U.S. FLEET CYBER COMMAND / C10F

AUTOCAD
Drawing Standards and Practices

August 28, 2014 USFLTCYBERCOMPUB N00055-0201-TETON

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FORWARD

This document establishes the basic AutoCAD drawing format for Naval Information Operations Command (NIOC) Basic Electronic System Engineering Plans (BESEPs), Standard Installation Plans (SIPs), Installation Design Plans (IDPs), Station Master Drawing Sets (SMDSs), and electronic installation and facility type drawings. This standard applies to the development of new drawings or the modification of existing drawings. It provides a basic format for use by all USFLTCYBERCOM/C10F elements and affiliates and replaces the Computer Aided Drawing (CAD) Standards for Naval Security Group Command (NSGPUB-N00069-0201-TETON dated Oct 2003).

Because of the rapidly changing CAD environment, revisions to this publication will be provided as they occur. Contact Commander, US Fleet Cyber Command N42 TETON for changes that may not have been distributed in a document change.

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CHAPTER 1

GENERAL CAD INFORMATION

1.0 PURPOSE

This instruction provides procedures for engineers and drafting technicians to use the Computer Aided Drawing (CAD) Standards for C10F drawings. This instruction assumes that the reader is familiar with basic AutoCAD instructions and procedures.

1.1 REFERENCE SUMMARY

A. ASME Y14.24-1999, Types and Applications of Engineering Drawings. Defines the types of engineering drawings most frequently used to establish engineering requirements.

B. ASME Y14.100-2000, Engineering Drawing Practices. Establishes the essential requirements and reference documents applicable to the preparation and revision of engineering drawings and associated lists.

C. ASME Y14.34M-1996, Associated Lists. Establishes the minimum requirements for the preparation and revision of parts lists, application lists, data lists, and index lists.

D. ASME Y14.35M-1997, Revision of Engineering Drawings and Associated Documents. Defines the practices for revising drawings and associated documentation and establishes methods for identification and recording revisions.

E. ASME Y14.38-1999, Abbreviations and Acronyms.

F. NSA DS-61, Data Standard For Preparation of Engineering Documentation and Appendix A or Appendix B.

G. SECNAVINST 5510.36(series), Department Of The Navy (DON) Information Security Program (ISP) Regulation

H. AutoCAD 2008/9(series) Reference Manual Publications.

I. WindowsNT/Windows2K Operating System Reference Publications.

J. http://pointa.autodesk.com/ (Website for AutoDesk, support.)

1.2 GENERAL CAD INFORMATION

US FLTCYBERCOM/C10F has tasked the CLASSIC TETON Program with managing drafting support to all its activities and detachments; its Computer Aided Design program, including maintaining and updating the Drawing Repository.

1.3 STANDARD CAD SOFTWARE

AutoCAD 2008/9 is the current CAD standard software for all new drawings and old drawings requiring revision. Older AutoCAD revision drawings are to be upgraded to AutoCAD 2008/9 for all pending and active tasks and programs as they are revised. Transferring of drawing packages to USFLTCYBERCOM/C10F sites without AutoCAD 2008/9 will require users to manually save the drawings in the 2004 format. Historical drawings for closed sites or de-installed equipment may be archived, as AutoCAD R2004 files if that is the original format, but any older file formats must be brought up to R2004 format at a minimum. Archived files are to be held as directed by US FLTCYBERCOM/C10F.

1.4 CLASSIFICATION AND MARKING

Drawings will be reviewed and classified as determined by the applicable classification guide. Reference (G) governs marking, handling, and dissemination of classified and special handling documents. Drawing pages will be appropriately marked at the top and bottom as delineated in reference (F). Drawings should be kept unclassified and considered "For Official Use Only" (FOUO). Green will be used for unclassified drawings and classified drawings will be marked red.

Drawings will also be marked as either DRAFT WORKING COPY, IDP, or AS-BUILT. These markings will be created in their own layer (i.e. IDP) and assigned colors as follows:

BLUE for IDPs

GREEN for AS-BUILTs

RED for DRAFTs.

The markings will be placed above the title block and sized properly for the drawing scale. A template for marking a drawing is provided in the TETON standard title and continuation pages.

1.5 DRAWING STORAGE AND TRANSFER

Drawings are processed using both hard copies (paper) and computer data files. The SMDS TETON team doing the CAD work will ensure that hard copies, "B" size (11"x17" Tabloid) or larger, are provided to the proper site and cognizant sponsor. Upon completion of the task, the IMD/OIMD will ensure final as-built hard copies, "B" size or larger, and .pdf files are forwarded to the site. USFLTCYBERCOM/C10F will maintain both electronic and hard copies of the as-built drawing package. Master electronic files will be maintained at Fort Meade on the Drawing Repository Server (DRS). Hard copies are to be maintained at the USFLTCYBERCOM/C10F sites.

AutoCAD drawing packages will be distributed on CD ROM Label the CD-ROM with the site name, task name, and date. See example below:

A master drawing file repository will be maintained at Fort Meade, Maryland. The repository will contain completed and approved Station Master Drawing Set (SMDS) packages. These master drawings will not be altered without approval from USFLTCYBERCOM/C10F N4. Master drawing files will be converted to .pdf for access by all authorized users. A complete backup master drawing file repository will be maintained by the SMDS Project Manager and updated as approved changes are made to master files.

AutoCAD automatically creates a backup file when a drawing is saved. This backup file takes the same name as the .DWG file, but with a .BAK extension.

When preparing drawing packages for transfer to CD ROM, remove all .BAK files to reduce the size of the drawing package and to ensure the site is receiving the most current drawing. In addition, all Plot .txt files should be removed. As drawings are printed, the .txt files are created and saved in the directory with the drawing file. These files will not be needed at the site receiving the drawing package.

1.6 BASIC CAD CONFIGURATION

The following instruction establishes the minimum configuration requirement for USFLTCYBERCOM/C10F approved CAD workstations:

HARDWARE

- CD-RW Drive
- 10.0GB Hard Drive (IDE or SCSI) minimum
- 21” Multisync Color Monitor. Non-interlaced, 1600x1200 resolution and 256 colors.
- LaserJet printer w/ 8Mb RAM, able to print “B” size (tabloid 11" X 17") drawings
- DesignJet plotter w/8MB RAM suitable for plotting “D” (34” X 22”) drawings
- CD-RW Rewritable Discs

SOFTWARE

- Windows XP or newer
- AutoCAD 2008/9/10/11
- Adobe Acrobat Professional

CHAPTER 2

DRAWING SETUP

2.0 GENERAL

A quick startup guide is provided in Appendix E using “Wizards” available in AutoCAD 2008 through 2013. The following setup information is provided for those needing advanced setups.

2.1 DRAWING SIZES

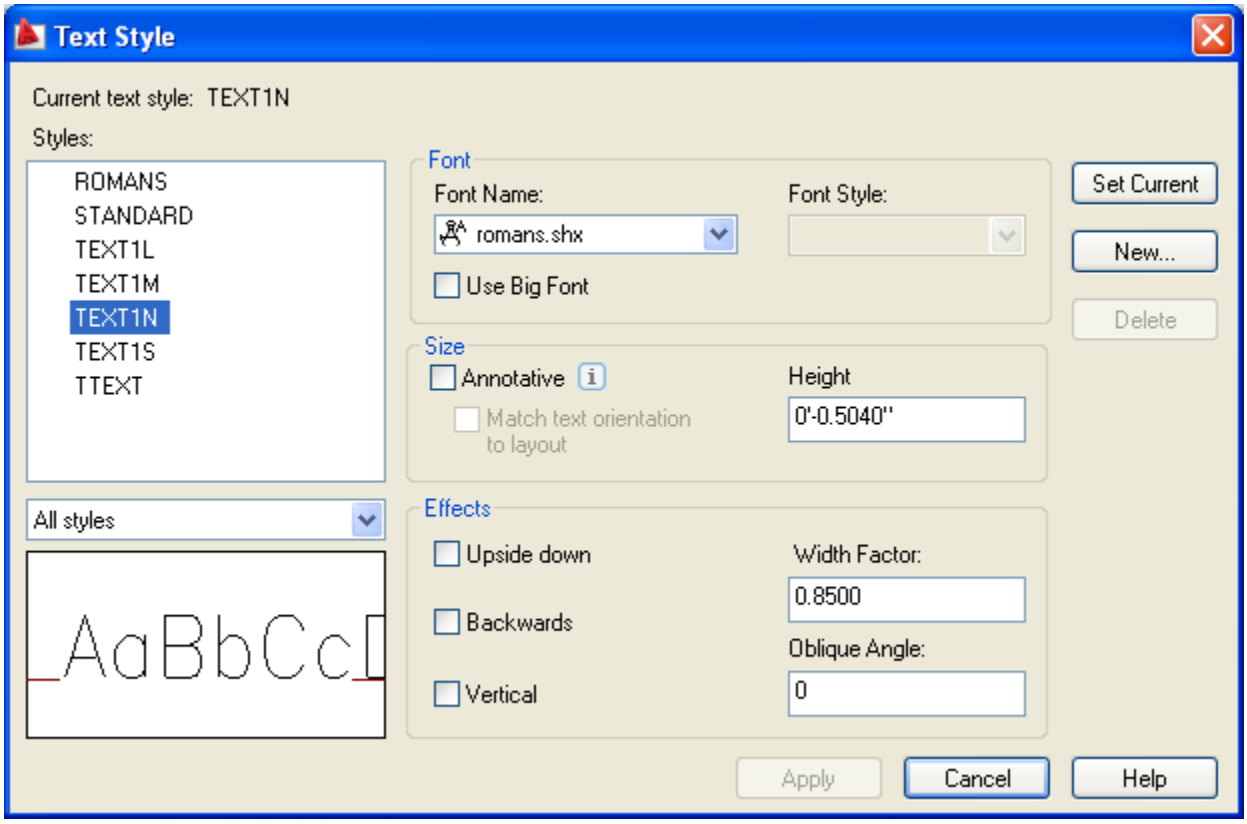
The “F” Size drawing sheet is the standard for AutoCAD drawings. The “F” Size sheet is defined as 40 inches long by 28 inches wide, with horizontal and vertical margins 0.50 inches wide.

2.2 UNITS

The preferred UNITS for all drawings is ARCHITECTURAL. However, ENGINEERING and DECIMAL may be used as necessary. The architectural format produces a "feet and inches" with fractional display. The denominator of the smallest fraction to display (UNITS) is a 16th of an inch. Engineering and Decimal uses “feet (Engineering) and inches” with a decimal inch display. The UNITS should be set to four (4) decimal places.

2.3 LETTERING

The minimum acceptable lettering size is 1/8 inch on a 40 x 28 inch “F” size drawing. When a drawing is plotted in “C” (half-size), 1/8 inch lettering will be reduced to 1/16 inch. Printing in A size (8-1/2" x 11") will further reduce the text to approximately 1/32 inch. When choosing the lettering size, choose one that, after printing, is readable to the average reader. Roman Simplex (Romans) is the standard text font on drawings. To create a Roman Simplex text font, use the "FORMAT" pull-down menu. Select "TEXT STYLE". Your display should look as follows:



Select "NEW" and create the Classic TETON Standard text styles:

TEXT1S -	Height: .12	Width Factor: .85
TEXT1N -	Height: .156	Width Factor: .85
TEXT1M -	Height: .18	Width Factor: .85
TEXT1L -	Height: .30	Width Factor: .85

These heights are for a standard 40" X 28" border. If scaling the border to a larger size to accommodate the drawing, multiply the height size by the scale factor. For example, if using a border that has been scaled to a size "32," the "Height" setting for TEXT1N would be 4.48 (32.0 x 0.14=4.48). The remaining text styles are also configured accordingly.

2.4 ORIGIN COORDINATES

The bottom left outer corner of the drawing border is defined as the origin (0.0, 0.0, 0.0) on drawings. AutoCAD drawings, with the origin located elsewhere, may require an adjustment during the plot process to include the entire drawing in the plot. To reorientate a drawing, turn on all the layers and ensure that they are not locked or frozen. Using object snap, pick the lower left outer corner of the border as the base point for the MOVE command and 0,0 as the second point of displacement.

2.5 LAYER DEFINITIONS

Standard layer names are in the form "XXXXnT," where:

"XXXX" is a character descriptor in capital letters, e.g., BLDG, EQPT, WIRE, etc.
"n" represents a number allowing for sub-categories with the same layer name. For example: rack-mounted equipment can be listed on EQPT1 layer and desktop PC's listed on EQPT2 layer.
"T" represents the text layer related to the items in the layer XXXX, e.g. EQPT1_T.

Notes: (1) If there is only one layer, the layer number may be eliminated.

Drawing layers should be created and set up in accordance with the table below. Additional layer names may be used as appropriate but every attempt should be made to follow the standard naming convention. As shown in the table below, each drawing layer is assigned with a screen color. Objects will be assigned the color property "by layer" so that they will take on the default color of their layer. There are a few exceptions to the "one color per layer" convention. The following layers have more than one color instead of making more layers: BRDR1, KEY, BLDG1, and SCALE.

Table 2-1 - Layer Names and Colors

LAYER NAME	DESCRIPTION	SCREEN COLOR AND NUMBER
0	Reserved For Blocks Only	AS REQUIRED
BLDGn BLDGnT	Building Layout/ Text	WHITE (7) ORANGE YELLOW (30)
BRDR1	Border Lines Light Border Lines Medium Border Lines Bold	GREEN (3) BLUE (5) WHITE (7)
CLSN	Classification Marking If unclassified	 GREEN (3
DCTBn DCTBnT	Black Duct/Tray/Conduit Text	LT GRAY (252) ORANGE YELLOW (30)
DCTFn DCTFnT	Fiber Optic/Conduit/Duct Text	LT BLUE (140) ORANGE YELLOW (30)
DCTPn DCTPnT	Red/Black Power Duct/Tray/Conduit (Use hatching and legend to differentiate between RED and BLACK.) Power Panels Text associated with Red/Black power duct	DK GREEN (64) ORANGE YELLOW (30)
DCTRn DCTRnT	Red Duct/Tray/Conduit Text	LT BLUE (140) ORANGE YELLOW (30)
DIMNn	Dimensions and Text	ORANGE YELLOW (30)
EQPTn	Existing Equipment (PNL Size) (Continuous Line) Use RED HIDDEN lines for details.	CYAN (4)

LAYER NAME	DESCRIPTION	SCREEN COLOR AND NUMBER
EQPTnT EQPT_OFF	Text Existing Equipment (PHANTOM lines)	ORANGE YELLOW (30) GREY (9)
FIREn FIREnT	Fire Control/Suppression Systems/Extinguishers Text	RED (240) ORANGE YELLOW (30)
FLPNn FLPNnT	Room Walls/ Furniture Text	GREEN (3) ORANGE YELLOW (30)
FUTRn FUTRnT	Future Equipment (Hidden or Phantom lines) Future Wiring and Block diagrams (Hidden or Phantom lines) Text	GREEN (3) RED (1) ORANGE YELLOW (30)
HVACn HVACnT	Air Conditioning System Text	GRAY (252) ORANGE YELLOW (30)
KEY	Key Plans/Maps Text	RED (1) ORANGE YELLOW (30)
LANn LANnT	LAN Cables/Conduit/Duct Text	DK GREEN (64) ORANGE YELLOW (30)
LEGEND	General use for legend explanations	AS NEEDED
LTNGn LTNGnT	Emergency/Commercial Lighting Text	RED (10) ORANGE YELLOW (30)
NORTH	North Arrow (All building drawings)	RED (1)
NOTES	General use for note explanations	ORANGE YELLOW (30)
PHONn PHONnT	Gray Phone System/Secure Phone System(s)/Commercial Phone System Text	LT GRAY (9) ORANGE YELLOW (30)
RFLRn RFLRnT RFLRn_OFF	Raised Flooring (Point set to ABSOLUTE VALUE 3.0) Text Raised Flooring Off (shows floor covered by equipment and/or furniture)	RED (1) ORANGE YELLOW (30) ORANGE YELLOW (30)
SCALE	Graphic Scale Text	WHITE (7) ORANGE YELLOW (30)
SCTYn_SYS SCTYnT	IDS/Access Control System/Sound Cover System/BMS/PIR/Conduit Text	LT GRAY (9) ORANGE YELLOW (30)
WIREn WIREnT	Existing Lines/Arrows (Continuous Lines) Text	GREEN (3) ORANGE YELLOW (30)
VPORT or VP	Viewports. Set to NO PLOT.	GRAY (252)

Table 2-1 - Layer Names and Colors (cont)

2.6 DRAWING NUMBER AND FILENAME SYSTEM FOR SMDS

The following section describes the CAD filename, drawing number and filing system for all SMDS USFLTCYBERCOM/C10F drawings effective 01 JAN 2012.

AutoCAD and Windows 32-bit operating systems will allow a maximum of (256) characters in the filename with a three-character extension, AutoCAD using .DWG, to identify a file. CLASSIC TETON will use a (26) character filename with a .DWG extension.

A B C E F G H
GROD_106_INTRO_A01_TS.DWG

A B C D E F G H
GROD_106_208_PHYSEC_ J01_WD.DWG

-**Group A** (GRO): Indicates activity, using the digraph mnemonic from Appendix B.
-**Group B** (D): Indicates whether this is a NIOC (C), a detachment (D), a NCTS (S) or NCTAMS (M)
-**Groups C** (106): Indicates the building number for this particular set.
-**Groups D** (107A): Indicates the room number if the drawing refers to a particular room.
-**Groups E** (INTRO): Indicates the drawing package section in the Station Master Drawing Set (SMDS) package. SMDS packages will be sectioned by category.
-**Group F** (A): Indicates the drawing type category (See Table 2-2 and Appendix D).
-**Group G** (01): Indicates the category sequence number (01, 02, 03, ... 99).
-**Group H** (TS): Indicates drawing type sub-category (See Table 2-3).
- (_) are separators used for breaking down and indexing the filename. The building number, room number, and section title can vary in length allowing the file name to expand and contract as necessary.

Table 2-2 - Drawing Type Categories

CATEGORY	DPM FIG. NO.	DRAWING TYPES
A	1	Cover Sheets/Table of Contents/ Revisions/References
B	1	Roof Plan/Plot Plan/Building Plan/Antenna Layout
C	1	Floor Plan/Elevation Views/ Heat and Loading Plan
D	2	Signal Flow Diagrams
E	3	Cabling Diagrams
F	4	AC Power Distribution

CATEGORY	DPM FIG. NO.	DRAWING TYPES
H	6	Installation Details
J	7	Wiring Diagrams
K	7	Patch Panel Assignments
L	7	Miscellaneous Details
M	8	Bill of Materials
N	N/A	Facilities Drawings (AC Power Single-Line & Grounding System)
S	N/A	Guidance/Standard Installation Plan

Table 2-3 - Sub-Category Mnemonics

_AC	POWER PANEL ASSIGNMENT
_AD	AUDIO SIGNAL DIAGRAM
_BD	BLOCK DIAGRAMS
_BM	BILL OF MATERIALS
_BP	BUILDING PLAN
_DB	DUCT, BLACK SIGNAL (INCLUDING CONDUIT)
_DF	DUCT, FIBER (INCLUDING CONDUIT)
_DP	DUCT, POWER (INCLUDING CONDUIT)
_DR	DUCT, RED SIGNAL (INCLUDING CONDUIT)
_EA	EQUIPMENT ARRANGEMENT
_ED	EQUIPMENT DETAIL
_EL	ELEVATIONS (EQUIPMENT AND WALL)
_F1	FUTURE 1, 2, …
_FL	FLOOR LOADING
_FP	FLOOR PLAN
_FS	FIRE SYSTEM
_FT	FIBER TRUNK
_GS	GROUNDING SYSTEM
_HD	HEAT DISSIPATION
_HV	HVAC PIPING
_LB	LISKEY BOX PLACEMENT
_LD	LIST OF DRAWINGS
_LR	LIST OF REVISIONS
_ND	NETWORK DIAGRAM
_PP	PATCH PANEL ASSIGNMENT
_PS	PHYSICAL SECURITY
_RC	REFLECTIVE CEILING
_SF	SIGNAL FLOW
_SM	SITE MAP
_TD	TRUNKING DIAGRAM
_TL	TELEPHONE SYSTEMS

_TS	TITLE SHEET
_WD	WIRING DIAGRAM

Category "C" provides for many sub-categories of drawings. Within that category the following drawing order is recommended:

1. Architectural Floor Plan (FP) including dimensions
2. Equipment Arrangement (EA)
3. Power Duct (DP)
4. Signal/Black Duct (DB)
5. Signal/Red Duct (DR)
6. Fiber Duct (DF)
7. Equipment Elevations (EL)
8. Wall Elevations (EL)
9. HVAC and Grounding information if known (HV & GS)

2.7 SCALE FACTOR

In the past, building floor plans have been manually drafted by scaling down the dimensions of the building to fit within the confines of a 40" x 28" "F" size sheet. However, AutoCAD enables the CAD operator to draw building floor plans and cabinet elevations to actual size. A floor plan with equipment cabinets and furniture would depict these objects in actual size so that actual distances may be measured on the drawing using the DISTANCE command. In order to accomplish this for a floor plan scaled at ½"=1'-0", a 40" x 28" "F" size border must be scaled up by a Scale Factor of 24 so that the outer borderlines define an area 80 feet by 56 feet. Similarly, a cabinet elevation drawing may be scaled up by a factor of 8 or 12, so that equipment inserted in the cabinets can be shown in actual size. The below table depicts the most common scales used in the USFLTCYBERCOM/C10F drafting community.

Table 2-4 - Scale Factors

SCALE	UP SCALE FACTOR
1/16 in. = 1 ft. 0 in.	192
3/32 in. = 1 ft. 0 in.	128
1/8 in. = 1 ft. 0 in.	96
3/16 in. = 1 ft. 0 in.	64
1/4 in. = 1 ft. 0 in.	48
3/8 in. = 1 ft. 0 in.	32
1/2 in. = 1 ft. 0 in.	24
3/4 in. = 1 ft. 0 in.	16
1 in. = 1 ft. 0 in.	12
1 1/2 in. = 1 ft. 0 in.	8
3 in. = 1 ft. 0 in.	4
1 in. = 10 ft.	120
1 in. = 20 ft.	240

SCALE	UP SCALE FACTOR
1 in. = 30 ft.	360
1 in. = 40 ft.	480
1 in. = 50 ft.	600
1 in. = 60 ft.	720
1 in. = 100 ft.	1200

To rescale a 40" x 28" “F” size border for a 1/2" = 1’-0” floor plan, key in the following:

Command: SCALE
Select objects: Type W (for Window)
First Corner: Pick the bottom left of the drawing, or type 0,0
Other Corner: Pick the top right of the drawing, or type 40", 28"
Base point: Type 0,0
<Scale factor>/Reference: 24 (for a scale of 1/2" = 1’-0”)

A CAD user can scale up and down with accuracy. If not careful, object dimensions on the drawing may lose accuracy through repeated up scaling and downscaling. If a scaled border somehow gets out of whack, simply delete it and insert a new border and repeat the up scaling process.

Two more setting changes need to be done after scaling a drawing. The first is the Dimension Scale (DIMSCALE). IT SHOUD BE THE SAME AS YOUR SCALE FACTOR FOR YOUR DRAWING. To set the Dimension Scale for a drawing recently set up with a scale factor of 24, key in the following:

Command: DIMSCALE
Enter new value for DIMSCALE <0'-1">: Type 24 <Enter>

The Dimension Scale is now set to 24. Next is the Linetype Scale (LTSCALE). IT SHOULD BE 1/2 OF THE DIMENSION SCALE (IN THIS CASE 12). To set it, key in the following:

Command: LTSCALE
Enter new linetype scale factor <1.0000>: Type 12 <Enter>

The Linetype Scale is now set to 12.

Note: If the Dimension Scale and Linetype Scale are not set properly it could cause Hidden and Phantom lines to appear as Continuous lines. Additionally, it could invalidate several calculations that the AutoCAD programs uses based on the settings of these variables.

A drawing scale should still always be included on any scaled CAD generated drawing. The scale should provide a measurement ruler and scale conversion factor that would be appropriate if the drawing were plotted on a 40" x 28" “F” size sheet.

2.8 DRAWING TEMPLATES

SMDS Program Manager provides drawing templates for use with the AutoCAD program. These templates are already scaled to the fourteen (14) most common size drawings used within

USFLTCYBERCOM/C10F. All Text Styles are included along with an attributed border that should not be exploded. Exploding the border will cause valuable attributed information to be lost. Using Templates also ensures that a standard border continues to be utilized throughout USFLTCYBERCOM/C10F. Here is a list of the scaled templates:

TT_CONT001.DWT	(Not Scaled 40" X 28")
TT_CONT002.DWT	
TT_CONT004.DWT	
TT_CONT008.DWT	(Scale: 1-1/2”=1’0”)
TT_CONT012.DWT	(Scale: 1”=1’0”)
TT_CONT016.DWT	
TT_CONT024.DWT	
TT_CONT032.DWT	
TT_CONT048.DWT	(Scale: ¼”=1’0”)
TT_CONT064.DWT	
TT_CONT096.DWT	(Scale: 1/8”=1’0”)
TT_CONT105.DWT	
TT_CONT128.DWT	
TT_CONT192.DWT	(Scale: 1/16”=1’0”)

The number in the filename indicates the Scale Factor of the Template (i.e. TT_CONT012.DWT has a Scale Factor of 12). All setup procedures have been completed in the templates. The only remaining item to complete is the creation of the specific layers for the particular drawing.

Also available are four (3) Non-Scaled Templates. These are a Title Page, two (2) different types of List of Drawings and a List of References. Below is a list of the Non-Scaled Templates:

TT_TITL1.DWT
TT_LSTDWG.DWT
TT_LSTDWG2.DWT

2.9 IDP (Installation Design Plans) Drawings

The following section describes the CAD filename, drawing number and filing system for all new USFLTCYBERCOM/C10F IDP drawings effective 01 JAN 2002.

AutoCAD and Windows 32-bit operating systems will allow a maximum of (256) characters in the filename with a three-character extension, AutoCAD using .DWG, to identify a file. CLASSIC TETON will use a (26) character filename with a .DWG extension.

A typical IDP drawing number is alphanumeric and up to 26 characters in length. Below is an example of the standard format used:

Drawing Number: SDA-63896-001F03
Sheet Number: C03 (see “category” explanation below)
UIC No: N69054

The UIC No will be the UIC of the IMD/OIMD completing the package.

The filename set is derived from the drawing number:

Filename: SDA_03225_C03_DR.DWG

Positions 1-2 (SD): Indicates activity, using the digraph mnemonic from Appendix B.
Position 3 (A): Indicates whether this is an activity (A), a detachment (D), or a department of a larger non-NAVSECGRU activity (T).
Positions 5-9 (03225): Indicates the Julian Date for this particular set.
Position 11 (C): Indicates the drawing type category (See Table 2-2 and Appendix D).
Positions 12-13 (03): Indicates the category sequence number (01, 02, 03, ... 99).
Positions 15-16 (_DR): Indicates drawing type sub-category (See Table 2-3).

Positions 4, 10, & 14 (_) are separators used for breaking down and indexing the filename.

To identify the drawing as an IDP, IDP (in blue) will be placed above the title block.

New drawings should be prepared using CAD conventions and layering as directed in chapter 2 of this document.

CHAPTER 3

DRAWING PRACTICES AND FORMATS

3.0 GENERAL

To ensure consistency among IDPs and SMDS drawing packages standard drawing practices and formats must be identified.

3.1 DRAWING SECTION LAYOUT

Six sections form the layout of the Standard drawing border.

1. The Drawing Area
   a. Objects to be drawn are shown in the drawing area. Drawing objects should not overlap or "spill over" in to the revision column.
2. The Revision Block
   a. The revision block is used when updating individual drawings. Drawings may change due to site initiative tasking, new system installations or SMDS periodic updates.
   b. Numerals will be used the in the letter column. For each update that is completed, the number will increment by one.
   c. The description column will contain the task number or statement as to why the drawing changed.
   d. The date will contain the date the drawing was updated.
   e. Typical Revision Statements:
      REVISED TO REFLECT AS-BUILT CONDITIONS FOR <TASK NAME>
      REVISED TO REFLECT AS-BUILT CONDITIONS AS OF <DATE>
3. The Annotation Section
   a. Notes, References, Abbreviations, and the legend are contained in the Annotation section.
   b. All text shall be upper case.
   c. Headings are medium-size text, underlined and with a colon.
      Example: <u>NOTES:</u>
   d. Text height should be slightly larger than normal to promote clarity and readability in reduced sized plots.
   e. Abundant notes, references, abbreviations, and symbols can be placed on a separate continuation sheet near the front of the drawing package. This sheet will be contained in the "A" drawing category.
   f. Abbreviated text can help to improve clarity of the drawing.
      Examples:
      AFC ABOVE FALSE CEILING

EMT	ELECTRICAL METAL CONDUIT
UDT	UNDER DECK TILE
TYP	TYPICAL

g. Abbreviations and Symbols appearing in the drawing area must be declared in the Revision Column unless dedicated to a separate sheet. A brief description should follow symbols. Symbols may or may not be drawn to scale and should be sized appropriately to maintain clarity and easy reading.

4. Key Plan and North Arrow Section

a. The Key Plan is a rudimentary building outline showing the spatial relationship of a particular room, floor space, or “Area of Work” or “Interest” with the rest of the building. These are placed in the designated Key Plan section above the title block and below the “Annotation Section” of the revision column. Figure 3-1 illustrates a typical Key Plan.

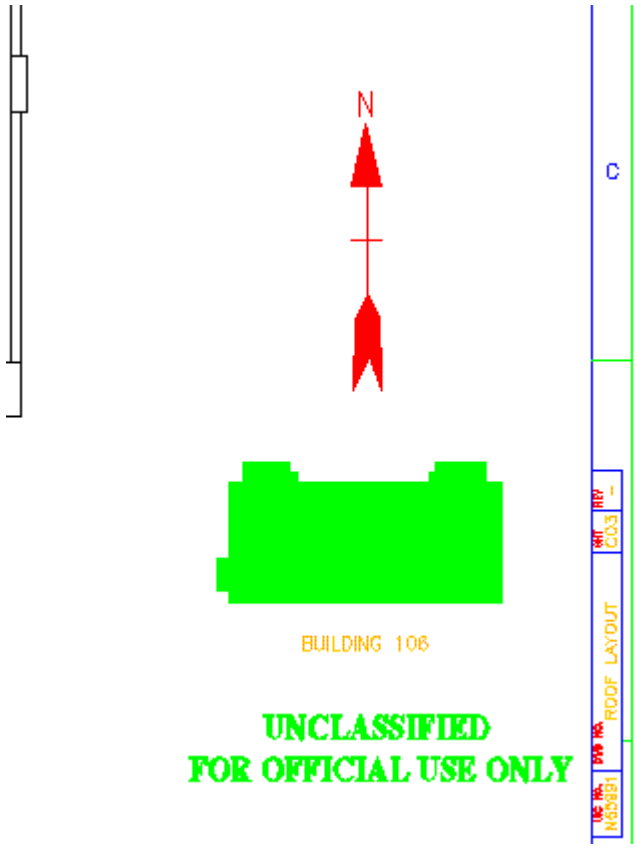


Figure 3-1 – Title Block with Key Plan

b. Key Plans are not drawn to scale.

c. Overlay a series of diagonal lines, “Hatch,” to represent the “Area of Interest.”
d. Include a floor level and room number in the Key Plan.
e. Add a Title. First Line: Key Plan. Second Line: Floor Level and Building Number.
f. Include the abbreviation “NTS” or “Not to Scale” in a normal text height.

5. The Title Block
   a. A drawing title should be brief and simple. It should describe the drawing and distinguish itself from similar drawings. See Figure 3-2.

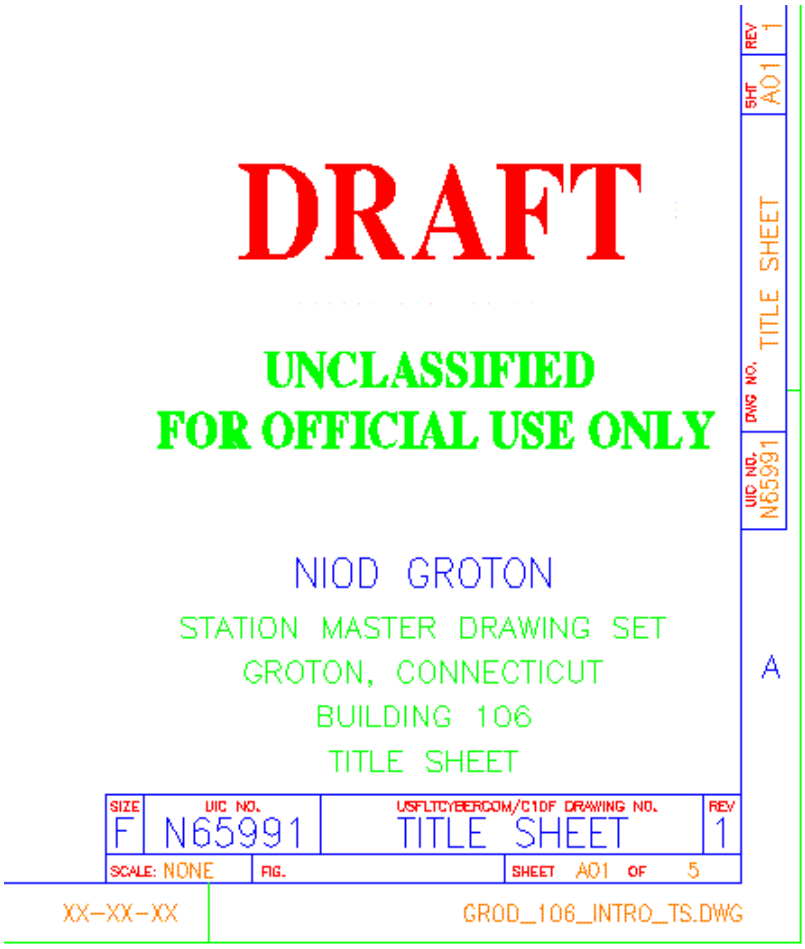


Figure 3-2 - Typical Sheet Title Block

b. For SMDS Title Blocks, the following applies:

Main Title:	Site name (Ex. NIOD GROTON)
Sub-Title 1:	STATION MASTER DRAWING SET
Sub-Title 2:	Location Description (Bldg 106– Room 120)
Sub-Title 3:	System Name or Detail (Power Panel Locations)

Last Line: Type of Drawing (AC Power Distribution)

c. For IDP Title Blocks, the following should be used:
   Main Title: Site name (Ex. NIOC SAN DIEGO, CA)
   Sub-Title 1: Task Name (Ex. N63896-009F03-SDCCTVINST)
   Sub-Title 2: Location Description (Bldg 106 – Room 120)
   Sub-Title 3: System Name or Detail (Power Panel Locations)
   Last Line: Type of Drawing (AC Power Distribution)

6. Classification Marker
   a. Markers will be used to show the classification of the drawing. Each drawing will be marked. The classification marker will be in its own layer within the drawings.
   b. All SMDS drawings will be marked as "**UNCLASSIFIED//FOR OFFICIAL USE ONLY**." See Figure 3-3.
7. Drawing Designation
   a. Drawings will be marked as IDPs, AS-BUILTS, or DRAFT WORKING COPY. See Figure 3-3 for placement.
   b. The designators will be located in their own layer within the drawing.
   c. The following colors will be used:
      IDP – BLUE
      AS-BUILTS – GREEN
      DRAFT WORKING COPY– RED
8. Graphic Scale Section
   a. Graphic scales reside in the designated area to the left of the title block. Refer to Figure 3-3 for location.
   b. The scales are drawn to "True Size" or scale.
   c. Graphic scales are used only for scaled drawings.
   d. The architectural scale (e.g. ½" = 1'-0") is placed beside or above the graphic.
   e. Note the following in the title block section "SCALE":
      For no scale – enter "NONE"
      For a single scale – enter "NOTED"
      For multiple scales – enter "AS SHOWN"

Figure 3-3, **Standard Drawing Section Layout**, illustrates the component sections in a standard drawing border.

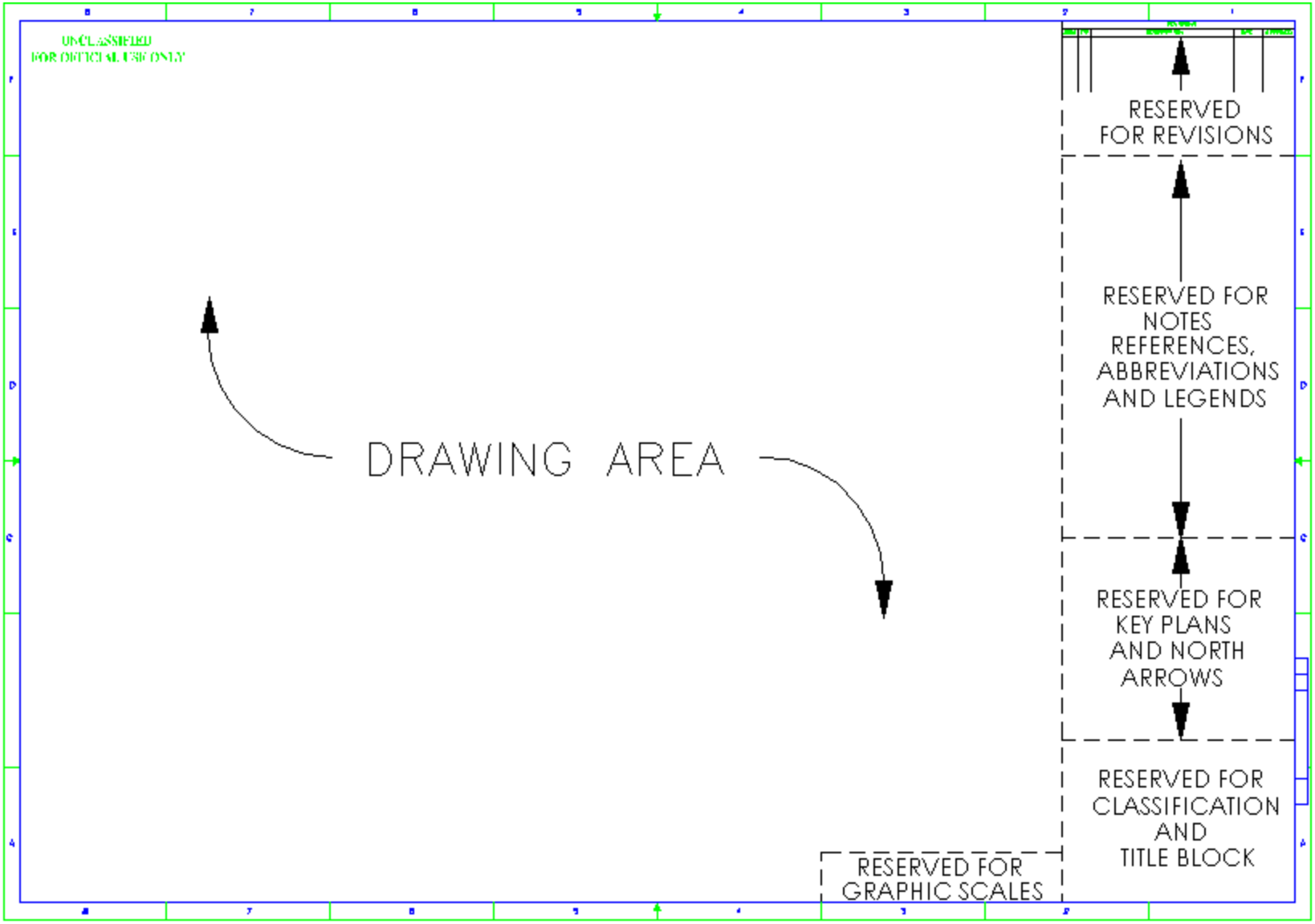


Figure 3-3 - Standard Drawing Section Layout

3.2 DRAWING LEGIBILITY AND READABILITY

The relationship between drawing objects and text size is critical to visual presentation. When objects are scaled properly, the results should produce a plot that is both legible and readable.

The following GUIDELINES should be used when determining the size of text and objects:

a. Drawing objects and text should be discernible to a minimum distance of two feet.
b. Text height should be slightly larger than normal to promote clarity and readability in reduced-size plots.
c. Spacing is important to avoid crowding in reduced-size plots.
d. The main drawing should not extend into the Revisions column.

3.3 DISTRIBUTION PLOTS

Drawing packages are normally distributed to USFLTCYBERCOM/C10F sites in “B” size plots. In some cases, a site may require “C” size, or larger, plots due to having larger floor plans. This will be considered on a case-by-case basis.

CHAPTER 4

PLOTTING

4.0 GENERAL INFORMATION

All Installation Design Plans (IDP) and as-built drawings will usually be plotted "C" size for distribution to all US FLTCYBERCOM/C10F activities. Standard “F” size plots will be provided to sites on a case-by-case basis. A "D" size plotter is normally used to plot "C" size drawings.

4.1 PLOT DATA

All drawings regardless of plotted size will have an "F" border. All drawing size designations referenced in this document are defined in the table below.

Table –4-1 - STANDARD COMPUTER GENERATED DRAWINGS

SIZE DESIGNATION	PAPER SIZE (INCHES)	BORDER SIZE (INCHES)	PLOT SCALE
A	8.5 X 11	MAX.	TO FIT
B	11 X 17	MAX.	TO FIT
C	17 X 22	MAX.	TO FIT
D	22 X 34	MAX.	TO FIT
E	34 X 44	MAX	TO FIT
F	30 X 42	28 X 40	AS REQUIRED

Note: The "D" size drawing is not normally used in the USFLTCYBERCOM/C10F community.

“Plot to fit” or “scale to fit” commands are not normally used for “F” size drawings. This is because scaled measurements with an architect's scale may not be possible on a drawing plotted to fit a size sheet. See Figure 4-1 for drawing plot sizes.

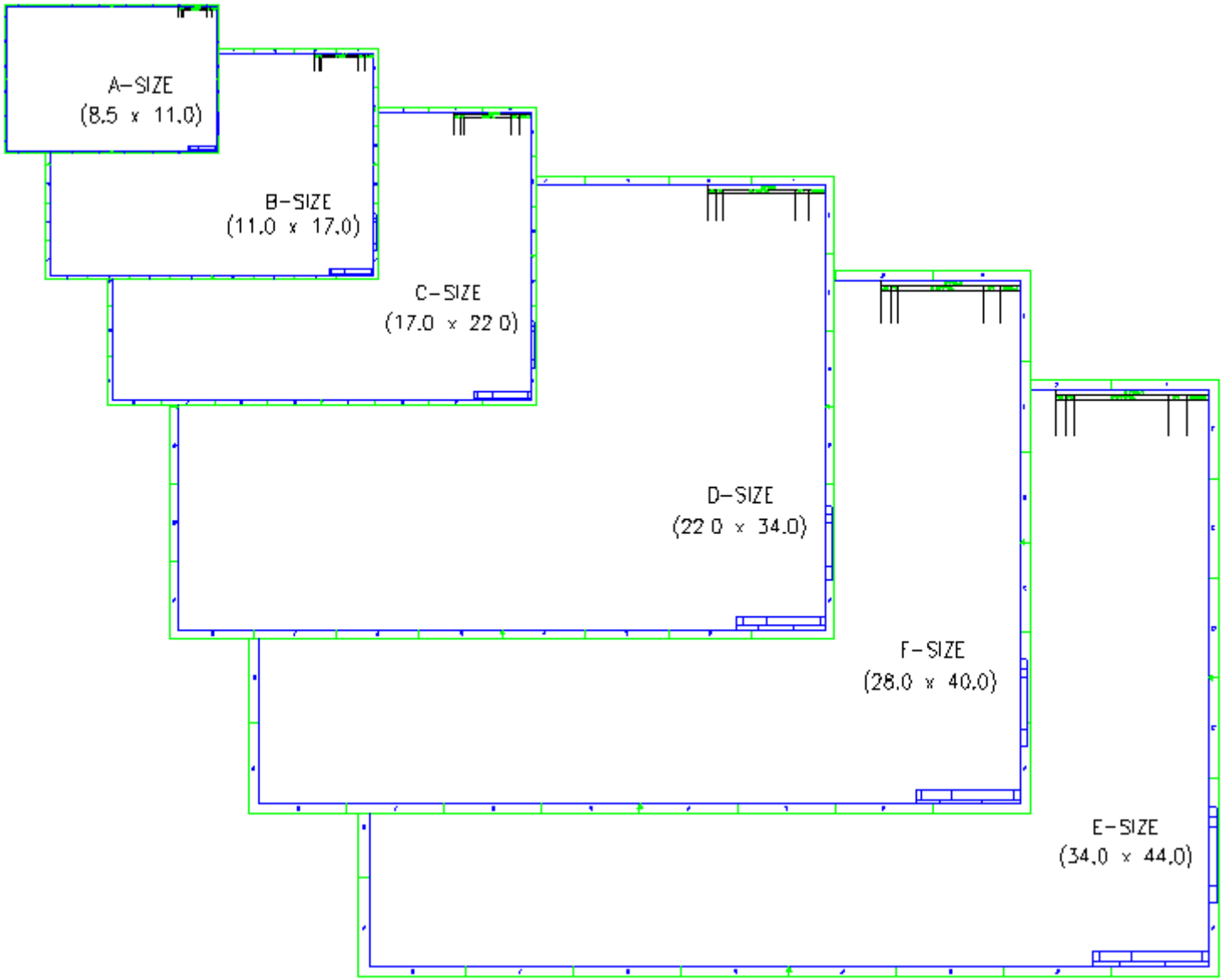


Figure 4-1 – ANSI Sheet Size

4.2 PLOTTING (GENERAL)

Since various types of printers/plotters are used in the field, only the general plot process will be discussed. To begin the plot process, select the "Printer" icon on the tool bar. The Plot dialogue box (Figure 4-2) will appear.

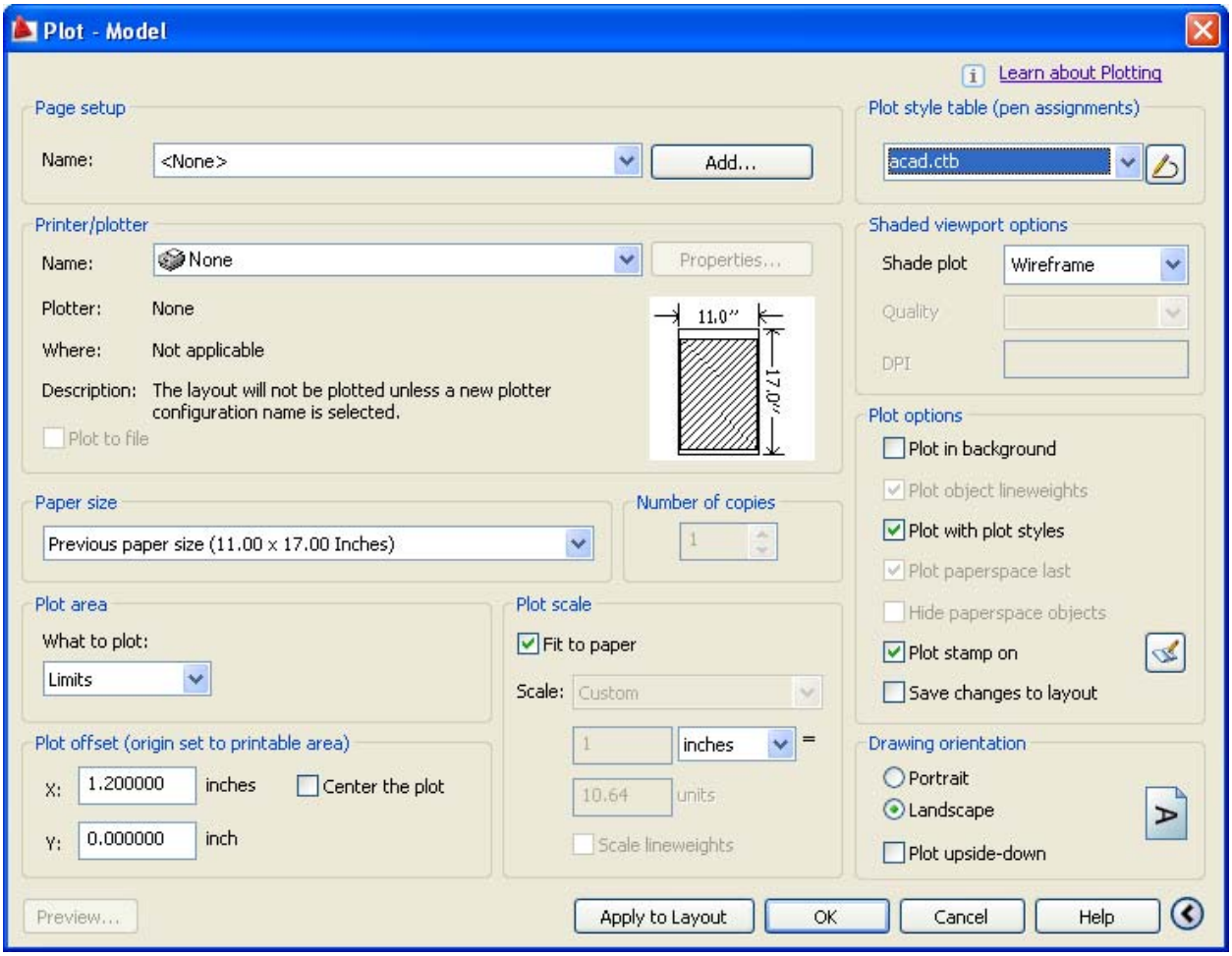


Figure 4-2 - Plot Dialogue Box (Color Plotting)

To start the plot process, select the printer you use by clicking on the "Name" pick box in the Printer/plotter configuration area. Continue with the "Name" pick box in the Plot style table (pen assignments) section. For plotting in black it is suggested that the monochrome.ctb color table be selected which will be all black with no dithering (speckling) effects. If color plotting is desired you may leave the acad.ctb plot style table active. (If you want the color YELLOW to print BLACK (recommended), then you will need to follow the procedure in Appendix G.) For color plotting, your screen should look similar to the one shown in Figure 4-2.

For black and white plotting, your screen should look similar to the one shown in Figure 4-3.

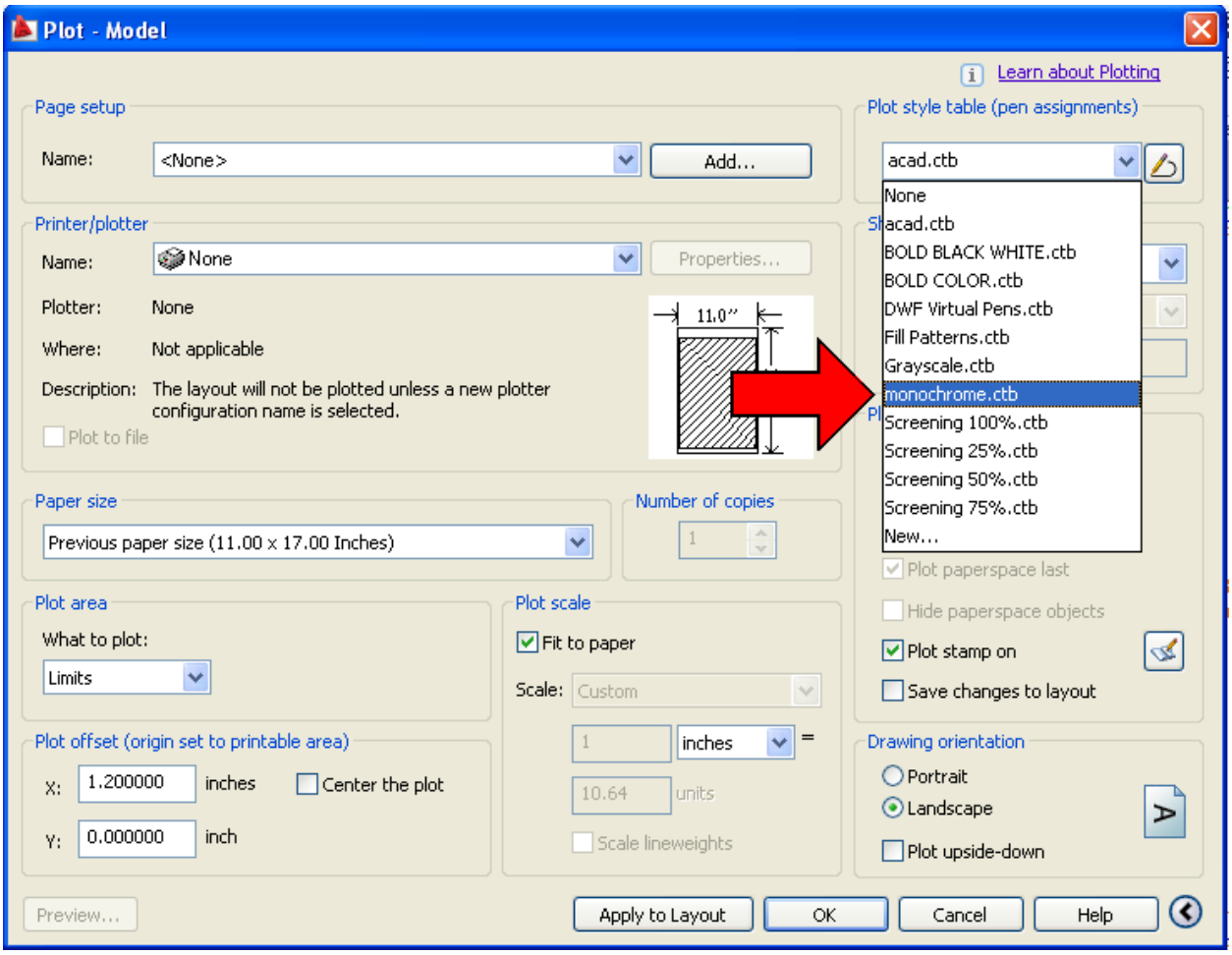


Figure 4-3 - Plot Dialogue Box (Black and White Plotting)

In the Plot Settings tab, Figure 4-4, you have the ability to select the paper size used by the printer, define the drawing orientation and how the drawing will be set on the paper (plot offset).

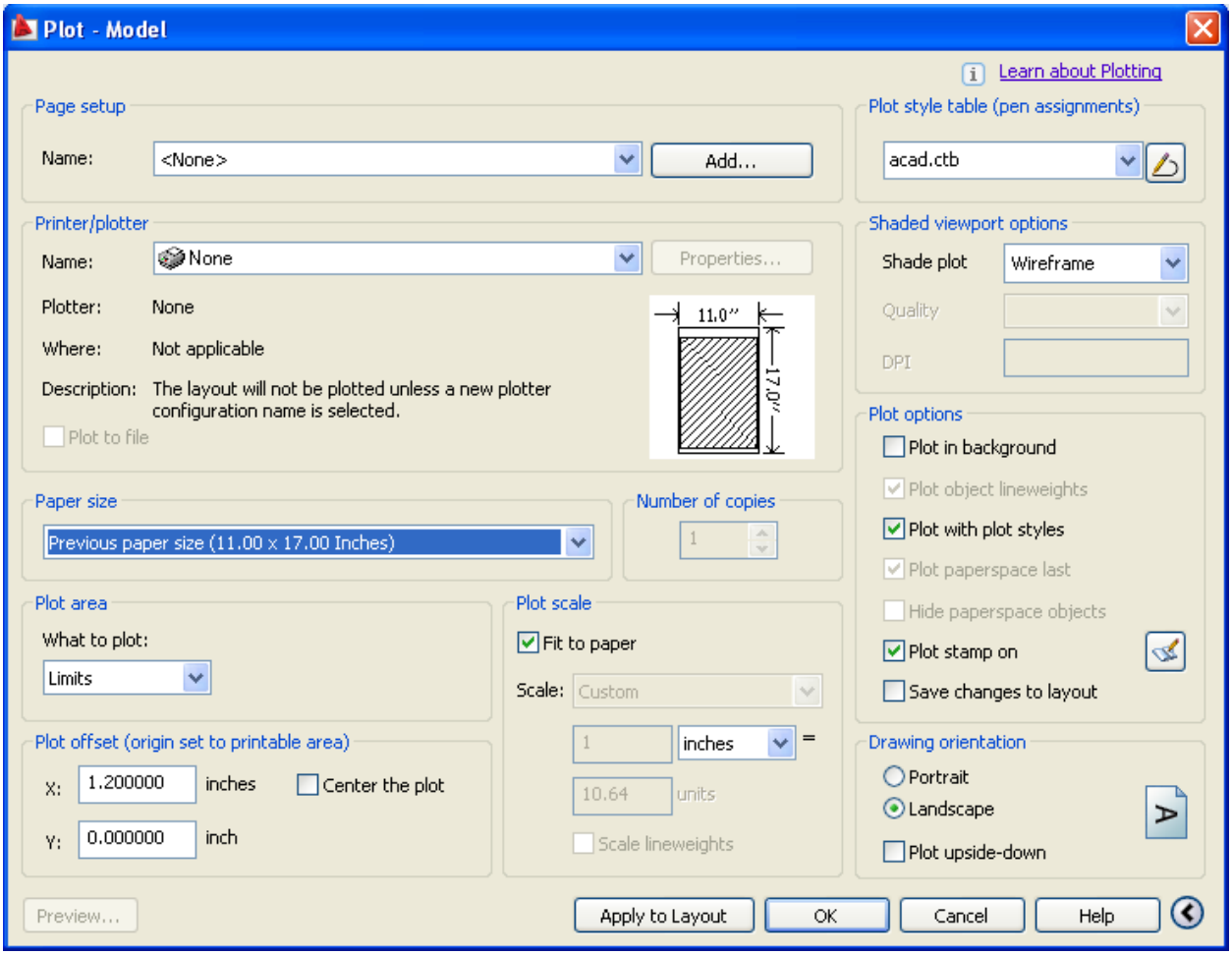


Figure 4-4 - Plot Dialogue Box (Plot Device Tab)

Click the pick box in the Paper size and paper units box. Select the paper size you wish to plot. *Note: You will only be able to select paper sizes that your selected printer is capable of handling.* Once you have selected the proper paper size move to the Drawing orientation section and choose the appropriate radial button. The Plot scale pick box should be left on Scaled to Fit. In the Plot area section we have a choice of five radial buttons to choose from. Here is a brief description of the choices:

Limits - Plots everything within the limits that you defined when you originally set up your drawing (preferred for general plotting).
Extents - Plots everything on the drawing regardless of the limits setting. If layers are turned off it will still put that area onto the plot.
Display - Plots your current screen.
View - Will plot any saved views you have created in your drawing.
Window - Allows you to select a particular area of a drawing to be plotted.

If your drawing was set up properly (Chapter 2 - Drawing Setup) Limits is the preferred setting. Disregard the plot offset. This is set up during the “plot stamp” section.

It is recommended that you click on the "Full Preview" tab before clicking "OK". This will bring up a screen that will show you EXACTLY what your plot will look like on paper. If all looks good then select “OK.”

4.3 CUSTOMIZED PLOT STYLE TABLES

Depending on the content of your drawing there may be times when different LINEWEIGHTS are needed to bring out details or distinguish between entities. The acad.ctb and monochrome.ctb plot style tables both have default line weights. This section explains how to create new customized plot style tables.

To begin, bring up the Plot dialogue box with the Plot Device tab highlighted. Select the acad.ctb plot style table. Next, click the "Edit" button. This brings up the Plot Style Table Editor dialogue box. Click on the "Table View" tab. You can make the window wider to see more information. It should appear similar to the one in Figure 4-6 below:

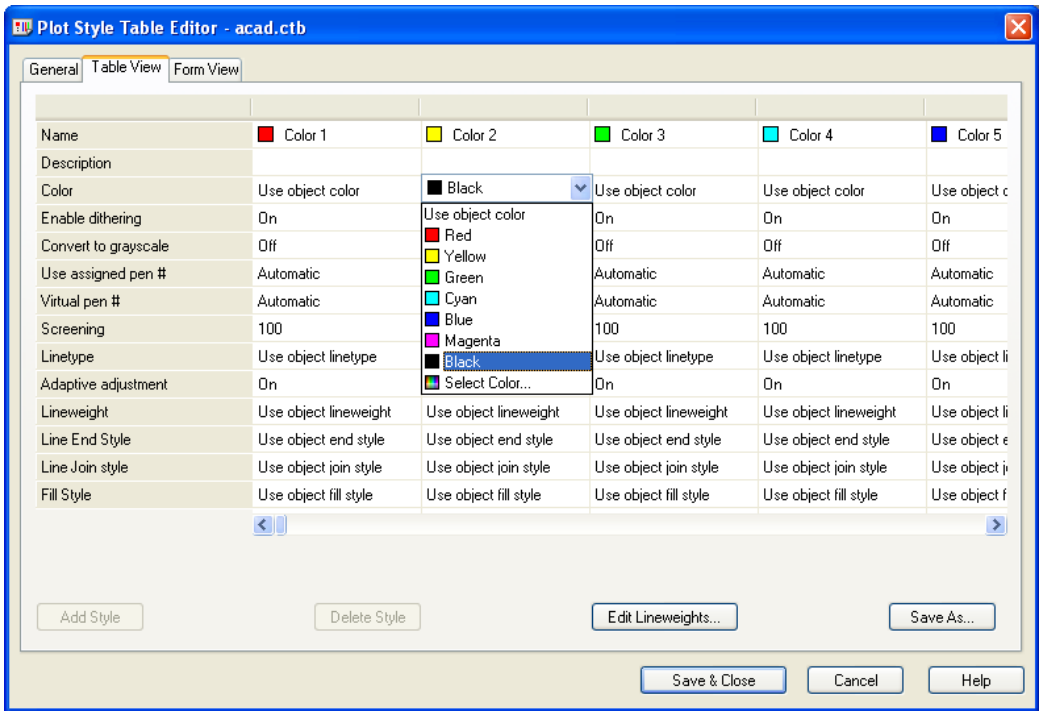


Figure 4-6 - Plot Style Table Editor (Table View Tab)

Next, click the "Save As" button. You are then prompted to enter a name for your new plot style table. One suggestion is to use the name of the printer/plotter you plan to use it on. Example: If a Hewlett Packard DesignJet 1055CM plotter for color plots is used, customize the plot style table HP-DesignJet_1055CM Color.ctb. It is descriptive enough that there is no confusion as to which file goes with which printer/plotter. Once you have selected a name, click the "Save" button. The Plot Style Table Editor dialogue box should now show the new file name in the Active Title Bar.

The fourth row from the bottom of the dialogue box is "Lineweight." The default setting is "Use object lineweight." For the Standards Manual we have assigned line weights to the first nine colors. Table 4- lists the first nine colors and suggested line weights. Also listed are instances when those particular colors and line weights should be used. Go to the Color 1 block (Red). To make changes to the "lineweight" box simply click in it and it will give you a list of choices. *Note: Line weights are measured in millimeters.* Select 0.1800mm. Continue with colors 2 through 9 using Table 4-4-2.

Table 4-2 - Line Weights

Color and Size	**Line Description**	**Possible Usage**
Red (1) 0.0500 mm	Very Fine	TEXT1S layer, RFLR1 layer, tic-marks for raised floor [+], small details & symbols, thin hatch, lavatory details
Orange-Yellow (30) 0.2200 mm	Thin (Black Line)	TEXT1N layer, TEXT1N text style, text layers, fixtures, furniture
Green (3) 0.2800 mm	Thin to Medium	WIRE1, FLPN1 layers, TEXT1M text style
Cyan (4) 0.3500 mm	Medium to Medium Thick	EQPT1, FRONTMRK1, TEXT1L text style
Blue (5) 0.4000 mm	Thick to Very Thick	BRDR1, HLIN, TEXT1B and TITLE1 text styles
Magenta (6) 0.3000 mm	Medium to Medium Thick	Match Line, Divide Line, Detail View
White (7) 0.4500	Medium Thick to Thick (Black Line)	BLDG1 layer, Load bearing & exterior walls in FLPN1 layer or Overall Building Plan drawing
Dark Gray (8) 0.0900 mm	Fine	Medium size symbols and generic use
Light Gray (9) 0.2200 mm	Medium	Medium size symbols, SCTY Layers and generic use

Note: Line weight descriptions are suggested for general-purpose use only. Exceptions may apply when making distinctions among objects justifies modifying an object's color, line weight or line type. As such, these settings may vary depending upon the desired plot size and printer/plotter being used.

After you have finished, click on the "Save & Close" button. To make a Black and White Plot Style Table, go back to paragraph 4.3.2 and use monochrome.ctb INSTEAD of acad.ctb. The same line weights should be used for your black and white printer/plotter.

4.4 PLOT STAMP

In AutoCAD version 2004 you have the option of placing a plot stamp on your plots. The Plot stamp function is a check box labeled "On" which is located in the Plot dialogue box under the "Plot Device" tab. Click the check box so that the check mark is visible. If this is the first time you will need to set up your plot stamp.

When you clicked on the "On" check box, a message box should have popped up telling you to set up your plot stamp. Click the "Settings" button. Your screen should look similar to Figure 4-7:

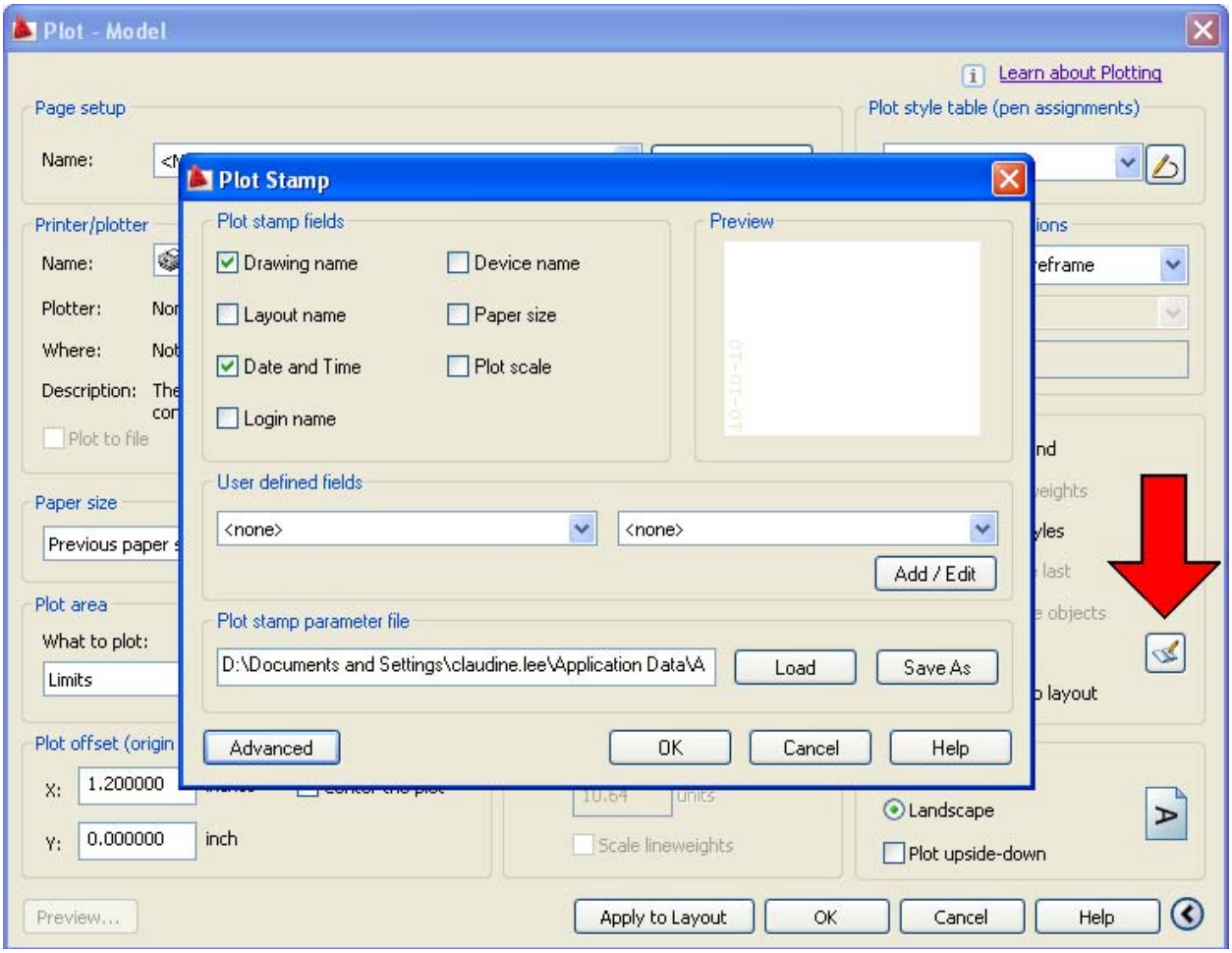


Figure 4-7 - Plot Stamp

At this point you have the option to set up the Plot stamp fields section. In this case we have Drawing name, Date and Time and Login name selected. Next click on the "Advanced" button. Your screen should look similar to the one shown in Figure 5-8. The setup options for this dialogue box are as follows:

Location - Bottom left
Orientation - Vertical
X offset - .1000
Y offset - .1200
Font - Courier new

Height - .080

All others settings need not be changed. Click "OK" and go back to the Plot Stamp dialogue box. Click "OK" and the plot stamp option should be set up. *Note: The Preview section in the Plot Stamp dialogue box DOES NOT show everything that is selected in your settings. It only shows you a date to show you placement.*

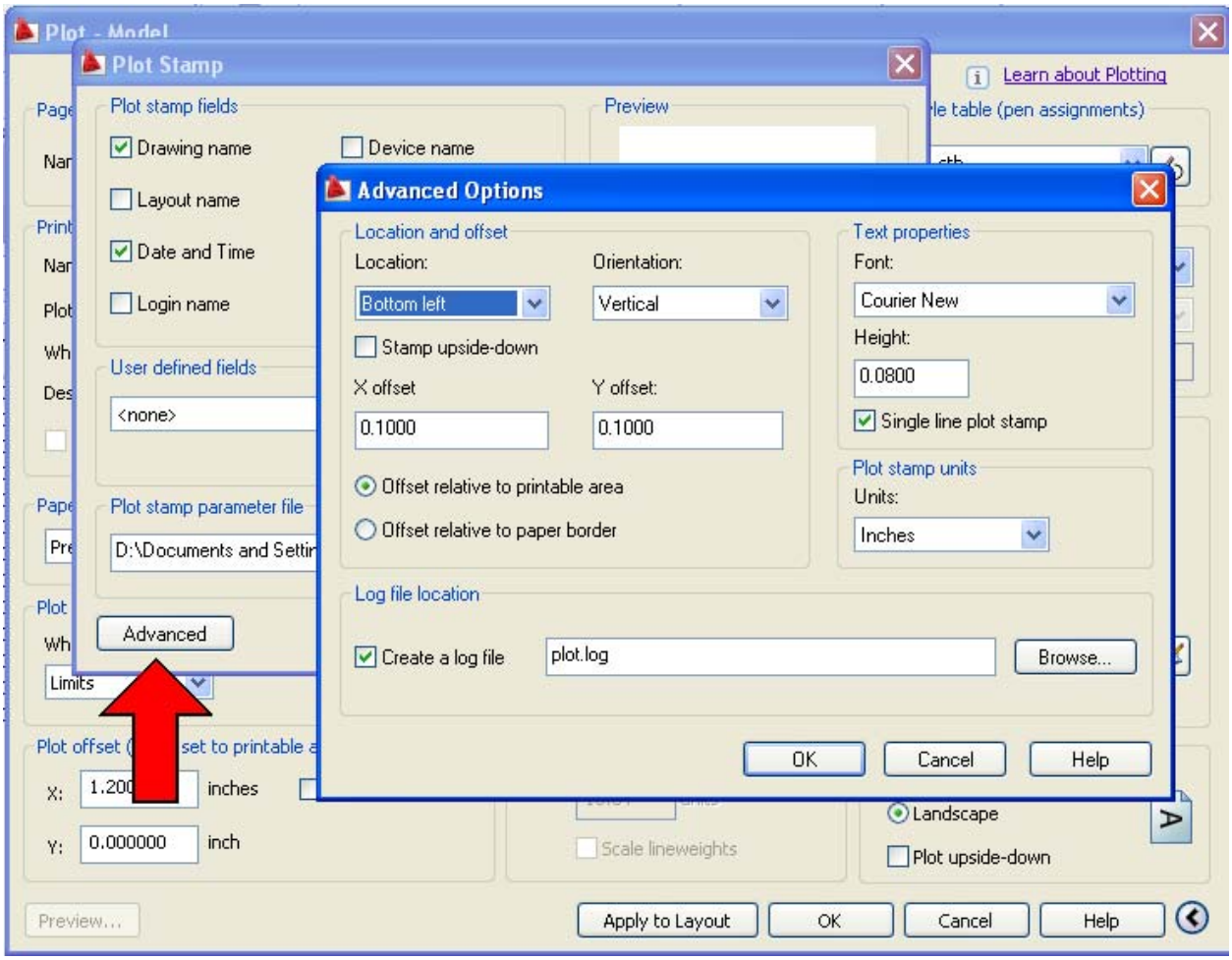


Figure 4-8 - Plot Stamp (Advanced Options)

Once the plot stamp is set up, you only need to turn it on and off as needed.

APPENDIX A

PRE-DEPLOYMENT CHECKLIST

1. The following checklist is to be completed prior to an SMDS Team deployment to the field. The list contains the ACTION ITEM to be accomplished, The ACTIONEE responsible for completing the task and WHEN the task is required to be accomplished.

ACTION	RESPONSIBILITY	DATE
Clearance message sent to Field Sites. (Area and special clearances if requited).		
Visas		
Existing drawings/documents printed/plotted to be used as red lines. (Blank racks, Building/room layouts).		
POC established at Field Site. Brief them on what to expect. Acquire a Shipping Address. Request someone from ship's force to accompany us if we deem it necessary.		
Ship any materials that cannot be hand carried to Field Site. Set up for return shipment of materials (if required).		
Travel Arrangements made.		
Lodging Arrangements made.		
Rental Car Arrangements made.		

Materials:

Blank CD's
Paper 11 x 17
Pencils
Tape Measures (Acoustic)
Rulers (straight edge)
Printer
Paper 11 x 17
Clipboards
Graph Paper

APPENDIX B

STATION UIC LISTINGS

TETON Code	UIC	PLA	Buildings
C10F	N00055	US FLTCYBERCOM/C10F	OPS-3
GEOC	N41246	NIOC Georgia	
SG	N31188	NIOC Sugar Grove, West Virginia	
HI	N43456	NIOC Hawaii	
BAH	N48035	NIOC Bahrain	
PF	N46828	NIOC Pensacola, Florida	
NV	N63902	NIOC Norfolk, Virginia	
WI	N30574	NIOC Whidbey Island, Washington	
GC	N65991	NIOD Groton, Connecticut	
MH	N41725	NIOC Menwith Hill, England	
DIG	N39899	NIOD Digby, United Kingdom	
TXC	N49721	NIOC Texas	
YJ	N69027	NIOC Yokosuka, Japan	
MDC	N63936	NIOC Maryland	9803, 9804, 9805, OPS-3, NBP
ASAD	N32224	NIOD Alice Springs, Australia	
SD	N63896	NIOC San Diego, California	
COLC	N49763	NIOC Colorado	
MJ	N66752	NIOC Misawa, Japan	
DAMD	N47889	NIOD Damneck, Virginia	
JF	N35293	NIOD Jacksonville, Florida	
KH	N44594	NIOD Kaneohe Bay, Hawaii	
SEOD	N46452	NIOD Seoul, Korea	
YW	N41724	NIOD Yakima, Washington	
JAXS	N68734	NCTS Jacksonville	
JAXSD	N63425	NCTS Jacksonville DET Key West	
NI	N70294	NCTS Naples	
SDS	N70240	NCTS San Diego	
SDSDF	N49657	NCTS San Diego DET SCU Fairfield	
SDSDO	N49658	NCTS San Diego DET SCU Oklahoma City	
SDSDP	N49659	NCTS San Diego DET SCU PAX	
GUAS	N70243	NCTS Guam	
FARS	N70278	NCTS Far East	
FARSDA	N33217	NCTS Far East DET Atsugi	
FARSDO	N33261	NCTS Far East DET Okinawa	

TETON Code	UIC	PLA	Buildings
FARSDC	N41231	NCTS Far East DET Chinhae, Republic of Korea (ROK)	
FARSDM	N42211	NCTS Far East DET Misawa, Japan	
FARSDS	N48542	NCTS Far East DET Sasebo, Japan	
FARSDD	N68073	NCTS Far East DET Diego Garcia, British Indian Ocean Terriroty (BIOT)	
ITAS	N68893	NCTS Sicily, Italy	
NAVSOC	N63200	NAVSOC Naval Satellite Operations Center	
NAVSOCA	N30316	NAVSOC DET Alpha	
NAVSOCB	N30312	NAVSOC DET Charlie	
NAVSOCD	N46458	NAVSOC DET Delta	
FFSC	N45854	FFSC Forces Surveillance Support Center	
NCDOC	N3029A	NCDOC Navy Cyber Defense Operations Command	
ATLM	N70272	NCTAMS Atlantic	
NORM	N3303A	NCTAMS Atlantic DET Norfolk, Virginia	
CUTM	N63038	NCTAMS Atlantic DET Cutler	
GBM	N31542	NCTAMS Atlantic DET Guantanamo Bay	
HRM	N39146	NCTAMS Atlantic DET Hampton Roads	
ICEM	N63143	NCTAMS Atlantic DET Iceland	
NMCIM	N4139A	NCTAMS Atlantic DET NMCI	
ROTM	N63182	NCTAMS Atlantic DET Rota	
SBM	N32526	NCTAMS Atlantic DET Souda Bay	
PACM	N00950	NCTAMS Pacific Hawaii	1,10, 12A, 105, 114, 261
PSM	N68660	NCTAMS Pacific DET Puget Sound	
NCWDG	N46439	NCWDG Navy Cyber Warfare Development Group	
GNOC	N4278A	NNWC GNOC Naval Network Warfare Command - Global Network Operations Center Detachment	
JEB	N69235	NNWC JEB Naval Network Warfare Command Joint Expeditionary Base	

APPENDIX C

RED -LINE DRAWING COLOR CODES

Two “B” size copies of as-built drawings are presently being provided to the NAVSECGRU Activities. If modifications to the electronic installation are made by station personnel, then the site shall "redline" these copies to reflect the changes. One copy shall be forwarded to the IMD at Northwest for approval and updating as required. The second copy shall be retained by the site should clarification be required. The following pen/pencil/marker color format shall be used for "Red Lining" drawings:

The color ***RED*** shall indicate new wiring, lines, equipment, etc. that needs to be **ADDED** to the drawing. It may also be used in place of ***YELLOW*** to mark items for deletion.

The color ***YELLOW*** (may be highlighter or pen) over equipment, lines, wiring, etc. indicates these items are to be **DELETED** from the drawing.

The color ***BLUE*** is used to provide **CLARIFYING INFORMATION** to the draftsman or engineer/technician in the revision of the drawing. Items written or drawn in blue WILL NOT BE INCLUDED in the drawing.

APPENDIX D

CATEGORY DEFINITIONS FOR C10F DRAWINGS

The intent of this appendix is to describe in detail the category definitions for each grouping of drawings that make up a complete drawing package. The drawing descriptions in this appendix are shown as representations of format and content of drawings for their associated category.

STATION MASTER DRAWING SETS

Station Master Drawing Sets (SMDS) are being funded and developed by USFLTCYBERCOM/C10F to document the existing conditions at all activities and detachments. They are intended to be a living document that will provide a basis for all future installations at those sites. The SMDS drawing package for each site will include, as appropriate, the following drawings:

Section 1 – Introduction

-Title The first sheet of a drawing package will contain the following information:

Name of the customer site, i.e. NIOC Norfolk

Project title that the drawing package concerns

Station Master Drawing Set

Overall classification of the drawing package

A one-up numeral will be placed in the "Revision" block to indicate the current revision of the drawing package. A "1" placed in the block indicates the first revision of the package.

-Table of Contents may contain the following:

a) Page/figure number

Revision letter for each page/figure number

Number of sheets for each figure number

-List of Drawings shall contain the following information:

Applicable revision letter, description of the revision, and the page number affected.

Short project abstract describing the scope of work for the project creating the revision.

-Building Material List of Material shall be provided listing all cable types, connectors, and miscellaneous items required for cabling and connecting the system or systems shown. Each plug shall be identified by the proper item number as listed in the List of Material.

-Site Map

a) Area Maps

b) Topography

c) Base Maps

Section 2 – Architectural

-Building Plans. Floor Plans should contain the following data and details if applicable:

a) Overall floor plan showing the relationship of various rooms and/or equipment within a building. Shade applicable areas on the key plan to show the relationship of the partial floor plan to the overall building layout for a partial floor plan.

Room Designation.

Direction of North (if known).

Scale.

Equipment Layout. Equipment outlines should include all protrusions of the equipment/cabinets such as keyboards, tape bins, etc. Also include power panel boards, status boards, station ground planes and ground boxes, fire extinguisher devices, office furniture and machines, water coolers, etc., which require floor space and/or access clearances which may affect the placement of equipment/cabinets.

Dimensions.

Front of equipment or row, racks, and cabinet marking

Row and Bay and/or Equipment Numbers.

Elevation View. Reference to elevation drawing.

-Wall Construction (as needed)
-Roof Plan
-Rack Layout

Section 3 – Facilities

-Power

a) Power Panel Data

I. Manufacture - name of panel board manufacture.

II. Model No. - model or type number of the panel board.

III. Voltage - the voltage and frequency supplied to the panel board.

IV. Phase/Wire - number of phases and feeder wires.

V. Bus Capacity - current rating for each bus bar in the panel board.

VI. Main Breaker - current rating of the main breaker servicing the panel board.

VII. Circuit Breaker Type No. - type number of the branch circuit breaker mounted in the panel board.

VIII. Circuit Breaker Spaces Total - total number of single-pole circuit breakers that the panel will accept.

IX. Panel Board Dimensions - the physical dimensions of the panel board; i.e., height, width, and depth.

b) UPS

c) Generators

-AC

a) Ducting

b) Panel Schedules

-Fire System

-Ground Plan

a) Station Ground

b) Server Ground

c) Penetration Ground

Section 4 – Communication

-Single line diagrams

a) Circuit

b) System

c) Network

d) Block Diagram

(i) Area of Interest. The functional block diagram is drawn to show the complete system; i.e., transmitter sites, communication center, and receiver site. Therefore, if the project involves only one site, use the applicable sheets that pertain to that site.

(ii) Site Adaptation. The functional block diagram covers alternative ways for interconnecting sites (microwave and land-line) and optional line conditioning equipment. Eliminate the details on the functional block diagram that are not applicable to a particular station/site.

(iii) Equipment Quantities. Enter equipment quantities in parentheses within the equipment block. If the equipment contains more than one channel, the equipment quantity shall be expressed as a fraction; i.e., (1/3). The first number is the channel used while the other is the total channel capability of the equipment.

-Elevations (Command/TETON controlled only)

a) COMMS/PHYSE

b) System / RDEK

c) Conduit

Section 5 – Physical Security

-IDS
-CCTV
-Trench Plans (as needed)
-Elevations
-Single line diagrams
-Wiring Diagrams
-EACS
-COMMS path to RDC to Security

APPENDIX E

FAST-TRACK TO SET-UP A NEW DRAWING

The following steps for setting up a drawing are not particularly applied in the order shown.

Manual Step (Scratch)	Quick Wizard	Advanced Wizard	Example / Reference	**DESCRIPTION**
Limits	Yes	Yes	40, 28 (no scale)	Set the Limits to the desired Scale Factor (e.g. ¼" = 1'-0" is 48)
Grid (F7) On			0.5 (no scale)	Set the desired X, Y Grid spacing relative to the limit setting
Snap (F9) On			0.25 (no scale)	Set the X, Y Snap spacing relative to Grid setting
Zoom			Zoom All	Zoom to the limits of the drawing to reveal your working area
Dimension Style			Overall SF = 1.0 Leader = 0.25	DIMSTYLE (DDIM macro) Issue this command and select the OVERRIDES tab to make changes. From the FIT tab, input the Overall Scale Factor. In the Text & Arrows tab, adjust the desired size for your leaders (e.g. 0.18 to 0.25) Adjust to the dimension setting, as needed. Check the sample dimension (thumbnail view) to reveal your adjusted settings.
Units	Yes	Yes	Architectural vs. Engineering	DDUNITS (DDU or Units) Select the desired unit discipline. (e.g. 1-¼" is Architectural and 1.25" is Engineering).
Precision		Yes	0.0000 or 1/16"	Adjust the Units precision to something realistic or consistent to the needs of your drawing's accuracy levels (How many zeros to the right of the decimal place are really needed?).
Angles		Yes	Counter-Clockwise 0° = East	The Default setting is typical – No real need to change this setting
Text Styles			TEXT1N	TEXT1S=0.12, TEXT1N=0.1562, TEXT1M=0.185, TEXT1L=0.30, TITLE=1" times the Scale Factor.
Borders			TT_TITL1.dwg TT_CONT1.dwg	Insert them, Scale them, and Edit Attributes in the Title Block. Do not Explode Border drawings/blocks – Attribute will be lost.

Scaling Borders			Scale-up vs. Scale-down	Scale command, select object, base point (0,0), Enter actual Scale Factor or substitute with a Formula to perform same: (/ Desired scale factor by actual scale factor) Example: Your current drawing scale is ¼" = 1'-0" (SF = 48). The target scale is ½" = 1'-0" (SF = 24). The resulting formula to reduce the border size would be (/ 24.0 48.0). Enter formula at the command line. Scale up: Actual SF > Desired SF and Quotient > 1.0 Scale down: Actual SF < Desired SF and Quotient < 1.0

Using Templates:

Start a new drawing and select "Use a Template." Navigate to the appropriate template directory and select the desired template file. When selected, the new template is loaded as your new drawing. A template is actually a saved drawing, one that you would use frequently, as a standard.

When you start a new drawing using a Template there is no saved name - just as if working from scratch but with exceptions. A Template drawing in its native format has a (.DWT) file extension. AutoCAD allows you to edit this .DWT format drawing; moreover, you can save them as either a Template (.DWT) or drawing (.DWG). Any drawing can be saved as a template with the .DWT filename extension.

A Template drawing can be created to include preset drawing setups, customized working environments, and prototype drawing configurations. The use of templates relieves the CADD operator from performing repetitive and often cumbersome drawing setups. Using templates can also increase productivity, promote standardization, and reduce the element of error. A Template drawing is not a block by design – but it could contain a collection of blocks.

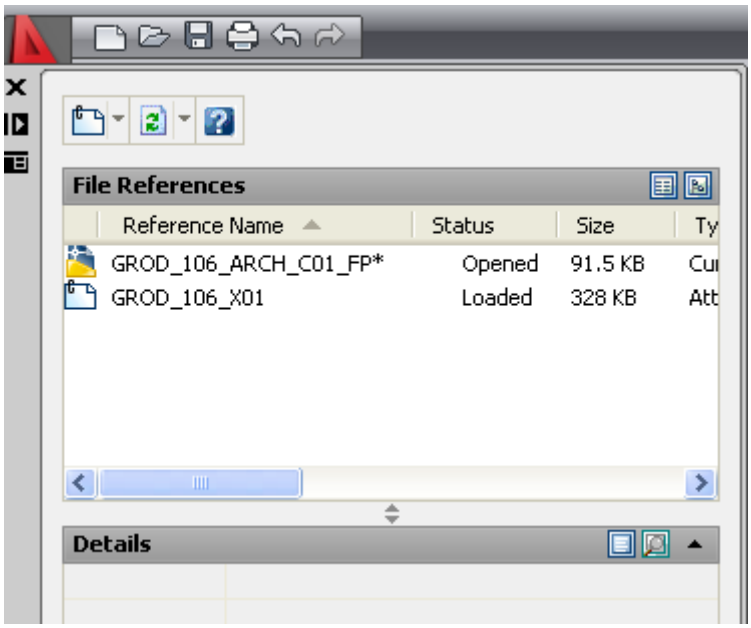
APPENDIX F

USING EXTERNAL REFERENCES

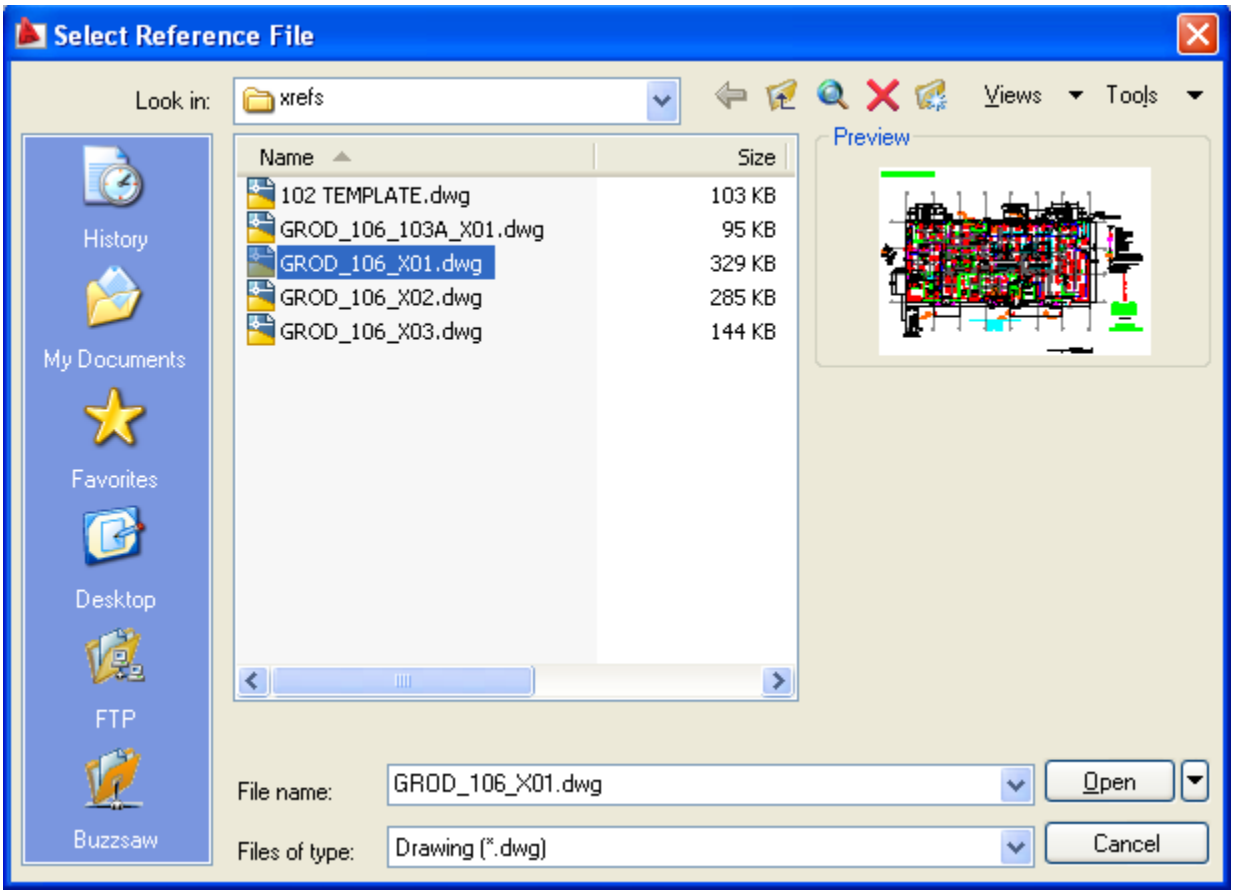
When using AutoCAD 2009 and working with External References (XREF)'s your SOURCE drawing is just an average drawing. It is treated in the same manner as any other drawing. The drawings you create off of this drawing are merely a "picture" of the original thus making file size minimal. For example: Using the "Save As" function to create your new file will make it just as large as your original (e.g. a 600K drawing will make another 600K drawing and so on). Using EXTERNAL REFERENCES the "picture" of that 600K drawing plus your new border information may be only 75K thus minimizing file size and conserving disk space. You first need to get all of your layers in the drawing. If you need to show nine different views using the same layout you would want to draw all of that information before you begin making your XREF dependent drawings.

Once you have all the information entered, it is time to start making your XREF. At this point, to avoid some confusion later, you should turn OFF and FREEZE the BORDER layer in the SOURCE (Master) drawing. SAVE and CLOSE the SOURCE drawing. Now create a new drawing with the same setup (e.g. Drawing Limits, DIMSCALE, Scale Factor) as your SOURCE drawing. Once you have done this it is time to bring in your XREF.

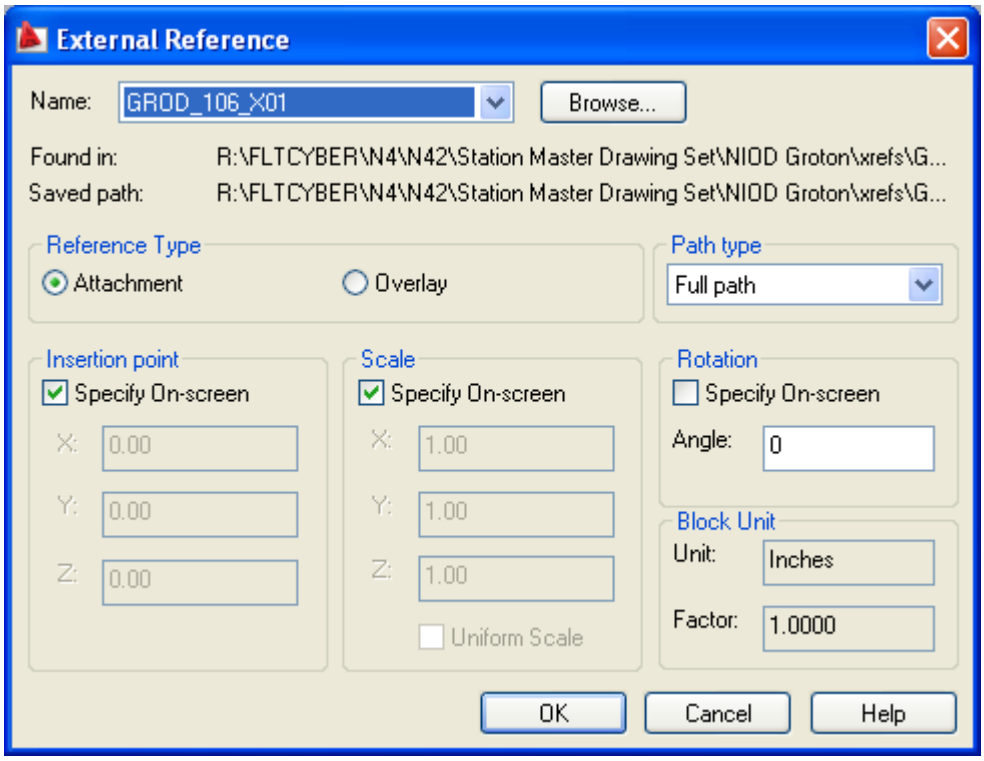
There are several ways to access the "XREF MANAGER" dialogue box. First, you can simply type



"XREF" in the command line. Second you may use the "REFERENCE" tool bar from the AutoCAD group and click on "EXTERNAL REFERENCE ATTACH". With either of these two choices your dialogue box should look like this:



At this point you click on "Attach". Select your SOURCE drawing that you finished earlier. Ensure that the "ATTACHMENT" circle is selected in "Reference Type". At this point your dialogue box should appear as follows with your "SOURCE" drawing name in the "NAME" block:



You should then see your drawing appear. **Make sure that "VISRETAIN" is set to "1"**. To check this simply type "VISRETAIN" in the command line. If you created your drawing from a TEMPLATE provided by IMD East, this will already be set to the appropriate variable of "1". You may now turn layers on and off to set this drawing to the state you desire. Once you get it all set up you can "SAVE". Next, use the "SAVE AS" command and set up your next XREF drawing. All settings will be retained from the first drawing that you saved. Turn the layers on and off to present the desired appearance. You can repeat this process as many times as necessary.

Last but not least, you can choose the "INSERT" pull-down menu and select "EXTERNAL REFERENCE". Your screen should appear generally like this:

Select your SOURCE drawing and the rest should be the same as discussed in the previous paragraphs.

To edit or make any changes, you need only update the SOURCE drawing and the rest of your XREF drawings will be updated automatically.

APPENDIX G

MAKING YELLOW PLOT BLACK

Using the AutoCAD® Plot Dialogue Box

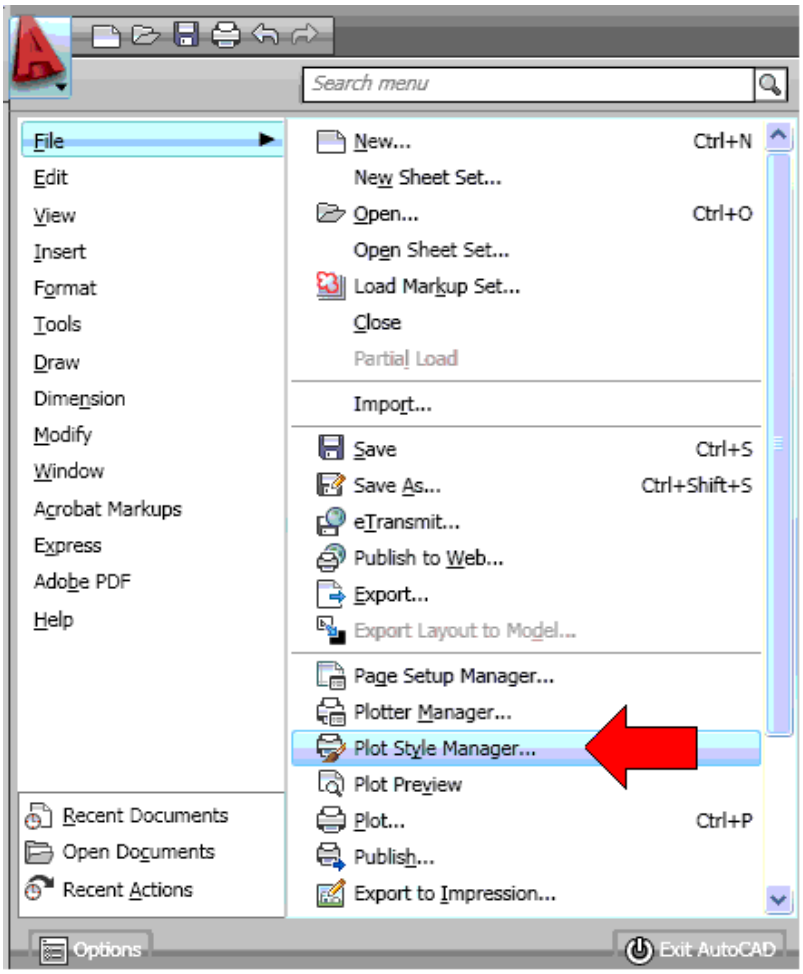
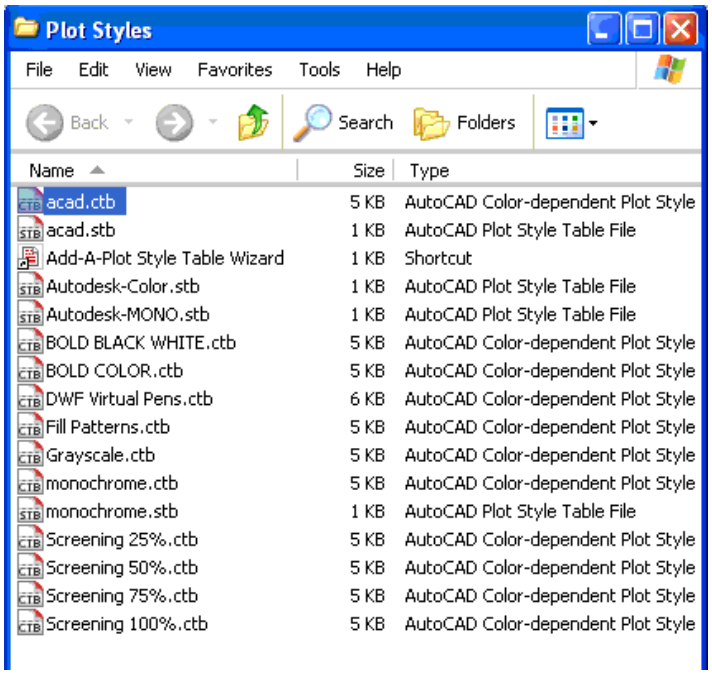


Figure 1- Plot Manager Dialogue Box

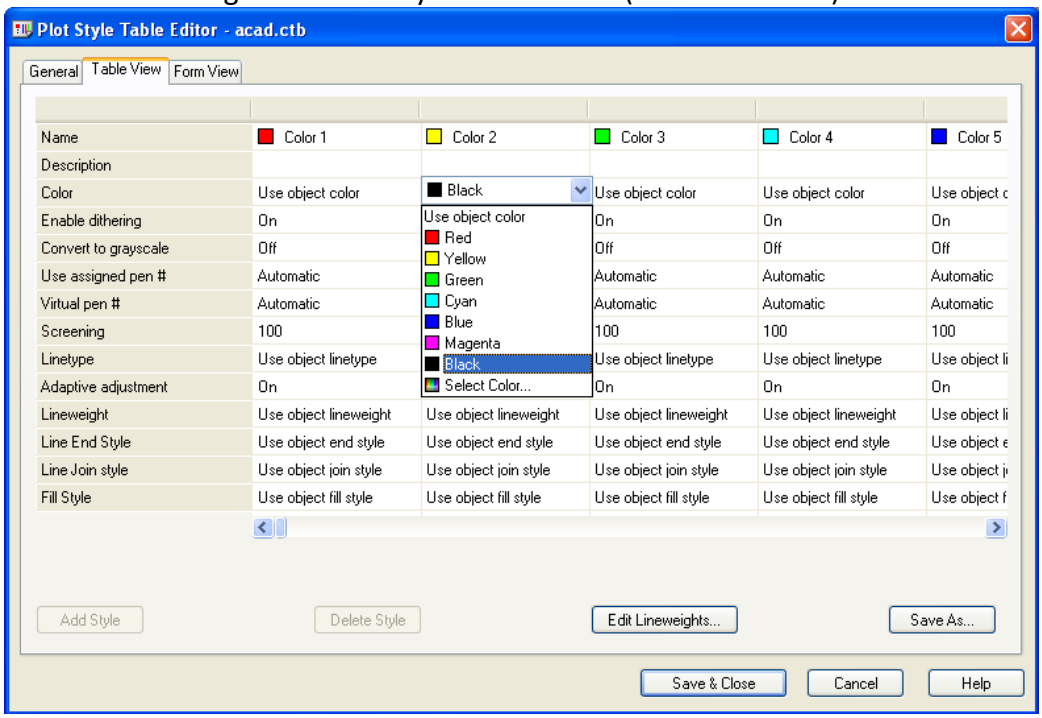
***Note**: **Acad.ctb** is the default plot style table assigned to your AutoCAD default drawing layout*

- **Select acad.ctb from the Plot Style Manager dialogue box.**



Next, Select "Table View" tab.

Figure 3 - Plot Style Table Editor (Table View Tab)



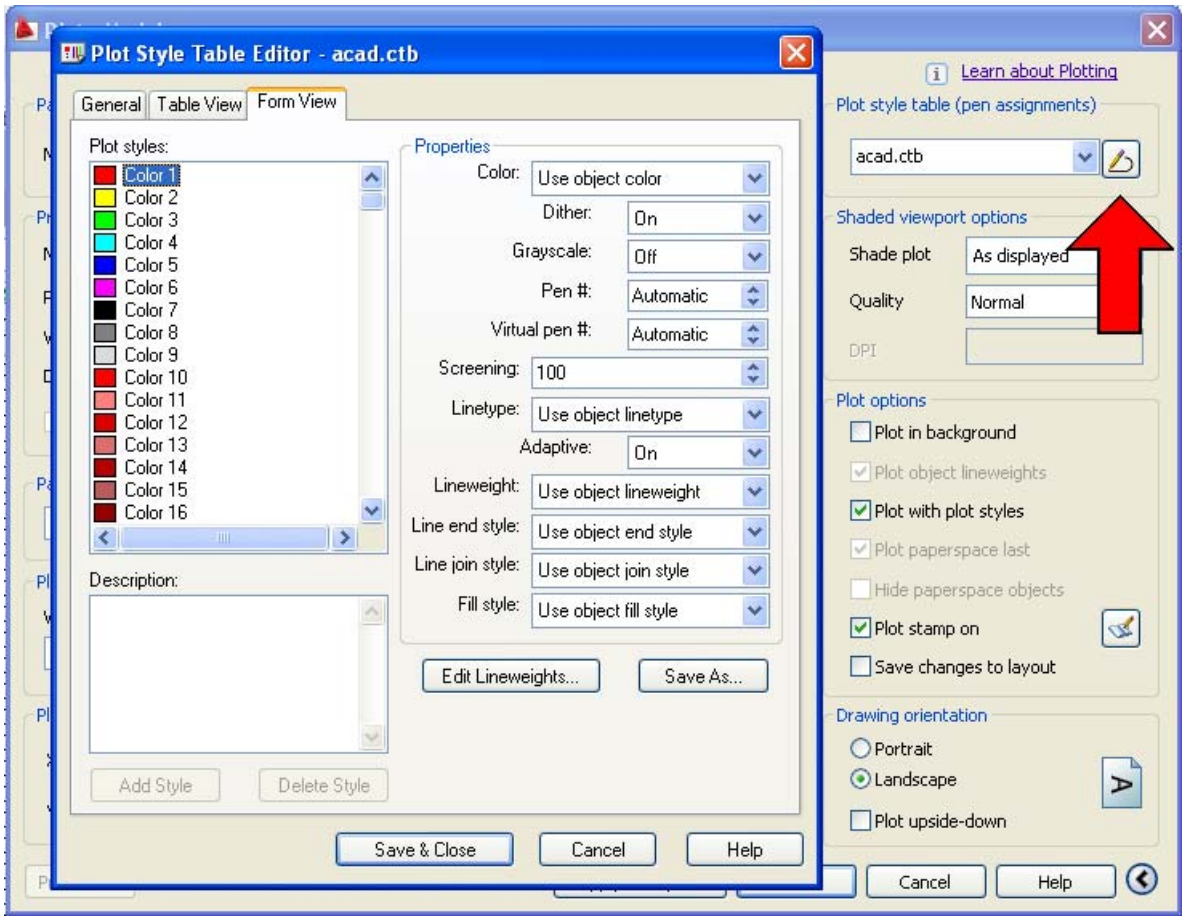


Figure 2 - Plot Style Table Editor (Form View Tab)

***Note**: The Table Editor properties control consists of pen settings: color, dithering (speckle), grayscale, line type, line weight, and so fourth.*

- **Next, Pick the Form View tab (Figure 2)**
- **Select/highlight Color (2) in Plot styles section:**
- **Change Color (2) to use Pen Number (7) in Properties section**
- **Select Dither "Off" for all colors *(see Tip - below)***

Tip: You can perform dynamic changes throughout the Form View table by highlighting (Control-key pick or Shift-key pick) selective colors, as many as you require, prior to making changes to the Properties section. For example, pick color 1 (red) then scroll down to color 250 and pick hold-shift-key. When all the enclosed colors are highlighted, go to the Properties section next to "Dither" and select "Off". As a result, all colors selected will reflect Dither as "Off." Save and Close to complete the process.

- **Next, Select the Table View tab to review your changes or to compare overall color settings (Figure 3).**

Reminder: *When you are finished, you will save this "default" change to the acad.ctb file. Later, you may want to create a "Printer or plot specific" color table file, e.g., HP-LJ4V_B-Size_Scale01.cbt*

Table 1 - Line Weights

Red	Very Fine	TEXT1S layer or TEXT1S text style, RFLR1 layer, tic-marks [+], small details & symbols, thin hatch, lavatory details
Yellow Orange	Thin	TEXT1N layer or TEXT1N text style, fixtures, and furniture
Green	Thin to Medium	WIRE1, FLPN1 layers, and TEXT1M layer or TEXT1M text style
Cyan	Medium to Medium-Thick	EQPT1, FRONTMRK1, TEXT1L layer or TEXT1L text style
Blue	Thick to very Thick	BRDR1, HLINE, TEXT1B layer or TEXT1B and TITLE1 text style
Magenta	Medium to Medium-Thick	Match Line, Divide Line, Detail View
White	Medium-Thick to Thick (Black Line)	BLDG1 layer, Load bearing & exterior walls in FLPN1 layer or Overall Building Plan drawing
Dark Gray	Fine	Duct and conduit runs, medium size symbols, etc.
Light Gray	Medium	Duct and conduit runs, medium size symbols, etc.

***Note**: Line-weight descriptions are suggested for general-purpose use only - exceptions may apply when making distinctions among objects justifies adjustments to an object's color, line weight and line type. As such, these settings may very depending upon the desired plot size, type and plotter. Refer to the **Table 4-1** for specifics.*

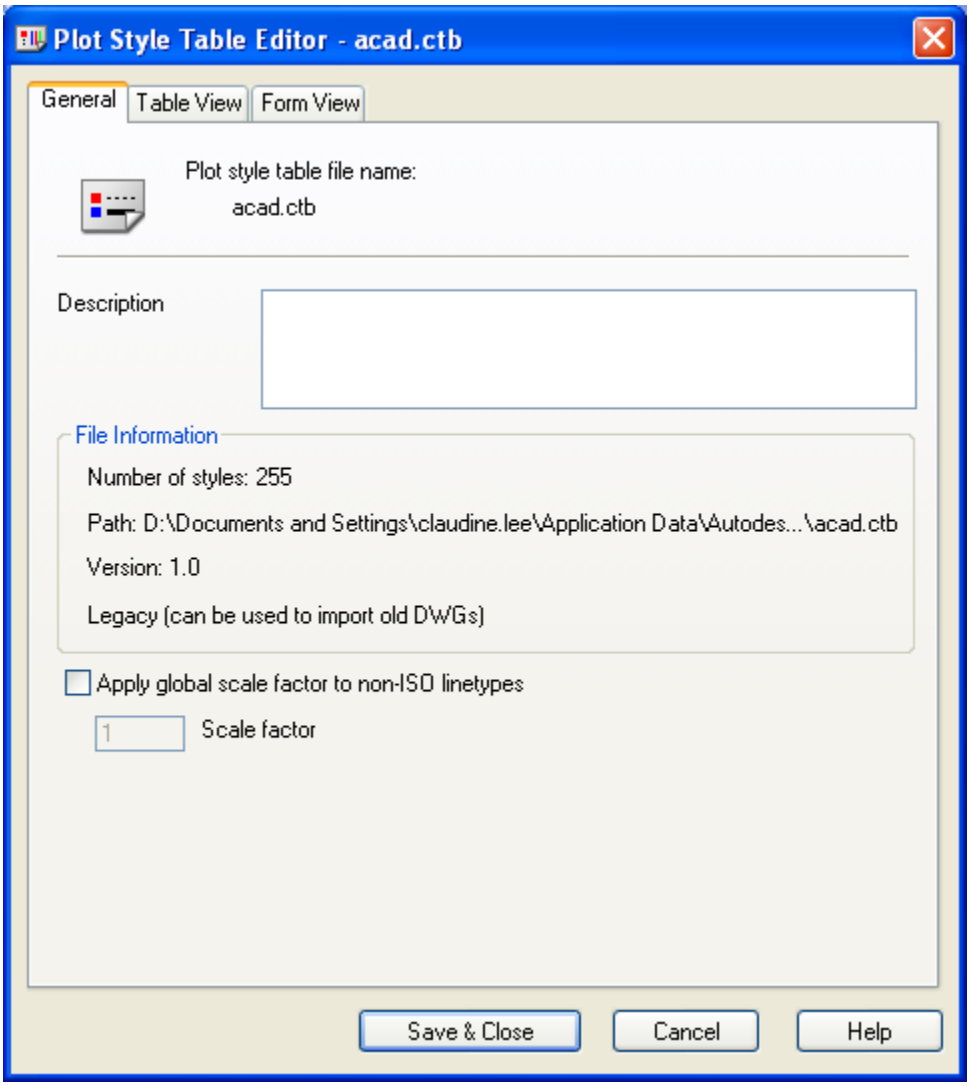


Figure 4 - Plot Style Table Editor (General Tab)

- **Next, if you prefer to add some descriptive information about the changes that you made to your Pen Style, select the "General" tab. (Figure 4).**
- **When you finish making changes to the Pen-Table Editor, select "Save and Close" from either three of the tab selections – to save changes to Acad.ctb.**

Important Note: If you want to make custom pen setting changes (i.e., for a specific plotter or plot-size), select the "Save As..." button (Figure 3) to create a custom CTB file (Figure 5). Make sure you don't save plotter-specific pen styles to Acad.ctb, unless you intend to make these your default plot style.

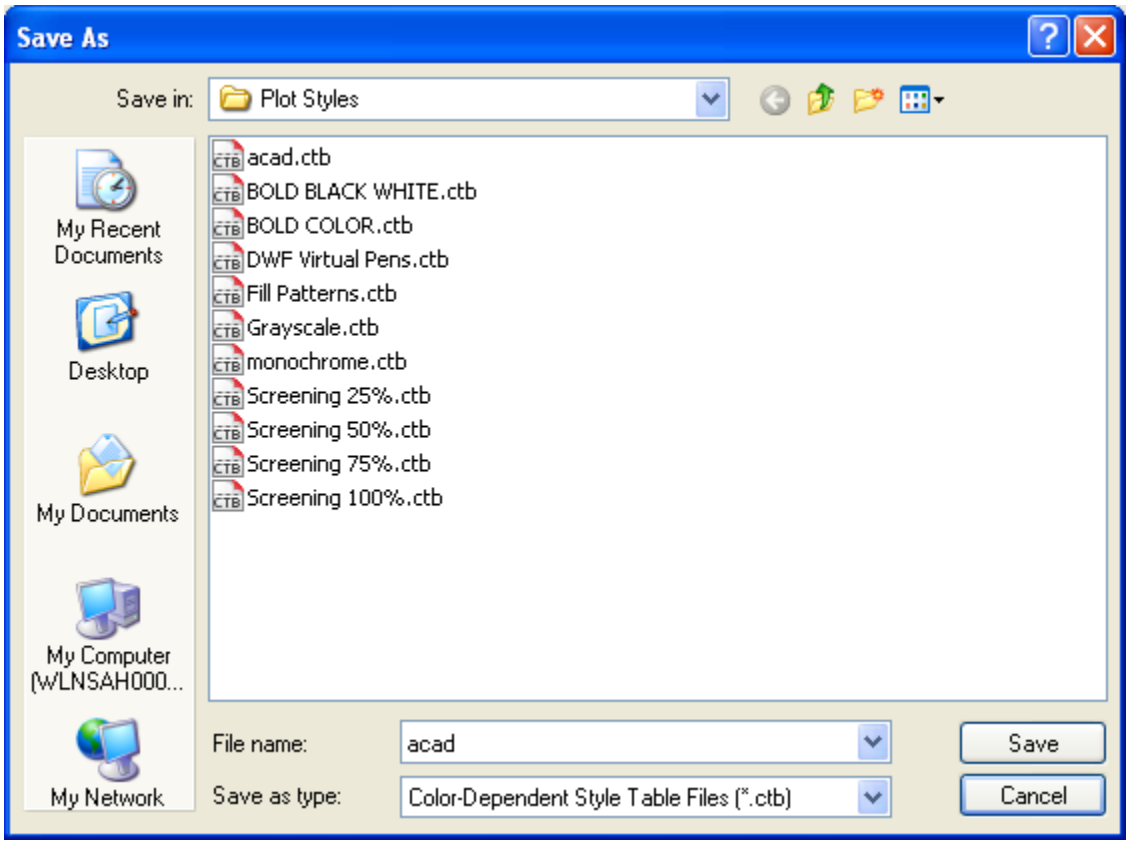


Figure 5 – Example plotter/plot specific Pen style name

APPENDIX H

SCALE FACTOR CHART

SCALE	UPSCALE FACTOR	DRAWING LIMITS (inches)	DRAWING LIMITS (ft. in.)	DIMSCALE
1/16 in. = 1ft. 0 in.	192	7680 x 5376	640' x 448'	192
3/32 in. = 1 ft. 0 in.	128	5120 x 3584	426'8" x 298'8"	128
1/8 in. = 1 ft. 0 in.	96	3840 x 2688	320' x 224'	96
3/16 in. = 1 ft. 0 in.	64	2560 x 1792	213'4" x 149'4"	64
1/4 in. = 1 ft. 0 in.	48	1920 x 1344	160' x 112'	48
3/8 in. = 1 ft. 0 in.	32	1280 x 896	106'8" x 74'8"	32
1/2 in. = 1 ft. 0 in.	24	960 x 672	80' x 56'	24
3/4 in. = 1 ft. 0 in.	16	640 x 448	53'4" x 37'4"	16
1 in. = 1 ft. 0 in.	12	480 x 336	40' x 28'	12
1 1/2 in. = 1 ft. 0 in.	8	320 x 224	26'8" x 18'6"	8
3 in. = 1 ft. 0 in.	4	160 x 112	13'4" x 9'4"	4
6 in. = 1 ft. 0 in.	2	80 x 56	6'8" x 4'8"	2
1 in. = 10 ft.	120	4800 x 3360	400' x 280'	120
1 in. = 20 ft.	240	9600 x 6720	800' x 560'	240
1 in. = 30 ft.	360	14400 x 10080	1200' x 840'	360
1 in. = 40 ft.	480	19200 x 13440	1600' x 1120'	480
1 in. = 50 ft.	600	24000 x 16800	2000' x 1400'	600
1 in. = 60 ft.	720	28800 x 20160	2400' x 1680'	720
1 in. = 100 ft.	1200	48000 x 33600	4000' x 2800'	1200

APPENDIX I

TEXT SIZE CHART

SCALE	UPSCALE FACTOR	DOWNSCALE FACTOR	BLUE/CYAN TEXTB .3	GREEN TEXTM .185	(30)/BLACK TEXTN .156
1/16 in. = 1ft. 0 in.	192	0.0052083	57.6	35.52	29.95
3/32 in. = 1 ft. 0 in.	128	0.0078125	38.4	23.68	19.97
1/8 in. = 1 ft. 0 in.	96	0.0104167	28.8	17.76	14.98
3/16 in. = 1 ft. 0 in.	64	0.0138889	19.2	11.84	9.984
1/4 in. = 1 ft. 0 in.	48	0.0208333	14.4	8.88	7.488
3/8 in. = 1 ft. 0 in.	32	0.0277778	9.6	5.92	4.992
1/2 in. = 1 ft. 0 in.	24	0.0416667	7.2	4.44	3.744
3/4 in. = 1 ft. 0 in.	16	0.0625	4.8	2.96	2.496
1 in. = 1 ft. 0 in.	12	0.0833333	3.6	2.22	1.872
1 1/2 in. = 1 ft. 0 in.	8	0.125	2.4	1.48	1.248
3 in. = 1 ft. 0 in.	4	0.25	1.2	0.74	0.624
6 in. = 1 ft. 0 in.	2	0.5	0.6	0.37	0.312
1 in. = 10 ft.	120	0.0083333	36	22.2	18.72
1 in. = 20 ft.	240	0.0041667	72	44.4	37.44
1 in. = 30 ft.	360	0.0027778	108	66.6	56.16
1 in. = 40 ft.	480	0.0020833	144	88.8	74.88
1 in. = 50 ft.	600	0.0016667	180	111	93.6
1 in. = 60 ft.	720	0.0013889	216	133.2	112.3
1 in. = 100 ft.	1200	0.0008333	360	222	187.2

APPENDIX J

SMDS DRAWING SUBMISSION PROCESS

1.0 Purpose

This Appendix addresses the procedure for submission and review of a Site's Station Master Drawing Set (SMDS). The SMDS packages will be produced in accordance with this document. and the packages will be subject to the review process detailed below.

2.0 The Process

USFLTCYBERCOM/C10F drafting support is provided by the TETON organization. The SMDS team is comprised of drafting personnel assigned to TETON. These personnel are responsible for creating, incorporating or formatting every site's drawings into a SMDS package. The development of these packages will be accomplished in various ways: periodic site visits by drafting personnel, redlines received as a result of an installation, and receipt of drawings directly from the site. Once the data has been incorporated, the review process will begin. At the conclusion of the review process, the baseline will be established and changes will be tracked from that point. All packages will be submitted with a SMDS DRAWING SUBMISSION FORM (see Section 3.0).

SMDS Package Release Philosophy

The intent of the SMDS program is to have formalized and standardized drawings of all USFLTCYBERCOM/C10F commands. Because there are many different size sites with as many different situations, it is not possible to make one rule for every site. It is suggested that the larger, more active (in terms of installs) be updated periodically once the initial baseline has been created. Smaller, less active sites, would probably only need to be updated whenever their periodic site visit occurs. The system will be flexible enough to accommodate updates anytime; however, each and every update will not constitute a new release and review process. The goal is to provide drawings (hardcopy and softcopy on the Drawing Server) that are as up-to-date as possible.

Sites that are large and constantly changing will freeze their drawings, only in terms of the SMDS package, at an agreed upon time. Those drawings will then be captured as the baseline,

and updated releases will be scheduled as needed from that point. This will enable the SMDS personnel to begin the review process and ensure that some level of documentation is available. The Revision Block within the Title Block of the package will indicate what revision a given package is at. The baseline will be "1" and the Revision Column will increment by "1" as the drawing packages are updated. When individual drawings are changed, the Revision Column on the drawing will reflect the Task Number or a statement reflecting why the drawing was changed. After a formal Periodic Visit to verify and validate the drawings, the completed and reviewed package will be considered the new baseline and the Revision Column will revert back to "1."

Initial Submission and Review

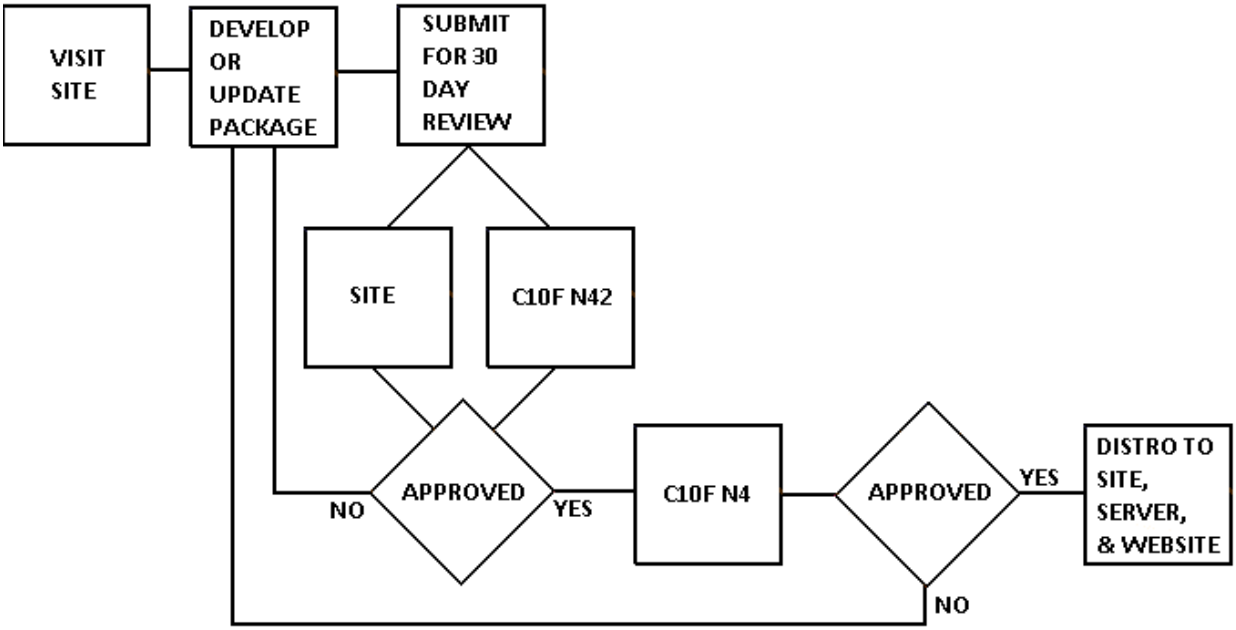
After development of the initial package, SMDS personnel will submit the package, along with a transmittal letter, to the site and the USFLTCYBERCOM/C10F N42 for review. The transmittal letter will request that the package be reviewed within 30 days of receipt, and the letter will clearly state that lack of response will indicate concurrence with the package. Should a site experience a delay in receiving their package, the POC will need to contact the appropriate USFLTCYBERCOM/C10F to have the review time period adjusted.

The site will contact the appropriate SMDS POC with any corrections they might have. The corrections will be made and the package (or just the corrections, depending on the drawings effected) will be forwarded to the site and USFLTCYBERCOM/C10F for another 30-day review. Throughout the review process, the drawings will be annotated as "DRAFT WORKING COPY."

At the conclusion of the review period(s), the package will be submitted to USFLTCYBERCOM/C10F N4, who will have ten (10) days to review and provide final signature. USFLTCYBERCOM/C10F will then send the package to the site. USFLTCYBERCOM/C10F will also send the package to the Drawing Server.

The final, baselined package will indicate that it is "AS-BUILT" and will have a "1" in the Revision Block (Title Block) to indicate it is the baselined drawing.

The Initial Submission and Review flow is detailed in Figure 1.



2.0 Submission Forms

The SMDS DRAWING SUBMISSION FORM, below, will be filled out to track the drawing package through the review and distribution process.

SMDS DRAWING SUBMISSION FORM

SITE UIC HQ, N00069 WI, N30574 POC: EMAIL ADDRESS: PHONE #:	DRAWING #(S):
SUBMISSION PERIOD: ☐ INITIAL SUBMISSION ☐ FIRST QUARTER ☐ SECOND QUARTER ☐ THIRD QUARTER ☐ FOURTH QUARTER ☐ PERIODIC VISIT/NEW BASELINE ☐ OUT OF CYCLE	
BRIEF DESCRIPTION OF CHANGE:	

FOR SMDS OFFICE ONLY

DATE PACKAGE RECEIVED: _ _____

REVIEWER: _ _____ DATE:_ _

DISPOSITION: APPROVED

FOR C10F OFFICE ONLY

DATE PACKAGE RECEIVED:_ _____

PM APPROVAL:___ _____ DATE:_ __

DISTRIBUTION:

☐ SITE DATE:__ REVISION#:
☐ DRS DATE:__
☐ C10F/N4 DATE:__

COMMENTS DUE FROM SITE:

DATE DUE:___

COMMENTS RECEIVED? ☐ YES DATE:__ ☐NO

APPENDIX K

INITIAL SITE SURVEYS AND PERIODIC VISITS

The following priority listing will be used to direct the efforts of the SMDS team for gathering or verifying of data for the station drawing packages. After the initial check-in with the EMO or maintenance department, the team will start with the first priority.

Only UNCLASSIFIED information is to be documented.

The listing below can be used as a check-list during the site visit to ensure all areas are covered. Some items may not pertain to all sites and may be omitted. Conversely, items that are site specific may be added by the team when considered necessary.

Tier 1

Priority No. 1

Architectural Building Plan (Physical Structure, Bldg Measurements)
Building Room Layout
Computer Decking Arrangement (to include height from True Floor)
True Walls (True Floor to True Ceiling)

Priority No. 2

Equipment Arrangements – Operational Spaces only
Elevations – equipment racks (front and rear) and walls (operational spaces only)
AC Power Panel Assignment (Copy Only) (Technical/UPS)
Grounding System – Building/Earth ground location only
Duct Layouts (Power, Signal and LAN)
LAN's (Drop Locations)
Alarm Systems (Physical Security, Access Control, PIR's, BMS's, CCTV)

Priority No. 3

Power/Lighting Panel Locations (Non-Technical)
    AC Power Panel Assignment (Copy Only) (Non-Technical)
Telephones
    NSTS – Show Phone locations, conduit and switch
    Unclassified – Show Jack Locations only

Priority No. 4

Fire Alarm System (Smoke Detectors, Sprinkler Heads etc)
HVAC (Ductwork, Air Handlers in Overhead; Chilled Water Supply and Return Pipes)
Light fixture locations (Reflective Ceiling)
Roof Layouts (If Accessible)

Tier 2

Signal Flow Diagrams (Specifics to Distant End)
Block Diagrams (from IDP)
Wiring Diagrams (from IDP)
Underground cable locations
Antenna Plot Plan/Compound
AC Power Electrical Distribution Diagrams (Verification of Branch Circuits)
HVAC Unit Capacity
UPS Capacity

CASE-BY-CASE ITEMS

Equipment Settings/Strapping
Cross-connects
Cabling Diagrams
Lighting Wiring Diagrams