00092 ENDMK

?1:

```
COMMENT ?1
             VALID ØØØ24 PAGES
              DESCRIPTION
RECORD PAGE
00001 00001
              WRITEUP FOR THE FOONLY DRAWING PROGRAM,
00004 00002
ENWAM SDOOD
                NOW FOR THE COMMANDS YOU CAN GIVE ANYTIME;
                         TYPES "WHAT'CHA WANT BOSS??" TO WHICH YOU MAY TYPE ANY O
00015 00004
00022 00005
00025 00006
00033 00007
                POINT MODE:
QQQ36 QQQQ8
80843 90909
0004/ 00010
                BODY MODE:
00052 00011
                SET MODE:
00055 00012
                LIME MODE:
00057 00013
                ALTER MODE:
00059 00014
                EDIT MODE:
D0063 B0015
                MACRO'S:
00064 00016
00068 00017
                HOW TO DO IT -- PC CARDS
                MORE PC CARDS -- PCP
00070 00018
00080 00019
                RUNNING UML
8083 80829
                UML FILE FORMATS
ØØØ85 ØØØ21
                RUNNING MAGGOT
                RUNNING PORILL
ØØØ86 ØØØ22
00087 00023
                RUNNING FR80
00088 00024
                MISCELANEOUS
```

WRITEUP FOR THE FOONLY DRAWING PROGRAM.

THE CHARACTERS "?"", "?#", "?&", AND "?(" STAND FOR COTRL>, CMETA>, COTRL>CMETA>, AND COON'T CARE> RESPECTIVELY, "?"", "?#", AND "?&" ARE ALWAYS INTERPRETED BY THE SCANNER AS THESE THINGS!

THE LETTER "D" PRECEDING ANY DESCRIPTION MEANS THIS IS FOR THE LOGIC DRAWING PROGRAM ONLY, "PC" MEANS PC CARD PROGRAM ONLY, "L" MEANS THIS IS A FEATURE OF THE LAYOUT VERSION ONLY, "R" MEANS THIS IS A FEATURE OF THE ROUTING VERSION ONLY,

FULLOWING ARE THE PROGRAM NAMES FOR THE VARIOUS VERSIONS:

NAME	DESCRIPTION	RUNS WITH
D	BASIC DRAWING PROGRAM	ALONE
PC	BASIC PC CARD PROGRAM	ALONE
RPC	ROUTING VERSION OF PC	ALONE
LD LPC	LAYOUT VERSION OF D (USING FASTBANDS) LAYOUT VERSION OF PC (USING FASTBANDS)	LPC LD
TD TPC	LAYOUT VERSION OF D (USING SEGMENTS) LAYOUT VERSION OF PC (USING SEGMENTS)	TPC TD
LRD LRPC	ROUTING AND LAYOUT D (USING FASTBANDS) ROUTING AND LAYOUT PC (USING FASTBANDS)	LRPC LRD
TRD TRPC	ROUTING AND LAYOUT D (USING SEGMENTS) ROUTING AND LAYOUT PC (USING SEGMENTS)	TRPC TRD

HERE ARE SOME MONITOR LEVEL COMMANDS:

REE REFRESHES DISPLAY, FLUSHES ANY MACRO'S IN PROGRESS THEN JUMPS TO WHATEVER IS IN JOBOPC.

REE;S

RESTARTS PROGRAM WITHOUT FLUSHING CURRENT DATA IF
POSSIBLE, THIS MAY NOT WORK IF YOU WERE IN THE
MIDDLE OF SOMETHING WHEN YOU WENT TO THE MONITOR.

FIRST THE FOUR BASIC MODE SWITCHING COMMANDS:

EACH OF THE FOLLOWING COMMANDS FINDS THE CLOSEST PRIMITIVE IN THE DRAWING AND MAKES IT THE "CLOSEST" PRIMITIVE, IF YOU ARE FINDING BODIES YOU MAY NOT DO OPERATIONS ON POINTS, ETC.

- ?&P FIND THE CLOSEST POINT, A LARGE P INDICATES THE POINT, IF THE POINT HAS TEXT ON IT A LARGE T IS USED,
- 38T SAME AS 38P EXCEPT THAT THE ONLY POINTS WHICH WILL BE FOUND ARE THOSE WITH TEXT ON THEM.
- FIND THE CLOSEST LINE, A LINE IS NOT "CLOSE" TO A POINT UNLESS THE PERPENDICULAR FROM THE POINT TO THE LINE INTERSECTS THE SEGMENT WHICH IS THE LINE, A LARGE LINDICATES THE MIDPOINT OF THE LINE.

?&B FIND THE CLOSEST BODY, A LARGE B IS PLACED AT THE CENTER OF THE BODY.

W

? AS FIND THE CLOSEST SET, A LARGE S IS PLACED AT THE CENTER OF THE SET, THE CENTER OF A SET IS THE AVERAGE OF THE LOCATIONS OF ITS MEMBERS.

THE FULLOWING 3 CHARACTERS INDICATE WHICH KIND OF INPUT YOU ARE DOING;

MAITING FOR SINGLE LETTER COMMAND

WAITING FOR SINGLE LETTER, NOT COMMAND

?o WAITING IN LINE MODE (ONLY USED DURING MACROES TO INDICATE THIS, OTHERWISE NO CHARACTER),

SPECIAL CONTROL CHARACTERS AT ALL LEVELS!

?&! REFRESH DISPLAY.

MOW FOR THE COMMANDS YOU CAN GIVE ANYTIME:

	?(+ ?(;6 ?(;1	THESE OFFSET THE DRAWING LEFT, RIGHT, UP, DOWN, THE AMOUNT IS DETERMINED BY THE NUMBER OF CONTROL BITS HELD DOWN,
	SIZE CO	TROLS;
	?(*	NAKE THE DRAWING SMALLER. " MAKE THE DRAWING LARGER, THE CONTROL BITS AGAIN DETERMINE THE AMOUNT.
	<pre>5(3) 5(3* 5(4) 5(7) 5(1) 5(1) 5(1) 5(1) 5(1) 5(1) 5(1) 5(1</pre>	MOVE CURSOR LEFT (ONE GRID SPACE TIMES CONTROL BITS) MOVE CURSOR LEFT (SIXTEEN GRID SPACES TIMES CONTROL BITS) MOVE CURSOR RIGHT (ONE GRID SPACE TIMES CONTROL BITS) MOVE CURSOR RIGHT (SIXTEEN GRID SPACES TIMES CONTROL BITS) MOVE CURSOR UP (ONE GRID SPACE TIMES CONTROL BITS) MOVE CURSOR UP (SIXTEEN GRID SPACES TIMES CONTROL BITS) MOVE CURSOR DOWN (ONE GRID SPACE TIMES CONTROL BITS) MOVE CURSOR DOWN (SIXTEEN GRID SPACES TIMES CONTROL BITS)
L	7 & V	IN PC PROG GO TO LOGIC PROG, IN LOGIC PROG GO TO PC PROG.
	?&&	ZERO "CURRENT" SET POINTER, THE "CURRENT" SET IS THE ONE WHICH GETS THINGS ADDED TO IT BY ?"&.
	?&P	FIND CLOSEST POINT, SEE ABOVE,
	?&T	FIND CLOSEST POINT WITH TEXT ON IT, SEE ABOVE,
	?&L	FIND CLOSEST LINE, SEE ABOVE.
	?&B	FIND CLOSEST BODY, SEE ABOVE,
	5 µ C	MOVE THE CURSOR TO THE PHYSICAL CENTER OF THE SCREEN
	?#C	MOVES THE CURSOR AND THE POINT IN THE DRAWING AT WHICH IT RESIDES TO THE PHYSICAL CENTER OF THE SCREEN.
	?&C	SET THE OFFSET AND THE CURSOR POS TO Ø. (I.E. MOVE THE CURSOR AND LOGICAL Ø.Ø TO THE CENTER OF THE SCREEN).
D	?&M	MASSAGE, TRIES TO MAKE ALL LINES IN THE DRAWING EITHER HORZ, OR VERT,
D	?&E	EDIT (OR CREATE) A BODY, YOU ARE ASKED "BODY TYPE??" THEN YOU ENTER THE EDITOR WITH IT (OR EMPTY), IF THE BODY DID NOT EXIST BEFORE IT DOES NOW.
0	3 n I	INPUT UNITS FROM A DRAWING FILE, THIS ALLOWS YOU TO DEFINE BODIES ONLY ONCE AND USE THEM IN ALL DRAWINGS.
PC	\$ 11 I	LIKE ?#I EXCEPT THAT ANY UNPADDED DRILL HOLES ARE GIVEN PAD

D

D

2 # T

TYPE 1		BECAUSE	UNPADDED	HOLES	DONIT	WORK,
--------	--	---------	----------	-------	-------	-------

• , •	, , , , ,	, ,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
189	INPUT	BODY	DEFINITIONS	ONLY,	WHEN	Α	CONFLICT	AR

ALREADY EXISTS), REPLACEMENT IS AUTOMATICALLY EFFECTED BY A GEOMETRIC MAPPING!

ISES (BODY

INPUT A DRAWING.

PC 185 INPUT A ROUTE FILE (FROM WAGNER'S ROUTING PROGRAM), ASKS FOR FILENAME (DEFAULT EXTENSION IS "DAT"), FILENAME IS USUALLY FOR21, THERE SHOULD ALREADY BE IN THE DRAWING THE DIPS WHICH WERE ROUTED TO, IN THE EXACT POSITIONS AS WHEN THE FILE TO THE ROUTER (FOR20, DAT) WAS WRITTEN,

?"L LIST ALL THE BODY TYPES ON THE TTY. FOR LIBRARY BODIES THE \mathbf{I} LIBRARY MAME IS ALSO LISTED,

?#L LIST ALL THE BODY TYPES ON THE LPT.

> 3 "W WRITE OUT A WHOLE DRAWING IF THE FILENAME HAS NO "," IN IT THE EXTENSION ", DRN" (OR ", PC") WILL BE ATTACHED, IF YOU SAY "?@" IN PLACE OF THE FILENAME THE LAST ONE USED ON MAJOR INPUT OR OUTPUT WILL BE USED; IF NO PPN ARE GIVEN, THEY ALSO WILL BE THE LAST ONES USED ON INPUT. IF OTHER THAN THE LAST FILENAME AND PPN USED ON INPUT IS GIVEN, A CHECK IS MADE TO SEE IF IT EXISTS ALREADY.

?#W WRITE A MIRE LIST FILE, THE EXTENSION ", WD" (OR ", WPC") IS THE DEFAULT.

WRITE A PLOT FILE, THE EXTENSION ", PLT" (OR ", PCP") WILL BE 38W USED IF MONE IS SPECIFIED.

? " R CHANGE THE WORKING SIDE OF THE PC CARD TO THE OTHER SIDE, PC

PC 2#R LEAVE "BOTH SIDES" MODE.

PC 2 & R ENTER "BOTH SIDES" MODE, THE CURRENT WORKING SIDE IS DISPLAYED AT BRIGHTNESS 7 AND THE OTHER SIDE AT CURRENT BRIGHTNESS.

PC

1.

TYPES "WHAT'CHA WANT BOSS??" TO WHICH YOU MAY TYPE ANY OF THE COMMANDS IN THE FOLLOWING LIST, SEPERATED BY COMMAS ENDING WITH <CR>. THE ENTIRE LINE IS SCANNED BEFORE EXCUTING ANY OF THE COMMANDS.

THE EXTENDED SCAMNER IS FOR SETTING THE VALUE OF VARIABLES, TYPE ONE OF THE FOLLOWING TEXT STRINGS:

SLICE ASKS FOR INITIAL PIN #, FOLLOWED BY WIDTH OF SLICE AND CONVERTS [N+N] ETC. TO THE APPROPRIATE NUMBER.

CLEAR THIS DELETES "ALL" BODIES, POINTS, AND SETS (IN LOGIC DRAWING PROG. DEFINITIONS OF BODIES ARE ALSO DELETED.).

INNER THIS IS TO MAKE A "INNER PLANE FILE", IT DELETES ALL TEXT, LINES, AND POINTS WHICH ARE NOT DRILL HOLES AND PADS ALL DRILL HOLES WITH PAD TYPE ?# (CLEARANCE) THIS IS THE NORMAL INPUT TO THE "PPLOT" COMMAND TO MAKE INNER PLANE PLOTS, AFTER GIVING THIS COMMAND TEXT AND LINES MAY BE ADDED, PAD TYPES MAY BE CHANGED ETC., THE "CURRENT" SIDE IS STILL THE ONE WHICH GETS PLOTTED.

DSKIN ASKS FOR A FILE NAME. THEN USES SAID FILE IN PLACE OF TELETYPE INPUT! USE "?=" TO GET ALTMODE AND ?/ TO GET CRLF. USE THE ?"?# KLUDGE TO GET CONTROL BITS!

USE ?((REALLY LAMBDA) TO CAUSE A TEMPORARY INPUT BREAK, INPUT COMES FROM TTY UNTIL A ?&?(IS TYPED.

DSKOUT ASKS FOR FILE NAME, ALL TELETYPE INPUT IS COPIED TO THE OUTPUT FILE, THE FILE IS NOW OF THE FORM TO USE WITH "DSKIN".

CLOSE - CLOSES THE FILE ENTERED BY "DSKOUT",

ASK FOR A FILENAME, THEN SAVES THE CURRENT CORE IMAGE UNDER THAT FILENAME, THE DEFAULT EXTENSION IS DMP, THE STARTUP ADDRESS IS SET TO RESTORE THE AC'S AND RETURN AS IF YOU HAD JUST GIVEN THE SAVE COMMAND, IN LAYOUT VERSIONS, THE DEFAULT EXTENSION IS "DMQ", (THATS THE ONE YOU RUN), ANOTHER FILE IS ALSO MADE, WITH THE SAME NAME AS THE FIRST, EXCEPT WITH THE EXTENSION INCREMENTED BY 1, I,E, IF YOU GAVE THE NAME "FOO", THE TWO FILES WOULD BE "FOO,DMQ" AND "FOO,DMR",

ESAVE THIS WRITES OUT THE DRAWING WITH THE REMEMBERED NAME (?Ø)
THEN DOES A SAVE WITH THE REMEMBERED NAME.

AUTOSAVE THIS ASKS "HOW MANY COMMANDS BETWEEN SAVES??" AND EVERY TIME THAT MANY TOP LEVEL COMMANDS ARE PROCESSED IT DOES AN "ESAVE".

-AUTOSAVE DISABLE AUTOSAVE,

IWIRES THIS READS A LOGIC DRAWING WIRE LIST (ASKS FOR FILENAME)
AND BUILDS AND INTERNAL LIST OF POINTERS TO THE APPROPRIATE
PINS ON THE PC CARD (MUST HAVE ALREADY READ IN THE PC
CARD DRAWING), THIS COMMAND IS CURRENTLY ONLY USED WITH

THE "WROUTE" COMMAND.

-INIRES THIS RELEASES THE STORAGE USED BY THE "IWIRES" COMMAND.

WROUTE ASKS FOR FILENAME, THEN WRITES THE FILE FOR INPUT TO WAGNER'S ROUTING PROGRAM. IF THERE IS NO INTERNAL POINTER LIST, YOU GET AN ERROR MESSAGE. THE NORMAL FILENAME THAT WAGNER'S PROGRAM USES IS "FOR20".

MACRO TYPES THE NAMES OF ALL DEFINED MACRO'S!

DISP ENABLE DISPLAYING DURING MACRO'S.

HDISP DISABLE DISPLAYING DURING MACRO'S,
THIS ONLY DISABLES MAIN DRAWING DISPLAYING
NOT CURSOR MOVEMENT!

DPY ENABLE DISPLAYING,

-DPY DISABLE ALL DISPLAYING.

PINS ENABLE DISPLAY AND PLOTTING OF PIN #'S, THIS INCLUDES CONNECTOR PINS.

-PINS DISABLE PINS.

LOCS ENABLE DISPLAY AND PLOTTING OF LOCATION #15.

-LOCS DISABLE LOCS.

D PINIDS ENABLE DISPLAYING OF PIN ID'S.

PINIDS DISABLE PINIDS.

TEXT ENABLE TEXT.

HTEXT DISABLE TEXT.

D PTEXT ENABLE POINT TEXT SEPARATELY FROM BODY TEXT.

D - PTEXT DISABLE POINT TEXT SEPARATELY.

D BTEXT ENABLE BODY TEXT SEPARATELY.

D -BTEXT DISABLE BODY TEXT SEPARATELY.

WINDOW LIMIT OPERATIONS TO THE ON SCREEN PORTION OF THE DRAWING, (THIS IS THE DEFAULT)

-WINDOW ALL OPERATIONS APPLY TO THE ENTIER DRAWING NOT JUST THOSE THINGS ON SCREEN.

LWINDOW ANY LINE SEGMENT WHICH HAS ONE OR MORE ENDPOINTS OFF SCREEN IS SOFTWARE WINDOWED, THIS CAUSES A NOTICABLE AMOUNT OF COMPUTING SO BE CAREFUL!

-LWINDON DISABLE LWINDOW (AND SAVE TIME),

NEWID REHALLOCATE ALL BODY AND POINT ID'S, THIS MAY BE

NECESSARY IF A LOT OF SET COPYING AND DELETIONS ARE DONE,

ENABLE PLOTTING OF DIAMONDS AT THE INTERSECTION DIAMONDS D OF FOUR LINE SEGMENTS (NOT SHOWN ON DISPLAY). ASKS IF YOU WANT DIAMONDS AT THE INTERSECTION OF THREE LINES! DISABLE DIAMONDS -DIAMONDS D ENABLE DISPLAYING OF BODYNAMES NEAR BODIES! D IDENT -IDENT DISABLE SAME. n ENABLE LIGHT PEN TRACKER. CURSOR -CURSOR DISABLE LIGHT PEN TRACKER. CLOCATE SHORT DASHED LINES, ONE HORIZONTAL AND ONE VERTICAL INDICATE THE CURRENT CURSOR POSITION. -CLOCATE DISABLE CLOCATE. LOCATE LONGER DASHED LINES, ONE HORIZONTAL AND ONE VERTICAL -LOCATE DISABLE LOCATE. INDICATE THE LOCATION OF THE "CLOSEST" THING. CENTERS BLINKING POINTS (PC PROG) OR LINES (DRAWING PROG) CENTER L AND SETS APPROPRIATE SCALE FACTOR TO SEE ALL BLINKING PINS. THIS IS DONE WHEN THE BLINKING THINGS ARE FIRST FOUND! -CENTER DISABLE CENTERING, L TCENTER WHEN TEXT IS FOUND WITH THE "?"F" COMMAND, PUT THE n POINT AT THE CENTER OF THE SCREEN, EVEN IF IT WAS OFF SUREEN. TCENTER TURN OFF TOENTER. D ENTERS DOT(RAID) IF PRESENT, TO RETURN TOO TYPE "RSG", SET SCALE FACTOR, (GUARANTEED TO PUT GRID POINTS SCALE ON III POINTS.) ORIGINALLY SCALE=16(2 FOR PC) SET THE MINIMUM DISTANCE THE CURSOR WILL MOVE STEP PC FOR SMALLEST STEP (MUST BE DIVISIBLE BY 5 (MILS)). TELLS YOU HOW WIDE AND HIGH YOUR DRAWING WILL SIZE D BE IF PLOTTED AT SCALE OF 2 IN PLOT PROG. ALSO TELLS YOU THE SMALLEST BOARDER WHICH WILL FIT AROUND THIS DRAWING (ASK WHAT SCALE YOU WILL USE!) TELLS YOU HOW MIDE YOUR PC CARD WILL BE (NOT SIZE PC COUNTING THE CARD OUTLINE) WHEN PLOTTED AT A

SCALE OF 1 (REAL SIZE),

BRIGHT SETS SCREEN BRIGHTNESS (ONE DIGIT)

W

CURBRT SETS CURSOR BRIGHTNES

PC MOVE MOVES CURSOR X, Y(IN MILS) RELATIVE TO

ITS CURRENT POSITION.

XOFF SETS ABSOLUTE X OFFSET.

YOFF SETS ABSOLUTE Y OFFSET.

מ	TITLE	ASKS FOR 2 STRINGS, "TITLE LINE 1" AND "TITLE LINE 2" THESE ARE REMEMBERED AND USED FOR PLOT FILES SO YOU DON'T HAVE TO TYPE IT TO THE PLOT PROG. IF NULL STRING IS GIVEN, THE PLOT PROG WILL ASK FOR THAT ONE.
D	AUTHOR	LIKE TITLE BUT SETS STRING TO BE USED FOR "DRAWN BY" PART OF PLOT.
D	LTITLE	LIST BOTH TITLE STRINGS AND AUTHOR STRINGS ON TTY
נו	PBOX	ASKS FOR BOX SIZE (TYPE SINGLE LETTÉR A=D). SCALES DRAWING AND TEXT TO JUST FIT INTO BOX BUT MAINTAINS RATIO BETWEEN TEXT AND LINES WHICH YOU SEE ON THE SCREEN, WILL NOT BE SCALED LARGER THAN THAT WHICH MAKES TEXT LARGER THAN SIZE 3 ON PLOTTER, TELLS YOU SCALES BEFORE ASKING FOR FILE NAME.
PC	PPLOT	PLOT AN INNER PLANE, ASKS FOR PLANE NUMBER, DOESN'T PLOT PADS WHICH TOUCH THE PLANE IN QUESTION, LINES ARE PLOTTED, WILL ALSO PLOT TEXT.
PC	MUNG	FORCES ALL POINTS AND DIPS ONTO GRID POINTS, THIS IS DONE BY TAKING THE X AND Y LOCATIONS OF ALL THE DIPS AND POINTS IN THE DRAWING AND MAKING THEM MULTIPLES OF THE CURRENT STEP SIZE, IF IM SET MODE ONLY THE CURRENT SET IS MUNGED, (I WONDER WHY I CALLED THIS "MUNG"??)
PC	COUNT	TELLS YOU HOW MANY POINTS THERE ARE IN THE ENTIRE DRAWING, ALSO TELLS YOU HOW MANY OF EACH TYPE OF BODY, ALSO TELLS YOU HOW MANY OF THE POINTS ARE DRILL HOLES,
	DELNULL	ASKS IF YOU WISH TO PICK AND CHOSE OR DELETE ALL NULL POINTS, THEN DOES THAT, A NULL POINT IS ONE WITH NO LINES, NO TEXT, AND NO PIN CONNECTIONS,
	DELSET	DELETE ALL SETS, DOESN'T DELETE CONTENTS.
0	TYPDEL	ASKS "TYPE BODY NAME" THEN DELETE ALL INSTANCES AND THE DEFINITION, IF FROM LIBRARY, DEFINITION IS NOT DELETED,
D	RENAME	ASKS "TYPE BODY NAME" THEN ASKS "TYPE NEW BODY NAME" THE BODY IS GIVEN THAT NAME IF IT IS NOT IN USE.
.	GETL18	ASKS FOR A "LIBRARY FILENAME??" THEN READS THE BODIES FROM THAT FILE AND MAINTAINS A POINTER TO THE FILE INSTEAD OF WRITING OUT THE BODY DEFINITIONS EACH TIME, REDUNDANT LIBRARY REFERENCES ARE IGNORED WHEN POSSIBLE.
D	DELLIB	DELETES ALL REFERENCES TO BODIES IN THE LIBRARY YOU MENTION, AND FLUSHES THE POINTER TO THE FILE.

D TYPLIB TYPES ALL LIBRARY FILENAMES,

D GETBOD ASK FOR A TYPE NAME, THEN A FILENAME
THEN TRIES TO READ IT IN USING THE NORMAL
TO ROUTINES (MAY HAVE TO REPLACE, ETC.).

· 14

ASKS FOR CARD NUMBER, THEN READS IN THE SPECIFIED CARD. THE CARD CONTAINS THE CARD IMAGE ALL PINS, PIN #'S, CONNECTOR LOC'S, AND SHORTING BARS, ANY POINT WHICH IS NOT A FEED THROUGH OR A DIP PIN AND IS FOUND AT THE SAME LOCATION AS A CONNECTOR PIN WILL BECOME THAT CONNECTOR PIN, IF THE NUMBER YOU ASK FOR IS THE SAME AS THE CURRENT CARD, THEN IT IS MERELY DISPLAYED AGAIN. ARGUMENT OF Ø (OR JUST CR.) WILL CAUSE THE CARD TO BE FLUSHED! THE CARD NUMBER IS REMEMBERED WHEN THE CARD IS WRITTEN OUT!

PC -CARD DISABLE DISPLAYING OF CARD, CARD NUMBER IS STILL WRITTEN OUT, TO REDISPLAY THE CARD TYPE "X" THEN "CARD" CR FOLLOWED BY THE SAME CARD NUMBER AND IT WILL BE REDDISPLAYED.

PC SETLOC SET NLN FOR LOCATION OF THIS CARD ON BACK PANEL.

PC UML WILL ASK FOR THE LETTER OF THE UPPERMOST DIP AND THE NUMBER OF THE LEFTMOST DIP, THEN IT WILL SLICE UP THE CARD INTO ROWS AND COLUMNS AND ASSIGN DIP LOCATIONS.

RPC ROUTE INITIALIZE ROUTING SYSTEM, THIS MAY BE DONE IF YOU THINK THE PROGRAM ISN'T KEEPING THE TABLES UP TO DATE, THE PROGRAM WILL TRY TO REINITIALIZE THE TABLES WHEN NECESSARY.

RPC RDISP DISPLAY A POINT IN EACH OCCUPIED SQUARE ON THE PC CARD. THIS IS ONLY A DEBUGGING AID.

RPC -RDISP DISABLE DISPLAYING OF POINTS,

RPC RCODE ASKS FOR "ROUTE CODE", YOU MAY TYPE A NUMBER FROM 0-3. THEY HAVE THE FOLLOWING MEANINGS:

ROUTE ON COMPONENT SIDE ONLY

1 ROUTE ON SOLDER ONLY

2 HORIZONTAL ON COMPONENT, VERTICAL ON SOLDER VERTICAL ON COMPONENT, HORIZONTAL ON SOLDER

STARTING THE PROG SETS ROODE TO 3:

THE FOLLOWING COMMANDS ALLOW MODIFICATION OF THE ROUTING ALGORITHM BY CHANGING THE WEIGHTING FACTORS OF CERTAIN TYPES OF ROUTES, THE COMMAND IS THE VARIABLE NAME, THIS CAUSES THE OLD VALUE TO BE PRINTED AND THEN ASK FOR THE NEW VALUE, <NUMBER><CR> SETS THE VARIABLE TO NUMBER, ANYTHING FUNNY LEAVES THE VARIABLE UNCHANGED THE FOLLOWING VARIABLES EXIST AND HAVE THE FOLLOWING MEANINGS:

CNR	THE COST OF MAKING A CORMER (NOT INCLUDING FEED THROUGHS).
FED	THE COST OF MAKING A FEED THROUGH,
BAK	THE COST OF GOING AWAY FROM THE DESTINATION POINT.
SIO	THE COST OF ONE STEP ON THE WRONG SIDE OF THE BOARD (RCODE= 2 OR 3), NOT CHARGED AT CORNER!

POINT MODE: THE FOLLOWING APPLY IF THE LAST PRIMITIVE SEARCH COMMAND WAS ?&P OR ?&T AND A POINT WAS FOUND.

		•			
	3 nb	PLACE A	POINT AT THE CURRE	NT CURSOR POSITION	١.
n	? (+	POINT.	RIGHT ANGLE FOLLOW A STAR IS PLACED AT YOU ARE DRAWING FR	THE CLOSEST POINT	OM THE CLOSEST
υ .		?(%	(ALTMODE) STOP RIG MORE POINTS AND RE	HT ANGLE WITHOUT F TURN TO MAIN SCAND	PLACING ANY NER.
n		?(=	ATTACH THE RIGHT A (FOUND ABOVE) AND ?????? IS TYPED IF OF AN EXISTING LIN	RETURN TO THE MAIN THIS WOULD REQUIN	N SCANNER. RE THE DELETION
D		?(?%	MAKE A SINGLE SEGM ANGLE IS COMING FR MOT NECESSARILY BE IT.).	OM TO THE CLOSEST	POINT, (MAY
D		?(+	MAKE THE CORNER OF START A NEW RIGHT		POINT THEN
מ		?(SPACE	CAUSES THE SENSE O	F THE ANGLE TO CH	ANGE.
PC	?(+	START A	LINE FOLLOWING THE	CURSOR FROM THE	CLOSEST POINT
PC		5 (2)	LEAVE LINE DRAWING	MODE WITHOUT PLA	CING LAST LINE,
PC		? (-	ATTACH LINE TO POI	NT WITH STAR ON I	Т,
PC		?(+	PUT DOWN END OF LI	NE AT CURSOR POSI	TION AND START
PC		?(?;	SIMULATES THE FOLL THE BUCKY BITS HAV	OWING, "+ <altmod E THE FOLLOWING E</altmod 	E> ?"F ?"R +", FFECT;
			BITS PA	D THIS SIDE PAD	OTHER SIDE
			MONE ?" ?# ?&	YES NO YES NO	YES YES NO NO

M

PC	3 n L	MAKE THE CLOSEST POINT INTO A FEED THROUGH, CREATE A POINT ON THE OTHER SIDE IF ONE DOES NOT ALREADY EXIST, PAD TYPE # IS SET TO 0.
PÇ	?#F	LEGAL ONLY FOR FEED THROUGHS AND PINS, ATTACHES THE POINT TO THE INTERIOR PLANE SPECIFIED(0+3) AND INDICATES THIS ON THE POINT, Ø SHOULD BE USED FOR GROUND, 1 FOR TTL SUPPLIES,
PC	? «F	LEGAL FOR ALL POINTS. ASKS "PAD TYPE #??" THE NUMBER YOU TYPE IS THE IDENTIFICATION # FOR THE TYPE OF PAD TO PLOT HERE. @ IS NO PAD. 1 IS DEFAULT FOR DIP PADS, 2 IS DEFAULT FOR INNER PLANE CLEARANCES. THESE ARE SET ON BOTH SIDES OF DRILL HOLES WHEN THE EXTEND MODE COMMAND "INNER" IS USED. PAD TYPE 3 IS 50 MIL SQUARE USED FOR DIP PIN 1!
PÇ	?"U	MAKE THIS FEED THROUGH NOT A FEED THROUGH,
Pζ	?#U	DETACH THIS POINT FROM ANY INTERIOR PLANES.
	?"D	DELETE CLOSEST POINT AND ALL LINES DIRECTLY ATTACHED TO IT, IF THE POINT IS A PIN IT DOESN'T REALLY GO AWAY JUST THE LINES, AND TEXT,
D	?#D	SAME AS ?"D EXCEPT THAT COLINEAR SEGMENTS ARE MERGED. THIS WILL REVERSE A ?#B OPERATION ON A LINE;
PC	3 # D	SAME AS ?"D EXCEPT IN THE CASE WHERE EXACTLY 2 LINES LEAVE THE POINT, IN THIS CASE THE TWO LINES ARE MERGED INTO ONE BETWEEN THE REMAINING 2 POINTS,
	?" M	PUTS THE CURSOR ON THE CLOSEST POINT, THEN MAKES IT FOLLOW THE CURSOR UNTIL A SPACE IS TYPED, THE LINES ARE MASSAGED AS YOU GO.
	?#M	PUTS CURSOR AT CURRENT TEXT OFFSET (IF ANY TEXT) AND ALLOWS YOU TO CHANGE IT BY MOVING THE TEXT, IN D THE OFFSET IS RELATIVE TO THE CHARACTER SIZE, IN PC THE OFFSET IS TO AN ABSOLUTE POSITION ON THE CARD,
	3 11 V	ATTACH THE CLOSEST POINT TO THE CLOSEST OTHER POINT, A STAR IS PLACED ON THE OTHER POINT AND YOU ARE ASKED "THIS ONE??" YOU ARE NOT AT COMMAND LEVEL WHEN THIS IS ASKED SO YOU SHOULD NOT SAY "Y" IF THE STAR IS NOT ON THE RIGHT ONE, IF YOU WISH TO ATTACH TO A PIN, YOU MUST BE ON THE PIN WHEN YOU SAY "?"A",
ם	?#∆	PUTS AN "L" ON THE CLOSEST LINE AND ASKS "THIS ONE??" IF YOU SAY "Y" THEN THE CLOSEST POINT WILL BECOME THE MID-POINT OF THE LINE. YOU CAN GIVE THIS COMMAND IN LINE DRAWING MODE AND THE ANGLE WILL BE ATTACHED TO THE MID-POINT OF THE LINE.
	?"T	ASKS "TEXT??" AND ATTACHES THE STRING TO THE POINT, IF "?2" APPEARS IN THE STRING, A CRUF IS INVENTED, IF THE CHARACTER "\" IS THE FIRST IN THE STRING THE FOLLOWING CHARACTER IS INTERPRETED AS THE CHAR, SIZE, NEITHER CHARACTER APPEARS IN THE STRING,

D

D

IF A "V" APPEARS JUST BEFORE THE CHAR, SIZE THEN THE TEXT WILL BE PLOTTED VERTICALLY, A POINT IS DISPLAYED AT THE BEGINNING OF SUCH TEXT, IF THE POINT PREVIOUSLY HAD NO TEXT IT IS ADDED TO "TXTLST", UNLESS "TXTLST" IS EMPTY,

?"K IF THE CLOSEST POINT HAS TEXT ON IT THE TEXT IS DELETED, POINT IS REMOVED FROM "TXTLST".

?"Z LOADS THE TEXT INTO THE LINE EDITOR, THEN INPUTS THE RESULTANT STRING AND REPLACES THE TEXT WITH IT,

SAME AS "Z" EXCEPT THE LINE EDITORS CURSOR IS AT THE END OF THE LINE,

D : "N IF POINT OR CONNECTOR PINE

SET CONNECTOR PIN NUMBER. PIN NUMBER IS OF THE FOLLOWING FORM:

NLNLLN OR LLN

IF PIN;

JUST TYPE PIN NUMBER,

FOR CPIN'S ONLY, PUTS YOU AT THE CURRENT OFFSET FOR THE LOC TEXT AND LETS YOU MOVE IT, OFFSET IS RELATIVE TO CHAR SIZE OF LOC TEXT NOT PIC SCALE.

?"8 <CURRENT SET>←<CURRENT SET> UNION <CLOSEST POINT>
POINT MAY NOT BE A PIN. IN PC CURRENT POINT MAY NOT BE
A CONNECTOR PIN.

?"# REMOVE POINT FROM CURRENT SET.

?## REMOVE POINT FROM ALL SETS,

CONSIDER POINTS IN TXTLST TO SEE IF THERE IS AN OCCURENCE OF "SEARCH STRING" IN ITS TEXT, AFTER CONSIDERING A POINT IT IS TAKEN OUT OF THE LIST, REGARDLESS OF WETHER THE "SEARCH STRING" WAS FOUND, IF IT WAS FOUND THE CURSOR IS PLACED ON THE POINT, TEXT OFF SCREEN IN WINDOW MODE CANNOT BE FOUND, AND THE POINT IS DISCARDED, IF "TCENTER" IS IN FORCE THE POINT IS ALSO CENTERED ON SCREEN.

?#F PUT ALL POINTS WITH TEXT ON THEM IN THE "TXTLST".

SET "SEARCH STRING": IF ENDED WITH ALTMODE OLD STRING IS RETAINED. IF NULL ALL STRINGS WILL HAVE IT AS THEIR SUBSTRINGS.

ΓD	•	(PERIOD) TRACE WIRE ATTACHED TO THIS POINT AND FLASH IT. TRACING INCLUDES WIRES WITH SAME SIGNAL NAMES. ALL PINS ARE LOOKED UP ON THE PC CARD AND ARE FLASHED THERE WHEN YOU ENTER THE PC PROG.
LPC	•	LOOKUP THIS PIN IN THE LOGIC DRAWING AND SAVE POINTER. THEN ENTER LOGIC DRAWING PROG AND TRACE WIRE. THEN FLASH WIRE.
L, D	?",	SAME AS "," EXCEPT THE PC PROG IS ENTERED AND ALL THE ASSOCIATED PIN FLASH,
LPC	311 *	SAME AS "," EXCEPT EVENTUALLY RETURN TO PC PROG AND FLASH PINS ON LINE.
LRPC	?#,	EQUIVALENT TO "?"." FOLLOWED BY "?8."
LRD	?#,	EQUIVALENT TO "?&V" FOLLOWED BY "?&,"
LRPC	?'6,	ENTER ROUTING MODE FOR FLASHING PINS. PROGRAM RESPONDS WITH "ROUTING PAIR = ", YOU WILL NOTICE THAT THE FLASHING PINS HAVE LETTERS ON THEM, TYPING TWO OF THE LETTERS FOLLOWED BY CR, CAUSES THE ROUTING ROUTINE TO BE ENTERED WITH THESE TWO PINS AS THE ENDPOINTS, ALL THE NORMAL COMMANDS APPLY TO THE ROUTING ROUTINE (NORMALLY ENTERED BY "?&E") UP UNTIL THE TIME THAT YOU LEAVE IT, TYPING "ALTMODE" CAUSES YOU TO LEAVE ROUTING MODE, ANYTHING FUNNY GETS YOU THE QUERY AGAIN:
LKD	?&,	EQUIVALENT TO "?8V" FOLLOWED BY "?8,"!
LRPC	?(JKLET	TER> FINDS LETTER <letter> OF FLASHING PINS AND MOVES CURSOR THERE (IF POSSIBLE), ONLY WORKS WHEN LETTERS ARE BEING SHOWN!</letter>
	?&∧	IF THE CLOSEST POINT HAS TEXT ON IT YOU ENTER ALTER MODE! ALTER MODE!
RPC	?"E	SET ENDPOINT ONE FOR ROUTING, A "+" INDICATES ENDPOINT ONE,
RPC	?#E	SET ENDPOINT TWO FOR ROUTING, A "?2" INDICATES ENDPOINT TWO,
RPC	?&E	MAKE A ROUTE FROM ENDPOINT ONE TO TWO, THE ALGORITHM COMPUTES SCORES FOR ROUTES, IT TRIES TO FIND ROUTES WITH SCORES OF Ø FIRST, THEN 1, ETC, WHEN A ROUTE IS FOUND YOU WILL BE ASKED "HOW ABOUT THIS ONE" AND THE ROUTE WILL BE BLINKED, WIRES ON THE CURRENT SIDE WILL BE BRIGHTER THAN THOSE ON THE OTHER, IF YOU RESPOND "Y" THE ROUTE WILL BE MADE AND MARKED, IF YOU SAY " (SPACE) THE ROUTE WILL BE DISCARDED AND ANOTHER FOUND, IF YOU SAY "?" (CTRL SPACE) THE PROGRAM WILL SHIFT TO THE NEXT HIGHEST SCORE AND CONTINUE LOOKING, IF YOU SAY "\$" ALTMODE THE PROGRAM WILL JUST QUIT, ANYTHING ELSE WILL GET YOU "??????" AND THE QUESTION REPEATED, ALTMODE AND CTRL SPACE WILL WORK EVEN WHEN THE PROGRAM IS RUNNING (KEYBOARD INPUT ONLY);

WHEN THE PROGRAM IS RUNNING (KEYBOARD INPUT ONLY)!

BODY MOD THE FOLL	OWING CO	OMBANDS APPLY IF THE LAST PRIMITIVE SEARCH COMMAND WAS
?&B AND	A BODY Y	NAS FOUND, PLACE A BODY AT THE CURRENT CURSOR POSITION, YOU ARE ASKED "THIS WAY??" AND EACH TIME YOU TYPE SPACE, THE BODY RUTATES 90 DEGREES, WHEN YOU SAY "Y" THE BODY IS PLACED, UP UNTIL YOU SAY "Y", YOU MAY MOVE THE CURSOR AND THE BODY
PC		WILL FOLLOW IT. PIN 1 GETS PAD TYPE 3 ALL THE OTHERS GET PAD TYPE 1.
D	3.11E	EDIT THE CLOSEST BODY,
D	3.11.K	REPLACE THE CLOSEST BODY, YOU WILL BE ASKED FOR NEW BODY NAME THEM THE YOU MAY SET THE REPLACEMENT MODE, IF YOU ANSWER "S" TO THE REQUEST THE CORRESPONDENCE IS PIN# TO PIN#, IF YOU ANSWER "L" TO THE REQUEST, THEN A GEOMETRIC (CLOSEST PIN) MAPPING IS USED, IF YOU ANSWER "C" TO THE REQUEST A GEOMETRIC MAPPING WHICH WORKS FOR DIFFERENT #S OF PINS MILL BE USED, IF YOU ANSWER CRLF> THEN YOU WILL BE ASKED FOR THE CORRESPONDENCE PIN BY PIN, ANY UNSPECIFIED PINS ON THE OLD BODY ARE DELETED, ANY UNSPECIFIED PINS ON THE MEW BODY ARE CREATED. IN "L" MODE, IF EACH PIN CANNOT BE MATCHED TO ANOTHER YOU WILL BE THROWN OUT!
ט	?#R	REPLACE SOME, ASKS FOR OLD BODY NAME, THEN NEW BODY NAME, THEN SETS UP CORRESPONDENCE AS IN ?"R, THEN PUTS A "B" ON EACH INSTANCE OF THE OLD BODY AND ASKS "THIS ONE??" IF YOU SAY "Y", IT IS REPLACED, OTHERWISE IT IS NOT, IF YOU SAY ALTMODE YOU GET BACK TO BODY MODE, THIS ONLY WORKS ON ONSCREEN BODIES,
D	?&R	REPLACE ALL, LIKE REPLACE SOME EXCEPT YOU AREN'T ASKED,
	3 "D	DELETE THE CLOSEST BODY,
	3.iW	MOVE THE CLOSEST BODY. THE CURSOR IS PUT AT THE CENTER OF THE BODY. THEN ALL PINS ON THE BODY ARE MASSAGED AS THE BODY IS MOVED. ANY CHARACTER STOPS YOU MOVING.
	3 n M	"NUMBER" THE CLOSEST BODY, NUMBERS MAY BE OF THE FOLLOWING FORM:
D		NLNLN OR LN
		THESE "NUMBERS" ARE USED FOR WIRE LISTING.
	?#N	LEGAL ONLY IF ?"N DONE PREVIOUSLY. PUTS YOU AT CURRENT OFFSET FOR LOC TEXT AND LETS YOU MOVE IT. THIS OFFSET IS SCALED BY DRAWING SCALE. NOT CHAR SIZE.
	340	ROTATE CLOSEST BODY 90 DEGREES COUNTER CLOCKWISE,
D	? !! S	SWAP. ASKS FOR TWO PIN NUMBERS, IF THEY EXIST ON THIS BODY ALL LINES, TEXT, AND ANYTHING ELSE ARE SWAPPED BETWEEN THESE TWO POINTS.

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Ŋ	?#\$	SWAP PIN #'S, ANY PIN #'S ASSOCIATED WITH THE ID'S YOU TYPE WILL BE INTERCHANGED,
D	?#P	SET PIN #18 FROM LOW ORDER 9 BITS OF PIN ID.
	3 11 8	<current set="">+<closest body=""></closest></current>
	3 11 #	REMOVE BODY FROM CURRENT SET.
	?##	REMOVE BODY FROM ALL SETS.
	?#F	PUT ALL PINS OF THIS BODY WITH TEXT ON THEM INTO "[XTLST".
	?&F	SET "SEARCH STRING", IF ENDED WITH ALTMODE OLD STRING IS PETAINED. IF NULL ALL STRINGS WILL HAVE IT AS THEIR SUBSTRINGS.

SET MODE:

THE FOLLOWING COMMANDS APPLY IF THE LAST PRIMITIVE SEARCH COMMAND WAS 28S AND A SET WAS FOUND

- PSEUDO-CENTER IS INDICATED BY AN S.
- 2#P MAKES A COPY OF THE CLOSEST SET AT
 THE CURRENT CURSOR LOCATION, THEN
 PUTS YOU IN MOVE-THE-SET MODE (SEE BELOW).
- ?"M POSITIONS THE CURSOR ON THE CENTER OF THE SET, THE SET NOW FOLLOWS THE CURSOR, THE SET MEMBERS ARE AGAIN INDICATED.
- ?"D DELETE THE CLOSEST SET.
- ?#D DELETE ALL ELEMENTS OF THE CLOSEST SET FROM THE PICTURE.
- PAD DELETE ANYTHING NOT IN CLOSEST SET,
- PC 2"0 ROTATE SET 90 DEGREES COUNTER CLOCKWISE,
 - ?#K DELETE ALL TEXT ON POINTS IN SET!
 - ?"8 <CURRENT SET>+<CURRENT SET> UNION <CLOSEST SET>
 THIS MAKES A NEW SET IF THERE IS NO CURRENT SET.
 - ?#& <CURRENT SET>+?7<CLOSEST SET> DOESN'T MAKE NEW SET
 - ?"# REMOVE ALL MEMBERS OF CLOSEST SET FROM CURRENT SET, ILLEGAL IF CURRENT SET IS CLOSEST,
 - ?## REMOVE ALL MEMBERS OF CLOSEST SET FROM ALL SETS, THE DELETE CLOSEST SET.
 - ?#F
 PUT ALL POINT TEXT IN THE CLOSEST SET INTO "TXTLST"
 - ?&F SET "SEARCH STRING", IF ENDED WITH ALTMODE OLD STRING IS RETAINED, IF NULL ALL STRINGS WILL HAVE IT AS THEIR SUBSTRINGS.

LINE MODE: THE FOLLOWING COMMANDS APPLY IF THE LAST PRIMITIVE SEARCH COMMAND WAS ?&L AND A LINE WAS FOUND.

	3.1.D	DELETE THE LINE, DOES NOT AFFECT ITS ENDPOINTS.
	3.1. B	PUTS A BEND ON THE LINE EVEN WITH THE CURSOR (MAKES IT INTO 3 SEGMENTS), YOU ARE THEN MOVING THE MID-POINT,
D	?#B	PUTS A POINT ON THE LINE EVEN WITH THE CURSOR,
PC	3 ?	"JUMPS" SEGMENT TO OTHER SIDE OF PC CARD, CREATING OR DELETING FEED THROUGHS AS NECESSARY.
PC	? #J	"JUMPS" A "WIRE" TO THE OTHER SIDE OF THE PC CARD, CREATING OR DELETING FEED THROUGHS AS NECESSARY, A "WIRE" IS THE CLOSEST SEGMENT TRACED THROUGH ADJOINING SEGMENTS UNTIL ONE OF THE FOLLOWING IS REACHED; A FEED THROUGH, A PIN, OR A JUNCTION:

ALTER MODE:

bc3333333333

D

MUMBERS ARE REMEBERED AND USED AS REPEAT FACTORS ?(0-?(9

FOR SOME COMMANDS, THESE COMMANDS ARE PRECEDED

BY <N>.

MOVE TO CHAR (END IF NOT FOUND) <N>S<CHAR>

DELETE N CHARACTERS (NO-OP AT END) C < N > D

W

HOVE FORWARD N SPACES (NO-OP AT END OF LINE)

<N><BACKSPACE> MOVE BACKWARD N SPACES (NOHOP AT BEGINNING OF LINE)

ASKS "INSERT TEXT+" AND INSERTS THE STRING YOU TYPE, I TEXT IS INSERTED BEFORE THE CURRENT CHAR WHICH

REMAINS THE CURRENT CHAR.

<N>R EQUIVALENT TO "NDI",

LEAVE ALTER MODE, <altraode>

DELETE UP TO BUT NOT INCLUDING THE NTH OCCURENCE OF <N>K<CHAR>

<CHAR>, NO DELETE IF NOT FOUND BUT LEAVES YOU AT

END OF LINE.

SEARCH TO NTH NUMBER (A NUMBER IS ANY CONTIGUOUS < 1/1>N

SEGMENT OF DIGITS). END OF LINE IF NOT FOUND.

< N > U SEARCH TO NTH NUMBER AND DELETE IT.

<n>f<string><t> searches for the NTH occurence of <string> as A

SUBSTRING OF THE CURRENT TEXT, IF FOUND AND THALTMODE THEN DELETE THIS OCCURENCE <STRING>

OTHERWISE DONE, IF T?=ALTMODE THEN T MUST = CRLF.

IF STRING IS NULL, NO SEARCH IS DONE

IF STRING IS NULL, THEN "SEARCH STRING" IS USED

UNLESS IT IS ALSO NULL IN WHICH CASE NO SEARCH

IS DONE.

EDIT MODE; THE EDITOR STARTS UP IN "EDIT MODE", LEGAL COMMANDS ANY TIME ARE;

?&P ENTER PIN MODE.

?&T ENTER TEXT MODE,

POINT OF THE BODY AND THE CURSOR IS PUT THERE,

S(ALTMODE) RETURN TO EDIT MODE!

W

SET A PIM, POSITION THE CURSOR FIRST, YOU WILL BE ASKED "PIN ID??", TYPE A DECIMAL NUMBER, THE PIN WILL APPEAR AT THE CURSOR POSITION, IF THE NUMBER IS OF THE FORM:

M(M)

IT WILL BE INTERPRETED AS THE MTH OCCURENCE OF THE PIN WHOSE ID IS N. THIS IS USEFUL FOR BUSSING THROUGH, AND IS INTERPRETED AS THE SAME PIN BY THE WIRE LISTER AND THE LAYOUT STUFF, PIN #'S ASSOCIATED WITH ANY PIN WHOSE ID IS N WILL BE KEPT THE SAME, PIN ID'S MAY BE DUPLICATED AT THIS TIME, BUT YOU MAY NOT LEAVE THE EDITOR UNTIL THEY ARE UNIQUE.

?"T PLACE BODY TEXT AT THE CURRENT CURSOR POSITION.
THE SIZE KLUDGE IN DRAWING MODE APPLIES HERE.

?"E EXIT THE EDITOR, (RETURN TO DRAWING LEVEL AND MODE LAST USED THERE,) UNLESS SOME PIN ID!S ARE DUPLICATED:

EDIT MODE COMMANDS:

?#I ENTER INSERT MODE: THE CURRENT POINT IS SET TO THE POINT WHICH PREVIOUSLY HAD A STAR ON IT:

?"G "GET" A TYPE BY NAME AND ADD IT TO THE END OF THIS BODY, YOU WILL BE ABLE TO MOVE IT AND ROTATE IT (USING THE RETRIEVER).

?"D DELETE "CLOSEST" POINT.

?"R CHANGE FLAVOR OF CLOSEST POINT, WAITS FOR ** OR ***

INSERT MODE COMMANDS:

- ?(+ THIS TERMINATES THE CURRENT VECTOR FOLLOWING THE CURSOR, AND STARTS A VISIBLE ONE FOLLOWING IT.
- ?(- SAME AS + BUT AN INVISIBLE VECTOR IS STARTED, (FEAR NOT YOU CANNOT WASTE SPACE BY PUTTING TWO INVISIBLE VECTORS TOGETHER.)
- THE CURRENT POINT TO THE CORRESPONDING TYPE.

PELETE THE CURRENT POINT, THIS WILL LEAVE A VECTOR JOINING THE TWO NEIGHBORING POINTS THE TYPE WILL BE THAT OF THE ONE ALREADY ON THE LAST POINT, HOWEVER THE CURSOR IS ON THE NEXT POINT,

SPACE MAKE THE NEXT POINT THE CURRENT ONE.

BACKSPACE MAKE THE PREVIOUS POINT THE CURRENT ONE,

TEXT MODE COMMANDS:

?"K DELETE THE TEXT,

?"M MOVE THE TEXT, THE TEXT FOLLOWS THE CURSOR UNTIL YOU TYPE A SPACE.

?#M CHANGE TEXT OFFSET FROM TEXT LOC.

PIN HODE COMMANDS:

?"D DELETE CLOSEST PIN

?"M MOVE THE CLOSEST PIN, CURSOR IS PLACED ON PIN AND PIN FOLLOWS IT UNTIL SPACE IS TYPED.

W

?"N ASKS "NEW PIN ID??", THEN CHANGES THE NUMBER OF THE CLOSEST PIN TO WHAT EVER YOU TYPE, SAME RESTRICTIONS ON NUMBER AS WHEN PLACING NEW PIN,

MACROIS:

?(: MUST HAVE SOME BITS, EQUIVALENT TO ; RØ<CR>

W

?(; TELL SCANNER THAT NEXT CHAR, IS MACRO COMMAND,

MACRO COMMANDS:

- P START TEMPORARY MACRO.
- M START PERMANENT MACRO, EVERYTHING FROM HERE TO THE NEXT CORS WILL BE TAKEN TO BE THE MACRO NAME.
- LIKE M, EXCEPT DOESN'T EXECUTE MACRO DURING DEFINITION.

 IF REPEAT COUNT IS GREATER THAN 1, THE REST OF THE

 ITERATIONS WILL BE IGNORED ALSO.
- END MACRO, EVERYTHING FROM HERE TO THE NEXT <CR> WILL BE TAKEN TO BE THE REPEAT FACTOR (INCLUDING DEFINITION OF MACRO). FOR PERMANENT MACRO'S THE REPEAT FACTOR BECOMES PART OF THE DEFINITION.
- C CALL MACRO BY NAME, EVERYTHING FROM HERE TO NEXT <CR> WILL BE TAKEN AS THE MACRO NAME.
- A FOLLOWED BY:

I,N,M<CR>

SUBSTITUTE AT THIS POINT THE NUMBER N AND INCREMENT BY MEVERY TIME THROUGH THE MACRO I LEVELS UP FROM THE CURRENT ONE. N AND M MAY BE NEGATIVE,

- N SAME AS ";A" EXCEPT ALWAYS SIGNS THE NUMBER, EXCEPT FOR ZERO WHICH EXPANDS INTO A NULL STRING!
- L FOLLOWED BY:

<NUMBER><CR>

ADDS 100 (OCTAL) TO NUMBER AND RETURNS IT AS A LETTER, IF "D" PRECEEDS THE NUMBER, G,I,O, AND Q ARE SKIPPED. THE "D" STANDS FOR "DEC"

T WILL REQUEST TTY INPUT AT THIS POINT.
MUST BE TERMINATED BY "; RØ",

F<N><FLAG><CR>

<FLAG>:;=

<FLAGNAME> ?: =<FLAGNAME>

<N>::= <MACRO LEVEL>

IF <FLAG> IS TRUE, ALL CHARACTERS ARE EATEN UNTIL A MACRO LEVEL <N> LEVELS UP FROM THE CURRENT ONE IS LEFT. THE FOLLOWING FLAGNAMES EXIST:

ALWAYS FALSE (USE =FALSE FOR TRUE)

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D

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CLOSES FTXT AEOL ABOL EDGE TRUE IF CLOSE TO SOMETHING
TRUE IF LAST "?"F" FOUND SOMETHING
TRUE IF AT END OF LINE IN ALTER MODE
TRUE IF AT BEGINNING OF LINE
TRUE IF LAST CURSOR MOVE HIT SCREEN EDGE
(NOT TRUE IF IN WINDOW MODE)

HACRO'S MAY BE NESTED TO A LEVEL OF 102 DECIMAL THE ONLY REQUIREMENT BEING THAT EACH MACRO CONTAIN AN EQUAL NUMBER OF ; P'S AND ; R'S,

HOW TO DO IT == PC CARDS

START HERE WHEN YOU HAVE COMPLETELY FINISHED WIRING YOUR PC CARD.

YOU ARE NOW IN THE PC PROGRAM, YOU MUST NOW GENERATE 4 PLOT FILES, THE 2 OUTER PLANES (COMPONENT AND SOLDER) AND THE 2 INNER PLANES (POWER AND GROUND). YOU SHOULD TRY TO USE THE FOLLOWING FORM FOR PLOT FILENAMES. END THE NAME WITH "C" FOR COMPONENT, "S" FOR SOLDER, "P" FOR POWER. AND "G" FOR GROUND.

W

TO GENERATE THE COMPONENT AND SOLDER PLANE PLOTS GET ON THE APPROPRIATE SIDE AND SAY <CTRL><META>W. THEN

TYPE THE FILENAME. NOW FOR INNER PLANES, IF YOU WANT ANYTHING BUT CLEARANCES IN YOUR INNER PLANES, STOP AND SEE RPH, OTHERWISE YOU NOW TYPE INNER CR > TO THE EXTENDED SCANNER, THIS DELETES ALL LINES AND POINTS EXCEPT DIP PINS AND FEED THROUGHS, AND SETS THE PAD TYPE FOR THESE TO 2 (CLEARANCES), CURRENTLY THE PLANE CONNECTIONS AREN'T INDICATED BY THE ABSENCE OF PADS.

TO MAKE THE INNER PLANE PLOTS, USE THE EXTENDED MODE PPLOT COMMAND, WHICH ASKS FOR THE PLANE NUMBER, THEN THE FILENAME. THE PLANE NUMBER IS THE SAME AS THE ONE YOU GAVE

TO ATTACH TO THE PLANE IN THE FIRST PLACE.

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MORE PC CARDS == PCP
NOW YOU HAVE 4 PLOT FILES (IF NOT SEE RPH), NOW RUN PCP,

W

THE FOLLOWING INDICATES PROGRAM PROMPTS IN UPPER CASE, THEN A DESCRIPTION OF YOUR RESPONSE IN LOSER CASE, IT IS SUGGESTED THAT YOU RUN PCP ON A TELETYPE WHEN DOING A TRW PLOT, AND SAVE THE OUTPUT FOR TRANSFERING TO A PLANNING SHEET.

TRW PLOT TAPE??

IF YOU WANT TO MAKE ARTWORK AT TRW SAY YES, IF YOU SAY NO, THE FOLLOWING SEQUENCE WILL BE OMITTED.

ADD SYMBOL DEFINITIONS??

IF YOU ARE USING ANY CHARACTERS NOT IN THE TRW STANDARD CHARACTER SET (SEE RPH FOR CHARACTER SET), SAY Y<CR>, IF YOU SAY Y, THE FOLLOWING WILL BE ASKED:

SYMBOL DEFINITIONS LIVE FOR EVER (IN THIS CORE IMAGE).
BE SURE TO MAKE A SKETCH OF THE SYMBOL INDICATING THE "D" CODE.
D60??

TYPE THE SINGLE CHARACTER FOR THIS CODE (NO <CR>), ANY PREVIOUSLY ASSIGNED CODES WILL BE PRINTED FOLLOWED THEIR CHARACTER, THE YOU WILL BE ASKED TO ASSIGN THE FIRST UNASSIGNED CODE.

D61??

THIS WILL CONTINUE UNTIL YOU ANSWER <CR>.

FR-80 PLOT TAPE??

THIS WILL MAKE AN FR80 FILE WHICH MAY BE SENT TO LOCKHEED AND TURNED INTO MICROFILM AND SMALL PRINTS.

IF YOU ANSWER YCOR> THE FOLLOWING QUESTIONS ARE ASKED:

OPTIMIZE PLOT??

IF YOU ARE ONLY MAKING AN FR80 TAPE, YOU SHOULD ANSWER NCR>, THIS SUPPRESS THE ORDERING OF LINES, ETC, WHICH TAKES AT LOT OF COMPUTING A PRESENT, BUT THE FR80 DOESN'T CARE SO MUCH ABOUT ORDERING.

AT FR80 SCALE OF 3.7 FRAME IS ABOUT 22X17, FR80 SCALE*10 ??

THIS IS EXACTLY WHAT IT SEEMS, IF YOUR CARD IS SOMEWHAT SMALLER THAN THIS, YOU MAY USE A LARGER SCALE, USE AID TO CALCULATE THE APPROPRIATE SCALE, <CR> WILL GET YOU SCALE OF 37 (3.7),

FR80 FRAME IS 22X17,

THIS WILL BE PRINTED IF YOU GIVE A SCALE OTHER THAN 37.

SCALE??

SCALE OF 1 IS REAL SIZE (YOU GET THIS IF YOU TYPE <CR> ALONE), DON'T USE ANYTHING ELSE IF YOU ARE MAKING A TRW PLOT OR AN FR80

PLOT, THIS MAY BE USED TO MAKE DETAIL PLOTS.

POSITIVE X,Y OFFSET (IN INCHES, DECIMAL POINT OK!)??

THIS MUST BE USED TO GENERATE TRW PLOT TAPES, AND CINCH DRILL TAPES, BOTH SYSTEMS HAVE 0,0 AT THE LOWER LEFT. THE STANDARD FILM WE ARE USING AT TRW IS 24 X 20 INCHES, THUS THE OFFSET SHOULD BE 12.10 CR>, THE CINCH DRILL FRAME SIZE WE WILL USE IS 20 X 20 INCHES, SO USE 10,10 FOR DRILL TAPE, IF CR> IS TYPED, AND YOU ARE MAKING A TRW PLOT, 12.10 WILL BE USED, OTHERWISE 0,0 IS USED. THIS OFFSET IS NOT USED FOR FR80 OUTPUT, FR80 OUTPUT IS CENTERED AUTOMATICALLY.

IF FR80 OR TRW PLOT WAS SPECIFIED. THE FOLLOWING QUESTION IS ASKED:

CALCOMP PLOT??

THIS ALLOWS YOU TO SUPPRESS THE CALCOMP PLOT.
THE CALCOMP PLOT MAY ALSO BE SUPPRESSED BY
REENTERING INSTEAD OF STARTING THE PROGRAM.

THE PRECEDING INFORMATION IS ASKED ONLY ONCE EVERY TIME THE PROGRAM IS STARTED. THE REST IS ASKED IN A LOOP STARTING HERE, WHEN DONE TYPE +C (CALL).

FILENAME??

TYPE THE PLOT FILENAME, DEFAULT EXTENSION IS "PCP",

CHAR	11 M 11	HEIGHT
SCALE	CODE	(IN MILS)
Ø	M5/J	120
1.	M51	
2	M52	
3	M53	
4	M54	

THIS CONTROLS THE CHARACTER SIZE, THE TYPEOUT ACTUALLY STOPS AT THE END OF EACH LINE, <CR>
SUPPRESSES TEXT OF THIS SCALE, IF THIS IS A TRW TAPE, THE HEIGHT MUST BE DIVISIBLE BY 15, OTHERWISE IT MUST BE DIVISIBLE BY 5, THIS NUMBER IS THE HEIGHT AND SPACING OF THE CHARACTERS OF THAT SCALE, SCALE Ø (M5Ø) IS USED FOR THE MESSAGES, WHICH ARE PLOTTED ACROSS THE BOTTOM OF THE FILM,

PUT PEN AT 0;0. LINES, TEXT, AND PADS MAX X= 0,000 MIN X= 0,000 MAX Y= 0,000 MIN Y= 0,000

THIS INFORMATION IS CALCULATED FROM THE PLOT FILE, AND DOES NOT INCLUDE THE CARD OUTLINE. IF ANY OF THE NUMBERS ARE ABNORMALLY LARGE, STOP AND GET RPH IMMEDIATELY.

IS THIS A DRILL PLOT??

IF YOU ANSWER YCCR> TO THIS ALL LINES AND TEXT AND PADS WILL BE SUPPRESSED AND DONUT PADS WILL BE PLOTTED FOR EACH DRILL HOLE, ALSO THE CARD OUTLINE WILL BE PLOTTED WITH TARGETS

BUT NO FINGERS, SAYING YES HERE GETS YOU THE FOLLOWING QUESTION:

CINCH DRILL TAPE??

SAYING YCR> WILL CAUSE A TAPE FILE FOR CINCH'S NUMERICALLY CONTROLLED DRILL MACHINE TO BE WRITTEN IN A FILE.

DRILL TAPE FILENAME??

THIS IS THE NAME IT WILL USE (DEFAULT EXTENSION IS "DRL").

IF THIS IS A TRW PLOT TAPE THE FOLLOWING IS ASKED!

OPERATOR MESSAGES, 40 CHARS PER LINE (MAX), END WITH <CR>, STANFORD A.I. FOONLY GROUP, <ALREADY ON TAPE>

THIS PUTS MESSAGES ON THE TAPE WHICH ARE TYPED TO THE OPERATOR AT TRW AT THIS POINT IN THE PLOT, THESE MESSAGES ARE ALSO PLOTTED ACROSS THE BOTTOM OF THE FILM FOR IDENTIFICATION PURPOSES, THE FIRST LINE ALWAYS IDENTIFIES US, SUBSEQUENT LINES SHOULD IDENTIFY THE PLANE NUMBER (Ø TO 4, TOP TO BOTTOM) AND WHAT IT IS, END WITH A BLANK LINE.

IF THIS IS AN FR80 PLOT:

FRBØ FILENAME??

THIS SETS THE FILENAME TO USE FOR THE FR80 PLOT THE DEFAULT EXTENSION IS "F80", "?0" MAY BE USED IN WHICH CASE THE PLOT FILENAME WILL BE USED. THESE FILES MUST BE SUBSEQUENTLY COPIED ONTO A MAGTAPE, BUT I DIGRESS.

IF THIS IS NOT A DRILL PLOT (PADS FOR DRILL HOLES ONLY), THE FOLLOWING QUESTION IS ASKED;

SKIP PLOTTING OF ALL PADS??

THIS IS ONLY USEFUL ON CALCOMP FOR OVERLAYING PLOTS WITH THE SAME PADS,

NOW THE PROGRAM WILL SPEW OUT VARIOUS THINGS ABOUT HOW FAR ALONG IT IS, IF THE CARD NUMBER WAS AVAILABLE WHEN THE PLOT FILES WERE WRITTEN, IT WAS PASSED IN THE FILE, IF NOT, THE FOLLOWING QUESTION WILL BE ASKED:

CARD NUMBER??

HERE YOU TYPE THE NUMBER OF THE CARD YOU WANT TO USE. IF YOU TYPE ØCCR> OR JUST CCR>, NO CARD WILL BE DONE.

HERE PROGRESS ON THE CARD IS INDICATED.

NOW THE PROGRAM WILL TYPE:

ACTUAL MAX X \equiv 0.000 MIN X \equiv 0.000 MAX Y \equiv 0.000 MIN Y \equiv 0.000

THESE NUMBERS INCLUDE THE CARD OUTLINE AS WELL AS LINES, TEXT, ETC. THEY MUST BE COPIED TO THE TRW PLANNING SHEET IF THIS IS A TRW PLOT.

W

THEN IT SAYS:

PLOT DONE!

AND HERE WE LOOP BACK TO THE PLOT FILENAME PROMPT!

AT COMPLETION OF PLOTS, THE FOLLOWING COMMAND SHOULD BE TYPED TO GENERATE AN FR80 TAPE:

COPY MTAØ: FOO+STANFO, F8ØCF, RPHJ, <ALL YOUR F8Ø FILES, SPECIFYING PPN>, STANFO, F8Ød

TO PUNCH PAPER TAPE FROM AN XXX, DRL FILE, RUN TDEF, RPHI AND TYPE THE FILENAME XXX, THIS IS A SEPARATE PROGRAM BECAUSE THE TAPE MUST BE PUNCHED IN BINARY.

FIN

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RUNNING UML

HOW TO RUN THE WIRE LISTER

W

OR

EASY LITTLE STEPS FOR MUDDY LITTLE FEET

COMMANDS:

I WIRE LIST ID> CR>

THE WIRE LIST ID IS ANY STRING INCLUDING NULL, IT IS USED TO IDENTIFY DIFFERENT WIRE LISTS, IF THIS IS A NEW WIRE LIST, YOU WILL BE ASKED;

NEW WIRE LIST, WIRE LIST TITLE??

THE STRING YOU TYPE WILL BE PRINTED AT THE TOP OF YOUR LISTINGS.

IF THIS IS AN OLD WIRE LIST, PROGRAM WILL TYPE;

OLD WIRE LIST.

NOW YOU WILL BE ASKED!

FILENAME??

YOU MAY TYPE A FILENAME (DEFAULT EXTENSION IS "WD") OR @FILENAME (DEFAULT EXTENSION IS "DIR"), THE FORMAT OF A "DIR" FILE WILL BE EXPLAINED LATER.

THE FILE(S) ARE READ, SIGNAL NAMES ARE COMPARED AND THE WIRE LIST IS BUILT:

U<WIRE LIST ID><CR>

THE WIRE LIST ID MUST EXIST, ELSE YOU GET AN ERROR MESSAGE, THEN YOU ARE ASKED:

FILENAME ??

SAME AS FOR I EXCEPT INSTEAD OF "WD", "UML" IS USED. THIS SETS UP THE CORRESPONDENCE BETWEEN DIPS AND BODY NAMES OR LOCATIONS, THE FORMAT OF A UML FILE WILL BE DESCRIBED LATER.

L<WIRE LIST ID><CR>

THIS LISTS A WIRE LIST ON THE LINE PRINTER, ALL SORTS OF NEAT THINGS ARE INDICATED ON THE WIRE LIST, THE BEST WAY TO FIND OUT WHAT THEY ARE IS TO MAKE ONE, ANY UNNAMED SIGNALS ARE GIVEN UNIQUE NUMBERS

WHICH ARE PRINTED PRECEEDED BY A "#",

U<WIRE LIST ID><CR>

THIS MAKES THE FOLLOWING SUMMARIES!

SUMMARIZES ALL DIP TYPES USED IN THIS WIRE LIST TOTALING THE DIFFERENT BODY NAMES AND TOTAL NUMBER OF SECTIONS USED,

W

UNGENERATED SIGNALS

UNUSED INPUTS

UNUSED OUTPUTS

UNATTACHED SIGNAL NAMES

EACH OF THESE CATAGORIES IS LISTED, ONLY ONE OF THE NAMES OF A WIRE FITTING THE CATAGORY IS LISTED, UNNAMED SIGNALS ARE GIVEN THE SAME NAME AS IN A REGULAR LISTING.

T<WIRE LIST ID><CR>

THIS WRITES A CARD TESTER FILE FOR P. PETIT'S SIMULATOR, THE DEFAULT EXTENSION IS "TST".

PAGE 1=36

UML FILE FORMATS

IN THIS PART:

?C?3 MEANS OPTIONAL SYNTACTIC ENTITY ?C?3* 1 OR MORE OF SINGLE LETTER SYNTACTIC ENTITY 1 OR MORE DIGITS

"UML" FILES!

BY NAME CRLF> ? C <TAB> ?3# <DIP TYPE> <CRLF> ?3#

OR

THE "BY LOCATION" FORMAT TELLS WHICH DIPS LIVE IN WHICH LOCATIONS,

"DIR" FILES;

?[<FILENAME> ?[,<EXT> ?3 ?[E<P>,<PN>] ?3 ?[<L> <N> (<N> ?[,<N>?3) ?3# # ?

THIS IS A LIST OF FILES TO READ FOR "I" OR "U" COMMANDS.
THE <L> <N> (<N> ?[.<N>?3) CONSTUCT IS FOR AUTOMATIC SLICING.
HOWEVER SOME OF THIS MAY CHANGE SOON SO SEE RPH.

PAGE 1=37

RUNNING MAGGOT

MAGGOT READS MAGTAPE ON MTAØ AND SIMULATES GERBER PLOTTER PACKAGE ON CALCOMP. ALSO MAKES LINE PRINTER LISTING.

W

ASKS IF YOU WANT A CALCOMP PLOT ASKS IF YOU WANT A LINE PRINTER LISTING

THE FIRST TIME ANY SCALE IDENTIFIER IS ENCOUNTERED YOU WILL BE ASKED TO TYPE ITS HEIGHT.

PAGE 1=38.

RUNNING PDRILL

PDRILL READS PAPER TAPE AND PLOTS X'S ON CALCOMP FOR EACH DRILL HOLE, ALSO LISTS X, Y'S OF HOLES ON LINE PRINTER

W

ASKS IF YOU WANT A CALCOMP PLOT ASKS IF YOU WANT A LINE PRINTER LISTING ASK YOU TO LOAD TAPE BEFORE STARTING PAGE 1=39

RUNNING FR80

ASKS IF YOU WANT A CALCOMP PLOT.
ASKS IF YOU WANT LPT OUTPUT.
ASKS FOR A FILENAME. (DEFAULT EXT IS "F80")
MAKES PLOT AND LISTING IF APPROPRIATE.

MISCELANEOUS
DRAWING PITFALLS:

1. LINES WHICH APPEAR TO TOUCH MAY NOT INTERSECT IN THE DATA STRUCTURE. TO INSURE CONTINUITY YOU MUST EITHER:

A. USE THE "=" METHOD TO HAVE A LINE YOU ARE DRAWING INTERSECT A POINT YOU CAN SEE.

B. USE THE "?"A" OR "?#A" METHOD TO ATTACH TO A POINT OR LINE RESP.

(IN CASE OF DIFFICULTY, LEARN THE "3"B" AND "7#B" FUNCTIONS,)

LABELS (LOGICAL NAMES) MAY APPEAR NEAR A WIRE AND NOT BE ASSOCIATED WITH IT. TO FORCE ASSOCIATION, YOU MUST:

A. GET ON THE POINT AT THE END OF THE WIRE AND PLACE THE TEXT THERE, MOVE THE WIRE IF THE TEXT GETS GARBAGED BY SOME NEARBY OBJECT.

(YOU MIGHT USE THE "?"A" FUNCTION TO ATTACH SOME TEXT TO THE NEAREST POINT)
PC CARD LAYOUT RESTRICTIONS (BY MCGUIRE):

THE FOLLOWING LAYOUT TECHINQUES ARE TO BE CONSIDERED MANDITORY UNTIL PROVEN OTHERWISE:

THE STANDARD STEP SIZE (50 MILS) WILL BE USED IN ALL PC CARDS EXCEPT FOR SPECIAL PURPOSE ONES, THIS ALLOWS EXACTLY ONE WIRE TO PASS DIRECTLY BETWEEN TWO PADS.

WIRES BETWEEN PADS SHOULD BE WITHIN 15 DEGREES OF STRAIGHT THROUGH TO ALLOW 18 MILS OF CLEARANCE BETWEEN WIRE AND PAD, 30 DEGREES GIVES 15 MILS OF CLEARANCE, STRAIGHT THROUGH GIVES 20 MILS OF CLEARANCE.

WIRES BETWEEN PADS ARE ALLOWED ONLY ON THE TOP (DIP INSERTION) SIDE OF PC CARDS OWING TO TROUBLE WITH SOLDER BRIDGING ON THE BOTTOM.

SPACING BETWEEN WIRES MAY BE THE MINIMUM, THAT IS 50 MILS. CONSIDER PADS AND FEED THROUGH TO BE 52 MILS IN DIAMETER AND WIRES TO BE 10 MILS WIDE (AFTER ETCHING).

IF A FEED THROUGH IS TO BE PLACED BETWEEN TWO WIRES THE WIRES MUST BE AT LEAST 100 MILS APART IN ORDER THAT THE 20 MILS CLEARANCE BE MAINTAINED AROUND THE FEED THROUGH.

IN ORDER TO KEEP MOST OF THE LINES VISIBLE AT HIGH MAGNIFICATION NO LINE SHOULD BE LONGER THAN 1 INCH. LONGER LINES MAY BE MADE UP OF A NUMBER OF 1 INCH SEGMENTS.

PLANE DESIGNATIONS:

IN ORDER TO AVOID CONFUSION THE FOLLOWING PLANE DESIGNATIONS WILL BE USED IN ALL PC CARDS:

PLANE USE

Ø GROUND PLANE.

1 FIRST POWER PLANE (USE THIS IF ONLY ONE)

PAGE 1-41

SECOND POWER PLANE (USE THIS AND 1 IF TWO POWER PLANES) 2

THIRD POWER PLANE.

IF SOMEBODY NEEDS MORE THAN 4 PLANES, HE IS CRAZY AND SHOULD SEE RPH FOR TREATEMENT.

W

EXTERIOR PLANES!!!!!!!

THE SIDE OF THE BOARD INTO WHICH DIPS ARE INSERTED WILL BE REFERED TO AS THE TOP, THE OTHER SIDE WILL BE REFERED TO AS THE OTHER SIDE.