CalComp Model 907
Online Plotter Controller
Operation

operation manual

MODEL 907

ONLINE PLOTTER CONTROLLER

OPERATION MANUAL

WARNING

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the instructions manual, may cause harmful interference to radio communications, it has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment

Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

August 1979

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ILLUSTRATIONS

TABLE

DESCRIPTION

The Model 907 Online Plotter Controller (OPC), shown in Figure 1, provides a means to connect various CalComp plotters to a wide range of host computers and calculators in a real-time environment. Only one plotter and one host computer can be connected at a time. The primary data input to the OPC from the host computer is serial start-stop asynchronous format compatible with EIA Standard RS-232.

A terminal, having a RS-232 interface, may be attached through the OPC.

In addition to the RS-232 compatible input format, a parallel interface compatible with IEEE Standard 488 is provided. In the OPC, this parallel input is conside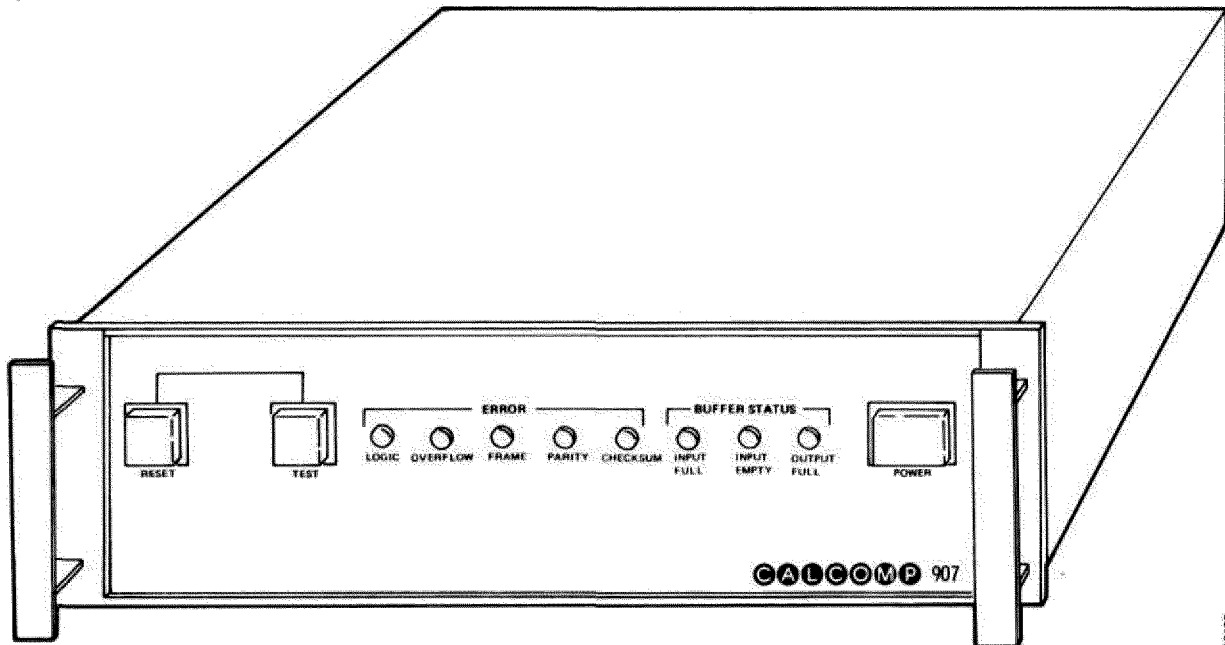red the standard parallel input. Non-standard parallel inputs can be accommodated with the addition of an optional circuit board.

OPERATING CONTROLS AND INDICATORS

The operating controls and indicators are on the front panel of the OPC. In those installations where the OPC is contained within the plotter, the indicators are on one of the plotter's control panels and consist of the BUFFER indicators and a SYSTEM ERROR indicator which lights upon the occurrence of any of the five ERROR indications listed in Table 1,

The operating controls and indicators are shown in Figure 2. Table 1 contains descriptions of the controls and indicators. A typical plotter control panel containing OPC controls and indicators is shown in Figure 3.

INPUT (J0102) - from ICA, directly (no modem eliminator) - on direct connect
or 3705

OUTPUT P0104 - from plotter

OUTPUT J0105 - from terminal (9600 baud, half duplex, odd parity)

if using a modem + dialup, need a modem eliminator cable here.

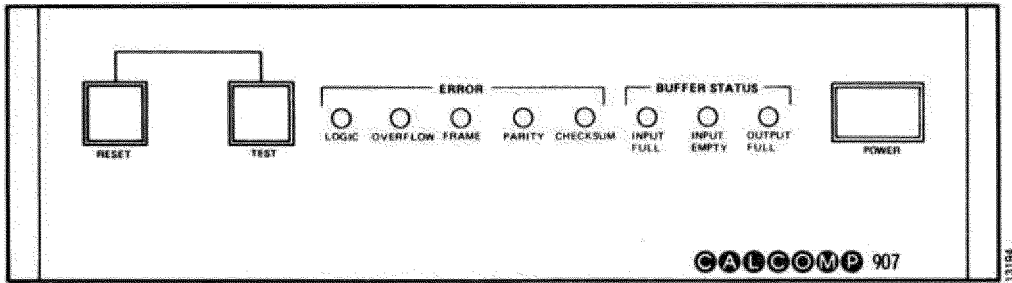Figure 1. Model 907 Online Plotter Controller
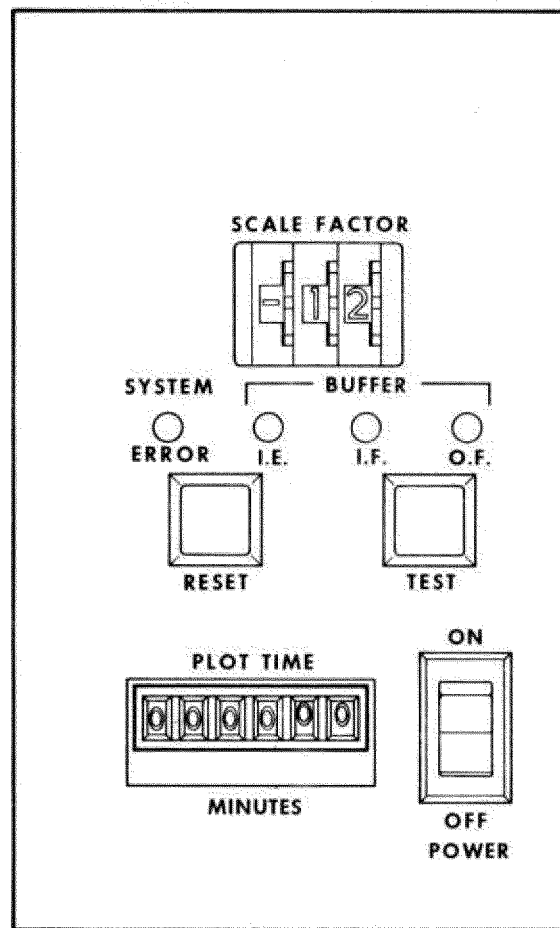
Figure 2. Operating Controls and Indicators

Figure 3. Typical Plotter Control Panel

TABLE 1. CONTROLS AND INDICATORS

Control/Indicator	Description
ERROR Indicators	
LOGIC	This error is caused by a loss of character synchronization between the host computer and the OPC. The detection of this error lights the LOGIC indicator and stops data transmission. Operator intervention is required to restart both the host computer and the OPC. The OPC is restarted by momentarily pressing the RESET switch.
OVERFLOW	This error condition occurs when the OPC input buffer is full and the host computer fails to send an End-of-Buffer character. The OPC initiates a Bad Data Response message to cause a retransmission. If the retransmitted data is good, including the End-of-Buffer character, the OVERFLOW Error indicator is turned off.
FRAME	This error occurs when the transmission protocol between the host computer and the OPC is incorrect. The OPC turns on the FRAME error indicator and sends a Bad Data Response message to the host to initiate a retransmission of data. Upon receipt of correct data, the FRAME error indicator is turned off.
PARITY	This error occurs when a data character has the wrong parity. The PARITY error indicator is turned on and a Bad Data Response message is sent to the host computer at the conclusion of the block transfer. The PARITY error indicator remains on until the data block is received parity error free. When this occurs, the PARITY error indicator is turned off.
CHECKSUM	This error occurs when a checksum test fails. The CHECKSUM indicator is turned on and a Bad Data Response Message is sent to the host computer. Upon retransmission of the data block and a successful checksum test, the CHECKSUM error indicator is turned off.
BUFFER STATUS Indicators:	(BUFFER STATUS indicators should be blinking off and on during normal operation.)
INPUT FULL *(I.F.)	This indicator is turned on when the OPC input buffer is full indicating that the host computer is waiting for the OPC.
INPUT EMPTY *(I.E.)	This indicator is turned on when the input buffer is empty indicating that the OPC is waiting for the host computer.
OUTPUT FULL *(O.F.)	This indicator is turned on when the output buffer is full indicating that the OPC is waiting for the plotter.
POWER Alternate Action Switch	When pressed on, it applies power (switch lighted) to the OPC. When pressed off, it disconnects power (switch not lighted) from the OPC.

TABLE 1. CONTROLS AND INDICATORS (Continued)

Control/Indicator	Description
RESET Momentary Pushbutton Switch	When pressed, resets all OPC electronics. With no ROM or RAM malfunctions, all ERROR and BUFFER indicators light momentarily and then only the INPUT EMPTY (or I.E.) indicator remains on. (Refer to turn-on procedure.)
TEST Momentary Pushbutton Switch	Operates in conjunction with the RESET switch. A test plot is drawn on the plotter when the TEST switch is pressed and held, the RESET switch is momentarily pressed, and the TEST switch is released. Also, when the INPUT EMPTY and INPUT FULL indicators blink in unison due to a pause code received within the plot data from the host, the TEST switch must be pressed to continue plotting.
*See Figure 3.	

OPERATION

The following procedures contain the information necessary for operation of the OPC.

Turn-On Procedure

To turn on the OPC, proceed as follows:

1. Set POWER switch on.

2. Momentarily press RESET switch.

Note

The OPC performs a ROM checksum test at each reset. The OPC locks up if the test fails, as indicated by OUTPUT FULL (or O.F.) indicator not on. All other indicators light.

The OPC also performs a RAM test after each reset. A RAM failure is indicated by all indicators on except INPUT EMPTY (or I.E.) or INPUT FULL (or I.F.).

Note

Pressing the RESET switch during a plot terminates the plot.

3. The OPC is ready for operation.

4. Prepare plotter for operation.

Basic Machine Operation Test

The operator can verify basic machine operations by momentarily pressing the RESET switch. All ERROR and BUFFER indicators light momentarily and then only the INPUT EMPTY (or I.E.) indicator remains on.

Note

If the OPC configuration is for serial input and no cable is attached, the FRAME ERROR (or SYSTEM ERROR) indicator, and possibly the PARITY ERROR indicator, may be on. If other indicators are on, an internal failure has occurred.

Confidence Test

The OPC and attached plotter can be checked without the host computer through a test plot stored in the ROM.

To perform the confidence test, proceed as follows:

1. Position pen block on plotter to lower right of plot area.

2. Set plotter mode to accept controller input.

3 Press and hold TEST switch.

4. While holding TEST switch, momentarily press RESET switch.

5. Release TEST switch. The plotter will now draw the test plot (see Figure 4).

6. When test plot has been completed, press RESET switch.

Logic Error Printout

The OPC can print on the plotter the content of the memory at the time that a logic error occurred. When a logic error occurs, the OPC stops and the LOGIC ERROR and OUTPUT FULL indicators (or SYSTEM ERROR and O.F. indicators) light to indicate that the OPC has received an invalid command. The logic error printout provides significant information for analysis by a programmer or a field service engineer.

The following procedure can only be performed after a logic error has occurred since operation stops only on a logic error. Perform the procedure as follows:

1. Position pen block on plotter to lower right of plot area.

2. Set plotter mode to accept controller input.

3. Momentarily press TEST switch.

4. Memory data prints out on plotter for locations 0000 through 00FF.

Note

The above assumes that the switches of S12 on the PCB are all set to zero. To dump any other memory bank, set the high order 8 bits of the address in S12, then momentarily press the TEST switch.
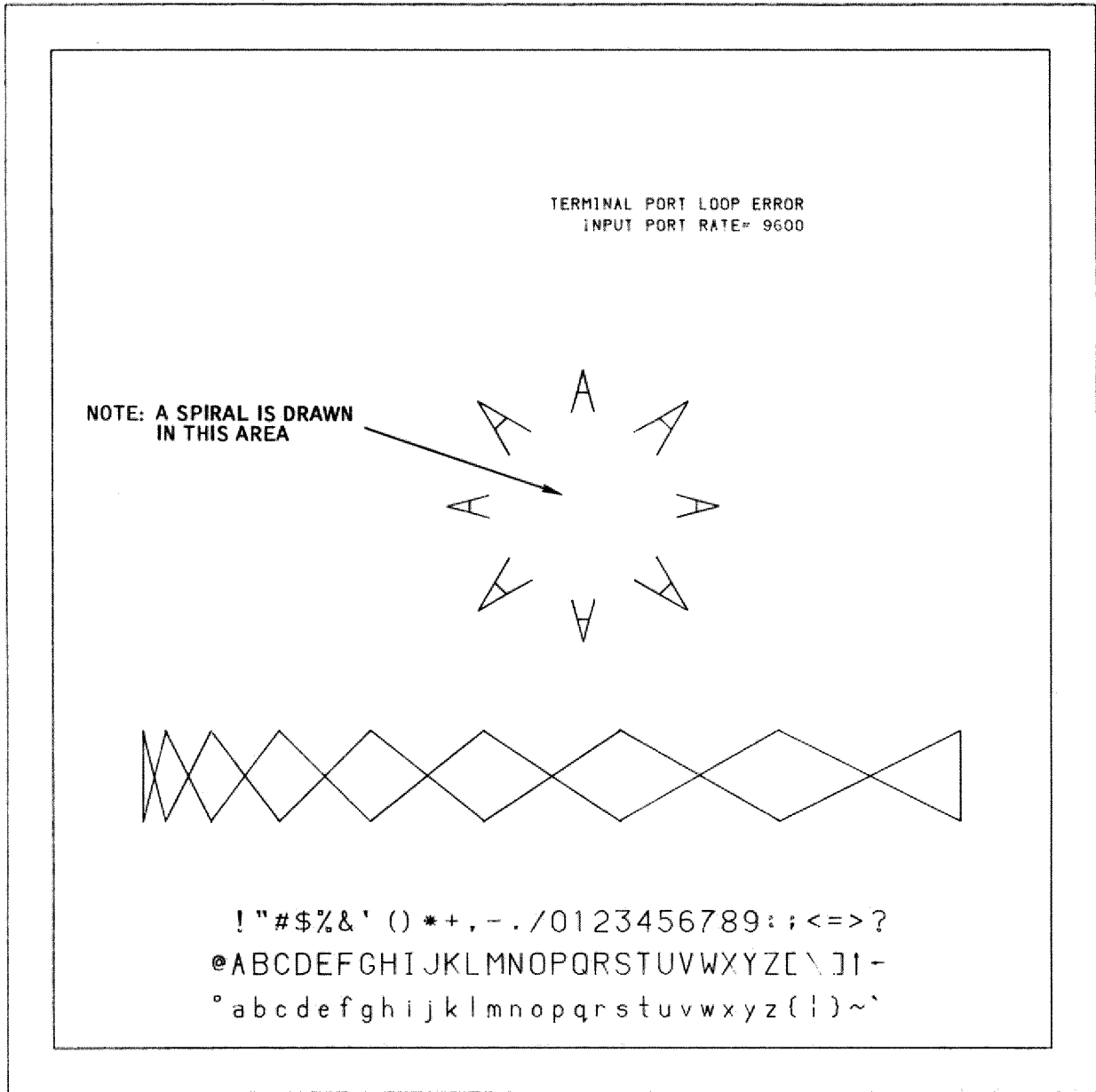
Figure 4. Confidence Test Plot

PACKING LIST FOR MODEL <u>907</u> CONTROLLER

907 Serial Number ___3104___ .   Order Entry Number ___12166___

            MCN ___1229___   Date ___5-25-82___

TO BE USED WITH: PLOTTER ___1051___ .   Serial Number ___3466___

CUSTOMER NAME _____WELLS FARGO_____

I.C. #	PART NUMBER	VOLTS/HZ
484440-3	20262-101-000	120/60

-THE FOLLOWING EQUIPMENT IS SUPPLIED:

I.C. #	PART NUMBER	DESCRIPTION	QTY REQD	QTY SHPD	B/O	INSP
LOOSE EQUIPMENT - DOMESTIC						
576950-0	20306-101-					
397130-6	20528-401-000	Power Cord	1	1		
017800-4	40101-304-022	Fuse, 3 Amp, 3 AG	2	2		
Xerox Copy	10034-213-000	Operation Sw. Config.	1	1		
LOOSE EQUIPMENT - EXPORT						
576960-9	20306-101-					
407330-3	20544-401-000	Power Cord	1			
445100-1	40108-304-020	Fuse, 2 Amp Time Lag	5			
Xerox Copy	10034-213-000	Operation Sw. Config.	1			
MOD KITS:						
444000-4	20392-801-021	POWER OPTION 120 V/ 60 HZ	1	1		
486240-5	20441-801-000	HP3000 PARALLEL	1			
483900-7	20427-801-000	CDC PARALLEL	1			
484880-0	20438-801-000	SYNCHRONOUS INPUT	1			

DO NOT KEYPUNCH BELOW THIS LINE

	Form 51-040	Arrival & Installation	1	1		
560330-3	10242-901-001	Operation Manual	2	2		
	Form 25-045	Return Mailer	*1			

*OEM ORDERS ONLY

906/907 CABLE CONFIGURATION

CUSTOMER ___WELLS FARGO___ OE# ___12166___ DATE ___5-25-82___

PLOTTER ___1051___ INBOARD _____ OUTBOARD __X__ VOLTAGE _____

REVIEWED BY _____ _____ _____

INPUT - FROM SOURCE

To OPC I/F Panel (Serial)

- ☐ 402890-8 20535-401-500 M/F
- ☒ 448710-4 20635-401-025 M/M
- ☐ 448700-5 20635-401-010 M/M
- ☐ 471090-1 20726-401-000 Racal

To OPC I/F Panel (Parallel)

- ☐ 438000-2 20593-401-000 IEEE

CCP
55

INPUT TO 906/907 PCB

I/F Panel to PCB (Serial) J9063 to J0102

- ☐ 444210-9 20600-401-000 (Remote)
- ☒ 445550-7 20605-401-000 (Local)
- ☐ 446730-4 20676-401-000 (20 MA 906)
- ☐ 471790-6 20727-401-000 (20 MA 907/1012)
- ☐ 515000-9 20892-401-000 (RS232 907 Remote)
- ☐ 457120-4 20681-401-000 (IBM 370 Local)
- ☐ 471010-9 20724-401-000 (RS 232 HP9845)

I/F Panel to PCB (Parallel)

- ☐ 444310-7 20602-401-000 (IEEE)
  J9066 to J0103

CDC - Cyber Units to Conform to Mod Kit

- ☐ 483900-7 20427-801-000 906/907 Mod Kit
- ☐ 492230-8 20446-801-000 103X Mod Kit
- ☐ 492210-0 20444-801-000 105X Mod Kit

HP 3000 Units To Conform To Mod Kit Drawings

- ☐ 486240-5 20441-801-000 906/907 Mod Kit
- ☐ 492220-9 20445-801-000 103X Mod Kit
- ☐ 492200-1 20443-801-000 105X Mod Kit

Adaptors

- ☐ 444200-0 Connector - Panel 4 Slots
- ☒ 449240-1 Terminal J0105 Adaptor Plate
- ☐ 454310-4 IEEE 103X Adaptor Plate
- ☐ 455310-5 RS232 103X Adaptor Plate 2 Slots
- ☐ 525560-9 RS232 103X Adaptor Plate 3 Slots
- ☐ 442260-6 RS232 103X Adaptor Plate 1 Slot
- ☐ 456140-3 IEEE Jumper 20142-501-000 3 ea.
- ☐ 456150-3 IEEE Jumper 20143-501-000 1 ea.

Terminal Option

- ☒ 445550-7 20605-401-000
  J9065 to ___J0105___

OUTPUT - PCB TO I/F PANEL

- ☒ 444300-8 20601-401-000 RS232,
  960,105X J9064 to P0104
- ☐ 444290-1 20599-401-000
  5XX, 835, 103X Outboard
  J9061 to J0105
- ☐ 444280-2 20598-401-000
  936 J9060 to J0105
- ☐ 439540-6 20366-401-853
  DIP/DIP 103X Inboard
  J9061 to J2110

OUTPUT I/F PANEL TO PLOTTER

- ☒ 402890-8 20535-401-500
  960, 105X, 1065,970 Outboard
- ☐ 448770-8 20606-401-000
  105X, 1065 Inboard
- ☐ 445560-6 20603-401-000
  5XX, 836, 103X Outboard
- ☐ 446720-5 20604-401-000
  936

- ☐ 526910-5 20499-801-000
  On Line Mod Kit

BI SYNC MOD KIT REQUIREMENT

- ☐ 484880-0 20438-801-000

970/906 INBOARD TO CONFORM TO MOD KIT

- ☐ 525630-0 20425-801-000

___1200___ BAUD

CALCOMP
SANDERS
A Sanders Graphics Company
California Computer Products, Inc.
2411 W. La Palma Ave., Anaheim, CA 92801
Telephone (714) 821-2011 TWX 910-591-1154

CONFIGURATION LIST

MODEL # 907

MCN # 1229 ☒

UNIT SERIAL # 3104

INSPECTOR STAMP 5-25-82

CUSTOMER NAME Wells Fargo

WORK ORDER #

ORDER ENTRY # 12166

DATE SHIPPED 5-25-82

INSPECTOR STAMP

2-17-82

PART NUMBER	IC NUMBER	DESCRIPTION	REVISION		W.O. #
			LAL	ACT	
10528-310-000	441050-2	ELECTRONIC ASSEMBLY	0	2	72360
20835-502-000	441060-1	M.I.B. P.C.B.	1	8	72189-72
21063-502-000	479050-7	CONTROLLER P.C.B. - 512 Rev 3	6	—	—
21063-502-000	479050-7	CONTROLLER P.C.B. - 512 Rev 4	8	9	60597-25
20189-402-000	441090-8	POWER SUPPLY	0	3	72365
20834-502-000	440930-6	P.C.B.	0	4	73133-73
20836-502-000	441100-5	INDICATOR BOARD	0	2	72191-19
21063-502-011	479060-6	CONTROLLER W/MEMORY	1	1	—
70167-508-300	562720-3	ROM SET	*	0	—
70167-508-202	533330-7	ROM -U68	*		
70167-508-203	533340-6	ROM -U69	*		
70167-508-204	533350-5	ROM -U70	*		
70167-508-205	533360-4	ROM -U71	*		
70167-508-206	533370-3	ROM -U72	*		

F0070-252 (8/81)

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California Computer Products, Inc.
2411 W. La Palma Ave., Anaheim, CA 92801
Telephone (714) 821-2011 TWX 910-591-1154

CONFIGURATION LIST

MODEL # 907

PART NUMBER	IC NUMBER	DESCRIPTION	REVISION		W.O. #
			LAL	ACT	
70167-508-307	562730-2	ROM -U73	*		
70167-508-308	562750-0	ROM -U74	*		
70167-508-109	491920-5	ROM -U63	*		
		*DNA REFERENCE ONLY			
		OPTIONS			
20438-801-000	484880-0	MOD KIT SYNCHRONOUS INPUT	2		
21064-502-000	537430-1	PCB ASSY	G		
21064-502-011	539320-2	SYNC. INPUTS PCB W/MEM.	Z		
70195-508-300	566170-7	MEMORY SET	0		
70195-508-301	566180-6	ROM U26	-		
70195-508-302	566190-5	ROM U27	-		
20913-901-000	535790-0	CABLE INPUT	2		
20441-801-000	486240-5	MOD KIT HP 3000	0		
20837-502-000	469250-5	PCB ASSY	G		
20837-502-011	557750-7	PCB ASSY W/MEM.	A		
70163-508-300	557760-6	MEMORY SET	0		

F0070-253 (7/81)

CALCOMP
SANDERS

California Computer Products, Inc.
2411 W. La Palma Ave., Anaheim, CA 92801
Telephone (714) 821-2011 TWX 910-591-1154

CONFIGURATION LIST

MODEL # ___907___

PART NUMBER	IC NUMBER	DESCRIPTION	REVISION		W.O. #
			LAL	ACT	
70163-508-301	557770-5	ROM U35	-		
20769-401-000	486270-2	CABLE ASSY IN	1		
20427-801-000	483900-7	MOD KIT CDC	3		
20837-502-000	469250-5	PCB ASSY	G		
20837-502-011	557750-7	PCB ASSY W/MEM.	A		
70163-508-300	557760-6	MEMORY SET	0		
70163-508-301	557770-5	ROM U35	-		
20754-401-000	482800-0	CABLE - 906 IN	2		
20755-401-000	482810-9	CABLE - 906 OUT	3		
20756-401-000	482970-1	CABLE - CDC	2		
20757-401-000	483910-1	CABLE - PRINTER	0		

F0070-253 (7/81)

MCN #1229

16 HEX

0D

907 OPERATING CONFIGURATION RECORD

OPC S/N _____

REPLACEMENT BOARD
NO. _____

HOST SYSTEM _____

TYPE OF PLOTTER 1051X

PLOT RATE N/A MS
(S2, R7, TP1)

INPUT CONFIGURED FOR:

☐ PARALLEL ☒ SERIAL

MODEM: TYPE RS232

MODEL NO. 907

BAUD RATES S8
1 = 110
2 = 150
3 = 300
4 = 600
5 = 1200
6 = 2400
7 = 4800
8 = 9600

S1 ☐ NORM ☒ TEST

S7 ☐ LOOP ☒ LINE

BAUD RATE S10
1 = 110
2 = 150
3 = 300
4 = 600
5 = 1200
6 = 2400
7 = 4800
8 = 9600

S11 ☐ HOST ☒ LOCAL

	1	2	3	4	5	6	7	8
S3 0	X		X	X		X		X
S3 1		X	X		X		X	
S4 0	X	X	X		X			X
S4 1	X	X	X	X	X	X		
S5 0	X	X	X	X		X	X	X
S5 1		X	X		X			
S6 0	X		X	X	X	X	X	X
S6 1	X		X	X		X		X

| S2 0 | | | | | | | | |
| S2 1 | | | | | | | | |

| S12 0 | | | | | | | | |
| S12 1 | | | | | | | | |

| S13 0 | | | | | | | | |
| S13 1 | | | | | | | | |

U67	U68	U69	U70	U71	U72	U73	U74
X	533330	533340	533350	533360	533390	562730	562750

DESCRIPTION SUMMARY FOR CONFIGURATION
SWITCHES S3, S4, S5, AND S6

DOUBLE SYNC CHARACTER RECOGNITION
(1 = USE DOUBLE SYNC CHARACTER)

SYNC CHARACTER
(0-177 OCTAL)

UNUSED

ENABLE DIRECT CONTROL
(RS-232 MODE #1)

FULL DUPLEX/HALF DUPLEX
TURNAROUND CODE (1-37 OCTAL)

END-OF-MESSAGE CHARACTER
(0-37 OCTAL)

CHARACTER FRAMING
(SEE CHARACTER FRAMING TABLE)

TERMINAL MUTING
(1 = MUTING)

ENABLE CHECKSUMMING
(1 = ENABLE)

SERIAL/PARALLEL
(0 = SERIAL)

PLOTTER TYPE
(SEE PLOTTER TYPE TABLE)

PLOT/MAINTENANCE MODE
(0 = PLOT MODE)

NOTE: Switch thrown toward the board edge (closed or ON)
        is in the 0 position.

Figure 4-2.   Configuration Switches (S3 - S6)

4-3

The plotter type positions of Switch S3, specify the plotter
model to be operated (see Table 4-3). Switch S3 tells the
controller on which plotter connector to send the plotter
commands and how to send the commands. Table 4-3 indicates
the switch settings for the CalComp plotters that can be
operated from the controller.

Table 4-3. Switch S3 Plotter Type Selection

S3 (8 7 6 5 4 3 2 1)	Octal Value	Decimal Value	Plotter Model	Step Size	Number of Pens
0 0 0 0	0	0	5XX		1
0 0 0 1	1	1	836		1
0 0 1 0	2	2	1037		1
0 0 1 1	3	3	1038		1
0 1 0 0	4	4	1039		3
0 1 0 1	5	5	936 (metric)		3
0 1 1 0	6	6	936 (inch)		3
0 1 1 1	7	7	1051		4
1 0 0 0	10	8	1055		4
1 0 0 1	11	9	960 (960 char. set)		2
1 0 1 0	12	10	960 (906 char. set)		2
1 0 1 1	13	11	N/A		
1 1 0 0	14	12	N/A		
1 1 0 1	15	13	N/A		
1 1 1 0	16	14	N/A		
1 1 1 1	17	15	925 P-34		

Handwritten annotations:
TesT / NoRMaL PLoT / NoRMaL
Serial 0
Parallel 1
DisableCheck 0
ENablecheck 1
NoTerminaL 0
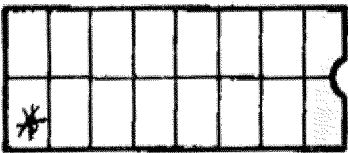TerMinaL 1

4-7

The character framing switch (S4) determines how the controller will interpret the bits it receives to form characters. This defines the asynchronous communications framing of each character with regard to:

— the number of bits

— the parity

— the number of stop bits

The operator should determine the requirements of the host computer and set switch S4 for the character framing according to Table 4-6.

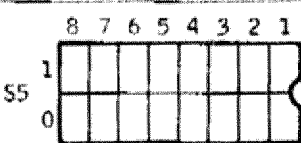Table 4-6. Switch S4 Character Framing

	Octal Value	Bits/ Char.	Parity	Stop Bits
0 0 0	0	7	Even	2
0 0 1	1	7	Odd	2
0 1 0	2	7	Even	1
0 1 1	3	7	Odd	1
1 0 0	4	8	None	2
1 0 1	5	8	None	1
1 1 0	6	8	Even	1
1 1 1	7	8	Odd	1

Handwritten annotations:
End of Message
Char
for Acad
to 0d hex
or 01101

Switch diagram (S4):
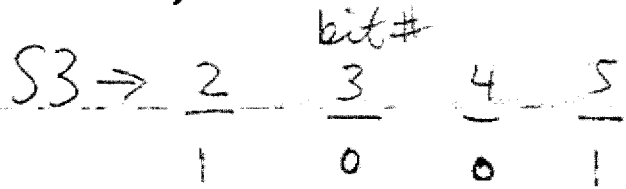8 7 6 5 4 3 2 1
1
0 *

4-10

The serial line control switch (S5) is used to indicate a full or half-duplex data set. This switch defines the turn-around code for half-duplex lines.

The least-significant bit is bit 1 (S5) and the most-significant bit is position 5 (S5). Table 4-8 gives the data set and turnaround codes together with the binary output of bits 1 thru 5 of switch S5. Observe that bits 6 thru 8 of switch S5 are not used.
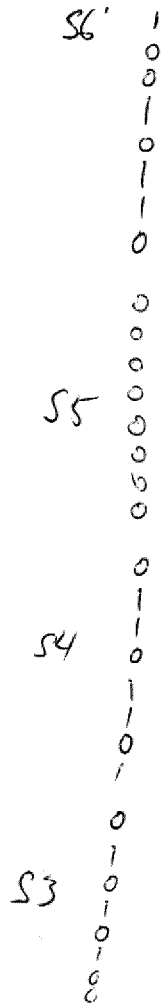
Table 4-8. Switch S5 Serial Line Control

Bit Switch Position	Octal Value	Turnaround Codes	Description
0 0 0 0 0	0		SERIAL LINE IS FULL DUPLEX-NO TURNAROUND CODE
0 0 0 0 1	1	SOH	START OF HEADING
0 0 0 1 0	2	STX	START OF TEXT
0 0 0 1 1	3	ETX	END OF TEXT
0 0 1 0 0	4	EOT	END OF TRANSMISSION
0 0 1 0 1	5	ENQ	ENQUIRY
0 0 1 1 0	6	ACK	ACKNOWLEDGE
0 0 1 1 1	7	BEL	BELL (AUDIBLE SIGNAL)
0 1 0 0 0	10	BS	BACKSPACE
0 1 0 0 1	11	HT	HORIZONTAL TABULATION (PUNCH CARD SKIP)
0 1 0 1 0	12	LF	LINE FEED
0 1 0 1 1	13	VT	VERTICAL TABULATION
0 1 1 0 0	14	FF	FORM FEED
0 1 1 0 1	15	CR	CARRIAGE RETURN
0 1 1 1 0	16	SO	SHIFT OUT
0 1 1 1 1	17	SI	SHIFT IN

NOTE: For codes 10000 thru 11111, the serial line is half duplex data set with a specified turnaround code.

(Switch diagram: 8 7 6 5 4 3 2 1, S5, positions 1 and 0)

4-12

Change to 960 plotter type

bit#

S3 → 2   3   4   5

        1   0   0   1

Now

S6' 1 0 0 1 0 1 0 0 0 0 0 0 0 5 0 0 1 0 1 0

S5

S4

S3

S1 = 116
S2 = 72

907 SWITCH SETTINGS
For use with AUTOCAD

DOWN = 0   UP = 1

HDOUBLE SYNC
MSB
SYNC=27dec=1Bhex
LSB

X16 CLOCKING
0=ACK/NAK
S5

MSB
EOM = 13dec = 0Dhex
LSB
7,Even,1 Stop

0 = No muting
1 = Checksum enabled
0 = serial
Plotter type = 104x

DOWN=CLOSE=ON=0   UP=OPEN=OFF=1

SW3
965
5 1
3 0
2 0