INSTITUTIONEN FÖR SYSTEMTEKNIK
DEPT OF EE

Projektet plotter

Plottern består av en roterande trumma samt en penna som kan föras horisontellt över trumman. Ett A4–papper kan fästas på trumman. Pennan kan flyttas i uppfällt eller nedfällt läge.

Rotation av trumman (y–led) samt den linjära pennrörelsen (x–led) styrs av två 4–fas stegmotorer.

X–motorns faser betecknas x_0, x_3, x_1, x_2. För att stega x–motorn används följande pulssekvens:

rad	x_0	x_3	x_1	x_2
1	1	0	0	0
2	1	1	0	0
3	0	1	0	0
4	0	1	1	0
5	0	0	1	0
6	0	0	1	1
7	0	0	0	1
8	1	0	0	1

Tabellstegning enligt rad 1, 2, 3, ..., 8, 1, 2, ... flyttar pennan åt höger. Omvänd tabellstegning 8, 7, ..., 1, 8, ... flyttar pennan åt vänster.

En radväxling t ex från rad 2 till rad 3 flyttar pennan 0,05 mm.

Y–motorns faser betecknas y_0, y_3, y_1, y_2.

Y–motorn styrs på samma sätt som x–motorn. Upplösning i x–led är densamma som i x–led, dvs 0,05 mm.

Plottern kan styras på olika sätt. Du kan välja att konstruera en enkel plotter eller en mer avancerad grafisk plotter.

SPECIFICATIONS.

The following table lists the specifications for the Model 100 Plotter:

Paper Size .... 8 1/2 in. (21.6 cm) width. Up
                        to 11 3/4 in. (29.5 cm) length, max.

Plotting Area .... 8 in. (20.3 cm) by 10 3/4 in.
                        (27.3 cm), max.

Pen Velocity .... 3 in./s (7.6 cm/s) along either
                        axis, max. Velocity can be set
                        by the user in software driver.

Minimium Step Size .... 0.002 in. (0.05 mm) along X and
                        Y axis.

I/O Requirements ...... Parallel TTL; 9 bits from output
                        port, 6 bits to input port.

Physical Dimensions ... 3 1/2 in. (8.9 cm) H.   16 1/8 in.
                        (41.0 cm) W. 8 1/2 in. (21.6 cm) D.

Weight .... 9 1/2 lbs. (4.3 kg).

Power Requirements .... 115 or 230 Vac (+/- 10%), 50/60 Hz,
                        40 W.

Fuses .... 1/2 Amp SloBlo.(115Vac)
                        1/4 Amp SloBlo.(230Vac)

OPERATOR CONTROLS.

A brief description of the Model 100 controls and their functions follows:

POWER. The AC power switch is located on the rear panel of the instrument on the right-hand side. When switched on, power is applied to the plotter's circuitry and the LINE indicator lights up.

MOTOR RELEASE. The MOTOR RELEASE toggle switch allows the operator to disable the stepping motors that provide the X and Y axis motions. With the MOTOR RELEASE switch in the ON position, the drum can be rotated manually to load paper and the pen carriage can be moved manually along its axis of motion.

When the switch is in the OFF position, power to the motors is controlled by output data from the host computer.

While plotting, note that if MOTOR RELEASE is switched ON, motion in both the X and Y axis ceases even though the host computer continues to issue plotting commands.

PEN. The PEN toggle switch allows the operator to raise the pen manually whenever it is in the "pen down" state.

If PEN is switched to the UP position while plotting, the pen will not drop even if "pen down" commands are issued by the host computer.

The remaining switches, PEN MOTION, FAST, and the START/ENTER keyboard switches are software controlled functions provided for in the Model 100 driver software. They are active whenever a call is made by the users routine to the initialization or digitizing subroutines in the plotter driver (see Section 2.)

When the appropriate calls to the driver are made, these switches provide the following functions:

PEN MOTION. The four motion switches allow the operator to rotate the drum up or down (Y axis motion), and to move the pen carriage to the left or right (X axis motion.) Two switches may be depressed simultanously, one for each of the axis of motion. This results in a diagonal pen motion.

FAST. The FAST switch, when depressed along with one or two of the motion switches, provides for faster pen motion.

START/ENTER. This switch performs two functions depending on the driver subroutine called.

When a call is made to the initialization routine, pressing START causes a termination of the initialization process establishing the current pen position as the location of the plotter's coordinate base reference (0,0). The driver then returns to the user's program so that plotting can start.

In the digitizing routine, pressing ENTER causes a return to the calling program and makes the current pen location data available to the user's program.

SECTION 3. HARDWARE INFORMATION

I/O INTERFACING.

The following table defines the pin functions of the I/O connector (J1) on the rear of the Model 100.

PIN #	NAME	DESCRIPTION		DATA BIT
1	+5VDC	Power from the plotter's power supply used to power interfaces only in cases where the host computer cannot provide interface power.		--
2	N.C.	No connection.		--
3	GND	Logic ground connection.		--
4	N.C.	No connection.		--
5	N.C.	No connection.		--
-	--	Input Port Switch Data (Logic 0 = switch depressed)		--
6	ENTER	START/ENTER switch.		DB-5
7	FAST	FAST switch.		DB-4
8	RT	Right Motion switch.		DB-3
9	LT	Left Motion switch.		DB-2
10	DN	Down Motion switch.		DB-1
11	UP	Up Motion switch.		DB-0
--	--	Output Port Data		--
12	PEN	PEN lift solenoid	(lower port)	DB-4
13	Y3	Y-Motor, phase 3	(upper port)	DB-3
14	Y2	Y-Motor, phase 2	(upper port)	DB-2
15	Y1	Y-Motor, phase 1	(upper port)	DB-1
16	Y0	Y-Motor, phase 0	(upper port)	DB-0
17	X3	X-Motor, phase 3	(lower port)	DB-3
18	X2	X-Motor, phase 2	(lower port)	DB-2
19	X1	X-Motor, phase 1	(lower port)	DB-1
20	X0	X-Motor, phase 0	(lower port)	DB-0