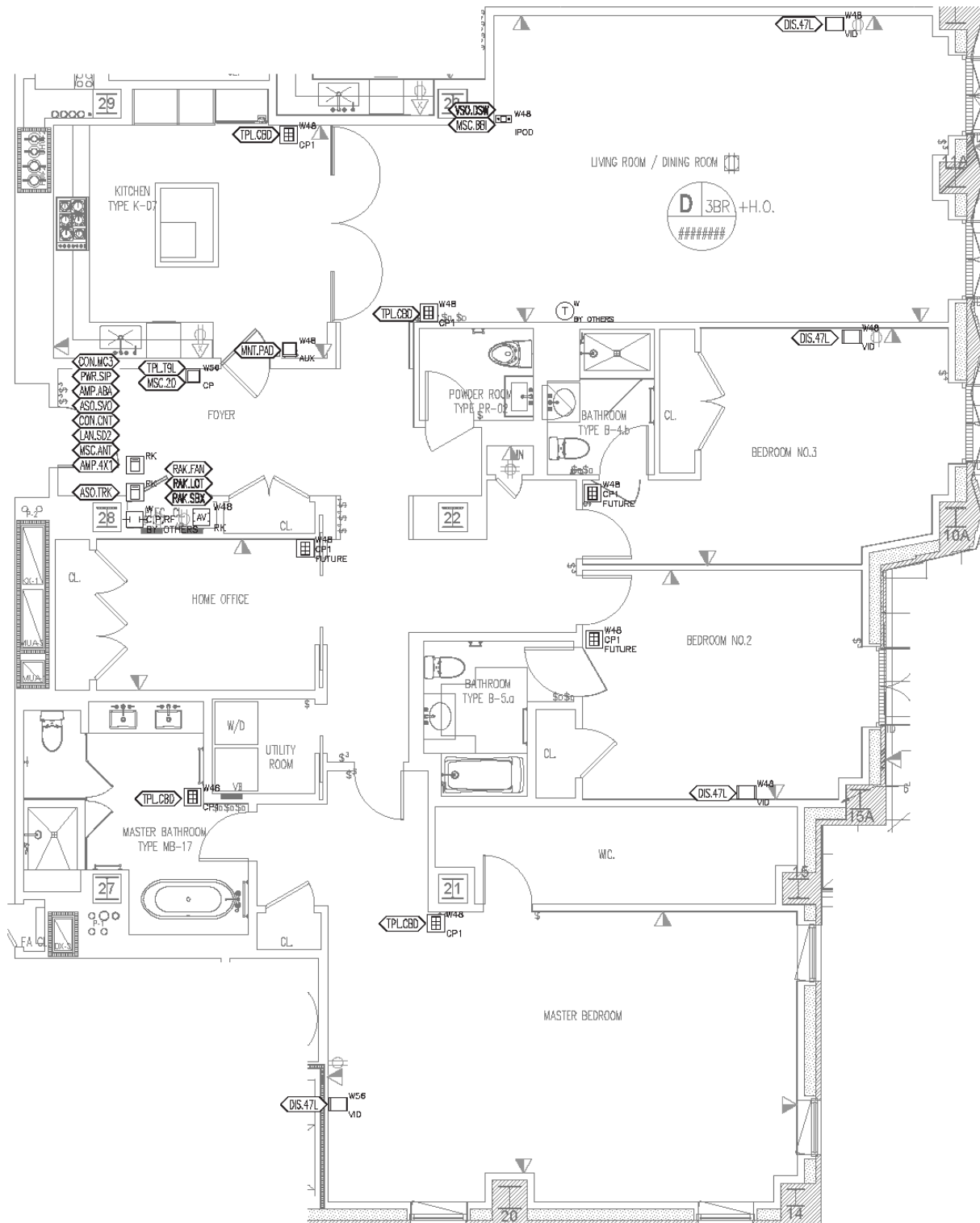
Rack/Cabinet Equipment Schedule - "AV10D.1"

Rack/Cabinet Equipment Schedule - "AV10D.1"										
Count	Equipment Tag	Equipment Description	Manufacturer	Model	Rack Units	Extended Rack Units	Watts	Extended Watts	Heat Output (BTU/hr)	Extended BTUe
1	AMP-KX1	4 Room Audio Processor Amplifier	Crestion	C2R-AMP-4x100	2	2	TBD	TBD	600	600.00
1	AMP-ABA	CAT5 Balanced Audio Receiver	Crestion	ABMR-1	N/A		18	18.00	43	43.00
1	ASO-SVO	Audio server	OFE	OFE	4	4				
1	ASO-TRK	Transferring Modules Multi-Tuner w/ Internet Radio Tuner Card	Crestion	C2M-TRACK-ALD1 ONET	2	2	48	48.00	114.7	114.70
1	CIN-CTR	Cinema Distribution Block	Crestion	CINTR-DCK	N/A		N/A	N/A	N/A	
1	CON-UMC3	3 Series Control System	Crestion	MC3	1	1	9	9.00	21.5	21.50
1	UNI-S52	8-Port 10/100 Switch	Uniphis	S52C8	N/A		11.5	11.50	27.5	27.50
1	MISC-ANT	10 Ft. Antenna Extender	Crestion	ANT-EXT-10	N/A		N/A	N/A	N/A	
1	PHI-SP	IP Addressable Power Conditioning Management System	SurgeX	SV1115SP	1	1	N/A	N/A	N/A	
1	RAK-FAN	Fan	Middle Atlantic	5-FAN-K	N/A		24	24.00	57.4	57.40
1	RAK-LOT	Drawers, shelves and accessories	Middle Atlantic	Lot	N/A		N/A	N/A	N/A	
1	RAK-SBK	18" Wall Mount Rack	Middle Atlantic	SBK-10	N/A		N/A	N/A	N/A	

AUDIOVISUAL OUTLET SCHEDULE

AUDIOVISUAL OUTLET SCHEDULE																							
AV Outlet Designation	AV Device Description (Type / Qty)	Mounting Height	Mounting Type	By Specifier (Specify Contractor for Alternative Mounting Coordination with Fabricator)		Audiovisual Connections										By Electrical Contractor (For or Information Only) Coordinate with Electrical Drawings							
				AV Outlet Cat. #A	RS-485 (RS)	Flame Retardant Cable	Digital Media Box	Quick Connect (QCN)	CNC-Cut Home (CH)	Coupled Cable	HDMI Cable	RG6 (V)	Component	Audio Line Level	Mic. Level	8 Ohm	75V Low Voltage Cable	Misc. CAT 6A Low Voltage Power	Blank	Power	AV Backbox	AV Color	AV Empty Cavities
AUX	Flat Tablet	N	Wall	As Shown															N/A	Custom	N/A	(1) 3-F	24"
CP	Touch Panel	N	Wall	As Shown															N/A	Custom	Custom	(1) 1-1/4"	
CP1	Audio Keypad	N	Wall	Standard									1						N/A	Custom	Custom	(1) 3-F	
IPQD	Pod Control	N	Wall	Standard															N/A	Custom	Custom	(1) 3-F	
SP1	Speaker Outlet - 8 Ohm	N	As Shown																N/A	Custom	N/A	(1) 3-F	
VD	Video Display Outlet	N	Wall	As Shown															1920A	5X5"	2 Gang	(1) 1"	Digital Media

B.8 Security and Communications Floor Plan



1

FLOOR PLAN

SCALE: $3/16" = 1'-0"$

SECURITY EQUIPMENT SCHEDULE

Equipment Tag	Manufacturer	Model	Category	(N/A or E) / (Y or N) / (C or F)	Type of Mounting	Volts (V)	Watts	Phase	IG (Y/N)	Power Connector	Devices/ Accessory Load (W)	Heat Output (BTU/hr)	(P) Prod., Shuts/ (C) Close*	Rack Units	Width (in)	Height (in)	Depth (in)	Weight (Lbs)	Note	
MCDR-01	GE	1015	Security	N	Recessed	-	-	-	-	HHV	-	-	-	n/a	0.25	-	1.13	-	Cylindrical w/ I/O. Contacts	
MCDR-02	GE	1072	Security	N	Recessed	-	-	-	-	HHV	-	-	-	n/a	0.32	-	1.31	-	Cylindrical w/ I/O. Contacts	
MCDR-03	GE	1076C/1076C	Security	N	Recessed	-	-	-	-	HHV	-	-	-	n/a	0.75	-	1.125	-	Cylindrical w/ I/O	
MCDR-04	GE	1076/1076	Security	N	Recessed	-	-	-	-	HHV	-	-	-	n/a	1	-	1.125	-	Cylindrical w/ I/O	
MCDR-05	GE	1200	Security	N	Surface	-	-	-	-	HHV	-	-	-	n/a	2.54	0.525	0.585	-	Rectangular w/ I/O	
MDCS-01	GE	2200	Security	N	Surface	-	-	-	-	HHV	-	-	-	n/a	3.5	1.5	1.5	-	Rect. w/ I/O & removed cable	
MDCS-02	GE	2600	Security	N	Surface	-	-	-	-	HHV	-	-	-	n/a	3	1	0.5	-	Rect. w/ I/O & removed cable	
MDCS-03	GE	5150	Security	N	Surface - Glass	-	-	-	-	HHV	-	-	-	n/a	1.25	1.25	0.37	-	Closed Loop	
BDSS-01	GE	5500	Security	N	Surface - Wall	5-16 VDC	0.4	-	-	HHV	0.4	1.35	4.52	n/a	2.75	4.52	0.81	-	Rect. w/ I/O A, Form C	
BDSS-02	GE	5600	Security	N	Surface - Wall	5-16 VDC	0.4	-	-	HHV	0.4	1.35	4	-	n/a	4	-	0.81	-	Circular w/ I/O A, Form C
BDSS-03	GE	5800	Security	N	Recessed	5-16 VDC	0.4	-	-	HHV	0.4	1.35	-	-	n/a	1.35	1	2.5	-	Cylindrical w/ I/O
PRR-01	Typ	PRR-01/2	Security	N	Surface	24 VDC	1.2	-	-	HHV	1.2	4.05	-	n/a	2.125	1.25	1.025	-	Rect. w/ I/O	
PRR-02	GE	627PM	Security	N	Flush	5-16 VDC	0.8	-	-	HHV	0.8	2.73	-	n/a	2.75	4.5	1.63	-	SPDT	
PRR-03	GE	AP-550AM	Security	N	Surface - Wall	5-16 VDC	0.24	-	-	HHV	0.24	0.82	-	n/a	2.9	4.1	2.8	-	SPDT	
PRR-04	GE	PRR-04	Security	N	Surface - Corner	5-16 VDC	0.32	-	-	HHV	0.32	1.05	-	n/a	3.05	2.05	1.9	-	SPDT	
PRR-05	GE	PRR-05	Security	N	Surface - Ceiling	5-16 VDC	0.32	-	-	HHV	0.32	1.05	-	n/a	5.43	-	2.68	-	Form C	
PRR-06	GE	PRR-06	Security	N	Flush	-	-	-	-	HHV	-	-	-	n/a	2.75	4.5	2.25	-	Rect	
PRR-07	GE	PRR-07	Security	N	Flush	-	-	-	-	HHV	-	-	-	n/a	2.75	4.5	1.5	-	Rect	
PRR-08	GE	PRR-08	Security	N	Flush	-	-	-	-	HHV	-	-	-	n/a	5.5	4.5	1.5	-	Rect	
PRR-09	GE	PRR-09	Security	N	Flush	12-24 VDC	3.35	-	-	HHV	3.35	11.45	-	n/a	1.75	4.5	1.75	-	SPDT	
PRR-10	GE	PRR-10	Security	N	Flush	12-24 VDC	3.35	-	-	HHV	3.35	11.45	-	n/a	2.75	4.5	1.75	-	SPDT	
PRR-11	GE	PRR-11	Security	N	Surface - Correlated	12 VDC	0.81	-	-	HHV	0.81	0.03	-	n/a	1.77	3.9	0.76	-	SPDT	
PRR-12	GE	PRR-12	Security	N	Surface - Wall	120 VAC	130	1	N	HHV	130	440	C	n/a	12.25	15	4	-	Installed w/ PDC 01	
PRR-13	GE	PRR-13	Security	N	Flush - VMI	12-24 VDC	1.2	-	-	HHV	1.2	4.05	C	n/a	4.5	4.5	2	-	Single Switch No LED	
PRR-14	GE	PRR-14	Security	N	Flush - VMI	12-24 VDC	1.2	-	-	HHV	1.2	4.05	C	n/a	4.5	4.5	2	-	Single Switch w/ LED	
PRR-15	GE	PRR-15	Security	N	Flush - VMI	12-24 VDC	1.2	-	-	HHV	1.2	4.05	C	n/a	4.5	4.5	2	-	Dual Switches w/ LED	
PRR-16	GE	PRR-16	Security	N	Flush - VMI	12-24 VDC	1.2	-	-	HHV	1.2	4.								

B.9 Security and Communications Reflected Ceiling Floor Plan



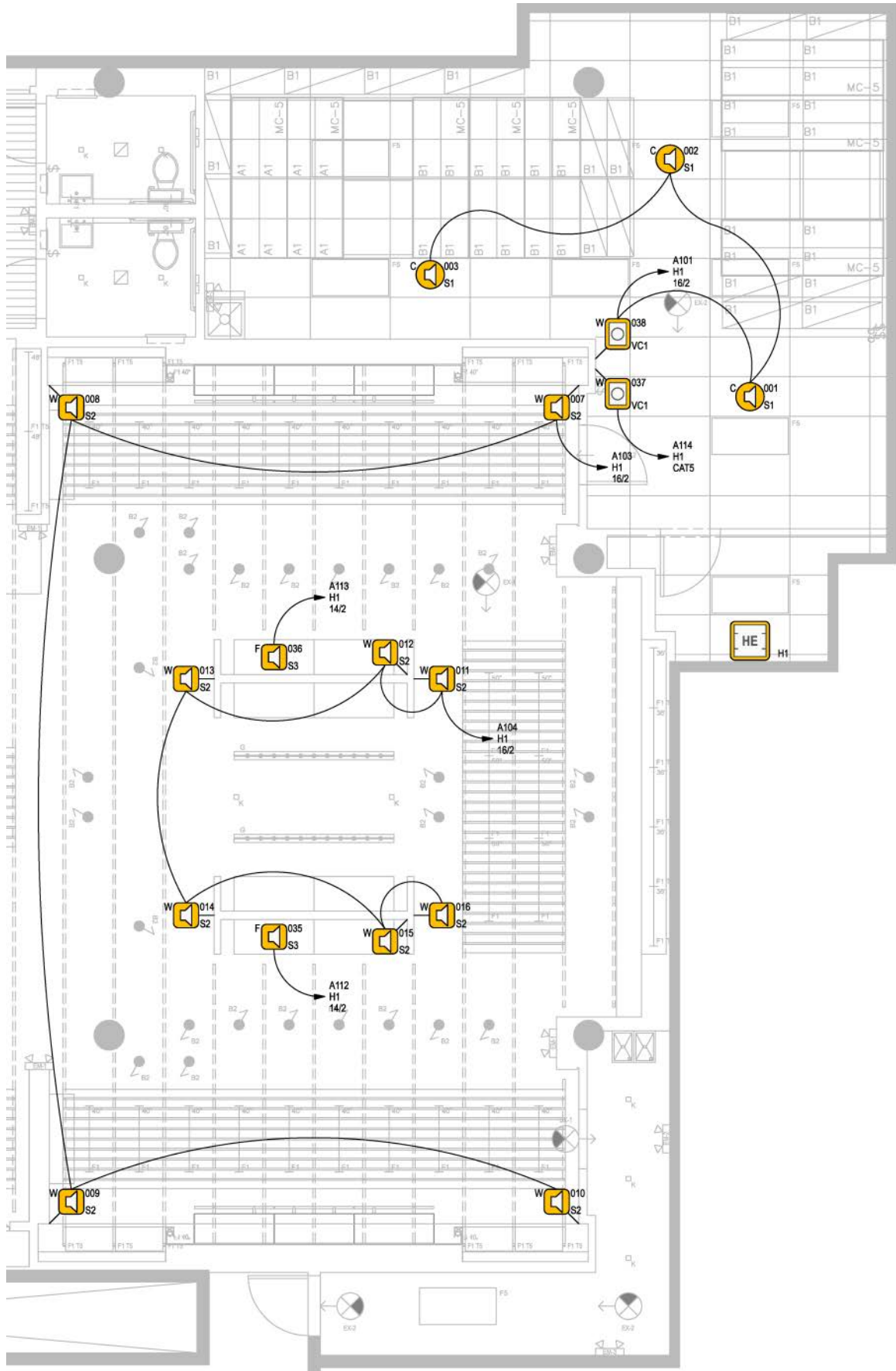
2 REFLECTED CEILING PLAN - ELECTRICAL

SCALE: 3/16"=1'-0"

OUTLET SCHEDULE

Outlet Tag	Description	New or Existing	Functional Group	Mounting Type	Faceplate	Voice	Data	CATV	Fiber	AV	Blanks	Other	Backbox	Gangs	Conduits	Notes
D	Voice/Data General Use	N	Communications	Wall	1G		1 CAT-6						4-11/16" sq	Single gang	1 25" Stub Up/Down	Coordinate conduit stub and height with architect and GC/EC. Use 100/Decora strap & faceplate as specified by Architect.
DC	Ceiling Mounted Device	N	Communications	Ceiling	N/A		1 CAT-6						N/A	N/A	1 25" Stub Up/Down	Terminate cable on jack with strain relief and dust cover. See Details for more information.
MB	Voice/Data General Use	N	Communications	Wall - Surface	1G		4 CAT-6	2 RG-6U Quad Shld					4-11/16" sq	Single gang mud ring	1 25" Stub Up/Down	Coordinate conduit stub and height with architect and GC/EC. Use 100/Decora strap & faceplate as specified by Architect.
MM	Voice/Data General Use	N	Communications	Wall - Surface	1G		2 CAT-6	2 RG-6U Quad Shld					4-11/16" sq	Single gang mud ring	1 25" Stub Up/Down	Coordinate conduit stub and height with architect and GC/EC. Use 100/Decora strap & faceplate as specified by Architect.
TV	Video Distribution (MATV)	N	Video	Wall/Floor Box	1G		1 CAT-6	1 RG-6U Quad Shld					4-11/16" sq	Single gang mud ring	1 25" Stub Up/Down	Coordinate conduit stub and height with architect and GC/EC. Use 100/Decora strap & faceplate as specified by Architect.
VD	Voice/Data General Use	N	Communications	Wall/Floor Box	1G		1 CAT-6	1 CAT-6					4-11/16" sq	Single gang mud ring	1 25" Stub Up/Down	Coordinate conduit stub and height with architect and GC/EC. Use 100/Decora strap & faceplate as specified by Architect.
V4	Voice/Data General Use	N	Communications	Wall/Floor Box	1G		1 CAT-6	3 CAT-6					4-11/16" sq	Single gang mud ring	1 25" Stub Up/Down	Coordinate conduit stub and height with architect and GC/EC. Use 100/Decora strap & faceplate as specified by Architect.
W	Voice General Use	N	Communications	Wall	1G		1 CAT-6						4-11/16" sq	Single gang mud ring	1 25" Stub Up/Down	Use studded faceplate. See Details for more information. Use finish as specified by Architect.

B.10 Office Building Floor Plan



ANNEX C. Abbreviations

Note: Abbreviations are available for download at: http://standards.ce.org/kwspub/published_docs/.

#	Term	Standard Abbreviation	Short Abbreviation	NCS	SIA
1.	ABOVE FINISHED FLOOR	AFF		AFF	
2.	ACCESS	ACS	A	ACS	ACS
3.	ACCESS DOOR	ACS DR	AD	ACS DR	ACS DR
4.	ACCESS FLOOR	ACS FLR	AF	ACS FLR	ACS FLR
5.	ACCESS PANEL	ACS PNL	AP	ACS PNL	AP
6.	ACTIVE	ACT			
7.	ACTUATOR	ACTR	AC		
8.	ALARM	ALM	A	ALM	ALM
9.	AM RADIO FREQUENCY	AM			
10.	ANNUNCIATOR	ANN	A	ANN	ANN
11.	ANTENNA	ANT		ANT	
12.	ARC FAULT CIRCUIT INTERRUPTER	AFCI			
13.	ARTICULATING	ARL	A		
14.	AUDIO	AUD	A	AUD	
15.	AUDIO LISTENING DEVICE	SPKR	S		
16.	AUDIO SERVER	AUD SVR	AS		
17.	AUDIO SOURCE	AUD	A		
18.	AUDIO VIDEO	AV		AV	
19.	AUDIO VIDEO SERVER	AV SVR	AVS		
20.	AUDIO/VIDEO SOURCE	AVS	AV		
21.	AUTOTRANSFORMER	AT			
22.	AXIAL FLOW	AX FL		AX FL	
23.	BACK UP	BU			
24.	BAG TYPE	BT			
25.	BAGLESS TYPE	BGL			
26.	BAR CODE	BC			
27.	BATTERY	BAT		BAT	
28.	BEAM	BM		BM	
29.	BELL	BL		BL	
30.	BLOWER	BLW			
31.	BOUNDARY	BND	B		
32.	BREAK	BRK	BK		
33.	BREAKER	BRKR	BK	BRKR	
34.	BRUSHED DC MOTOR TYPE	BDC	BD		
35.	BURGLAR ALARM	BA	B	BA	
36.	BUZZER	BUZ	Z		
37.	CABLE	CAB	C		

#	Term	Standard Abbreviation	Short Abbreviation	NCS	SIA
38.	CABLE TELEVISION	CTV		CTV	
39.	CAMERA	CAM		CAM	
40.	CAMERA CONTROL	CC			
41.	CEILING BOX	CCA	CB		
42.	CELLULAR PHONE	CEL	C		
43.	CELLULAR REPEATER	CR	C		
44.	CENTER DRAW	CDRW			
45.	CENTRAL PROCESSING UNIT	CPU			
46.	CHARGE CONTROLLER	CCT			
47.	CHIME	CH	C	CH	
48.	CLOCK	CLK	C		
49.	CLIP-ON	CLP	CL		
50.	COMMON GROUND	CG		CG	
51.	CONDITIONER/FILTER	CND	C		
52.	CONTROL, CONTROLLER	CTRL	CT	CTRL	
53.	CONTROL COMMUNICATIONS	CTRC	CC		
54.	CONTROL PANEL	CTRP	CP		
55.	CONTROL SENSOR	CSNSR	CTS		
56.	CONTROL SWITCH	CS		CS	
57.	COPIER	CP			
58.	CPU/SERVER	SVR			
59.	CREDIT CARD	CC			
60.	CURRENT SENSOR/TRANSFORMER	CT			
61.	CURTAIN	CURT		CURT	
62.	CURVED	CRV	CV		
63.	CYCLONIC	CY			
64.	DATA	DAT	D	DAT	DAT
65.	DATA PORT	DAT	D		
66.	DATABASE	DB		DB	
67.	DEDICATED CHARGER	DDC			
68.	DEMARICATION POINT	DMARC	DM		
69.	DETECTOR	DTK	D		
70.	DETECTOR	PIR	D		
71.	DIGITAL LIGHT PROCESSING	DLP			
72.	DIMMER	DMR		DMR	
73.	DIMMER, 3WAY	3DMR			
74.	DISH ANTENNA	DISH			
75.	DOCUMENT	DOC	D		
76.	DOOR	D			

#	Term	Standard Abbreviation	Short Abbreviation	NCS	SIA
77.	DOOR BELL	DB			
78.	DOOR BELL BUTTON	DB			
79.	DOOR PHONE	DPH	D		
80.	DOOR RELEASE	DR	R		R
81.	DOUBLE POLE	DP		DP	
82.	DOUBLE POLE SWITCH	2P	2P		
83.	DOUBLE SEAT	DBLS	DS		
84.	DOWN(DIRECTION)	DN			
85.	DUPLEX	DX		DX	
86.	DUPLEX OUTLET	DX OUT	DX	DX OUT	
87.	DURESS	D			D
88.	ELEVATOR	ELEV	H	ELEV	ELEV
89.	ELEVATOR FLOOR CALL	FC	F		FC
90.	ELEVATOR HALL CALL	ELEV H	H		ELEV H
91.	EMERGENCY	EMER		EMER	
92.	ENERGY	ES			
93.	EYE IRIS	IRIS	I		
94.	EYE RETINA	RET	R		
95.	FACSIMILE	FAX	FX	FAX	
96.	FAX/PRINTER/COPIER	PRN	PN		
97.	FIBER OPTIC	FIB	F		
98.	FILE CABINET	FC		FC	
99.	FINGER	FNGR	F	FNGR	FNGR
100.	FIRE ALARM	FA	F		FA
101.	FIRE WIRE	FW			
102.	FIXED	FXD	F		
103.	FLIP-TOP	FLTP	FT		
104.	FLOOD SENSOR	FS			
105.	FLOOR BOX	FCA	FB		
106.	FLOOR MAT	FM			
107.	FLUORESCENT	FLUOR	FL	FLUOR	
108.	FLUORESCENT FIXTURE	FLUOR FIX		FLUOR FIX	
109.	FLUORESCENT LIGHTING	LT FLUOR		LT FLUOR	
110.	FM RADIO FREQUENCY	FM			
111.	FOUNTAIN	FTN			
112.	FOOT CANDLE	FC		FC	
113.	FOUR-WAY	4WAY	4W	4WAY	
114.	FUNCTION	FCN			
115.	GAME CLOCK	GCLK	GC		
116.	GAME CONTROL	GCT			

#	Term	Standard Abbreviation	Short Abbreviation	NCS	SIA
117.	GAMING	GAM	GM		
118.	GARAGE DOOR	GD			
119.	GATE	GAT	G		
120.	GENERATOR	GEN	G	GEN	GEN
121.	GLASS	GL		GL	
122.	GLASS BREAK SENSOR	GBRK	GB		
123.	GOOSENECK	GNK			
124.	GRID-CONNECTED	GDC			
125.	GROUND	GND	G		
126.	GROUND FAULT CIRCUIT INTERRUPTER	GFCI	GF	GFCI	
127.	HAND GEOMETRY	HG	H		
128.	HANDHELD	HH			
129.	HARDWIRED	HDW	HW		
130.	HEADEND	RK	H		
131.	HIDE-A-HOSE	HAH	H		
132.	HIGH DEFINITION TV	HD			
133.	HIGH FREQUENCY	HF			
134.	HORIZONTAL	HORIZ	H	HORIZ	
135.	HORIZONTAL AXIS	HORIZX	HX		
136.	HORN	HRN	H		HRN
137.	HUMIDISTAT	HSTAT	H	HSTAT	
138.	HUMIDITY SENSOR	HS			
139.	HVAC	HVAC	H	HVAC	
140.	INDUCTION-TYPE	IDT			
141.	INFRARED	IR		IR	IR
142.	INPUT/OUTPUT	I/O		I/O	
143.	INTERACTIVE	ITE			
144.	INTERCOM	IC		INTERCOM	
145.	INTERNET PROTOCOL	IP			
146.	INVERTOR	INVR	INV	INVR	
147.	IP CAMERA	IP CAM	IP		
148.	IRRIGATION	IRR			
149.	ISOLATED GROUND	IG			
150.	JACK	JK		JK	
151.	JACUZZI	JCZ	J		
152.	JOYSTICK CONTROLLER	JOY	JS		
153.	JOYSTICK TOUCHPAD CONTROLLER	JPAD			
154.	JUNCTION BOX	JBOX	J	JBOX	JBOX
155.	KELVIN	K		K	

#	Term	Standard Abbreviation	Short Abbreviation	NCS	SIA
156.	KEY OPERATED	K			
157.	KEY OR KEYED	K			K
158.	KEYBOARD	KYBD	KB		
159.	KEYBOARD/VIDEO/MOUSE	KVM			
160.	KEYPAD	KPAD	KP		
161.	KILO	K	K	K	
162.	KILOCALORIE	kCAL		kCAL	
163.	KILOGRAM	kg		Kg	
164.	KILOHERTZ	kHz		kHz	
165.	KILOLITER	kL		kL	
166.	KILOMETER	km		Km	
167.	KILOVOLT	kV		kV	
168.	KILOVOLT AMPERE	kVA		kVA	
169.	KILOVOLT AMPERE PER HOUR	kVAh		kVAh	
170.	KILOVOLT AMPERE REACTIVE	kVAR		kVAR	
171.	KLAXON	KLX	K		KLX
172.	LIQUID CRYSTAL DISPLAY	LCD			
173.	LIQUID CRYSTAL ON SILICON	LCOS			
174.	LCR BAR SPEAKER	LCR			
175.	LIGHT EMITTING DIODE	LED			
176.	LEFT DRAW	LDRW			
177.	LEFT HAND	LH		LH	
178.	LEFT HAND SIDE	LHS		LHS	
179.	LIFT/MOUNTS	LIFT	L	LIFT	
180.	LIGHT	LT	L	LT	
181.	LIGHTING	LTG			
182.	LIGHTNING ARRESTOR	LTNGA	LA		
183.	LIGHTNING	LTNG	LT	LTNG	
184.	LINE ARRAY SPEAKER	LAR			
185.	LINE INTERACTIVE	LNI			
186.	LISTEN-IN	LIN	L		
187.	LOCAL AREA NETWORK	LAN			
188.	LOOP	L			
189.	LOW FREQUENCY	LF			
190.	LOW VOLTAGE	LV		LV	
191.	LOW VOLTAGE MASTER	LVM			
192.	LOW VOLTAGE ONLY	L			
193.	LOWER LEFT	LL		LL	
194.	LR BAR SPEAKER	LR			
195.	LOUDSPEAKER (SPEAKER)	SPKR	SP	SPKR	

#	Term	Standard Abbreviation	Short Abbreviation	NCS	SIA
196.	MAGNETIC PICKUP	MP	M		
197.	MAGNETIC STRIP	MS			
198.	MAIN	MAIN	M		
199.	MAINS CONNECTED CHARGER	MNCC	MC		
200.	MASKING SCREEN	MASK	M	MASK	
201.	MASTER	MSR	M		M
202.	MASTER ANTENNA TELEVISION SYSTEM	MATV		MATV	
203.	MASTER CLOCK	MCLK	MC		
204.	MASTER INTERCOM	M-IC	M		
205.	MAXIMUM POWER POINT TRACKING	MPPT	MPT		
206.	METER	m		M	
207.	MICROPHONE	MIC	M		
208.	MICROWAVE	MW	M	MW	MW
209.	MILLIMETER	mm		mm	
210.	MIRROR TV	M TV	M		
211.	MISCELLANEOUS CONTROL PORT	CTRL	C		
212.	MOBILE	MLB	M		
213.	MODIFIED SINE	MODS	MS		
214.	MOISTURE SENSOR	MS	M		
215.	MONITOR	MON	M		
216.	MOTION SENSOR	MS			
217.	MOTORIZED	MOT	M		
218.	MULTI FUNCTION DEVICE	MFD			
219.	NON MOTORIZED	NM	N		
220.	NO SCALE	NS		NS	
221.	NOT TO SCALE	NTS		NTS	
222.	NUMERIC	NUM			
223.	OCCUPY	OCC		OCC	
224.	OCCUPANCY	OCY	OY		
225.	OFF-LINE	OFL	OL		
226.	ON-CENTER	OC		OC	
227.	ON-LINE	ONL			
228.	ONE OR SINGLE POLE	1P		1P	
229.	ONE-WAY	1WAY		1WAY	
230.	ONBOARD CHARGER	OBC	OC		
231.	OUTDOOR	O			
232.	OVERHEAD DOOR	OHD			
233.	OVERLAY	OVLY	OV		

#	Term	Standard Abbreviation	Short Abbreviation	NCS	SIA
234.	OVER TEMPERATURE	OTEMP	OT		
235.	PAN	P			
236.	PAN/TILT or PAN	PT			PT
237.	PAN/TILT/ZOOM	PTZ			PTZ
238.	PANEL	PNL		PNL	
239.	PANIC	P			P
240.	PASSIVE	PAS	PA		
241.	PASSIVE INFARED DETECTOR	PIR			
242.	PERMANENT MAGNET TYPE	PMT	PM		
243.	PERIMETER	PERIM	P	PERIM	PERIM
244.	PHASE	PH		PH	
245.	PHONE PORT	TEL	P		
246.	PHONE REPEATER	PR	P		
247.	PHONE SYSTEM	P	P		
248.	PHOTOVOLTAIC	PV			
249.	PHOTOVOLTAIC ARRAY	PVA	PV		
250.	PORTABLE	PORT	PT	PORT	
251.	POWER (Usually Volts and AC OR DC)	PWR	P	PWR	
252.	POWER AMP	PA		PA	
253.	POWERED	PWR	P		
254.	PRIMARY	PRI		PRI	
255.	PRINTER	PRN			
256.	PROJECTION SCREEN	SCRN	PS		
257.	PROJECTOR	PROJ		PROJ	
258.	PROXIMITY	PX	P		PX
259.	PULL BOX	PB		PB	
260.	PULL-DOWN	PDN	PD		
261.	PULL-UP	PUP	PU		
262.	PULSE WIDTH MODULATION	PWM			
263.	PURE SINE	PS			
264.	PUSH TO TALK	PTT			
265.	PUSHBUTTON	PB		PB	
266.	QUADRAPLEX OUTLET	QX OUT	QUAD		
267.	RACK	RK			
268.	RADIO FREQUENCY	RF		RF	
269.	RAIN SENSOR	RS			
270.	REAR	R			
271.	RECEIVE	RX			
272.	RECEIVER	RX		RCVR	RX

#	Term	Standard Abbreviation	Short Abbreviation	NCS	SIA
273.	RECEPTACLE, DUPLEX ON EMERGENCY POWER	EMER			
274.	RECEPTACLE, SPECIAL PURPOSE	SPCL	S		
275.	REFLECTED CEILING PLAN	RCP		RCP	
276.	REMOTE	REM	R		
277.	REMOTE AV SOURCE	R-AV			
278.	REMOTE CONTROL	RC		RC	
279.	REQUEST FOR EXIT	X			
280.	RF CONTROLLED	RF			
281.	RF REPEATER OR ACCESS POINT	WAP			
282.	RIGHT DRAW	RDRW			
283.	RIGHT HAND	RH		RH	
284.	ROOM DARKENING	RDK			
285.	ROTARY	ROT	R		
286.	SATELLITE	SAT	S		
287.	SATELLITE ANTENNA	S-ANT	S		
288.	SATELLITE UPLINK	UPLINK	UL		
289.	SCREEN	SCRN	S	SCRN	
290.	SCSI	SCSI	S		
291.	SEAT	ST	S		
292.	SEAT ACTUATOR	SEAT ACTR	SA		
293.	SECONDARY	SEC			
294.	SENSOR	SNSR	S	SNSR	
295.	SERVER	SVR	SV		
296.	SHADE	SHADE	S		SHADE
297.	SHOCK	SHK			
298.	SHOTGUN	SGN			
299.	SINGLE POLE	1P		1P	
300.	SINGLE STAGE	1S			
301.	SKYLIGHT	SKLT		SKLT	
302.	SLAVE CLOCK	SCLK	SCK		
303.	SLIDER	SL	S		
304.	SMART CARD	SC		SC	SC
305.	SMOKE DETECTOR	SD		SD	
306.	SNOW MELT	SMLT	SM		
307.	SOFA	SOF	SF		
308.	SOUND MASKING	MASK	M	MASK	
309.	SPEAKER (LOUDSPEAKER)	SPKR	SP	SPKR	
310.	SPECIAL	SPCL		SPCL	

#	Term	Standard Abbreviation	Short Abbreviation	NCS	SIA
311.	SPOT(10' HOSE IN CLOSET)	SP	S		
312.	STANDARD	STD		STD	
313.	STAND-ALONE	STDA	SA		
314.	STANDBY	STBY	SY		
315.	STEREO	ST			
316.	STRESS	SS			
317.	STROBE	STRB	S	STRB	
318.	STROBE/HORN	STRB/HRN	SH	STRB/HRN	
319.	SUBSTATION INTERCOM	SIC	S		
320.	SUBWOOFER	SW	S		
321.	SURGE VOLTAGE PROTECTOR	TVSS	SVP		
322.	SURVEILLANCE CAMERA	SURV CAM	CAM	SURV CAM	
323.	SWITCH	SW	S	SW	
324.	SWITCHED	SW		SW	
325.	TABLET	TAB	TB		
326.	TECHNICAL	TECH	T		
327.	TELEPHONE	TEL	T	TEL	
328.	TELEPHONE & DATA	TEL/DAT	T/D		
329.	TELEPHONE TERMINAL BOARD	TTB		TTB	TTB
330.	TELEVISION	TV		TV	TV
331.	TEMPERATURE	TEMP		TEMP	
332.	TEMPERATURE CONTROL PANEL	TCP			
333.	TEMPERATURE SENSOR	TS		TS	
334.	TEMPERATURE/HUMIDITY SENSOR	THS		THS	
335.	TERMINAL BLOCK	TTB		TTB	
336.	THEATER SEAT	TSEAT			
337.	THERMOSTAT	TSTAT	T	TSTAT	TSTAT
338.	THERMOSTAT/HUMIDSTAT	TH			
339.	THREE STAGE	3S			
340.	THREE-WAY	3WAY	3W	3WAY	
341.	TILT	TILT	TT		
342.	TIME CLOCK	TCLK	TC		
343.	TIMER OPERATED	T		T	
344.	TOE KICK	TKK	TK		
345.	TOKEN	TK			
346.	TOUCH PANEL	TPAN			
347.	TOUCH PAD	TPAD			
348.	TRANSCEIVER	TR	T		TR

#	Term	Standard Abbreviation	Short Abbreviation	NCS	SIA
349.	TRANSIENT VOLTAGE SURGE PROTECTOR	TVSS	SP		
350.	TRANSMITTER	TX		TX	TX
351.	TWO-WAY	2WAY	2W	2WAY	
352.	TWO STAGE	2S			
353.	UHF	UHF	U		
354.	ULTRASONIC	US			
355.	UP (DIRECTION)	UP			
356.	UNDER BED	UDB	UB		
357.	UNDER TEMP	UT			
358.	UNDERSIDE	UDS			
359.	UNINTERRUPTIBLE POWER SUPPLY	UPS			
360.	UTILITY	UTIL	U	UTIL	
361.	VACUUM	VAC		VAC	
362.	VACUUM INLET	VACIN	VI		
363.	VACUUM CLEANER OUTLET, VOLTAGE ADDED IF NEEDED	VCO		VCO	
364.	VACUUM POWER UNIT	VAC			
365.	VACUUM TOE-KICK INLET	VACTK	T		
366.	VARIABLE HEIGHT	VRH	VH		
367.	VARIABLE HEIGHT AND WIDTH	VRHW	VHW		
368.	VARIABLE WIDTH	VRW	VW		
369.	VEHICLE	VEH		VEH	
370.	VEHICLE CHARGE POINT	VCP	CP		
371.	VEHICLE SENSOR	VEH	V		
372.	VERTICAL	VERT	V		
373.	VERTICAL AXIS	VERTXA	VX		
374.	VHF	VHF	V		
375.	VIBRATION	VIB		VIB	
376.	VIDEO	VID	V	VID	VID
377.	VIDEO CAMERA	CAM			
378.	VIDEO CONTROLLER WITH TOUCHPAD	VCPAD	VCP		
379.	VIDEO INTEGRATION	VINT		VINT	
380.	VIDEO MONITOR	VMON	VM		
381.	VIDEO MONITOR VOICE OVER IP	VMON	MON		
382.	VIDEO SERVER	V SVR	VS		
383.	VIDEO SOURCE	VIDS	V		
384.	VOICE	VOICE	V		
385.	VOICE OVER IP	VOIP			
386.	VOLT	V		V	

#	Term	Standard Abbreviation	Short Abbreviation	NCS	SIA
387.	VOLTAGE REGULATOR	VRG	VR	VR	
388.	VOLUME	VOL	V	VOL	
389.	VOLUME CONTROL	VOL	VC	VOL	
390.	VROOM (HOSE IN CLOSET)	VROOM	V		
391.	WALL BOX	WB			
392.	WEATHER STATION	WEA		WEA	
393.	WEATHERPROOF	WP			
394.	WHITEBOARD	WB			
395.	WI-FI WIRELESS LOCAL AREA NETWORK	WIFI			
396.	WIND GENERATOR	WG			
397.	WINDOW SENSOR	WS			
398.	WIRELESS	WLS			
399.	WIRELESS ACCESS POINT	WAP			
400.	WIRELESS LAN	WLAN			
401.	WIRELESS PROCESSOR/REPEATER	WP			
402.	WITH PILOT LIGHT	WPP	P		
403.	ZigBee	ZB			
404.	Z-WAVE	ZW			

SUMMARY of MOUNTING ABBREVIATIONS

Mount Type	Abbreviation
CEILING	C
DESK TABLE	D
FLUSH	F
FLOOR	FL
GROUND	G
HIDDEN	H
MULLION	M
OUTDOOR	O
PEDESTAL	P
RACK	RK
ROOF	R
RECESSED	REC
SURFACE	S
WALL	W

ANNEX D. Design Principles for Symbol Usage (Normative)

D.1. General Design Principles for CAD and Hand Drawings

The purpose of this Annex is to cover the essential engineering principles of the design, plotting and printing of floor plan and reflected ceiling plan drawings, including:

- Real (or actual) size drawing plans
- Scaled drawing plans
- Symbol stretch and rotation principles
- Use of layers, colors and text

These principles are applied to the following drawing utilities:

- Hand drafting
- “Traditional CAD”
 - o Traditional CAD uses Model Space and Paper Space, also called Layout Space
 - o This includes AutoCAD®, Bricscad®, Bentley Microstation® and others
- “Other CAD”
 - o Other CAD does not use Model Space
 - o Other CAD uses Paper Space, including Microsoft Visio®, Vectorworks® and others

D.1.1. The Architectural Plan

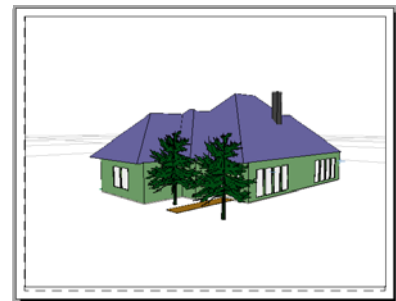
In all architectural drawings, the real architectural plan **must** be represented accurately, either as actual-size or scaled-size. Within the real building plan, all dimensional objects and dimensions **must** refer to the real size of the entities.

a. Traditional CAD uses Model Space for showing real size

The actual working area size in a traditional CAD program is called Model Space. Model Space objects are drawn to their actual size and one unit represents the drawing unit being used such as one millimeter, one meter, one inch or one foot). For example, a 50' x 40' (15.2m x 12.2m) house would be drawn using 50 one-foot drawing units x 40 one-foot drawing units.

Key principle: *No scaling within Model Space*

The major advantage of working in Model Space is all entities are drawn in real-size. For example, a 10' (3m) wall is 10' (3m) long, and a 36" (0.9m) door is 36" (0.9m) wide. Dimensioning these objects is in real-size, so the wall would dimension 10' (3m) long.



**Figure D-1: Model Space
where 1' = 1' (1m = 1m)**

b. Fitting the Architectural Plan on the Paper

The difficulty in traditional CAD Model Space is putting the architectural plan on paper. At the paper level, traditional CAD, hand drawing and other CAD share the same need—scaling the real-size architectural plan to the paper.

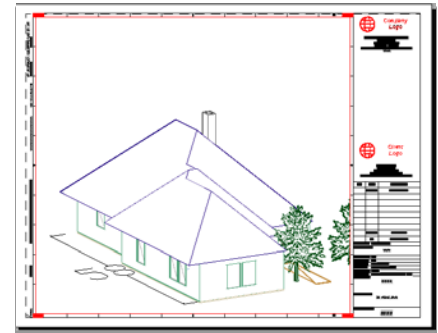
The paper representation of an architectural plan is called Paper Space. In traditional CAD, the Paper Space is the proportionately scaled representation of the model on the paper.

Standard Scale, as used in this Annex, refers to any scale defined for common use, for example, $1" = 1'0"$ or 1:100.

In the 50' x 40' (15.2m x 12.2m) building example of Model

Space in **Figure D-2** using a $1/8" = 1'0"$, or 1:96, Standard Scale, the model would fit on ANSI A/Letter.

On ISO A4 paper, it would fit using a 1:100 Standard Scale.



**Figure D-2: Paper Space with
 $1/8" = 1'0"$ scale
1:100 scale**

c. Principles of scaling applied to the different drawing utilities

Whether the drawing is created by hand, in traditional CAD or in other CAD, the Paper Space concept remains the same.

- **Hand drafting:** The drawing scale is determined by the size of the architectural model and the desired paper size to be used. Once the drawing scale is defined, all the elements in the floor plan or reflected ceiling plan are drawn using the appropriate scale ruler.

When $1/8" = 1'0"$ Standard Scale is used, a representative scale of the floor plan **must** be drafted to correctly fit the plan on the chosen paper size. For example, a 40' x 30' (12.2m x 9.1m) room would measure 5" x 3.75" (127mm x 95mm), regardless of the size of paper.

When 1:100 Standard Scale is used, a representative scale of the floor plan **must** be drafted to correctly fit the plan on the chosen paper size. For example, a 40' x 30' (12.2m x 9.1m) room would measure 4.8" x 3.6" (122mm x 91mm), regardless of the size of paper.

- **Traditional CAD:** Here, the architectural plan is drawn in Model Space to real scale ($1' = 1'$ or $1m = 1m$). The 40' x 30' (12.2m x 9.1m) room would measure exactly 40' x 30' (12.2m x 9.1m) in Model Space. Model Space is typically not printed to scale and **must** be reduced to fit on the selected paper size. The same $1/8" = 1'0"$ Standard Scale would need to be used to fit the plan on an ANSI A/Letter.

The model is scaled into Paper Space using Standard Scale of $1/8" = 1'0"$, as in hand drafting or other CAD.

- **Other CAD:** Scale is determined by the relationship between model size and paper size. As in hand drafting, everything drawn on the Paper Space is scaled. For example, if the scale is $1/8" = 1'$, the 40' x 30' (12.2m x 9.1m) room would measure 5" x 3.75" (127mm x 95mm).

d. Summary of Scaling Methodologies

All drawing utilities scale the real model to fit on the selected page size. The primary difference between traditional CAD and other CAD or hand-drawn plans is the traditional CAD program scales to the paper after the model is drawn, whereas other CAD and hand drawings scale the plan from the beginning.

D.1.2. Other Architectural Scale Principles

This section is necessarily technical, but it is important to understand how the scale is calculated for different purposes.

a. Standard Drawing Scale

Standard Drawing Scale is the proportional ratio between the original full-scale of an architectural plan, such as a building or room, and the presentation of the plan on paper. This scale ratio is normally presented as Paper units = Model units. For example, 1" = 1' 0" indicates one-inch measurement on the paper represents one foot in the model.

b. CAD Scale Factor

CAD Scale Factor (for traditional CAD) is the factor of a number which represents how many times bigger the full size (Model Space) is compared to the plotted size. For a 1/8"=1' 0" standard drawing scale, CAD Scale Factor is calculated like this:

$$\frac{\text{Model Units}}{\text{Paper Units}} = \text{CAD Scale Factor for ANSI: } \frac{1'}{1/8"} = \frac{12"}{0.125"} = 96$$

$$\text{CAD Scale Factor for ISO: } \frac{100\text{mm}}{1\text{mm}} = 100$$

Figure D-3: Formulas for CAD Scale Factor

For traditional CAD, the 1/4" x 1/4" (6.35mm x 6.35mm) floor plan symbol in Model Space **must** be scaled up by a factor of 96 on the Model Space view to appear at actual size of 1/4" x 1/4" (6.35mm x 6.35mm) on the paper. If the symbol were placed in the Viewport at Standard Scale, the symbol would appear as a dot on the paper—it would be too small to recognize.

c. Plotted Size

The plotted size refers to the Paper Space representation of the scaled model and is for printing on paper.

d. Text Size

Text readability is important in architectural drawings. Per the U.S. National CAD Standard (NCS) V5, minimum text size is:

Method	Minimum Size
Hand drafting	1/8" (3.2mm)
CAD	3/32" (2.5mm)

Table D-1: Text Size

In drawing notes, do not use bold, italic or underline.

Table D-2 shows different examples of text sizes and text measurements. The 3/32" (0.094" or 2.5mm) text is legible at 9 point text size.

Inches	Arial Font Point	Millimeter	SampleText in Arial Font
3/16	18 pt	5.0	This is in 18 pt text
3/32	9 pt	2.5	This is in 9 pt text
3/64	4.5 pt	1.2	This is in 4.5 pt text
3/128	2 pt	0.6	This is in 2 pt text

Table D-2: Text Size Examples

D.1.3. Drawing Paper Sizes

Architectural drawings can be shown on different sized paper. Common paper sizes are shown in **Table D-3**.

Paper Sizes of Metric ISO A Series Sheets		Paper Sizes of Metric ISO B Series Sheets	
<i>Name</i>	<i>Width x Length</i>	<i>Name</i>	<i>Width x Length</i>
A0	841 mm x 1189 mm	B0	1000 mm x 1414 mm
A1	594 mm x 841 mm	B1	707 mm x 1000 mm
A2	420 mm x 594 mm	B2	500 mm x 707 mm
A3	297 mm x 420 mm	B3	353 mm x 500 mm
A4	210 mm x 297 mm	B4	250 mm x 253 mm
A5	149 mm x 210 mm	A5	176 mm x 250 mm

Paper Sizes of Imperial Architectural (ARCH) Sheets		Paper Sizes of Imperial ANSI Sheets	
<i>Name</i>	<i>Width x Length</i>	<i>Name</i>	<i>Width x Length</i>
ARCH A	9" x 12"	ANSI A Letter	8.5" x 11"
ARCH B	12" x 18"	ANSI B Tabloid	11" x 17"
ARCH C	18" x 24"	ANSI C	17" x 22"
ARCH D	24" x 36"	ANSI D	22" x 34"
ARCH E	36" x 48"	ANSI E	34" x 44"
ARCH E1	30" x 42"	ANSI F	28" x 40"
ARCH E2	26" x 38"		
ARCH E3	27" x 39"		

Table D-3: Common Paper Designations and Sizes

D.1.4 Drawing Scale

Drawings are scaled proportionately to fit on the selected paper size. Regardless of the drawing size, symbols **must** be the maximum size that fits within a 3/8" (10mm) circle and **must** have at least 3/32" (2.5mm) text.

ANSI Standard Drawing Scales	ISO Standard Drawing Scales
1/8" = 1'-0"	1:100
1/4" = 1'-0"	1:50
3/4" = 1'-0"	1:20
1-1/2" = 1'-0"	1:10
3" = 1'-0"	1:5

Table D-4: Common ANSI and ISO Drawing Scales

D.1.5. Summary of Scale Factors and Text Size for Common Paper Sizes

Use **Table D-3** and **Table D-4** for reference when deciding scale factor and paper size.

For example, to fit a 100'x80' (30.5m x 24.4m) building on an ANSI A/Letter, the 1/16" = 1' 0" scale is used, and the 3/8" = 1' 0" is used to fit this same plan on an ANSI E-Size or ISO A0 paper.

NCS requires borders to be drawn as follows:

3/4" (20mm) for top, bottom and right margins
1 1/2" (40mm) for left margin

Standard Drawing Scale	CAD Scale Factor	CAD Custom Drawing Scale (1")	Visio Custom Drawing Scale (1')	A-Size Plot Area (w/o Border)	B-Size Plot Area (w/o Border)	D-Size Plot Area (w/o Border)	E-Size Plot Area (w/o Border)	3/32" Text Height
1/16" = 1'-0"	192	0.0052	.0625" = 1'-0"	112' x 148"	152' x 244'	328' x 516'	520' x 676'	18"
3/32" = 1'-0"	128	0.0078	.09375" = 1'-0"	74' x 98'	101' x 162'	218' x 344'	346' x 676'	12"
1/8" = 1'-0"	96	0.0104	.125" = 1'-0"	56' x 74'	76' x 122'	164' x 258'	260' x 338'	9"
3/16" = 1'-0"	64	0.0156	.1875" = 1'-0"	37' x 49'	50' x 81'	328' x 172'	173' x 225'	6"
1/4" = 1'-0"	48	0.0208	.25" = 1'-0"	28' x 37'	38' x 61'	82' x 129'	130' x 169'	4.5"
3/8" = 1'-0"	32	0.0313	.375" = 1'-0"	18' x 24'	25' x 244'	54' x 86'	86' x 112'	3"
1/2" = 1'-0"	24	0.0417	.50" = 1'-0"	14' x 18'	19' x 30'	41' x 64'	65' x 84'	2.25"
3/4" = 1'-0"	16	0.0625	.75" = 1'-0"	9' x 98'	12' x 20'	27' x 43'	43' x 56'	1.5"
1" = 1'-0"	12	0.0833	1" = 1'-0"	7' x 9'	9' x 244'	20' x 32'	32' x 42'	1.125"

Table D-5: ANSI Scale Factors and Text Size for Common Paper Sizes

Standard Drawing Scale	CAD Scale Factor	CAD Custom Drawing Scale (1mm)	Visio Custom Drawing Scale (1m)	A4-Size Plot Area (w/o Border)	A3-Size Plot Area (w/o Border)	A1-Size Plot Area (w/o Border)	A0-Size Plot Area (w/o Border)	2.5mm Text Height
1:5	5	0.2000	200	0.8m x 1.185mm	1.2m x 1.8mm	2.7m x 3.9mm	4m x 5.6mm	12.5
1:20	20	0.0500	50	3.4m x 4.7mm	5.1m x 7.2mm	11m x 15.6mm	16m x 22.5mm	50
1:30	30	0.0333	33.33	5.1m x 7.1mm	7.7m x 10mm	16.6m x 23.4mm	24m x 33.8mm	75
1:40	40	0.0250	25	6.8m x 9.4mm	10.2m x 1.8mm	22.1m x 31.2mm	32m x 45.1mm	100
1:50	50	0.0200	20	8.5m x 11mm	12m x 18mm	27.7m x 39mm	40m x 56.4mm	125
1:100	100	0.0100	10	17m x 23mm	25.7m x 36mm	55.4m x 78.1mm	80.1m x 5.646mm	250
1:200	200	0.0050	5	34m x 47mm	51.4m x 72mm	110.8m x 156.2mm	160.2m x 225.8mm	500
1:500	500	0.0020	2	85m x 118mm	128.5m x 180mm	277m x 390.5mm	400.5m x 564.5mm	1250
1:1000	1000	0.0010	1	170m x 237mm	257m x 360mm	54m x 781mm	801m x 1129mm	2500

Table D-6: ISO Scale Factors and Text Size for Common Paper Sizes

D.1.6. Examples Using Architectural Scale Principles

All drawings **must** be drawn to scale and the architectural symbols in this standard must be $3/32"$ (2.5mm) text on the final plot.

Regardless of paper size, a floor plan symbol **must** appear as $1/4" \times 1/4"$ (6.35mm x 6.35mm) with $3/32"$ (2.5mm) attribute text.

a. Real or Actual-Size Architectural Plan in Traditional CAD Model Space

See Figure D-4

- 40' x 30' Room (12.2m x 9.1m) in real size
- Standard Drawing Scale = $1'=1'$ or 1:1
- No Plot Size

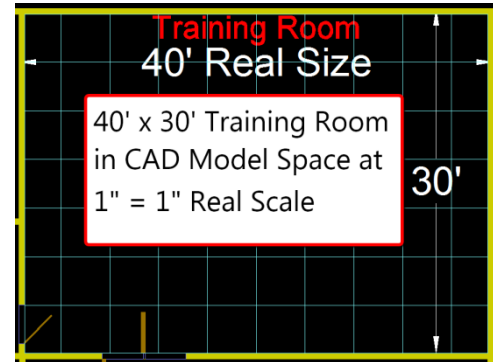


Figure D-4: Floor Plan in Real Size

b. Architectural plan scaled in other CAD software (not traditional CAD)

Other CAD software uses the *Page Setup* utility to determine the scale. See **Figure D-5** for an example of Page Setup in Microsoft Visio®.

- 40' x 30' Room (12.2m x 9.1m) on ANSI A/Letter or ISO A4
- Other CAD has no "Model Space," so the model **must** be scaled down to fit on the page
- Page Setup, **Figure D-5**, indicates this plan will fit on the ANSI A/Letter or ISO A4 with $1/4" = 1' 0"$ Architectural scale
- Visio® uses printer margins and does not use NCS standard margins
- Plotted Size is 10.1"x7.5" (255mm x 190mm)

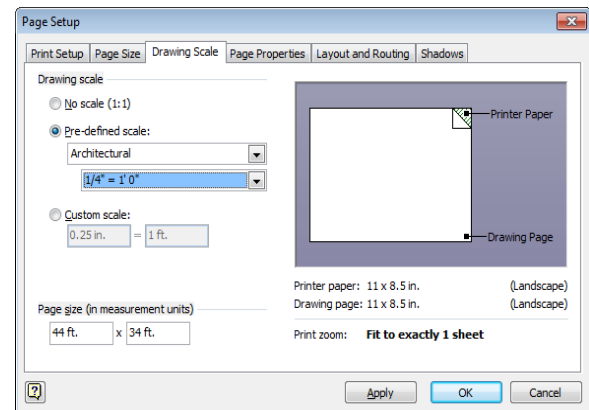


Figure D-5: Page Setup in Microsoft Visio®

c. Architectural plan scaled in hand drawing

The same scaling applies to hand drawn plans, but the scaling is done with a scaled ruler instead of the Page Setup used in other CAD.

- Plotted Size = 10.1"x7.5" (255mm x 190mm) on Page or Sheet (see **Figure D-6**)

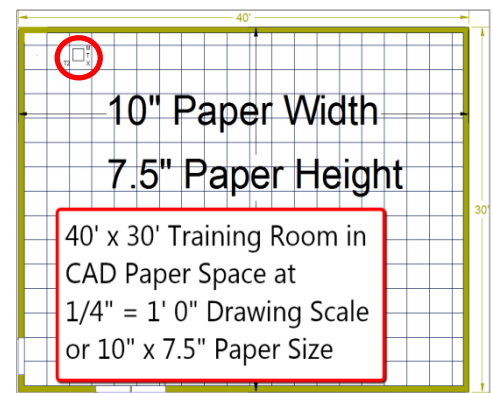


Figure D-6: Floor Plan in $1/4"$ Scale

d. Traditional CAD Scaled to fit in Paper Space

- It is customary in traditional CAD to have a “window” into the Model Space. This is usually called a “*Viewport*”
- The *Viewport* shows the 40' x 30' Room (12.2m x 9.1m) on ANSI A/Letter or ISO A4
- The *Viewport* is set to the Standard Scale of 1/4" = 1'-0" (see **Section D.1.4** Drawing Scale for other scale/paper sizes).
- The Plotted Size of the paper, including the *Viewport*, is 10.1"x7.5" (255mm x 190mm)

e. Scaling of Floor Plan Symbols on Paper Space or Layout Space in hand drawing and other CAD software

- There is no scaling necessary for the symbols in Paper Space or Layout Space, as the plan has already been scaled down using the Standard Scale
- The CAD Scale Factor is 1, and the symbol (see upper left corner of **Figure D-6**) measures 1/4" x 1/4" (6.35mm x 6.35mm) on the paper

Note: In traditional CAD software, it is possible to place the symbols in the Paper Space, but the resulting symbol may not track changes or moves in the Model through the Viewport. This is not the preferred way to place symbols in traditional CAD

f. Scaling of Floor Plan Symbols in Traditional CAD from Model Space to Paper Space

- The typical way to place symbols in a traditional CAD drawing is on Model Space
- In a 40' x 30' Room (12.2m x 9.1m) on ANSI A/Letter, the Standard Scale is 1/4" = 1' 0" (CAD Custom Drawing Scale of 0.0208)
- If the symbol were placed in the *Viewport* at Standard Scale, it would be too small to recognize
- Floor plan symbols placed in the *Viewport* **must** use the CAD Scale Factor to restore them to 1/4" x 1/4" (6.35mm x 6.35mm) in the Paper Space
- With the 1/4" = 1' 0" Standard Scale, the CAD Scale Factor is 48
- Scaling up the floor plan symbol by a factor of 48 results in a symbol size of 1/4" x 1/4" (6.35mm x 6.35mm) with 3/32" (2.5mm) text on the paper

D.1.7. Symbol Stretch

It may be beneficial to represent larger devices, such as a rack, display or projection screen at their real dimension or size on the drawing. Several of the symbols in this standard can be “stretched” to approximately the device’s actual size.

For example, a projection screen symbol may simply represent the location of the screen connection. Or, the symbol can be stretched to represent the actual width of the projection screen on the drawing. The projection screen symbol for a 109” (2.7m) width screen can be stretched to 1/4” x 1.56” (6.35mm x 39.6mm) using a 1/4” = 1’ 0” scale.

Refer to Section 3.5 Figures 13 and 14 for examples of a non-stretched and stretched symbol.

Count	J-STD 710 #	Symbol Name in Alphabetic Order	Count	J-STD 710 #	Symbol Name in Alphabetic Order
1.	2-10	ANTENNA	10.	1-4	PROJECTION SCREEN
2.	8-8	BATTERY	11.	7-1	RACK or HEADEND
3.	7-3	CURTAIN	12.	7-7	SEAT ACUATOR
4.	2-11	DISH ANTENNA	13.	7-4	SHADE
5.	1-2	DISPLAY MONITOR	14.	7-6	THEATER SEAT
6.	7-2	LIFT/MOUNT	15.	8-10	UNINTERRUPTABLE POWER SUPPLY
7.	1-1	LOUDSPEAKER	16.	3-12	VEHICLE SENSOR
8.	7-5	MASKING SCREEN	17.	1-7	WHITE BOARD
9.	8-15	PHOTOVOLTAIC ARRAY	18.	8-16	WIND TURBINE GENARATOR

Table D-7: Stretchable Symbols

a. Principles for Using Symbol Stretch

Drawing a symbol to scale is required when an item is being coordinated with its surroundings. For example:

- A symbol drawn to scale is not required when the reflected ceiling plan only shows the location of the projection screen control cable drops. For example, a 150” motorized projection screen is shown as a 1/4” x 1/4” (6.35mm x 6.35mm) symbol representing the connection location on the floor plan or reflected ceiling plan.
- A stretched symbol is required if the projection screen represents the space it occupies between light fixtures on a reflected ceiling plan at 1/8” drawing scale. The symbol is stretched along a single axis (X or Y, based upon the rotation in the drawing) to 1/4” x 1.56” (6.35mm x 39.6mm) long. The symbol height is not proportional, or scaled, to the exact screen depth because the symbol **must** maintain a minimum size of 1/4” (6.35mm).

The symbols that may be stretched are identified in this standard. For example, a projection screen is scalable and has a “Yes” in the “Stretch” column, whereas a data or phone port cannot be stretched (see **Annex A Symbols Table**).

Options for Stretch Reference

The symbol attributes offer numerous options for scale references in either technology attributes or the Legend reference.

Section 3.6 **Figure 15** shows examples of stretch references using either technology attribute 1, technology attribute 2 or putting the information in the legend.

Category	Legend description	Tech1	Tech2	X-Legend
Motorized screens	DRAPER 110" Diagonal Projection Screen"	110		M01
		M		M110
Flat panel displays	PANASONIC 103" Plasma Screen	P	103	F01
		P103		AV03
Subwoofer, no brand	EV Subwoofer, 18" x 10" x 12" (457mm x 254mm x 305mm), NS	S		AV15
		SUB1	NS	SS15
AV rack, no brand	84" x 24" x 24" Rack (2134mm x 610mm x 610mm)	AV39		RK84
		AV	24X	AV39

Table D-8: Symbol Stretch Reference Examples

D.1.8. Symbol Insertion Base Point Guideline

The base point of a symbol is the attachment and pivot point and is defined as 0,0. The base point is used when placing or rotating a symbol on a drawing.

The base point may change depending upon the symbol shape and application as shown in Figure **D-7**.

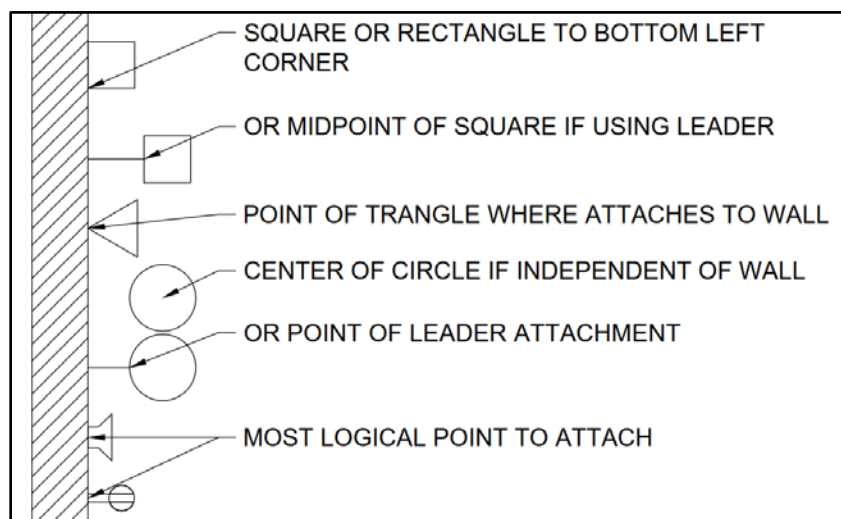


Figure D-7: Symbol Insertion Base Point Examples

D.1.9. CAD Principles for Symbol Creation

a. CAD Layer Naming Guidelines

In addition to the text principles already mentioned, the U.S. National CAD Standard V5 requires CAD layers to conform to their layer guidelines. These guidelines require layer names start with the discipline name. For example, the Audio/Video discipline name is "TA".

The layer name starts with the discipline name and is followed by a dash, then a 4-character Major Technology abbreviation, and up to 2 additional 4-character Minor Technology abbreviations. See **Table D-9** for guidelines.

Description	Layer Name
Layer for placing symbols	1. TA-EQPM-SYMB - for all categories except Furnishings 2. TA-FURN-SYMB - for Furnishings Category only
Layer for Attributes (Annotations)	1. TA-EQPM-ANNO - for all categories except Furnishings 2. TA-FURN-ANNO - for Furnishings Category only
Layer for Optional Color Backgrounds (classified as Patterns and Hatches)	1. TA-EQPM-SYMB-PATT - for all categories except Furnishings 2. TA-FURN-SYMB-PATT - for Furnishings Category only

Table D-9: CAD Layer Naming Guidelines

b. Using CAD Layers

Following CAD layer use standards is critical to being able to control the drawings by turning groups of layers on or off by discipline.

Since the core of the architectural drawing set are the floor plans and reflected ceiling plans, all the respective disciplines have their own layer names. If the CAD draftsman did not follow the guidelines, it would be extremely difficult for the architects, subcontractors, integrators and maintenance personnel to identify conflicting symbols.

These layer standards will enable the reader to easily distinguish symbols and tags on a floor plan drawing, allowing reviewers to:

1. Turn disciplines on or off
2. Lock drawing layers for disciplines to prevent them from being moved or edited
3. View and manipulate symbols and tags

c. Text Font Guidelines

Font legibility is important and it is recommended Arial font be used for most applications. The following font styles are recommended for the floor plan symbols when used in traditional CAD and other CAD software.

Use	Text Style	Font	Font Style	Text Height
Most attributes	J-STD 710	ARIAL	REGULAR	3/32" (2.5mm)
Text inside symbols	J-STD 710 Narrow	ARIAL Narrow	REGULAR	3/32" (2.5mm)

Table D-10: Font Styles and Text Layer Guidelines

d. Use of Optional Background Colors for Symbols

Most of the time drawings are plotted with black ink. Color can be helpful in distinguishing the different categories of symbols on floor plans, especially for customers. The key to using colors is selecting distinguishable colors. The following guidelines apply to using color fills with plan symbols:

- Color **must** not be used for the symbol itself or for text. Black is used for readability.
- Use color for symbol background fills only, by creating a border around the symbol, as shown in **Figure D-8**.



Figure D-8: Symbol Color Examples

- The symbol border can be a circle, square or rectangle, and the square or rectangle **may** have corners chamfered or filleted.
- Colors have been identified for each symbol category. Use the recommended background color for a selected symbol as shown in **Table D-11**:

Optional Background Colors for Symbols			
<i>Symbol Category/ Background Color</i>	<i>RGB Values</i>	<i>AutoCAD 16 Color</i>	<i>AutoCAD 256 Color</i>
AUDIO-VIDEO/ORANGE	255,179,51	40	40
COMMUNICATIONS/GREEN	85,234,137	3	90
ELECTRONIC SAFETY AND SECURITY/RED	240,0,100	1	230
ENVIRONMENTAL/BLUE	60,197,255	4	140
CONTROL/VIOLET	213,121,236	6	201
CENTRAL VACUUM/GRAY	179,179,179	9	9
FURNISHINGS/BROWN	197,138,80	33	33
ELECTRICAL/YELLOW	255,255,0	2	2

Table D-11: Symbol Category Background Colors

e. CAD Layer for Optional Color Backgrounds (classified as Patterns and Hatches)

Place the color on a unique CAD layer so the color background fills can easily be turned off as required by consultants or architects. Use the layer TA-EQPM-SYMB-PATT, since hatching and fills are both considered "Patterns" in the NCS.

CEA Document Improvement Proposal

If in the review or use of this document a potential change is made evident for safety, health or technical reasons, please email your reason/rationale for the recommended change to standards@ce.org.

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