RADIUS

Office Manual

Contents

Acknowledgments

The Radius members listed below have made this book possible by showing indifference to donating time during those hours normally reserved for sleep.

David Jones

John Hitch

Mark Dickey

Leslie Flowers

James Esquivel

Carol Acquesta

Brian Tennyson

Bill Haste

Becky Shankle

We are also indebted to the members of the DataCAD Boston Users Group (DBUG), who sent us a lot of really good stuff and, best of all, said we could use it however we wanted.

Introduction

The Radius Office Manual is a guide developed for DataCAD users who are interested in producing clear and consistent architectural working drawings. Our intention is that by limiting the scope of this manual to a specific software product and application, we have provided information that will be of more value to the reader than the generalist approach. Wherever possible, the material in the manual will give you specifics on how to achieve a desired result, whether it be a system for naming your files, coordinating drawing layers, or instructions on how to produce a floor plan.

While our goal for this manual is easy enough to state, it has proven to be an ambitious project. The realization that this manual was needed, came from two sources. First, those members who had been with Radius from the beginning were aware that each of us was inventing a somewhat different and less than perfect wheel. Unfortunately, we were never able to meet as a group for a long enough period of time to hash through all of the issues that needed to be resolved in the development of a workable system. The second source of inspiration came in the summer of 1987, when Radius hosted the National DataCAD End Users Meeting in Washington DC. Many of the questions that were asked as a result of that meeting ran along the following line: "We have the hardware and software, we know how to use both, but how do we put it all together into a system that will help us do our job?" The frequency of this question and our own fragmented attempts to answer it left us with no choice but to grit our teeth and write the Radius Office Manual.

We hope that this book will help your office to be successful with CADD, but there are a number of things that are not in-cluded here that are essential for this success. Our manual will not help you buy hardware. You should consult members of your local user group or your dealer for this advice. We assume that you have selected

DataCAD as your drafting software, and that your people know how to use it. We are not writing a third party version of the DataCAD User's Manual, but rather a companion guide that covers issues beyond the scope of the DataCAD manual.

Please note that this is the first printing of the Radius Office Manual (i.e. "beta version"). We are giving it to attendees of the Second National DataCAD End Users Meeting so that you may read it and help us to improve future versions. You may make as many copies of the manual as you need for your office, but we ask that you not distribute it beyond your firm.

Radius believes that the computer has a place in the drafting room of the successful architectural firm, and that the hardware and software available today provide you with the necessary tools. We offer this manual as the interface that will help you use these new tools to achieve the production goals of your office.

Radius, April, 1988

Organizing the Office for Effective CADD Use

For most architectural offices, the CADD system is a newcomer that must somehow fit within an existing and orderly office framework. Based on manual drafting, the office's methods have evolved over a period of years to a point where production and management methods are a near perfect fit for the firm's needs. Enter the CADD system.

Suddenly, the well-oiled machine threatens to come to a screeching halt. For many offices, the CADD system is a quick fatality, rejected, if you will, by its host. Basic incompatibility is cited as the cause.

Within the offices that make up RADIUS there are some common approaches to integrating CADD within an existing operating framework that seem to lead to success. In this chapter we will discuss these methods of office organization.

Personnel There are three basic roles to be filled for effective management of the cadd system: system coordinator, job captain, and technician. In the smaller office these roles may overlap, but it is important that the various responsibilities be clearly defined.

System Coordinator This person is responsible for all details relating to the hardware and software. The system coordinator should research and recommend system related purchases, relying on feedback from the job captains and technicians. Workstation use may need to be scheduled by the system coordinator to ensure that the cadd system is used for a maximum number of hours per day. Other duties of the system coordinator include equipment and file maintenance, purchase of supplies, training, developing the system manual (more on this later), and scheduling plotting time.

The system coordinator should have a thorough knowledge of every part of the system. While it is often not the case, this individual should be placed high enough in the office structure to participate in policy decisions.

Job Captain The job captains will probably be concurrently responsible for both manual drafting and CADD projects. They need to become familiar with the operation of the system and its strengths and limitations. The overall success of the system may depend on how well the job captains communicate with the system coordinator and technicians, particularly with respect to the overall structure of the system.

Technicians These people are the front line of your system. The technicians must be very familiar with the operation of the CADD software, and should know the rudiments of DOS. If your office is trying to make a smooth transition from manual drafting to CADD, it is important that the technicians know as much about architecture and your office practice as you would expect a manual draftsman to know. The technicians should be encouraged to communicate their problems with the CADD system to the job captain.

Cadd System Layout There are two ways to arrange the CADD equipment in your office. A centralized layout concentrates the CADD equipment in one location, under the watchful eye of the system coordinator. This is a common and generally good approach for firms who are installing their first system, or firms who will have a number of people sharing each workstation. As your experience with CADD increases, you will want to consider placing the workstations on the desks of the people who use them, ideally, one workstation for every technician.

The Office Manual We hope that this book will form the basis of your cadd manual. In addition to the material presented herein, your (the system coordinator's) manual should contain a description of your system, complete with serial numbers for hardware and software, procedures for backing up files and archiving projects, any formalities that you have established for plotting, service and supply contacts, etc. An extension of the manual will include the office template library.

Batch Files The use of batch files will make it easier for the job captains and technicians to use the system without being experts at using DOS. This is an easy way to make entering and exiting your system "menu driven".

While we believe that the information offered above will help your office make a successful transition to cadd, the critical elements are communication and patience. No office is successful with CADD overnight.

Communications With CADD Consultants

The more committed an Office is to CADD, as a means of producing drawings, the more important an all-CADD project becomes. When CADD drawings are mixed with traditional hand drawings, the process can be cumbersome. Frequent Plots are necessary in order to transfer information to consultants. Electronic archiving is difficult; the hand drawn information from consultants must be redrawn into CADD - by someone. (Guess who?)

If a "serious" CADD office is to be effective, it must use its influence to persuade their consultants to use CADD or consider finding new consultants that are currently use CADD. The software used by consultants is not as important as the fact that they are CADD users. The only critical consideration is that their software is compatible with DataCAD. Most CADD programs provide compatibility through a "DXF" utility. When the drawing is issued to a consultant through the DXF conversion process, it is copied out through "Write DXF" in the FileI/O Menu of DataCAD. The process is reversed for incoming through the use of the "Read DXF" command in the FileI/O menu.

All-CADD Project The first step in establishing an all-CADD project with consultants is to agree upon a set of standards. These should include at least the following:

1. Layering Protocols
2. Text Standards
3. Symbol Standards
4. Pen Color Standards

Distribute copies of all of the above to all disciplines for their project manual

The Data Exchange Loop

Step One: Initial Distribution via Floppy Disk

When the architect generates a drawing for distribution to a consultant, he date-stamps it, copies it with all layers on, and distributes it to all engineers. A copy is placed into the project manual. An example of a date-stamped Floor Plan might be 1FPL0328 (First Floor Plan March 28)

Drawings are Date-stamped because the architect and engineer may work on the distributed drawing simultaneously. The architect can verify, at any time, with his consultants that everyone is working on the same drawing version. Date-stamping provides a very clear and clean audit trail.

Step Two: Data Exchange Feedback for all Disciplines

When an engineer is ready to return a "check print" diskette on April 7, he returns the date-stamped plan 1FPL0407 with a new layer(s) containing only his engineering data. The architect's drawing is left unmodified. **It Imperative That The Architect's Work Not Be Changed by Anyone Except the Architect.**

Step Three: Cleanup After Receiving Feedback Data

When the architect receives feedback data from the engineer, he loads the engineers' layer(s) into his drawing, makes any revisions necessary and returns the updated information to all consultants.

This process continues until the drawings are completed. A permanent record is maintained by placing a copy of each date-stamped drawing in the project manual.

File Organization

Included in this chapter is a discussion of basic MS-DOS concepts for hierarchical file structuring, elements of Datacad file structures, strategies for organizing these files, and strategies for naming Datacad sub-directories and files. It is assumed that the reader has an understanding of his or her computer system (i.e. can turn the machine on and off, knows how to move from disk to disk, and understands some basic MD-DOS commands).

Hierarchial File Structure   Within MS-DOS, the operating system used to run Datacad, files can be organized in a manner similar to a filing cabinet using hierarchial files or directories. Each disk has one main directory, the root directory. The root directory is equivalent to the filing cabinet in our analogy. Were we to simply fill our filing cabinets without some organization, we would obviously have difficulty later locating any files. Therefore, within the filing cabinets are drawers and within the drawers are file folders, etc. In order to accommodate the many groups of files you might use on the computer, a similar idea is utilized. Analogous to the filing drawers, sub-directories are created to group files according to a purpose (i.e. word processing, Datacad, accounting). Within the sub-directories, or file drawers in our analogy, are file folders specific to the sub-directory under which they are stored.

To more completely understand the hierarchical file structure, a family three analogy is often used. As parents are the beginning or base of the family tree, the root directory is the beginning or base of the computer filing system. As parents may have children, the root directory may have sub-directories. Additionally, each sub-directory may have sub-directories. With each newly created branch on the family tree, a new sub-directory is created. As you follow the branches of your family tree, so might you follow the branches to a sub-directory. A sub-directory is located through MS-DOS by following its "path" from the root directory.

The hierarchial sub-directory structure associated with Datacad may follow this tree analogy:

File Structure

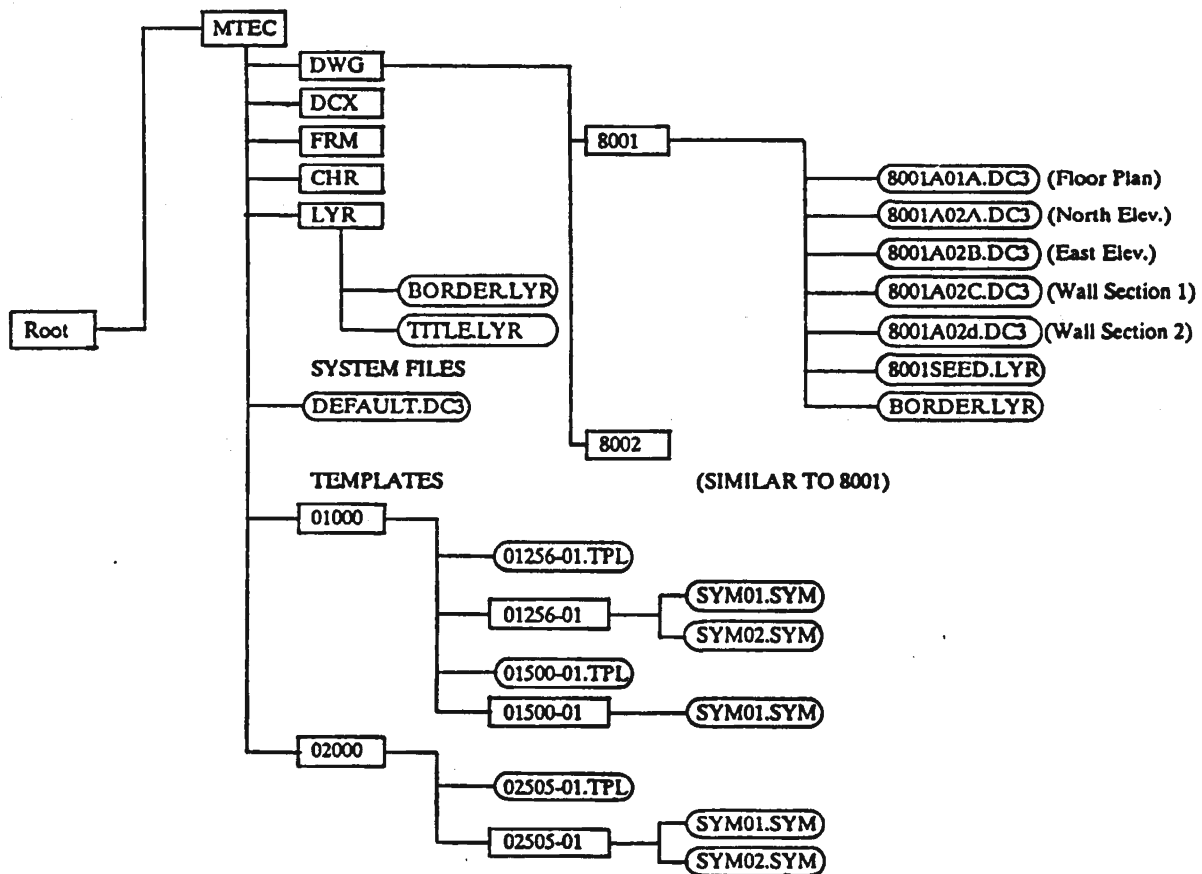| Root Directory	Sub-Directory	Sub-Directory	Sub-Directory
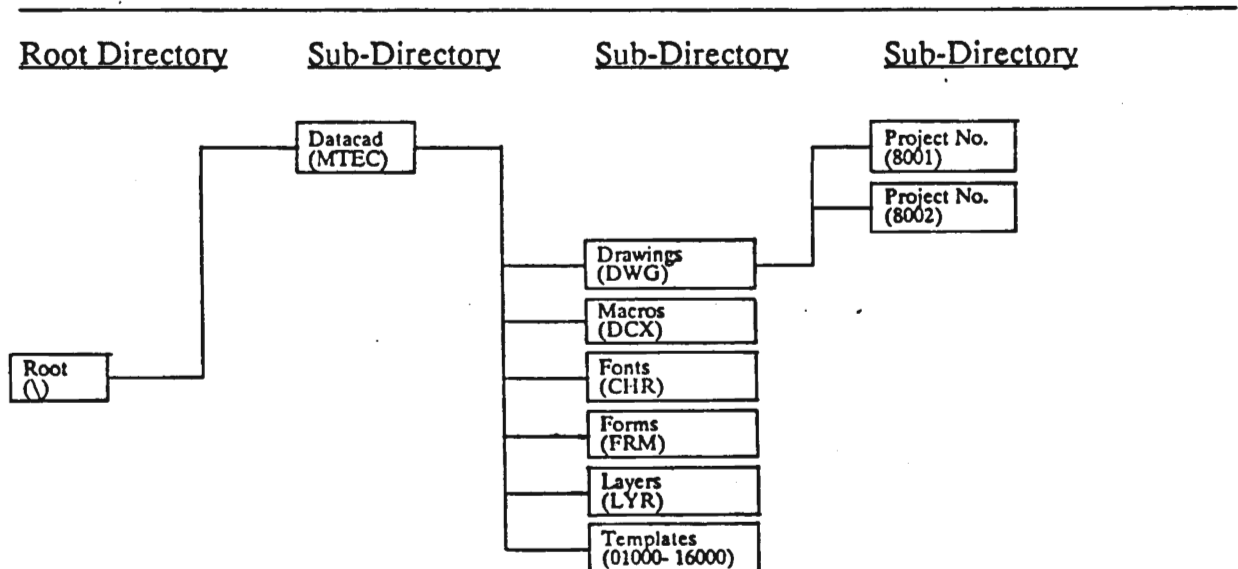
Note: ALTERNATE TEMPLATE location 1) Root directory of any drive or 2) separate floppy disks.

Using this structure, the "path" associated with the sub-directory containing drawing f16000) files is \MTEC\DWG. Beginning with the root directory, you must first tell DOS that the drawings sub-directory called DWG may be found by looking within the Datacad sub-directory called MTEC. The backslashes are required by DOS to separate directories, sub-directories and file names.

Expanding the sub-directory hierarchial structure, we can store and locate files within sub-directories as follows:

File Structure

This recommended structure will assist you in knowing exactly where you and MS-DOS can locate your information. Within the MTEC sub-directory are located Datacad system files. Disrupting these files is hazardous and can be minimized by keeping these files separate from other files. Virtually any meaningful combination of eight characters and letters you use for project numbers will suffice for sub-directory names. Our model uses the first character for the year, and the last three digits for sequential project numbers in the year designated.

The DWG sub-directory within MTEC groups all drawing files together. Files and sub-directories can be found under DWG. Sub-Directories titled as project numbers helps organize drawings by project. Drawing files are named by the first character being the year, three digit project number, sheet number and its location on the sheet. In most cases, sheets contain more than one drawing. Each of these drawings is a separate file. Since we number drawing files by sheet number, we need to distinguish each file accordingly. For instance, project number (sub-directory) 8001 on our tree diagram contains four drawing files on sheet A-2: 8001A02A, 8001A02B, 8001A02C and 8001A02D. While the A02 indicates the sheet number, the A, B, C, and D indicate different drawings on the sheet. (Though NOT recommended, you may choose to use an abbreviated alphabetic description of the drawing.) Either system will function best with prior planning. One technique found useful by many firms is the "miniset". This is a graphic outline of the project. Included in the miniset is a quick sketch of each drawing needed for the project. With each drawing, the file name and scale are predefined. A sample sheet is shown below:
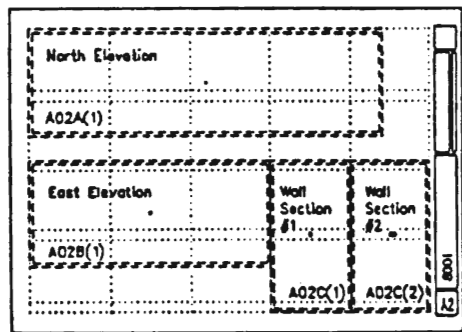
Layers may be listed on the miniset and checked by project managers to give draftsmen an idea of which parts of one drawing to utilize for another drawing.

Following these suggestions will lead to a thoroughly planned project before any drawing has begun. In this manner, much time may be saved by utilizing the power of Datacad.

So that a consistent sheet and file numbering system can be achieved, the following standard designations, based on the CSI Specification Divisions is recommended:

Sheet Letter	Sheet Type
A	Architectural
S	Structural
M	Mechanical
P	Plumbing
E	Electrical
C	Civil
L	Landscape
K	Kitchen Equipment
T	Tenant Upfit
X	Drawing issued during Construction
Z	Site Plan/Misc Dwg

Although useful for most firms, this designation might need adjustments to suit your needs.

Layer Files   Another powerful Datacad tool, layer files are shown under the project number sub-directory within DWG and under a layer file sub-directory within MTEC. Layer files related to a specific project may be located with the other drawing files as shown on the tree diagram. Generic layer files such as borders or title block should be stored in a more central location. Be wary, set up in this manner, the path for locating each group of layer files differs. All layer files are assigned the .LYR extension, differentiating layer files from drawing files which have the .DC3 extension. Naming layer files should reflect a logical system.

Whatever combination of eight characters suits your firm's preferences should suffice. An alphanumeric naming scheme which describes the layers and in some cases indicates scale is recommended. For example, the perimeter plan (PERIM.LYR) drawn first, along with the interior walls

drawn at differing scales and for a variety of sheet sizes. When saving these, the scales and sheet sizes should be part of the layer file name. For example, suppose we have a Border drawn for a D (24x36) size sheet and the sheet is to be plotted at a one-eighth scale. A possible name is BORD18.LYR. While the BOR indicates it is a border, the D indicates sheet size. Finally the 18 reflects the 1/8" plot scale.

Font Files   Another sub-directory located within MTEC is CHR, representing character. Text font files are contained within this sub-directory. Initially, text files are located directly under MTEC, which is fine. However, if you have purchased or made additional fonts, you need a common location for all files. This sub-directory helps maintain this central location and keeps system files separated as well.

Macro Files &   Several other sub-
Form Files &   directories (which have not been discussed) are indicated on the tree diagram, including DCX and FRM. The DCX sub-directory contains macro files. The FRM sub-directory contains form files. Both of these should remain separate and unless you are adding to them, should not be generally accessible.

Template Files   The remaining Datacad sub-directory not yet discussed is relating to templates. Since the Radius Group shares templates among its members, it is necessary to have a consistent method by which these files can be stored and named. At this point, we are locating them within sub-directories named according to CSI Specifications division numbers. These sub-directories are located directly under the root directory. Template and symbol files and naming methods are discussed more fully in another chapter of the manual.

Conclusion   We have discussed basic MS-DOS commands and functions and Datacad file structure. It is important to have a thorough understanding of these concepts and systems in order to develop your "ideal" cad strategy. Several naming and project planning strategies have also been suggested. Although you might choose to vary these strategies, consider carefully the ramifications of your actions. Have a thorough understanding of your computer system and office procedures while developing your file structure.

Default Drawing & Initial DataCAD Settings

The following chapter discusses the creation of a **DEFAULT DRAWING** and the initialization of typical drawing variables. The initialized settings are based on a cut sheet size of 24" x 36" and plotting scale of 1/8" = 1'-0". If other sizes or scales are used infrequently, the default drawing settings may be changed after creation of the new drawing. If other sizes are used frequently, it is recommended that the settings be modified in the default file. The most versatile default drawing will contain drawing layout information and set all variables to reasonable values. For more extensive file initialization, the creation of seed layers is recommended. Through seed layers, portions of repetitive drawings or typical sheet formats can be easily loaded without burdening all drawings with unnecessary data.

DEFAULT.DC3 drawing should be created in the **MTEC** sub-directory and the path to the default drawing entered in the DataCAD CONFIG Program.

Create an initial layer, called LAYOUT, in the **DEFAULT** drawing with the linetype of solid and color dark gray. Draw an image of the firm's typical cut sheet plotting paper showing sheet edges, the limits of plotting, title block location and sheet divisions for modular detail drawings. The following is a typical default sheet layout.
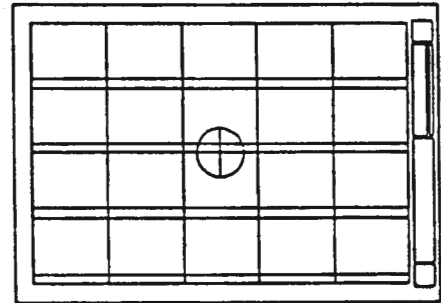
The center bull's eye with snapping point is used to layout a drawing for plotting to insure that the sheet is exactly registered. The LAYOUT layer is used for laying out the drawing and is normally not plotted. A similar layer called BORDER can also be created which contains the firm's actual title block and would be plotted (for those with plotters capable of plotting within one-half inch of the finished edge of the drawing.

Menu Structure & Settings

Layers   Select the Layers command from the Utility Menu. The Layers command is used to create layers, name layers, set active layer and turn layers on/off. Set the menu items as follows:

Name   Name layer1 as **LAYOUT**
*LyrRfsh   Turn on refresh

Geometry Select the Geometry command from the Utility Menu. The Geometry command is used to divide a line into segments, find the intersection of two entities, draw an entity offset from the original and to rotate the snap grid. Set the menu items as follows:

Divide	Set [Division] to 2
Offset	Set [PerpDist] to allow offset lines to initially be entered as a specified distance away from the target line.

Dimension Select the Dimension command from the Utility Menu. The Dimension command is used to draw dimension lines and automatically dimension certain types of entities. Make a sub-selection of **Linear**. Set the menu items as follows:

*Horiznt	Horizontal dimension
*Assoc	Associative dimensioning
TextStyl	
TextSize	1.0
Weight	1
Slant	0.0.0
Aspect	1.5
In Horz	Inside text will be rotated
OutHorz	Outside text will be rotated
*Above	Text above dimension line
Offset	Text offset 0.3 from line
*Auto	Text WILL be placed automatically
FontNm	ROMAN
Dim Styl	
*Line1	Draw extension line
*Line2	Draw extension line
Offset	0.6 (Ext. line offset)
Overlap	0.8 (Ext. line extension)
Increment	2.0 (Increment baseline)
Overrun	0.6 (Dimension line ext.)

_FixDis	Increment distance will NOT be used for placing dimension line
ArroStyl	
*TicMrks	Turn on tick marks
Size	0.5 (Relative size)
Weight	3 (Tic mark weight)
AutoStyl	
*StrngLi	Auto dimensioning WILL use Stringline style
_PtsOnly	Auto dimensioning will NOT use points only
_No Pts	Auto dimensioning will NOT ignore points
Min Dist	0.0 (Minimum distance to dimension)
MissDist	0.0
_LyrSrch	Turn layer search off

From the Dimension command menu make a sub-selection of **Angular**. Set the menu items as follows:

ArroStyl	
Arrows	Arrows WILL be drawn
Size	0.5 (Relative size)
Aspect	2.0 (Arrow aspect ratio)

From the Dimension command menu make a sub-selection of **Diameter**. Set the menu items as follows:

Dim Styl	
CntrMark	0.3 (Size of center mark)
ArroStyl	
*TicMrks	Turn on tick marks

From the Dimension command menu make a sub-selection of **Radius**. Set the menu items as follows:

_Auto	Text will NOT be placed automatically
_ArroStyl	
*TicMrks	Tick marks will be drawn

Settings   Select the Settings command from the Utility Menu. The Settings command is used to select units of measure and initialize system interface settings. Set the menu items as follows:

ScaleTyp
*Arch	Scale type is architectural
*Units	Units WILL be displayed

AngleTyp
*Compass	Angle style is compass (Some may prefer Normal rather than Compass, but DEFAULTS herein are based on Compass)
MissDist	10 (Distance in pixels)
SmallGrid	20 (Smallest grid size to display in pixels)
ScrlDist	50 (Scroll distance 50% of screen)
DistDlay	1 (Time delay for distance read out)
SaveDlay	20 (Save drawing every 20 minutes .... If the user is experiencing power outages or program errors, a shorter period may be prudent)
*DrwMrks	Cursor markings WILL be drawn
*Beeps	Beeps on
BigCursor	Small cursor size is 15
*NegDist	Distance readout WILL show negative distances
*Show Z	Z base and Z height WILL be shown in the command window
_FixdRef	Floating reference used

Grids   Select the Grids command from the Utility Menu. The Grids command is used to set the color, size, angle and display of the reference grid. Set the menu items as follows:

*Snap On	Snapping is on
_Displ1On	Grid display is off
_Displ2On	Grid display is off
GridSize	
Set Snap	1'-0"
SetDisp1	1'-0"
SetDisp2	4'-0"
GridColr	
SetDisp1	LtRed
SetDisp2	LtBlue
Snap Ang	8.0 (Number of snap angle divisions)
Angle	90.0.0 (Grid angle based on Compass angle type)
GridOrg	Snap to lower left hand corner of sheet

Display   Select the Display command from the Utility Menu. The Display command is used to set data types shown and size of data types shown. Set the menu items as follows:

*ShowTxt	Text will be displayed
*ShowDim	Dimensions will be displayed
_ShwHtch	Hatch lines will NOT be displayed
_ShowWgt	Line weights will NOT be displayed
*UserLin	User lines will be displayed
_OverSht	Line overshoot will NOT be displayed
ShowIns	Symbol insertion points will NOT be displayed
SmallTxt	Smallest text displayed 4 pixels
BoxColor	No Change
SmallSym	Smallest symbol displayed 4 pixels
ArcFactor	2.0 (Increase precision)

Obj Snap   Select the Obj Snap command from the Utility Menu. The Obj Snap command is used to set the method(s) that DataCAD will use to snap the cursor to a point on an entity and the method used to search the drawing data file. Set the menu items as follows:

_Nearest	Turn off snap to nearest point on an entity
*EndPnt	Turn on snap to ends of entities
_Mid Pnt	Turn off snap to mid-point of line
_N Pnts	Turn off snap to the 1/N th division of a line
*Center	Turn on snap to center of circles
_Quadrnt	Turn off snap to quadrant
*IntSect	Turn on snap to intersection of two lines
_Perpend	Turn off snap to a point on an entity normal to a line from the last point entered
_Tangent	Turn off snap to a point on an entity tangent to a line from the last point entered
_FastSym	Fast snapping for symbols disabled
Fast 3D	Quick snapping of 3D entities is disabled
MissDist	10 pixels
*LyrSnap	All displayed layers will be searched for object snapping
_SrchHch	Hatch lines will NOT be searched for editing
_Quick	"Quick" object snap disabled
_Sel Set	"Sel Set" object snap disabled
*Apertur	Snap distance aperature turned on

Plotter   The following settings are based on a Houston Instruments plotter. Best settings for other plotters may vary. Select the Plotter command from the Utility Menu. The Plotter command is used to set the plotter parameters. Set the menu items as follows:

Scale	1/8" (Set plotting scale)
PaperSiz	
*Custom	Xaxis 32"
	Yaxis 21 1/2"
	(Define plot area)
PenSpeed	10 inches per second
	(Suitable for ink)
	(0 for ball point pens)
PenWidth	5
Layout Sz	50 (Layout size 50%)
Layout Center	LAYOUT drawing on screen and snap to center mark to register exact center of plot
LayoutDiv	1 (X divisions)
	1 (Y divisions)
*ClrPlot	Plotter will stop for pen colors

Rotate   Select the Rotate command from the Edit Menu. The Rotate command is used to rotate entities. Set the menu items as follows:

NewAngle	90.0 (Select rotation angle after locating center)

Enlarge   Select the Enlarge command from the Edit Menu. The Enlarge command is used to change the size of an entity . Set the menu items as follows:

Enlarge	2.0 (X Enlargement)
	2.0 (Y Enlargement)

(Select ratio after locating center of enlargement)	Sill Hgt 2.2 (Set to most used) Head Hgt 7.4 (Set to most used)

LinkEnts Select the LinkEnts commmand from the Edit Menu. The LinkEnts command is used to associate entities as a group. Set the menu items as follows:

LinkEnts	Link all entities on screen by area. Then link only the center circle and snapping point as a separate group

Architct Select the Architct command from the Edit Menu. The Architct command is used to select special drawing features such as doors, windows and walls. Set the menu items as follows:

Walls	Walls will NOT be drawn (Set walls to 4" before leaving this selection)
*Centers	Draw walls by centers

DoorSwg	
DrwJamb	Jambs will NOT be drawn
*Sides	Door defined by jambs
*CtrPnt	Center snapping point will be added
*CutOut	Walls will be cut out
*In Wall	Doors will be centered between wall lines
_LyrSrch	Layer search off
JambWdth	0.2
Angle	90.0
Thicknss	0.1/2 (Draws dark line)
Head Hgt	7.0 (7'-0" doors std.)
*Single	Select single door

Windows	
Out Sill	0.2
In Sill	0.0
Glass Thk	0.0

Polygons Select the Polygons command from the Edit Menu. The Polygons command is used to draw multi sided objects such as rectangles, triangles, etc. Set the menu items as follows:

*CtrPnt	Draw center point
*Rectngl	Select rectangle

Text Select the Text command from the Edit Menu. The Text command is used to draw text. Set the menu items as follows:

Size	1.0 (1/8" high text)
Angle	90.00 (Horizontal text based on Compass type angle measurement)
Weight	1
Slant	0.00
Aspect	1.50
Arrows	
Size	0.5
Style	*Open
Aspect	2.0
*Left	Justify text left
Factor	1.0 (Line feed factor)
FontName	ROMAN

LineType Select the LineType command from the Edit Menu. The LineType command is used to set the type and color of line drawn. Set the menu items as follows:

Solid	
_Factor	Userline default spacing factor will NOT be used
Color	DkGray
Spacing	1.0
OverSht	0.0

Conclusion Upon completion of the DEFAULT drawing and initialization of the drawing parameters, save the drawing to the \MTEC sub-directory and to a floppy disk (for security). In order to test your DEFAULT drawing, create a new drawing. It will automatically incorporate the seed information from the DEFAULT drawing. If the new drawing fails to incorporate the seed information, run **CONFIG**, specify the directory location of **DEFAULT.DC3** and verify that DataCAD's default drawing name is correct. Once the new drawing is properly created, verify all settings.

The seed information contained in the DEFAULT drawing will be incorporated into all new drawings, and as a consequence it is essential that the settings be correct. Spend a little more time here to save a lot of time later!

Keyboard Macros

The following chapter discusses the creation of a useful **DCAD.MCR** file (keyboard macro file). A macro is a series of DataCAD commands which are executed by the simultaneous depression of the ALT key and any letter from A-Z. The DCAD.MCR macro file that comes with the DataCAD program is largely useful and appropriate for architectural work, but the following modified file enhances its capabilities. The first letter of each line of each column is the alpha character along with the ALT key which starts the keyboard macro. (Refer to the DataCAD manual for additional information on macro programming.)

Macro Listing

Macro Function

Key	Key Label	Macro Description
ALT A	ARCS	Select the CURVES menu.
ALT B	T.SNP	Turn TAN SNAP on in the Object Snap menu.
ALT C	CHANGE	Select the CHANGE menu.
ALT D	L.DIMEN	Select LINEAR DIMENSIONING from the Dimension menu.
ALT E	ENLRG	Select the ENLARGE menu.
ALT F	FILLET	Select the FILLET (radius) from the Cleanup menu.
ALT G	GMTRY	Select the GEOMETRY menu.
ALT H	P.SNP	Turn PERPENDICULAR SNAP on in the Object Snap menu.
ALT I	IDENT	Select the IDENTIFY function.
ALT J	JOIN	Select the 2 LINE TRIM function.
ALT K	LINKENT	Select the LINK ENTITY menu.
ALT L	LINETYP	Select the LINE TYPE menu.
ALT M	MIRROR	Select the MIRROR menu.
ALT N	C.SNAP	Turn CENTER SNAP on in the Object Snap menu.
ALT O	OFFSET	Select the OFFSET function.
ALT P	PLOTTER	Select the PLOTTER menu.
ALT Q	QUIT	Select the QUIT function.
ALT R	PLYGN	Select the POLYGON menu.
ALT S	STRTCH	Select the STRETCH menu.

ALT T	TEXT	Select the TEXT menu.
ALT U	STD.SNP	Turn END POINTS, INTERSECTION and CENTER on in the Object Snap menu for Standard Snapping.
ALT V	COGO	Select the COGO menu.
ALT W	WELDLN	Select the WELDLINE function.
ALT X	MEASUR	Select the MEASURES menu.
ALT Y	DOORS	Select the DOOR SWING function of the Architect menu.
ALT Z	WINDOW	SElect the WINDOW function of the Architect menu.

Conclusion Programming the keyboard macros to suit the user's most commonly used combination of function key strokes greatly enhances the overall CAD productivity. Spend a little time creating your best macros and make key cap labels to match. A copy of the R.A.D.I.U.S. key cap layout suitable to make stick on labels is included.

Keyboard Macros

RADIUS 10/31/87 DC 3.5a
Raleigh Area Datacad
Information & Users System

Drafting Procedures and Standards

The purpose of this chapter is to provide a well defined approach to the creation of architectural working drawings on a DataCAD equipped workstation. This method is not presented as the only method, or the best. It is simply one means to an end, and has worked reasonably well for a wide range of projects over a period of several years. The experienced office may wish to use this chapter as a way to verify that their method is optimal for their own use. The office new to CADD should use this material as a starting point for developing an approach tailored to their needs.

The chapter consists of three parts: drawing creation by drawing type, layer name cross-references, and screen color / plotter pen cross-references.

Drawing Creation by Drawing Type While the architect's office produces a wide variety of drawings, no two of which are exactly alike, it is possible to fit most drawings into a limited number of categories. For this chapter we have defined ten types of architectural working drawings:

  Site Plans

  Foundation Plans

  Floor Plans

  Roof Plans

  Reflected Ceiling Plans

  Exterior Elevations

  Small Scale Sections

  Large Scale Sections

  Details

  Room Elevations

For each type of drawing, we have provided a one page drafting reference which includes the following information: A sample drawing captured from an actual DataCAD screen; A list of building elements and drawing notations generally required for this drawing type; The layer name, suggested color, text size, and line type for each building element or notation; And finally, a step-by-step procedure for creating the drawing.

It is our intention that these pages be used as a desk-side reference for each cadd workstation. The value of this format can be enhanced by replacing the drawings we have provided on each page with two drawings; The first would be a color photograph taken from a CADD screen display of a drawing which includes your office's preferred symbols. The second drawing would be actual plotter output of the first drawing. Unfortunately, printing costs prevent us from providing color copies of the manual.

On some of the sheets you will see a layer that is named similar to the following: (dwg#)TEXT. Within the parentheses you should insert the number of the drawing on a particular sheet. For example, the layer that includes the notes for drawing #2 on a sheet could have a layer named "02TEXT". In some cases only two characters are allowed for the drawing number, but this should suffice for up to 99 drawings per sheet.

"Saved" layers are given a similar notation; where (Job#)SEED.lyr is indicated, you might use "8001SEED.lyr" to indicate the seed layer for the first job of 1988.

Layer Name Cross-Reference Immediately following the drafting references by drawing type is a layer name cross-reference guide. This lists all of the suggested layer names alphabetically, along with a description of the information that should be contained on the layer, and the drawing types which require the layer.

Screen Color/ Plotter Pen Reference   This chart indicates the 16 colors used by DataCAD. For each color, a line weight, pen turret/holder number, and pen ink color are assigned. The table assumes that a maximum of four line weights will be used, with the finest line weight plotted in black or green ink. Please note that the first plotter pen location is assigned to a medium width pen in deference to plotters like the Houston Instrument, which work best if the pen used most often is assigned to the first location.

Schedules   This chapter does not include a definitive method for producing schedules or large bodies of text on working drawing sheets. Within RADIUS, there are as many methods for handling this information as there are members. These methods are separated into two major categories: In the first, large bodies of text are plotted along with the rest of the drawings. With this approach, text can be created within DataCAD, either by direct text entry or through forms generation, or be created outside DataCAD and imported as a text file. In the second, schedules, etc. are created outside of DataCAD and added to the drawing later by means of sticky-backs or photo reproduction processes.

When you use the material in this chapter, remember that none of our decisions regarding colors, layer names, line weights, etc. are sacred. What is important is the need to think through and coordinate all of these variables so that your method of drawing production is efficient, consistent, and results in plots that have the "look" that your office desires.

```
F1 $BOUNDS
F2 *UTILTY
F3 *TOPO
F4 *PAVING
F5 *LSCAPE
F6 *BLDG
F7 *EBLDG
F8 *DEMO
F9 *TEXT
F0 *DIMEN
S1 *SYMBOL
S2 *BORDER
S3
S4
S5
S6
S7
S8
S9
S0  EXIT
    BOUNDS
    3/16"

Solid
SwOTHLUD  On/Off  Layer to switch: ▮
```
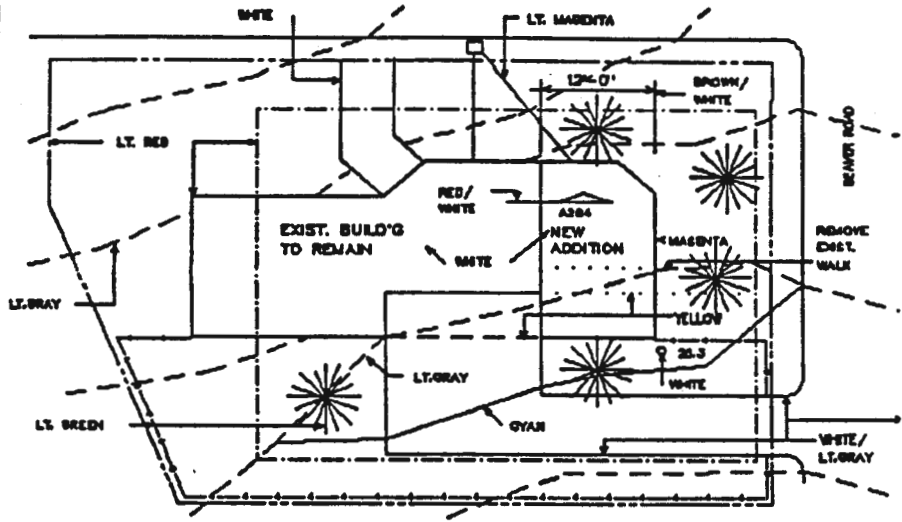
SITE PLAN

x:6'-3"   y:9'-8 15/16"   a:302-40'-23"   d:11'-6 15/16"
Z Base:0"   Z Hgt:8'-0"

SITE PLANS

TYPE OF INFORMATION	LAYER	COLOR	SIZE	LINE TYPE
BUILDING ELEMENTS				
Property Lines	BOUNDS	Lt. Red		••
Contract Limit Lines	BOUNDS	Lt. Red		••
Utilities	UTILITY	Lt. Magenta		••
Grades, Existing to Remain	TOPO	Lt. Gray		Dashed
Gradfes, Existing to Change	TOPO	Lt. Gray		Dashed
Grades, New	TOPO	Cyan		Solid
Streets	PAVING	White, Lt.Gray		Solid
Parking Lots/Drives	PAVING	White, Lt.Gray		Solid
Walks	PAVING	White		Solid
Fences	LSCAPE	Lt. Green		••
Building Footprint	BLDG	Magenta		Solid
Existing Bldg. to Remain	EBLDG	Lt. Red		Solid
Site Demolition	DEMO	Yellow		Dot
Landscaping	LSCAPE	Lt. Green		Solid/Dot
Overhangs	BLDG	Yellow		Dashed

••Special linetypes are required -- see "Office Standards for Drawing Symbols."

NOTATIONS

Titles	TEXT	White	6/32	
Scales	TEXT	White	4/32	
Sheet Borders	BORDER	Dk. Gray		Solid
Sheet Titles	BORDER	Dk. Gray	•	
Notes	TEXT	White	3/32	
Dimensions	DIMEN	Brown/White	3/32	
Plan Detail Symbol	SYMBOL	Red/White	4/32	Dashed
Room Names	TEXT	White	3/32	
Room Number Symbol	TEXT	Lt.Red/White	3/32	Solid
Section Symbol	SYMBOL	Red/White	4/32	Solid
Door Symbol	SYMBOL	Yellow/White	3/32	Solid
Spot Elevation Symbol	SYMBOL	White	3/32	Solid

*See typical border layer drawings for text sizes, fonts.

PROCEDURE

1. Most site plans will begin with a site survey provided by the Owner. Use the digitizer to transfer the property lines, topographic information, existing structure locations and existing landscaping information to the appropriate layers in the site plan file.

2. Make a "scratch" layer and load (Job #)FND.Lyr. Copy the building footprint information to the "BLDG," then erase the scratch layer.

3. Enter the information required to complete the "PAVING" layer.

4. Complete the "TOPO" layer, including modification of existing grades and addition of new grades.

5. Edit and complete the "BOUNDS," "UTILITY," "BLDG," "EBLDG," and "LSCAPE" Layers.

6. Add text, dimensions, and symbols on the appropriate layers.

PLOTTING SCALES:
1/8" = 1'-0", 1/4" = 1'-0"

```
F1  $FNDN
F2  *PIER
F3  *FTGS
F4  *VENT
F5  *ACCESS
F6  *EXISTWK
F7  *DEMO
F8  *TEXT
F9  *DIMEN
F0  *SYMBOL
S1  *BORDER
S2
S3
S4
S5
S6
S7
S8
S9
S0  Exit
    FNDN
    1/8"

Solid
SwOTHLUD   On/Off   Layer to switch: ▮____
```
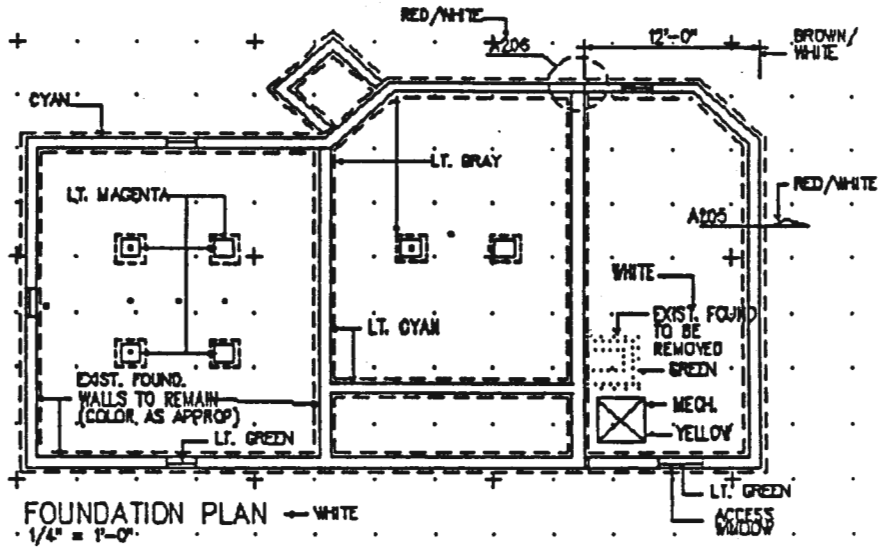
FOUNDATION PLAN ← WHITE
1/4" = 1'-0"

x:-17'-10 1/2"   y:22'-8 7/8"   a:128-10'-12"   d:28'-11 3/32"
Z Base:0"   Z Hgt:8'-0"

Labels in plan: RED/WHITE, A206, 12'-0", BROWN/WHITE, CYAN, LT. GRAY, RED/WHITE, A205, LT. MAGENTA, WHITE, EXIST. FOUND. TO BE REMOVED, GREEN, LT. CYAN, MECH. YELLOW, EXIST. FOUND. WALLS TO REMAIN (COLOR AS APPROP.), LT. GREEN, LT. GREEN, ACCESS WINDOW

FOUNDATION PLANS

TYPE OF INFORMATION	LAYER	COLOR	SIZE	LINE TYPE
BUILDING ELEMENTS				
Foundation Walls, Exterior	FNDN	Cyan		Solid
Foudnation Walls, Interior	FNDN	Lt.Cyan		Solid
Piers	PIER	Lt.Magenta		Solid
Footings	FTGS	Lt.Gray		Dashed
Windows	VENT	Lt.Green		Solid
Vents, Louvers	VENT	Lt.Green		Solid
Equipment	ACCESS	Yellow		Solid
Exist. Work to Remain	AS.APPROP.	As.Approp.		Solid
Exist. Work to be Removed	DEMO	Green		Dotted
NOTATIONS				
Titles	TEXT	White	6/32	
Scales	TEXT	White	4/32	
Sheet Borders	BORDER	Dk.Gray		Solid
Sheet Titles	BORDER	Dk.Gray	*	
Notes	TEXT	White	3/32	
Dimensions	DIMEN	Brown/White	3/32	
Plan Detail Symbol	SYMBOL	Red/White	4/32	Dashed
Section Symbol	SYMBOL	Red/White	4/32	Solid

*See typical border layer drawings for text sizes, fonts.

PLOTTING SCALES:
   1/8"=1'-0", 1/4"=1'-0"

PROCEDURE

1. Load Layer: (JOB#)WALL.LYR.

2. Copy Exterior Wall portion of loaded layer to EXTFND layer.

3. Copy interior wall portion of loaded layer to INTFND layer.

4. Copy column portion of loaded layer to PIER layer.

5. Edit EXTFND, INTFND, and PIER layers as required and add footing information and openings on appropriate layer. See floor plan instructions for addition of windows. (Vents, Louvers are wsimilar.)

6. Make a scratch layer and ocpy information from EXTFND, INTFND, and PIER layers to the scratch layer. Save this as (JOB#)FND.LYR. This will be used later for floor and roof framing plans.

7. Draw all other building elements on their appropriate layers.

8. Add text, dimensions, and symbols.

```
F1  $EXTWAL
F2  *INTWAL
F3  *COLUMN
F4  *DOOR
F5  *WINDOW
F6  *OOP
F7  *MILLWK
F8  *WKABOVE
F9  *ACCESS
F0  *EXISTWK
S1  *DEMO
S2  *TEXT
S3  *DIMEN
S4  *SYMBOL
S5  *BORDER
S6
S7
S8
S9
S0  Exit
    EXTWAL
    1/8"

    Solid
    SwoTHLUD
```
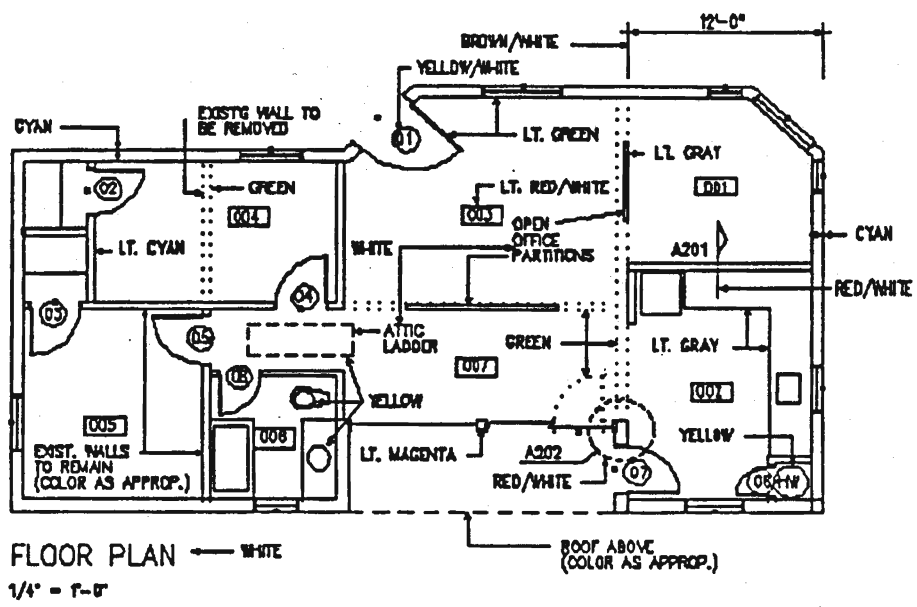
FLOOR PLAN ⟶ WHITE
1/4" = 1'-0"

x:9'-7 1/2"   y:6"   a:182-58'-20"   d:9'-7 21/32"
                              Z Base:0"   Z Hgt:8'-0"
On/Off   Layer to switch: ▮

FLOOR PLANS

TYPE OF INFORMATION	LAYER	COLOR	SIZE	LINE TYPE
BUILDING ELEMENTS				
Walls, exterior	EXTWAL	Cyan		Solid
Walls, interior	INTWAL	LtCyan		Solid
Columns	COLUMN	LtMagenta		Solid
Doors	DOOR	LtGreen		Solid
Windows	WINDOW	LtGreen		Solid
Open Office Partitions	OOP	LtGray		Solid
Casework, Misc. Millwork	MILLWK	LtGray		Solid
Work Above plan section	as approp.	as approp.		Dashed
Specialties	ACCESS	Yellow		Solid
Plumbing Fixtures	ACCESS	Yellow		Solid
Equipment	ACCESS	Yellow		Solid
Exist Work to Remain	as approp.	as approp.		Solid
Exist Work to be Removed	DEMO	Green		Dotted
NOTATIONS				
Titles	TEXT	White	6/32	
Scales	TEXT	White	4/32	
Sheet Borders	BORDER	DkGray		Solid
Sheet Titles	BORDER	DkGray	*	
Notes	TEXT	White	3/32	
Dimensions	DIMEN	Brn/White	3/32	
Plan Detail Symbol	SYMBOL	Red/White	4/32	Dashed
Room Names	TEXT	White	3/32	
Room Number Symbol	TEXT	LtRed/Wht	3/32	Solid
Section Symbol	SYMBOL	Red/White	4/32	Solid
Door Symbol	SYMBOL	Yel/Wht	3/32	Solid

* See typical border layer drawing for text sizes and fonts.

PROCEDURE

1. Draw exterior walls, columns, interior walls, using keyboard dimension entry. Verify dimensions before proceeding.

2. Save this layer to: (Job#)WALL.lyr. Be sure to include structural reference lines on the saved layer.

3. Add door and window layers. Insert door/window on wall layer(s), then erase as a group and change active layer to DOOR or WINDOW layer. Then restore door/window group. (option: use Move to layer function)

4. Repeat step 2, for a combined layer called (Job#)SEED.lyr. This saved layer will include window and door openings.

5. Draw all other building elements on their respective layers.

6. Add text, dimensions, symbols.

PLOTTING SCALES:
1/8" = 1'-0", 1/4" = 1'-0"

F1 $PLAN
F2 *DRAIN
F3 *ACCESS
F4 *TEXT
F5 *DIMEN
F6 *SYMBOL
F7 *BORDER
F8
F9
F0
S1
S2
S3
S4
S5
S6
S7
S8
S9
S0 Exit
PLAN
3/16"

Solid
SwOTHLUD | On/Off   Layer to switch: ■

ROOF PLAN
1/4" = 1'-0"   ← WHITE (TEXT)
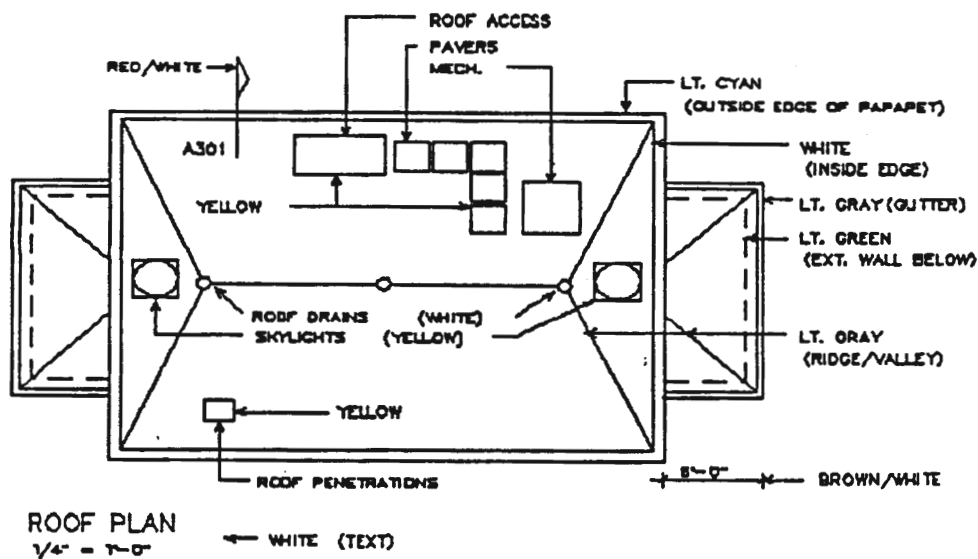
x:3'-4 29/32"   y:31'-1 13/16"   a:263-45'-25"   d:31'-4 1/16"
                 2 Base:0"   2 Hgt:8'-0"

ROOF PLANS

TYPE OF INFORMATION	LAYER	COLOR	SIZE	LINE TYPE	PROCEDURE
BUILDING ELEMENTS					1. Load (job#)WALL.lyr into a scratch layer.
Roof Perimeter	PLAN	Lt.Cyan		Solid	
Inside Edge of Parapet	PLAN	White		Solid	2. Copy necessary information from scratch layer to "PLAN" layer. Erase scratch layer.
Ext. Wall Line Below Roof	PLAN	Lt.Green		Dashed	
Ridge, Valley Lines	PLAN	Lt.Gray		Solid	
Gutters	DRAIN	Lt.Gray		Solid	
Roof Drains	DRAIN	White		Solid	3. Add information necessary to complete "PLAN," "DRAIN," and "ACCESS" layers.
Pavers, Walkways	ACCESS	Yellow		Solid	
Miscellaneous Penetrations	ACCESS	Yellow		Solid	
Scuttles, Skylights	ACCESS	Yellow		Solid	
Roof-Top Equipment	ACCESS	Lt.Gray		Solid	4. Add text, dimensions, and symbols on the appropriate layer.
NOTATIONS					
Titles	TEXT	White	6/32		
Scales	TEXT	White	4/32		
Sheet Borders	BORDER	Dk.Gray		Solid	
Sheet Titles	BORDER	Dk.Gray	*		**PLOTTING SCALES:**
Notes	TEXT	White	3/32		1/8"=1'-0", 1/4"=1'-0"
Dimensions	DIMEN	Brown/White	3/32		
Section Symbol	SYMBOL	Red/White	4/32	Solid	

*See typical border layer drawings for text sizes, fonts.

```
F1 $WALLS
F2 *CLG
F3 *ACCESS
F4 *TEXT
F5 *DIMEN
F6 *SYMBOL
F7 *BORDER
F8
F9
F0
S1
S2
S3
S4
S5
S6
S7
S8
S9
S0 Exit
   WALLS      REFLECTED CEIL'G PLAN ◄── WHITE (TEXT)
   3/16"      1/4" = 1'-0"
   Solid      x:15'-8"        y:2'-4"         a:171-31'-58"      d:15'-10 1/16"
   SwoTHLUD   On/Off   Layer to switch: ▮    Z Base:0"      Z Hgt:8'-0"
```
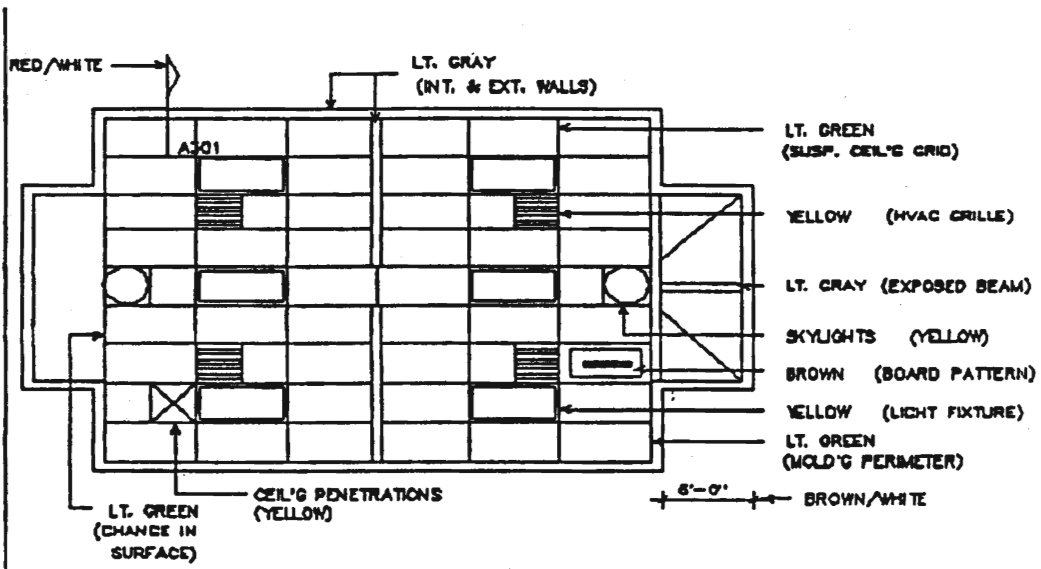
Diagram labels: RED/WHITE; LT. GRAY (INT. & EXT. WALLS); A301; LT. GREEN (SUSP. CEIL'G GRID); YELLOW (HVAC GRILLE); LT. GRAY (EXPOSED BEAM); SKYLIGHTS (YELLOW); BROWN (BOARD PATTERN); YELLOW (LIGHT FIXTURE); LT. GREEN (MOLD'G PERIMETER); 8'-0"; BROWN/WHITE; CEIL'G PENETRATIONS (YELLOW); LT. GREEN (CHANGE IN SURFACE)

REFLECTED CEILING PLANS

TYPE OF INFORMATION	LAYER	COLOR	SIZE	LINE TYPE
BUILDING ELEMENTS				
Interior/Exterior Walls	WALLS	Lt.Gray		Solid
Suspended Ceiling Grid	CLG	Lt.Green		Solid
Tile or Board Pattern	CLG	Brown		Solid
Light Fixtures	ACCESS	Yellow		**
HVAC Grilles, Etc.	ACCESS	Yellow		**
Changes in Surface	CLG	Lt.Green		Solid
Other Ceiling Penetrations	ACCESS	Yellow		**
Roof Windows, Skylights	ACCESS	Yellow		Solid
Exposed Beams	WALLS	Lt.Gray		Solid
Molding Perimeter	CLG	Lt.Green		Solid

**Special linetypes are required - see "Office Standards for Drawing Symbols."

PROCEDURE

1. Load (Job#)WALL.lyr into a scratch layer.

2. Copy necessary information from scratch layer to "WALLS" layer. Erase scratch layer.

3. Add information necessary to complete "CLG" layer. Use hatching feature where appropriate. .

4. Complete "ACCESS" layer.

5. Add text, dimensions, and symbols on the appropriate layer.

NOTATIONS

	LAYER	COLOR	SIZE	LINE TYPE
Titles	TEXT	White	6/32	
Scales	TEXT	White	4/32	
Sheet Borders	BORDER	Dk. Gray		Solid
Sheet Titles	BORDER	Dk. Gray	*	
Notes	TEXT	White	3/32	
Dimensions	DIMEN	Brown/White	3/32	
Section Symbol	SYMBOL	Red/White	4/32	Solid

*See typical border layer drawings for text sizes, fonts.

PLOTTING SCALES:
1/8" = 1'-0", 1/4" = 1'-0"

```
F1 $02BLDG
F2 *02FTGS
F3 *02ACCES
F4 *02EBLDG
F5 *02MATL
F6 *02TEXT
F7 *02DIMEN
F8 *02SYM
F9 *BORDER
F0
S1
S2
S3
S4
S5
S6
S7
S8
S9
S0  Exit
02BLDG
1/8"
```
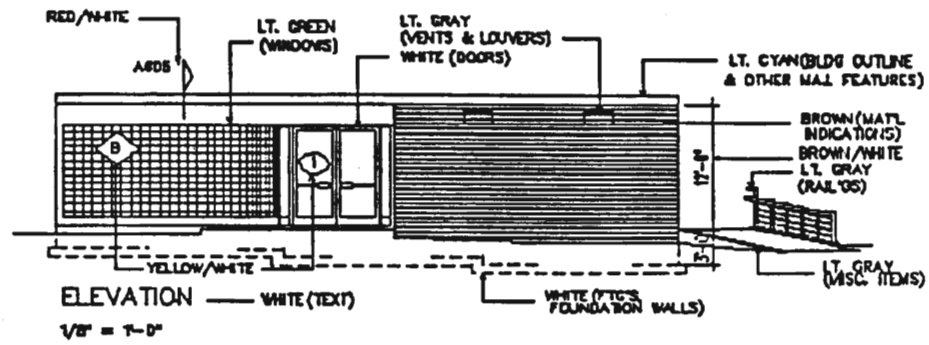
```
Solid
SwOTHLUD   On/Off   Layer to switch: █_____
```

```
x:37'-9"        y:8'-6"        a:167-18'-38"      d:38'-8 11/32"
                               Z Base:0"          Z Hgt:8'-0"
```

EXTERIOR ELEVATIONS

TYPE OF INFORMATION	LAYER	COLOR	SIZE	LINE TYPE
BUILDING ELEMENTS				
Building Outline and Major Surface Features	(dwg#)BLDG	Lt.Cyan		Solid
Doors	(dwg#)BLDG	White		Solid
Windows	(dwg#)BLDG	Lt.Green		Dashed
Vents, Louvers	(dwg#)BLDG	Lt.Gray		Solid
Railings	(dwg#)ACCESS	Lt.Gray		Solid
Footings, Foundation Walls	(dwg#)FTGS	White		Solid
Equipment	(dwg#)ACCESS	Yellow		Solid
Existing Work to Remain	(dwg#)EBLDG	Yellow		Solid
Existing Work to be Removed	(dwg#)EBLDG	Yellow		Solid
Necessary Mat'l. Indications	(dwg#)MATL	Lt.Gray		Solid
Gutters, Miscellaneous Items	(dwg#)ACCESS	Lt.Gray		Solid
NOTATIONS				
Titles	(dwg#)TEXT	White	6/32	
Scales	(dwg#)TEXT	White	4/32	
Sheet Borders	BORDER	Dk.Gray		Solid
Sheet Titles	BORDER	Dk.Gray	*	
Notes	(dwg#)TEXT	White	3/32	
Dimensions	(dwg#)DIMEN	Brown/White	3/32	
Plan Detail Symbol	(dwg#)SYM	Red/White	4/32	Dashed
Section Symbol	(dwg#)SYM	Red/White	4/32	Solid
Door Symbol	(dwg#)SYM	Yellow/White	3/32	Solid
Window Symbol	(dwg#)SYM	Yellow/White	3/32	Solid

*See typical border layer drawings for text sizes, fonts

PROCEDURE

1. Load Layer: (job#)SEED.lyr (to a scratch layer).

2. On this scratch layer, set Z-Base and Z-Height for all elements. Erase inside line of walls.

3. Create the "(dwg#)BLDG" layer for each elevation by copying from the "SEED" layer the appropriate wall information for that side of the building.

4. In each of the "BLDG" layers, rotate the walls so that they are horizontal and then use edit plane to create the wall elevation. Add the elevation to the layer and erase the plan view. Add detail as required to complete the "BLDG" layers.

5. Complete the other building element layers with the appropriate information.

6. Add text, dimensions, and symbols on the appropriate layers.

PLOTTING SCALES:
1/8" = 1'-0", 1/4" = 1'-0"

SMALL SCALE SECTIONS

TYPE OF INFORMATION	LAYER	COLOR	SIZE	LINE TYPE
BUILDING ELEMENTS				
Foundation	(dwg#)FNDN	Cyan		Solid
Floor System	(dwg#)FNDN	Cyan		Solid
Exterior Walls	(dwg#)SKIN	Lt.Cyan/White		Solid
Interior Walls	(dwg#)UPFT	White		Solid
Walls Not in Section	(dwg#)UPFT	Lt.Gray		Solid
Structural System	(dwg#)STRC	Lt.Red/Red		Solid
Structure Not in Section	(dwg#)STRC	Lt.Gray		Solid
Roof System	(dwg#)ROOF	Lt.Cyan/White		Solid
Windows, Doors in Section	(dwg#)SKIN	Lt.Gray		Solid
Windows, Doors in Elevation	(dwg#)UPFT	Lt.Green		Solid
Grade Lines	(dwg#)SKIN	Magenta		Solid
Ceilings	(dwg#)UPFT	White		Solid
Misc. Interior Items	(dwg#)UPFT	Lt.Gray		Solid
Misc. Exterior Items	(dwg#)SKIN	Lt.Gray		Solid

PROCEDURE

1. Load large scale wall sections for each of the small scale sections into a scratch layer.

2. Copy appropriate parts of the large scale sections to the "FNDN," "SKIN," "STRC," "ROOF," and "UPFT" layers.

3. Stretch these elements as required to form the transverse and longitudinal sections. .

4. Complete the "FNDN," "SKIN," "STRC," "ROOF" and "UPFT" layers.

5. Add notes, dimensions and symbols on the appropriate layers.

**Special linetypes are required — see "Office Standards for Drawings Symbols."

NOTATIONS

Titles	(dwg#)TEXT	White	6/32	
Scales	(dwg#)TEXT	White	4/32	
Sheet Borders	BORDER	Dk. Gray		Solid
Sheet Titles	BORDER	Dk. Gray	*	
Notes	(dwg#)TEXT	White	3/32	
Dimensions	(dwg#)DIMEN	Brown/White	3/32	
Section Symbol	(dwg#)SYM	Red/White	4/32	Solid
Plan Detail Symbol	(dwg#)SYM	Yellow/White	3/32	Solid
Room Names	(dwg#)TEXT	Yellow/White	3/32	Solid
Room Number Symbol	(dwg#)TEXT	Lt.Red/White	3/32	Solid
Door Symbol	(dwg#)SYM	Yellow/White	3/32	Solid
Window Symbol	(dwg#)SYM	Yellow/White	3/32	Solid

PLOTTING SCALES:
1/8" = 1'-0", 1/4" = 1'-0"

*See typical border layer drawings for text sizes, fonts.

```
F1  *01FNDN
F2  $01CLG
F3  *01WALL
F4  *01ROOF
F5  *01STRC
F6  *01UPFT
F7  *01TEXT
F8  *BORDER
F9
F0
S1
S2
S3
S4
S5
S6
S7
S8
S9
S0  Exit
    01CLG
    1/2"

Solid
swoTHLUD   Name      Layer to rename: ▮_____
```

Diagram labels:
- LT. RED/WHITE (ROOF/CEIL'G)
- RED/LT. GRAY (STRUCTURE)
- LT. RED/WHITE (ROOF/CEIL'G)
- LT. GREEN (DOORS & WNDWS IN SECT.)
- BROWN/WHITE
- YELLOW/LT. GRAY (MISC. ITEMS)
- LT. CYAN/WHITE (WALLS IN SECT.)
- CYAN (FLOOR SLAB & FOUNDATION)

WALL SECTION ——— WHITE (TEXT)
3/4" = 1'-0"
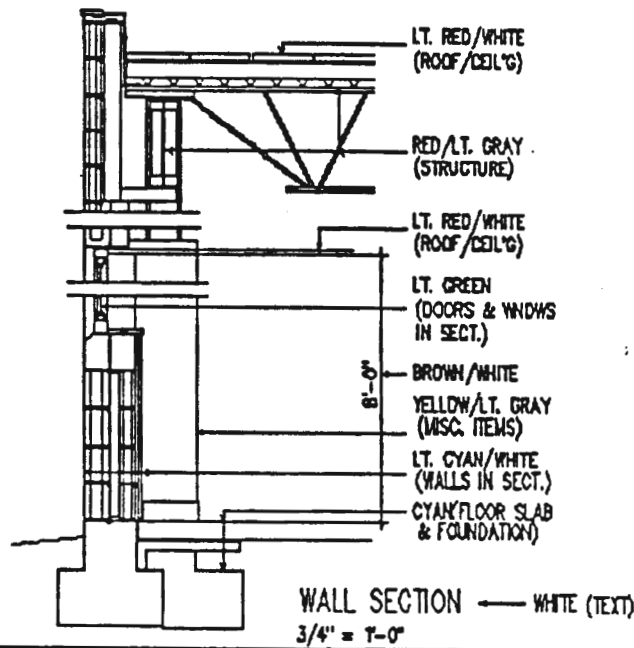
x:6'-4 7/8"   y:1'-1 1/2"   a:170-2'-40"   d:6'-6 1/16"
                 2 Base:0"   2 Hgt:8'-0"

LARGE SCALE SECTIONS

TYPE OF INFORMATION	LAYER	COLOR	SIZE	LINE TYPE
BUILDING ELEMENTS				
Foundations	(dwg#)FNDN	Cyan		Solid
Floor Slab	(dwg#)FNDN	Cyan		Solid
Floor/Ceiling	(dwg#)CLG	Cyan/White		Solid
Walls in Section	(dwg#)WALL	Lt.Cyan/White		Solid
Windows, Doors in Section	(dwg#)WALL	Lt.Green		Solid
Roof/Ceiling	(dwg#)ROOF	Lt.Red/White		Solid
Structure	AS APPROP.	Red/Lt.Gray		
Miscellaneous Items	(dwg#)UPFT	Yellow/Lt.Gray		Solid
NOTATIONS				
Titles	(dwg#)TEXT	White	6/32	
Scales	(dwg#)TEXT	White	4/32	
Sheet Borders	BORDER	Dk. Gray		Solid
Sheet Titles	BORDER	Dk. Gray	*	
Notes	(dwg#)TEXT	White	3/32	
Dimensions	(dwg#)TEXT	Brown/White	3/32	
Detail Symbol	(dwg#)TEXT	Red/White	4/32	Solid
Door Symbol	(dwg#)TEXT	Yellow/White	3/32	Solid
Window Symbol	(dwg#)TEXT	Yellow/White	3/32	Solid

*See typical border layer drawings for text sizes, fonts.

PROCEDURE

1. The large scale sections are probably the most important drawings of the set. Exercise great care in their creation. Make maximum use of templates.

2. Draw the most typical section first, then make use of the copy functions to create additional sections as needed.

3. Begin drawing with reference lines on a scratch layer. Add all building elements on appropriate layer. .

4. Add text, dimensions, and symbols on the appropriate layer.

PLOTTING SCALES:
1/2" = 1'-0", 3/4" = 1'-0"

```
F1  $A301
F2  *BORDER
F3
F4
F5
F6
F7
F8
F9
F0
S1
S2
S3
S4
S5
S6
S7
S8
S9
S0  Exit
    A301
    1-1/2"

Solid
SwOTHLUD
```

LT. CYAN/WHITE
(WALLS IN SECT.)

LT. GREEN
(DOORS & WNDWS
IN SECT.)

RED/LT. GRAY
(STRUCTURE)

YELLOW/LT. GRAY
(MISC. ITEMS)

BROWN/WHITE

WHITE (TEXT)

PLAN DETAIL
1 1/2" = 1'-0"
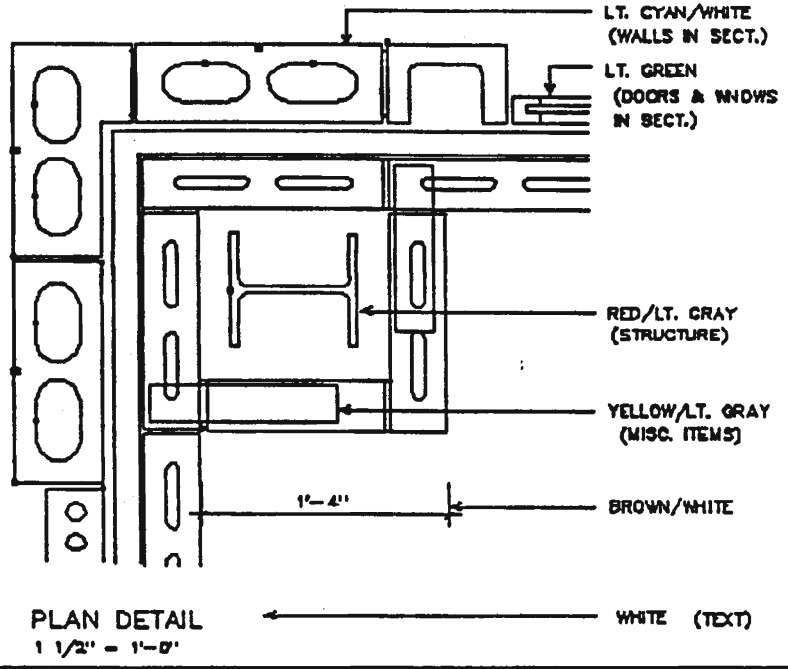
```
x:1'-9 1/4"      y:11 5/8"        a:208-40'-12"      d:2'-0 7/32"
                                Z Base:0"          Z Hgt:8'-0"
Name      Layer to rename: ▮
```

DETAILS

TYPE OF INFORMATION	LAYER	COLOR	SIZE	LINE TYPE
BUILDING ELEMENTS				
All Elements	(dwg#)	See Lg. Scale Sections		As.Req'd.
NOTATIONS				
Titles	(dwg#)	White	6/32	
Scales	(dwg#)	White	4/32	
Sheet Borders	BORDER	Dk. Gray		Solid
Sheet Titles	BORDER	Dk. Gray	•	
Notes	(dwg#)	White	3/32	
Dimensions	(dwg#)	Brown/White	3/32	

*See typical border layer drawings for text sizes, fonts.

PROCEDURE

1. Draw one detail per layer. Start with most common detail of group and make use of copying functions as much as possible.

2. Details provide the best opportunity to use templates. Mark newly created items for future inclusion in template handbook.

PLOTTING SCALES:
1-1/2" = 1'-0", 3" = 1'-0"
1/2 FULL, FULL

```
F1  $01WALL
F2  *01UPFT
F3  *01TEXT
F4  *01DIMEN
F5  *01SYM
F6  *BORDER
F7
F8
F9
F0
S1
S2
S3
S4
S5
S6
S7
S8
S9
S0  Exit
    01WALL
    1/4"
    SelSet1
    Solid
    SwOTHLUD
```

Labels on drawing:
- LT. GRAY (DOORS & WNDWS IN ELEV.)
- WHITE (CEIL'G)
- YELLOW/WHITE (DOOR & WNDW SYMBOLS)
- LT. GRAY (WALLS NOT IN SECT.)
- CYAN (EDGE WALLS)
- BROWN/WHITE
- LT. GREEN (DOORS & WNDWS IN SECT.)
- YELLOW/LT. GRAY (MISC. INT. ITEMS)
- RED/WHITE
- CYAN (FLOOR)
- LT. RED/WHITE
- YELLOW/WHITE
- KITCHEN [021]
- (12)
- 8'-0"
- INTERIOR ELEVATION 3/8" = 1'-0"
- WHITE (TEXT)
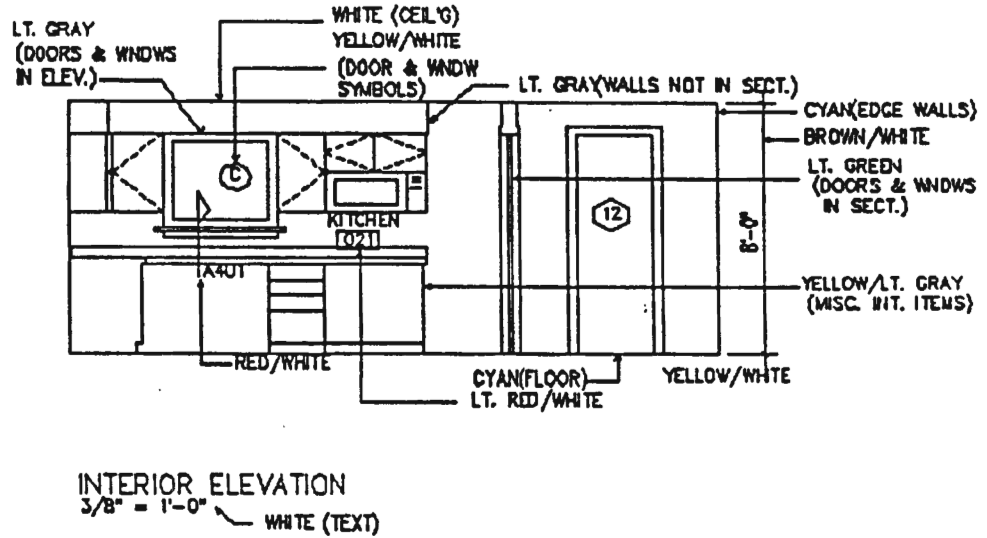
```
x:30'-11 1/4"    y:8'-7 1/2"    a:164-25'-20"    d:32'-1 13/32"
                              Z Base:0"          Z Hgt:0"
On/Off   Layer to switch: ▮
```

ROOM ELEVATIONS

TYPE OF INFORMATION	LAYER	COLOR	SIZE	LINE TYPE
BUILDING ELEMENTS				
Floor	(dwg#)WALL	Cyan	**	
Edge Walls	(dwg#)WALL	Cyan		Solid
Walls Not In Section	(dwg#)WALL	Lt. Gray		Solid
Windows, Doors in Section	(dwg#)WALL	Lt. Green		Solid
Windows, Doors in Elevation	(dwg#)WALL	Lt. Gray		Solid
Ceilings	(dwg#)WALL	White		Solid
Misc. Interior Items	(dwg#)UPFT	Yellow/Lt.Gray		Solid

**Special linetypes are required — see "Office Standards for Drawing Symbols."

NOTATIONS

Titles	(dwg#)TEXT	White	6/32	
Scales	(dwg#)TEXT	White	4/32	
Sheet Borders	BORDER	Dk. Gray		Solid
Sheet Titles	BORDER	Dk. Gray	*	
Notes	(dwg#)TEXT	White	3/32	
Dimensions	(dwg#)DIMEN	Brown/White	3/32	
Section Symbol	(dwg#)SYM	Red/White	4/32	Solid
Room Names	(dwg#)TEXT	White	3/32	
Room Number Symbol	(dwg#)SYM	Lt.Red/White	3/32	Solid
Door Symbol	(dwg#)SYM	Yellow/White	3/32	Solid
Window Symbol	(dwg#)SYM	Yellow/White	3/32	Solid

*See typical border layer drawings for text sizes, fonts.

PROCEDURE

1. Begin with "WALL" layer. Enter necessary information using floor plans, sections and schedules.

2. Complete the "UPFT" layer. Many of the items needed for this layer will be found in the template handbook.

3. Add text, dimensions, and symbols on the appropriate layer..

PLOTTING SCALES:
1/4" = 1'-0", 3/8" = 1'-0"

DRAWING LAYER CROSS-REFERENCE

LAYER NAME		SITE PLAN	FOUND PLAN	FLOOR PLAN	ROOF PLAN	CEILG PLAN	EXTER ELEV	ROOM ELEV	SMALL SCTN	LARGE SCTN	MISC DETS	DESCRIPTION OF LAYER CONTENTS
ACCESS	(ACCESSories)		X	X	X	X	X					Catch-all for misc. items on drawings.
BLDG	(BuiLDinG)	X					X					Building outline in plan or elevation.
BORDER		X	X	X	X	X	X	X	X	X	X	Sheet border, title block, sheet number.
CLG	(CeiLinG)					X				X		Ceiling line in plan, section.
COLUMN				X								Structural columns.
DEMO	(DEMOlition)	X	X	X								Work to be demolished.
DIMEN	(DIMENsion)	X	X	X	X	X	X	X	X			All dimension strings.
DOOR				X								Doors in plan.
DRAIN	(roof DRAINage)				X							Roof drains, gutters, scuppers, etc.
EBLDG	(Existing BuiLDinG)	X										Existing structure to remain.
EXTWAL	(EXTerior WALl)			X								Exterior walls in plan.
FNDN	(FouNDatioN)		X						X	X		Foundation walls in plan, elevation, section.
FTGS	(FooTinGS)		X				X					Footings in plan.
INTWAL	(INTerior WALl)			X								Interior walls in plan, demountable partitions.
LSCAPE	(LandSCAPE)	X										Landscaping or site furniture, Fences
MATL	(MATeriaL)						X					Material indications.
MILLWK	(MILLWorK)			X								Cabinets, cases, major millwork in polan.
OOP	(Open Office Part'n)			X								Open office partitions, furniture.
PAVING		X										Streets, parking lots, drives, walks.
PIERS			X									Piers on foundation plan.
PLAN					X							Major roof plan elements.
ROOF									X	X		Roof system in small scale section.
SKIN									X			Exterior walls in small scale sections.
STRC	(STRuCture)								X			Structural system in small scale sections.
SYM	(SYMbols)							X	X	X		Drawing symbols - section cut, room elev., etc.
SYMBOL		X	X	X	X	X						Same as above
TOPO	(TOPOgraph)	X										Topographic information, new and existing.
TEXT		X	X	X	X	X	X	X	X	X		All notes, drawing titles and scales.
UPFT	(UPFiT)								X	X	X	Interior work in small scale sections.
UTILITY		X										Site utilities - gas, electricity, sewer, etc.
VENT			X									Openings in foundation walls.
WALLS			X							X		Wall indications in ceiling plans, room elevs.
WINDOW				X								Windows in plan.

CADD SYSTEM COLOR USE CHART

SCREEN COLOR	DESIRED LINE WEIGHT	PLOTTER PEN COLOR	PLOTTER TURRET #
White	Fine	Black	1
Red	Medium	Black	3
Green	Fine	Black	1
Blue	Fine	Blue	7
Cyan	Medium	Black	3
Magenta	Heavy	Black	4
Brown	XFine	Green	5
Lt Gray	XFine	Black	2
Dk Gray	Heavy	Black	4
Lt Red	Fine	Black	1
Lt Grn	Fine	Black	1
Lt Blue	XFine	Blue	6
Lt Cyan	Medium	Black	3
Lt Mgta	Medium	Black	3
Yellow	XFine	Black	2

Line Weight: Denotes plotted line width, XFine may be the equivalent of a "000" and Heavy may be a "2" pen.

Turret #: This is shown for plotters with eight pen turrets (carousel). Also taken into consideration is a 1st position default, this is why the XFine and Fine pens are reversed with regard to turret pen position (typical of the HI Plotter line).

Note: Color setting/designation is a matter of preference. An acceptable standard must exist within a CADD office environment in order that drawing files can be worked on by multiple operators. For additional information regarding plotter operations see the section on plotters.

Scales

This chapter discusses the problems of scaling drawings that so many CADD operators face. In practice, the drafting of drawings are invariably the rendition of a subject at a reduced scale. Very seldom are our subject matters drawn at there true scale. The finished product that we create through the computer imitates the methods that we have long used on the drafting board. There is a difference, however, in the way the computer actually manages scaling that is very different from the way we have accomplished it in manual drafting.

In the computer environment all drawings are managed as full size renditions of the subject matter. Accordingly, when drawing with the aid of the computer, we input actual full scale dimensions in creating our drawing. Our files are distinguished by scales such as 1/4" scale, 1/8" scale, etc... not for the purpose of drawing, but for the purpose of plotting. All we are really doing is setting a format for the CADD software to duplicate the drawing information at a defined scale on a predetermined media size.

Single Scale Drawings In the following drawing, the two concentric circles were drawn at full scale, the center circle with a diameter of 100 feet and the outer circle, 150 feet. For the sake of discussion, we will use a drawing media of 24"x 36" (typical in most offices). Figure "A" shows the relationship of the two concentric circles plotted at one eighth scale to the 24" x 36" media. Therefore, at 1/8" = 1'-0", the sheet is represented by a rectangle (192'x 288').
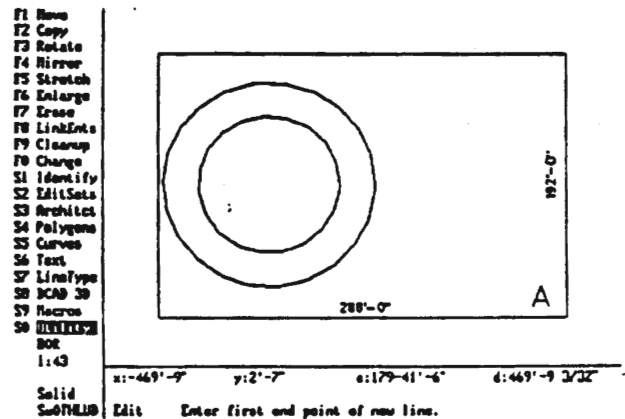
Figure A

In order to compute the sheet size for an architectural scale (ie. 3/8" = 1'-0") the reciprocal of the fraction preceding the equal sign is multiplies by the sheet size in inches to produce the CADD representation in feet. For 3/8" scale and a sheet size of 24" x 36", the equation would be 8 divided by 3 times 24 equals 64'-0" and 8 / 3 x 36 = 96'-0".

Keeping the bottom left corner as a fixed reference point will allow us to compare the relationship of these same concentric circles to that of an image plotted at 3/8"=1'-0" (See fig. B for this relationship).
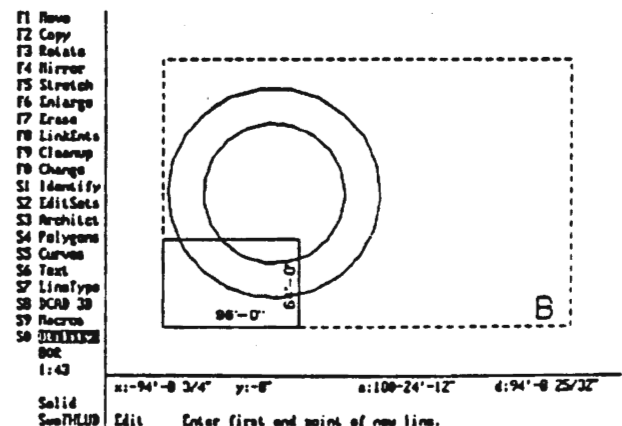
Figure B

If we look further at this same example with our plotted scale at 3/4" = 1'-0" and the bottom left corner still our fixed reference point, we get an understanding of the relationship between the plotted image and the full scale electronic image (See fig. C).
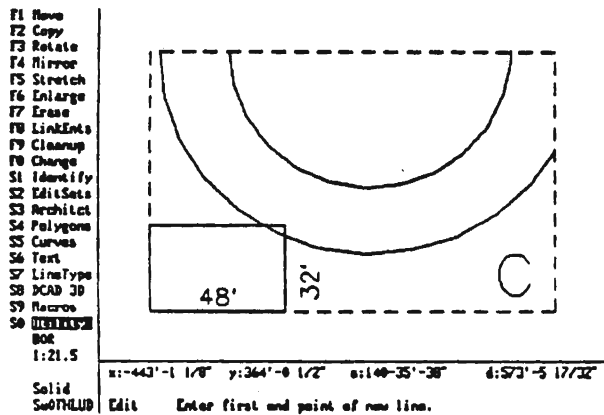
Figure C

Sheet Layout Sizes

	Sheet Sizes		
Plot Scales	34"x 22"	36"x 24"	42"x 30"
1/8"	272'x 176'	288'x 192'	336'x 240'
1/4"	136'x 88'	144'x 96'	168'x 120
3/8"	90'8"x 58'8"	96'x 64'	112'x 80'
3/4"	45'x 29'4"	48'x 32'	56'x 40'
1"	34'x 22'	36'x 24'	42'x 30'
1 1/2"	22'8"x 14'8"	24'x 16'	28'x 20'
3"	11'4"x 7'4"	12'x 8'	14'x 10'

Multiple Scale Drawings These examples are not meant to be redundant, rather to enable us to better understand the explanation that follows. The cases listed below is perhaps the most widely experienced problem. Though we cannot address every situation in this chapter, we can give you an understanding of the method for dealing with the problem of multiple scale plotting.

As was noticed in figures "B" and "C", the circles did not move in relation to the fixed reference point. In fact, the layout or border changed in size using the bottom left corner as a center of enlargement. In figure "C" the circles are almost missing from the layout at 3/4" = 1'-0" because the layout is so small in relation to the circles. The circles did not change their physical size within the computer's memory, rather the layout diminished in size as the plotted scale increased.

Let us consider a floor plan to be plotted at 1/4" = 1'-0". On this drawing we will also have enlarged column details at 1 1/2" = 1'-0". We must choose the scale at which the drawing is to be plotted. Generally we will choose the scale of the main subject of the sheet. In this case that would be the plan at 1/4" = 1'-0". The simplest procedure would be to create a file, insert the border (company layout) of the needed scale at 1/4" and draw the floor plan within those borders (See figure D).
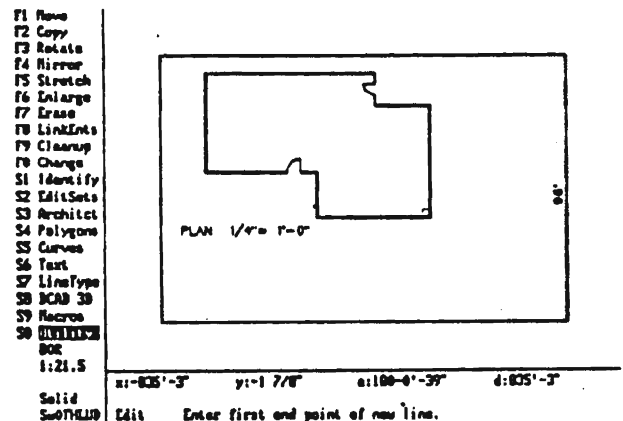
Figure D

After having drawn the plan, draw a grid layout to locate your details on the sheet (See fig. E). Now you are ready to draw details. Locate the detail in the center of the appropriate grid box. It will be drawn at full scale just as any other drawing, except without text.

By using a consistent enlargement center point within each detail grid you can easily return the detail to full scale for implementing changes as needed. The advantage to this procedure over multiple plot files is that it allows for all the information to be in one file without a complex network of layers, files, plot scales and text sizes.

Text Plot Size

Plot Scales	Plotted Size of Text					
	3/32"	1/8"	3/16"	1/4"	3/8"	1/2"
1/8"	9"	1'0"	1'6"	2'0"	3'0"	4'0"
1/4"	4.5"	6"	9"	1'0"	1'6"	2'0"
3/8"	3"	4"	6"	8"	1'0"	1'4"
3/4"	1.5"	2"	3"	4"	6"	8"
1"	1.125"	1.5"	2.25"	3"	4.5"	6"
1 1/2"	.75"	1"	1.5"	2"	3"	4"
3"	.375"	.5"	.75"	1"	1.5"	2"

Another method is the use of multiple plot files. Create a separate file for each scale used on the sheet. Each file contains a border layout at the desired plot scale. It is important that you be aware of the area on the sheet that the drawings take so that none overlap. Coordination can usually be accomplished through the use of a grid layout (See figure E). A potential advantage is that it reduces the size of the individual files and allows for changes without the added step of enlargement or reduction. The primary disadvantage is that several files are needed to create a single sheet of drawings.

Conclusion Careful sheet planning and detail coordination will facilitate multiple scale plotting. All CADD operators should observe the same conventions of locating centers of details, location of layout border, method of dealing with multiple scales and text sizes.

Figure F

In order for the detail to appear at 1 1/2" = 1'-0", it must be enlarged to an artificial scale. (Maybe DataCAD will eventually address this problem with multiple scaling windows, but until then this is the best procedure available.) Enlarge the detail by a factor equal to the detail scale divided by the plot scale. In this case we would enlarge the detail by a factor of (1 1/2" divided by 1/4") six. After enlarging the detail, the text is entered all at one time. This allows us to enter text at a known plot scale (See figure F).

Figure E

Template Files
& File Handling

The following chapter discusses the creation, organization and handling of template files. Templates are a powerful function of DataCad which are very susceptible to poor organization or inappropriate file handling. A complete approach to template handling has three main aspects: a template Filing System, a template Hard Copy Reference Manual and a template file Transfer Method.

Filing System   The filing system consists of the location within the directory structure (as described in the chapter on File Organization) of the TEMPLATE FILES (*.TPL) and the associated SYMBOL FILES (*.SYM). In concept the file structure organizes the *.TPL files into directories which are easily recognizable and the *.SYM files into sub-directories to avoid symbol naming conflicts.

The following structure conceptualizes template organization:

File Structure

Root Directory	Sub-Directory	Sub-Directory	Sub-Directory
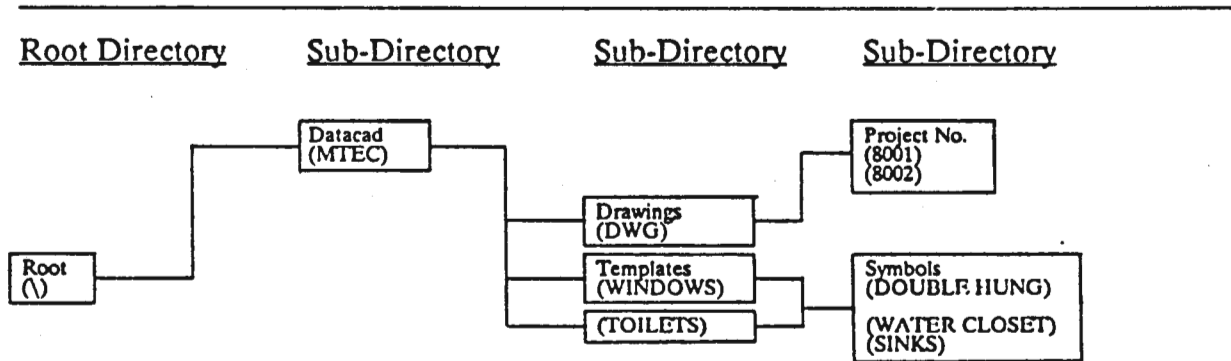
Note: The illustration above locates the TEMPLATE directories directly under the main DataCAD directory and the SYMBOL directories as a Sub-Directory of the template directory. This location allows the template path name to be the Sub-Directory name only (no backslash). ALTERNATE LOCATIONS: 1) Locate the Template directories as a Sub-Directory of the Root directory of this or another hard drive, or 2) locate the Template files (not directory) and its Symbols on a floppy disk organized according to topic.

Directory Tree   Translating the above directory concept into a consistent form for use by all CAD work stations, a uniform method of directory naming is required. In order to locate a template from among many templates, necessitates the use of directories to put templates into manageable groups. For that purpose we use the CSI numbering system and in particular the Sweet's Catalog detailed numbering system. Directories numbered from 01000 through 16000 are created under the DataCAD (MTEC) directory. The template files (*.TPL) are located in the appropriate numbered directory (ie. 06210-01.TPL is under 06000). That template's symbols are located in a Sub-Directory of the numbered directory whose name matches the TPL file (ie. 06210-01 is the symbol directory of 06210-01.TPL). The following file structure example details the actual organization:

Note: Refer to the chapter on File Organization for a detailed description for naming *.DC# files.

Hard Copy Reference Manual We have discussed the basic file organization which makes the template files easy to find on disk, but determining the suitability of a particular symbol still requires the insertion of the symbol on the drawing and possibly a plot of the symbol. Efficient use of symbols requires a manual (8 1/2" x 11" loose leaf binder) with a plot of each template showing the location of each symbol in the template window, the name of the symbol, the name of the TPL file, the date of origin, the scale, the origin of the template and a liability disclaimer. The following drawing illustrates the hard copy:

Transfer Method The last component is a method of transferring templates and symbols from one station to another. At first this seems to be an easy task, but it soon becomes clear that a template may refer to symbols located in many directories or even other disk drives. The task of retrieving all the symbols soon becomes monumental. In order to deal with the problem, R.A.D.I.U.S. developed a program called AUTOTPL.COM. AUTOTPL is designed to automate the process of SAVING and RESTORING templates.

```
                AUTO-TEMPLATE ver 2.83

    ┌───────── INSTALLATION OPTIONS ─────────┐
    │                                          │
    │  • SAVE Template to Floppy Disk    AUTO Symbol Path   │
    │    RESTORE Template to Hard Disk  • SELECT Symbol Path │
    │                                          │
    │ ─────────── TEMPLATE SOURCE ───────────  │
    │ D:\RTEC\TPL\81000\8110-801.TPL           │
    │ ────────── TEMPLATE DESTINATION ───────  │
    │ A:\                                       │
    │ ──────── SYMBOL DESTINATION PATH ──────  │
    │ D:\81000                                 │
    └──────────────────────────────────────────┘

     Enter symbol PATH to be written into TPL file:
```
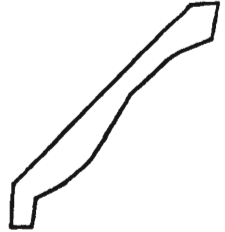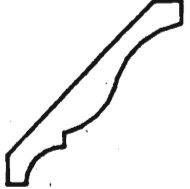
```
                AUTO-TEMPLATE ver 2.83

    ┌───────── INSTALLATION OPTIONS ─────────┐
    │                                          │
    │   SAVE Template to Floppy Disk   • AUTO Symbol Path   │
    │ • RESTORE Template to Hard Disk    SELECT Symbol Path │
    │                                          │
    │ ─────────── TEMPLATE SOURCE ───────────  │
    │                                          │
    │ ────────── TEMPLATE DESTINATION ───────  │
    │                                          │
    │ ──────── SYMBOL DESTINATION PATH ──────  │
    │                                          │
    └──────────────────────────────────────────┘

    SELECT Installation mode or <?> for INSTRUCTIONS:

      1 SAVE - AUTO        3 RESTORE - AUTO
      2 SAVE - SELECT      4 RESTORE - SELECT
```

Conclusion We have discussed basic template structure. A more detailed description of the use of AUTOTPL is contained in AUTOTPL.DOC. The purpose of uniform template file structuring is to facilitate the transfer of information within the office and between offices. If cooperative effort through a user's group is to succeed, uniform methods must be employed.

The template files and all symbols are SAVED to a transfer disk. AUTOTPL reads the TPL file to locate the symbols and copies both the template and symbols to a floppy disk. (Note: The transfer disk is NOT organized in a suitable way to allow it to be used as a TEMPLATE disk.) The templates are installed on a new drive through a RESTORE process that reads the TPL file on the transfer disk and writes the symbol files to the proper directories (creating directories as required). A typical screen from SAVE-SELECT session follows:

MW–120 1	2 1/2" CROWN 2	Millwork Cornice 3	6 1/2" CROWN
3 1/4" CROWN 5	8009 6	MW–150 7	8015
8012 9	MW–100 10	MW–170 11	C–5979 1
8016 13	8019 14	3" CROWN 15	MW–190 1
MW–185 17	MW–180 18		

RADIUS

ARCHITECTURAL TEMPLATE

Colonial Woodworks
Raleigh, North Carolina

11/13/87   BY: JLH

NOTES:

SCALE: 3"=1'-0"

06000\0621–001.TPL

1	2	
4	5	
7	8	
10	11	1
13	14	1
16	17	1

3/4" X 3 1/2" **1**	3/4" X 3 1/2" **2**	MW−450 **3**	1 1/8" x 3 1/2" **4**	3/4" x 2 1/4" **5**
3/4" x 2 5/8" **6**	MW−470 **7**	MW−450 **8**	MW−440 **9**	MW−430 **10**
DC−99 **11**	3/4" x 3 1/2" **12**	3/4" x 3 3/4" **13**	3/4" x 2 1/2" **14**	3/4" x 3 1/2" **15**
3/4" x 3 1/2" **16**	3/4" x 3 1/2" **17**	Millwork Casings **18**		

Colonial Woodworks
Raleigh, North Carolina

11/13/87   BY: JLH

NOTES:

SCALE: 3"=1'−0"

8-05   06000\0621−003.TPL

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18		

3/4" X 3 1/2" **1**	3/4" X 3 1/2" **2**	MW-450 **3**	1 1/8" x 3 1/2" **4**	3/4" x 2 1/4" **5**
3/4" x 2 5/8" **6**	MW-470 **7**	MW-450 **8**	MW-440 **9**	MW-430 **1(**
DC-99 **11**	3/4" x 3 1/2" **12**	3/4" x 3 3/4" **13**	3/4" x 2 1/2" **14**	3/4" x 3 1/2" **1!**
3/4" x 3 1/2" **16**	3/4" x 3 1/2" **17**	Millwork Casings **18**		

RADIUS

ARCHITECTURAL TEMPLATE

**Colonial Woodworks
Raleigh, North Carolina**

11/13/87   BY: JLH

NOTES:

SCALE: 3"=1'-0"

06000\0621-003.TPL

8-06

1	2	3	4
6	7	8	9
11	12	13	14
16	17	18	

Plotting Your Drawings

The plotter is perhaps the weakest link in the CADD equipped office. It is the funnel through which our final drawings emerge. No matter the size, the speed or the cost, the problems associated with plotting our drawings are very similar. Let's review these common problems:

Pens Skipping

Knurled Paper Edges

Lines Misaligned

Improper Line Weights

Plotter Hesitation

Out of Limit!

Crash

Clogged Pens

Inconsistent Alignment

This just names a few, there are many others. With plotters priced from about $4000 through $20000 you would think we wouldn't suffer these inconveniences. Let's address each of the above mentioned common problems and see what solutions may avail.

Pen Skipping   This occurs on different plotting media and with different degrees of occurrence. On paper one may discover that the problem may be improper ink, too fast a plotting speed (most plotter speeds are selectable), incorrect pen pressure settings, and of course dirty pen points. There are however, some plotters with pen point guides that require periodic cleaning in order that the point may make contact with the paper as is the case of the Calcomp and the Nicollet.

On preprinted mylars the problem is caused most frequently by the fine powder printers use to prevent the ink on one sheet from sticking to the back of another. Preprinted mylars can be ordered without this fine powder if requested (expect an increase in cost due to the additional handling time.).

Knurled Paper Edges   The gritty pinch rollers on most plotters cause the edge of soft paper to stretch causing poor tracking and inevitably will show up in misaligned lines on your drawing. Allowing additional paper edge and/or changing to a paper with a harder, smoother surface will usually solve the problem. If the problem persist call your service technician.

Lines Misaligned   The solution may be as simple as stated above. If this does not help call your service technician.

Improper Line Weights   Line weights are most often software controlled. This occurs through line color or line weight assigned within the drawing. These in turn correspond to positions in the carousel or pen holder assembly. Review your CADD software manual and plotter manual for more specific solutions.

Plotter Hesitation   This depends on your office practice and the type of plotter. If you plot in the background your computer is not fast enough to allow you to simultaneously plot and work efficiently. Perhaps allocating a block of time in the day or a day in the week for plotting will prove to be more cost effective. Acquiring a plot station will eliminate the loss of efficiency in background plotting and free up your CPU for what it was meant to do.

Out of Limit A light comes on, or a beep goes off... no problem, oops some of the drawing was left out. Operator error is very often at fault here. At times it will be that the pinch rollers were not adjusted since the last plot (just happens it was a smaller format). Then again it could be that the wrong scale was selected, making the drawing larger that the sheet; also improper layout prior to launching the plot will cause this alarm. Practice makes perfect. Find the methodology which works best for you and your plotter.

Crash! Power surges and static charges very often are at fault when the plotters drawing hand rams into a pinch roller. Usually the problem is minor. Start over by cutting the plotter off, move the drawing hand and turn on the power switch again.

Clogged Pens This is perhaps the most widely experienced problem. This is, at times, caused by the fine powder in preprinted mylar as discussed above. Also Poor maintenance, or pens left out uncovered. In special cases, air conditioning or dry heating systems remove too much water from the airspace in areas around the plotter. Be sure you do not locate the plotter under a diffuser in the office.

Inconsistent Alignment This usually occurs if the plotter you have is not self aligning. Each person has their way of loading plotting media unto the plotter. Establish a method that everyone can become familiar with. Perhaps using colored tape to establish the edge of the paper on the plotter bed, using different color tapes for different media sizes. These techniques will assist you in establishing a consistent office standard.

When possible, assigning the task of plotting and plotter care to one person will usually eliminate many of the problems we face with the plotters we so desperately need. Using a 'plot request' form, showing file name, paper size, media type, pen type, time need by and plotting time will help to control the flow of plots through the plotter; establishing a record with information

that will aid in plotting time allocations and material usage. These are but a few helpful hints to aid you in optimizing your plotters performance.

Let us, for the sake of a better example, go through plotting a drawing. This won't be too simple for beginners, but given time you will certainly get the knack of things. When you think about it, how else will you get a hard copy? From the beginning... we're in a drawing file, now what? Well, the first thing that you should do as you prepare to launch your plot is to select File I/O, then Save Dwg, this protects you in case of a problem in the plotting stage and prevents the lost of valuable information. After this stage return to the your UTILITY menu and select PLOTTER. Select plot scale (the scale in which the file has been executed in and the scale of your final drawing) and then select the scale desired. Return back to plotter menu; set the plotting media size whether it is a pre-selected or custom size. Next set the layout size at 50, this will give you a complete view of your layout on your monitor. Proceed by setting your layout divisions at one (1); there really is no need to use multiple divisions unless you are plotting in multiple scales (in which case you will need to refer back to the DataCad manual).

We now come to the selection of pens, line weight and your use of color. You must always remember that plotting with multiple weight pens require careful prior planning and the establishment of an office layer, color/line wt. standard. See the chapter on production drafting standards for a suggested approach. Set the pen positions which correspond to your drawing colors; we are now ready for the hard copy.

Turn on your plotter, load the necessary pen(s) and plotting media type (do not forget to use proper ink and media combinations) accordingly. Align the media with the pinch rollers just clearing the edge of your media, about 1/8" will do. Make ready your plotter and review your drawing file to be sure that the layers you want plotted are all on, or off as the case may be.

Now we are almost there. Layout your drawing as you would have it on your plotting sheet and then select **Plot**. Your drawing should momentarily be on its way.

Be aware that differing plotters have different pinch width requirements. This must be fully understood in order that your drawing will utilize the maximum area of your drawing sheet.

Allocating time to experiment and learn the limits of your plotter is vital to the productivity your plotter can attain as art of the whole CADD office system.

For those of you with noisy plotters, try putting it in a small room by itself; there you can better control access, humidity levels, static discharge (through the use of special tiles, carpeting or discharge plates) and provide for all your plotting needs in one area. Cable hookup length is important, but you can try up to thirty feet of travel (with a well shielded cable) before you really notice any problems. All you will lose will be the constant hum in your ears.

As a final note, remember that proper plotting planning will prevent poor plots.

Archiving Your Projects

The information that we work with on our computers is intangible information. We can only see and use this information through the use of the computer. This intangible information is stored via magnetic mediums, be it a hard drive in the computer or floppy disks, information that is quickly and easily lost or destroyed. Forever. For this reason we must protect ourselves from loss of information; countless hours of work is nothing to be toyed with. Until that moment comes when we lose valuable information we very seldom think about the need to ARCHIVE or record working copies of our labor on the computer. We have at some time heard of disk crashes, blackouts and magnetized floppies. I'm sure that most of us at one time or another has also lost work due to power outages. Protecting ourselves from this dilemma is what we will discuss.

Let us look at the solution in different forms and degree of cost by reviewing several of the available techniques.

Floppy disks Whether you use double sided double-density floppies (360kb) or high density floppies (1.2mb) both provide a medium for information storage (the 1.2mb floppy is your best buy and choice; we all know how large drawing files become.). Floppies can be used for storing copies of our files as soon as we are through working on them. Labeling is critical; file path name, file name and date, sometimes even time of day must be recorded. this method takes considerable time and floppy quantity usage, but it does ensure the availability and protection of your files on a regular basis. It is important when using this method of information storage to maintain a filing system that separates projects and allows time for regular updating of files. Don't forget a safe storage bin.

DOS "Backup" Another method is available with our Disk Operating System; that's right, DOS. Using DOS' backup command can be a very efficient method of archiving files, sub-directories, directories, or the entire hard drive. This approach, as in the first method, also utilizes several floppies. This is determined by the size of your files, quantity of files and sub-directories, etc. The use of the backup command differs slightly depending on the brand and version of DOS.

This method of information storage uses time in a block, be it at the end of the day, the end of the week or whatever pattern best suits your needs, rather than many sporadic moments of time throughout the day. One important advantage to this method is that it allows you to archive files greater than 1.2mb. The command format for storing files is as follows:

C:> BACKUP_[FILENAME.ext]_A:

(Storing files in root.)

C:> BACKUP_C:\[DIRECTORY]\[FILENAME.ext]_A:

C:> BACKUP_C:[PATHNAME]\[FILENAME.ext]_A:

(Generic form)

The wild characters ? and * are also accepted, allowing this to provide for an efficient means of backing up information in bulk. Be aware however that files archived in this manner are not working files that can be edited as a regular copy of a file; files must be restored back to their original path before they can be properly accessed. The RESTORE command allows you to retrieve any and all files. This is done in a reverse order:

```
C:>RESTORE_A:_C:[PATHNAME]\[FILENAME.ext]
```

(Generic form)

A very good use of the **BACKUP** command is in creating a backup copy of DataCad's 'MTEC' directory once it has been configured and operational. In this way, if ever your hard drive is damaged you can RE-STORE the information exactly as it was on your new or reformatted drive. This would save time and aggravation; this command backs up an exact image of \MTEC's path, including sub-directories. For example:

```
C:>BACKUP_C:\MTEC\*.*_A:/S
```

To restore the information:

```
C:>RESTORE_A:_C:\MTEC\*.*/
```

Review your DOS manual for the proper procedures if these do not suffice.

Utilities

A third method, more expensive, but less time consuming is the use of a special backup utility. There are several on the market available from 33-150 dollars; these include 'Fastback', 'Fullback', 'DS Back-Up Plus' and a few others you may already have heard of. These utilities have their own manuals and suggestions for their use. If you have a complex archival system with much information to archive on a regular basis with limited funds then one of the utilities mentioned is a must.

Hardware

Another more expensive method is the purchase of additional hardware designed for just such a task. This can be in the form of an internal tape backup streamer, a portable tape backup streamer, or an even more expensive piece of hardware... a Bernoulli Box; these are available as internal or portable. Each provide for efficient information archiving, quickly and efficiently.

If there are several CPU stations in your office with a frequent need for files archival, then a portable tape back-up streamer is a vital addition to your hardware line. Shop around for your best deal; these gems start at about $500-$1800.

Archiving your working files, your software, and all the miscellaneous items you may have on your hard drive is a must. This should go hand-in-hand with your office's standard procedures. Consider it an inexpensive form of insurance and piece of mind. A final note for those of you with regular power failures and power associated problems (spikes, surges and poor wave form) buy yourself a UPS power backup system; they're worth their weight in gold.