

Model 820-218
RD-4
Remote Time Display

Serial Number _____

March 28, 1997
Revision D

TABLE OF CONTENTS

<u>SECTION</u>	<u>PARAGRAPH</u>	<u>TITLE</u>
ONE		GENERAL INFORMATION
	1.1	Scope of Manual
	1.2	Purpose of Equipment
	1.3	Physical Specifications
	1.4	Environmental Specifications
	1.5	Power Specifications
	1.6	Input Signal Specifications
	1.7	Display Specifications
TWO		INSTALLATION AND OPERATION
	2.1	Introduction
	2.2	Installation
	2.3	Operation
THREE		THEORY OF OPERATION
	3.1	Introduction
	3.2	Circuit Cards
FOUR		MAINTENANCE & TROUBLESHOOTING
	4.1	Introduction
	4.2	Preventative Maintenance
	4.3	Troubleshooting
FIVE		DRAWINGS
<u>DRAWING NUMBER</u>		<u>TITLE</u>
820-218		Top Assembly
820-1016		RD-4 Basic Assembly
820-7016		RD-4 Basic Wiring Diagram
800-5079		Decoder Assembly
800-5096		Display Assembly
800-1077		Wall/Ceiling Mounting Kit Assembly

SECTION ONE

GENERAL INFORMATION

1.1 SCOPE OF MANUAL

This manual contains the information necessary to operate and maintain the TrueTime Model 820-218 RD-4 Remote Time Display.

1.2 PURPOSE OF EQUIPMENT

The Time Display decodes serial IRIG-B data and displays the decoded time.

1.3 PHYSICAL SPECIFICATIONS

The physical specifications are:

Height:	6.83 in. (17.35 cm)
Width:	30.42 in. (77.27 cm) without mounting knobs
Depth:	3.75 in. (9.53 cm) plus connectors
Weight:	Approximately 11 lb. (5 Kg)

1.4 ENVIRONMENTAL SPECIFICATIONS

The environmental specifications are:

Operating Temperature:	0° to +50°C (+32° to +122°F)
Storage Temperature:	-40° to +70°C (-40° to +158°F)
Humidity:	95% relative, non-condensing
Cooling Mode:	Convection

1.5 POWER SPECIFICATIONS

The input power specifications are:

Voltage:	95 to 260 VAC
Frequency:	47 Hz to 440 Hz
Power:	Approximately 50 W
Connector:	CORCOM 6EF1

1.6 INPUT SIGNAL SPECIFICATIONS

The input signal specifications are:

Format:	IRIG-B amplitude modulated
Amplitude:	0.1 to 10 Vpp
Ratio:	2:1 to 6:1
Impedance:	100 Kohm to ground
Direction:	Forward
Connector:	Female BNC

1.7 DISPLAY SPECIFICATIONS

The display specifications are:

Display:	Six 7-segment LED displays
Digit size:	4.0 in. (2.5 cm)
Intensity:	14000 ucd minimum/segment
Blanking:	Display blanks when input lost
Format:	HH:MM:SS

SECTION TWO

INSTALLATION AND OPERATION

2.1 INTRODUCTION

This section contains installation instructions and operating procedures.

2.2 INSTALLATION

Unpack the unit and carefully inspect it for shipping damage. Any damage must be reported to the carrier immediately.

If desired, mount the display on a wall or ceiling using the remote mounting kit provided.

Fabricate any cables required. Connect IRIG-B time code signal from the TrueTime GPS-DC Mark III to the rear-panel input connector. Connect the power cord to the rear-panel connector.

CAUTION! There are extremely dangerous voltages present in this unit. **DO NOT** remove the top cover without **FIRST** disconnecting the primary power! Only skilled technicians should access the inside of this unit.

2.3 OPERATION

Press the top of the rear-panel-mounted POWER switch. The numeric display will first illuminate all display segments and colons as a lamp test. At the end of the initialization sequence the display will show the time translated from the input code in the format HH:MM:SS. If no input or incorrect input is present, the display will blank. No user intervention other than applying power to the display is required.

SECTION THREE

THEORY OF OPERATION

3.1 INTRODUCTION

The RD-4 Remote Display is composed of a rear case containing two Power Supply Assemblies, an 800-5079 Decoder Assembly, and two 800-5096 Display Assemblies.

3.2 CIRCUIT CARD DESCRIPTIONS

The circuits of each of these card Assemblies are explained in the Circuit Card Descriptions on the following pages.

CIRCUIT BOARD DESCRIPTION

800-5079

DISPLAY DECODER

1.0 General Information

The 800-5079 Assembly provides input code decoding, processor control and I/O control.

1.1 AGC Circuit

Reference drawing 800-5079, sheet 2. The input code is applied to Z3-1 through C1 or optionally through the coupling transformer T1. Switch Z1 reverses the polarity of the signal applied to Z3-5 and Z3-6. The buffered input signal at Z3-7 is applied to the attenuator R10-Q1 then to the amplifier Z4. The normalized code output at Z4-1 drives the amplitude sensor Z4. The voltage at Z4-6 is approximately -2v. When the normalized output is more negative than -2v, Z4-7 is low discharging C8 which decreases the resistance of Q1 thereby attenuating the input to Z4-3. If the Z4-5 is more positive than -2v, Z4-7 is high and C8 is charged increasing the resistance of Q1 and increasing the signal level at Z4-3. The normalized output signal at Z4-1 is approximately 4 vpp.

1.2 Decoder Circuit

Reference drawing 800-5079, sheets 2 and 3. The normalized code output at Z4-1 also drives the code activity detector Z5, the polarity detector Z11, zero-axis detector Z6 and the high-amplitude-carrier-cycle detector Z7.

Comparator Z5 clocks flip-flop Z15 high when the input code level exceeds the threshold set by Pot R8. The processor reads this signal (ACT) from register Z31.

The zero-axis detector Z6 produces a square wave (CAR) with the same frequency as the input code carrier. Comparator Z7 detects negative-going high-amplitude carrier cycles (MK). Comparator Z11 detects positive-going high-amplitude-carrier cycles. Flip-flop Z15 is set by negative-going cycles and reset by positive-going cycles. From CAR and MK, Z19, Z14 and Z10 produce a demodulated code signal at Z8-6 which is delayed from on-time by two carrier cycles. This signal clocks the state of Z15-9 which indicates whether the last high-amplitude cycle was positive- or negative-going into Z18. The processor interprets this signal when read from register Z31 as polarity.

One-shot Z12 generates a 100 nanosecond wide pulse which synchronizes the divide-by-ten counters in Z16. The first counter in Z16 counts the number of carrier cycles that occur during the period when the demodulated code signal at Z8-5 is high. Every ten cycles the second counter in Z16 loads the hi-carrier-cycle count into register Z17. A count of 2 corresponds to a 0 code bit. A count of 5 corresponds to a 1 code bit and a count of 8 corresponds to a position marker or a frame reference.

The primary timing input to the processor is the interrupt /IRQ derived from the carrier. /IRQ is a 100PPS signal produced by flip-flop Z18. It indicates that a code bit has been decoded, stored in Z17 and is ready to be read by the MPU. The outputs of Z17 are placed on the MPU data bus when /RDCDATA is low and R//W is high.

1.3

Processor Control

Reference drawing 800-5079, sheet 4. Z29 is the processor. At turn-on Z30 generates a power-on reset and also loads the configuration into the processor through Z31. The 4.9152 MHz from crystal Y1 is divided by four to produce the processor clock E. E is slightly greater than 1 MHz. Transceiver Z28 is used to isolate the data bus, D0 - D7, from the remainder of the logic. When the read/write line R//W is low, Z28 moves data away from the processor. When A15 is high the program memory Z25 is selected by Z26-10. When A14 is high and A15 is low decoder Z27 is enabled. Decoders Z27 and Z33 provide read and write strobes. Register Z32 buffers data to the Display Assembly. Register Z31 interfaces the code activity signal ACT, the polarity signal POL and data from connector J4 to the data bus. Register Z22 buffers data from connector J3 and data encoded by switch S1 to the data bus. Z27-14 enables the write decoder for the hundreds of days and tens of days. Z27-13 enables the write decoder on the Display Assembly for the remaining digits. Z35 controls the polarity switch and the colons.

CIRCUIT BOARD DESCRIPTION

800-5096

1.0 General Description

Display Assembly 800-5096 converts BCD data from the Decoder Assembly into multi-digit seven-segment character display with colons.

2.0 Detailed Description

Reference drawing 800-5096, sheet 2. Decoder/drivers U5 through U10 convert BCD Data from the Decoder Assembly and drive displays U1 through U4. A rear panel pot connected to connector J3 adjusts the output voltage of regulator U6 thereby controlling the character intensity. Flip-flops U13 and U11 and exclusive NOR gate U9 buffer data and chip enable signals to connector J2 which may be used to daisy chain additional display assemblies.

SECTION FOUR

MAINTENANCE AND TROUBLESHOOTING

4.1 INTRODUCTION

Effective maintenance and troubleshooting of this system requires a thorough understanding of equipment characteristics, operating procedures, theory of operation, and knowledge of both linear and logic circuit elements. The equipment characteristics, operating procedures, and the theory of operation for the system processor are provided in SECTION ONE through SECTION THREE of this manual.

4.2 PREVENTIVE MAINTENANCE

A systematic preventative maintenance routine will reduce the possibility of a malfunction. This routine should include inspection, qualification, and cleaning of the instrument.

4.2.1 Inspection

CAUTION: Disconnect equipment from the primary power prior to inspection. Dangerous voltages are present that can cause serious injury or loss of life.

Exercise care when handling this equipment. It contains precision parts that can be damaged by improper handling. Do not touch connector pin surfaces. Foreign material deposited on contact surfaces can cause corrosion, resulting in equipment damage or failure. Inspect the unit for damaged components, loose or frayed connections, and corrosion on metal surfaces. If damage is found, correct it immediately.

4.2.2 Cleaning

CAUTION: Disconnect equipment from the primary power prior for cleaning. Dangerous voltages are present that can cause serious injury or loss of life.

Accumulations of dust and dirt can impair cooling and generally distracts from equipment appearance. A soft cloth and a commercial cleaner (such as Windex) may be used to clean the paint and the lens. Be careful not to get the cleaner into switches.

4.2.3 Qualification

Verify that the unit meets all of the applicable specifications listed in SECTION ONE. Failure to meet a specification is an indication of malfunction and should be corrected immediately.

4.3 TROUBLESHOOTING

CAUTION: Only a qualified technician should attempt repair to this unit. Dangerous voltages are present that can cause serious injury or loss of life. The power supply in particular uses high voltages.

The following suggestions are general in nature. When followed, they will minimize equipment down time. Use these suggestions in conjunction with the drawings in SECTION FIVE and the circuit descriptions in SECTION THREE to diagnose equipment malfunctions.

4.3.1 General Troubleshooting Procedures

Since an apparent problem may actually be the result of operator error, misunderstanding, or misuse, the technician will need a thorough understanding of the normal operation. Refer to SECTION TWO for a description of normal operation. Thoroughly evaluate the procedures used by the operator when the malfunction occurred.

4.3.2 Power Circuits

Verify that power supply is as specified. Verify that the primary power fuse has not blown and that primary power is present. Check external loads where applicable.

4.3.3 Locating Drawings

Reduced drawings of all mechanical assemblies and circuit card schematics are located in SECTION FIVE of this manual. The index contains a list of the drawings in this manual.

4.3.4 Locating Circuits

SECTION THREE provides a written description of each circuit card. Use this information in conjunction with the schematics while troubleshooting.

4.3.5 Circuit Card Removal

CAUTION: Disconnect equipment from the primary power prior to disassembly. Dangerous voltages are present that can cause serious injury or loss of life.

To remove a circuit card first the screws that secure the lid to the case. Remove the countersunk screws from the case which hold the spacers to the case. Lift the circuit card and its spacers from the case. Reinstall the circuit cards in the same position that they occupied before disassembly.

4.3.6 Replacing Components

It is imperative that the IC's are replaced with exactly the same type of component. Do not guess in this area. Use the parts lists to find the exact IC part number. Be sure not to bend under the IC legs when replacing them.

When replacing soldered components use a low temperature iron and be careful not to disturb the etch. Use a resin-core flux and clean the soldered joints carefully with alcohol. Do not allow the cleaner to penetrate the pots or switches.

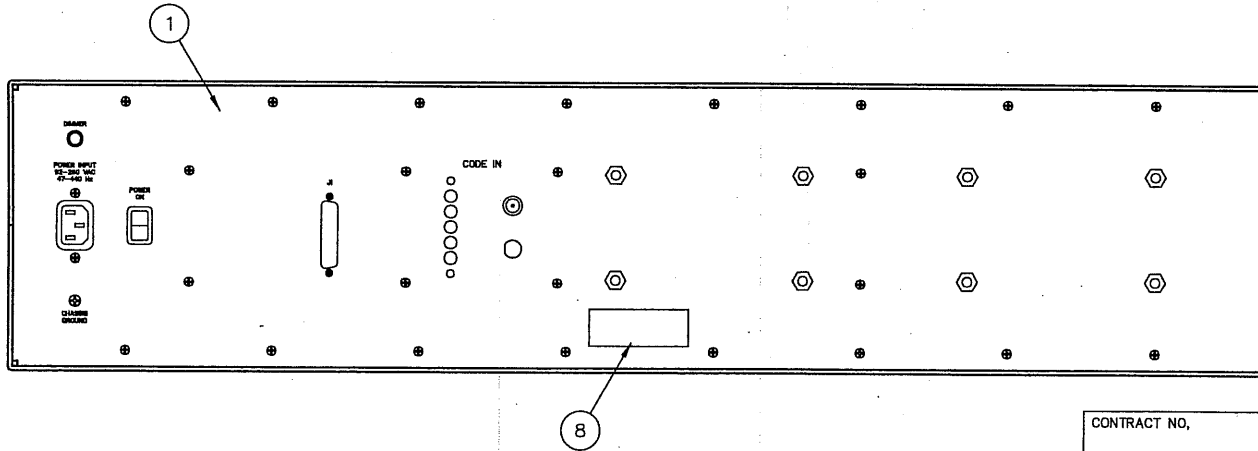
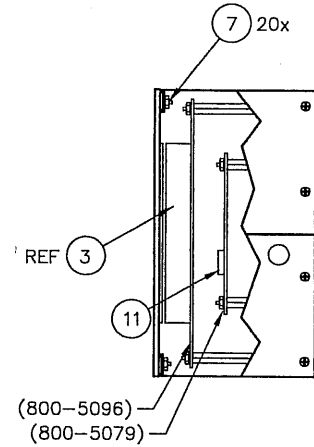
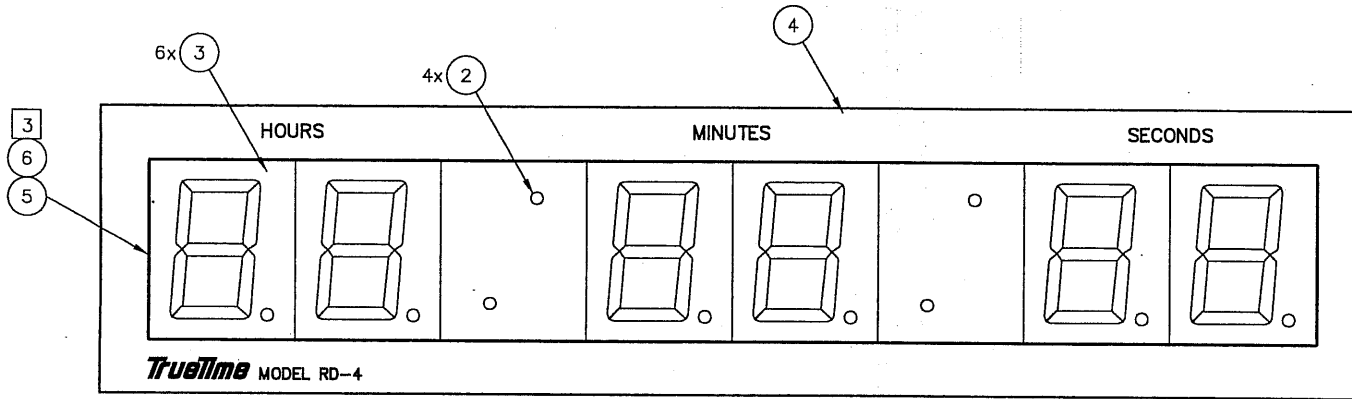
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REVISIONS

REV	DESCRIPTION	DATE	APPROVED
A	ADDED ITEMS 5, 6, 7, 8, & NOTE 3	04/08/99	RB 4-99



- 3 SECURE LENS (ITEM 5) TO FRONT PANEL (ITEM 4) USING PLASTIC ADHESIVE (ITEM 6).
- 2. INSTALL ITEMS 2 & 3 ON ASSY 800-5096.
- 1. INSTALL ITEM 11 ON LOCATION Z25 OF DECODER ASSY (800-5079).

NOTES: UNLESS OTHERWISE SPECIFIED

FILENAME: \820\218
DATE: 04-08-99

CONTRACT NO.				TCU TOP ASSEMBLY MODEL RD-4 (TIME DISPLAY)			
APPROVALS	DATE						
DRAWN BY DLE	11/91						
CHECKED BY RC	11/91						
APPROVED BY PE	11/91	NEXT ASSY		SIZE	CODE IDENT NO.	DRAWING NO.	REV
		B		820-218	A		
		SCALE NONE			SHEET 1 OF 1		

MAX * BILL OF MATERIALS * SINGLE-LEVEL EXPLOSION BY PART IDENTIFIER W/REFERENCE

PART IDENTIFIER	DESCRIPTION 1	DESCRIPTION 2	EFF DATE	ECN #	QTY/ASSY	UOM	REV LVL	REFERENCE DESCRIPTION
820-218	TCU RD-4 TIME DISPLAY						EA	
0000-APPROVAL	PARTS LIST APPROVAL		000000		1.0000		EA	<u>RB 4-99</u>
0000-PL	PARTS LIST REV LEVEL		000000		1.0000		EA	REV A (04-09-99)
0000-PRINT	REFERENCE PRINT		000000		1.0000		EA	820-218 REV A
058-010	LED RED 300 MCD	KINGBRIGHT L-813SRD/E	000000		4.0000		EA	02
189-022	DISPLAY 100MM 7-SEGMENT	KINGBRIGHT SA40-19SRWA	000000		6.0000		EA	03
251-006	NUT KEP SS 6-32 .250 HEX	KEPNUT SMALL PATTERN	000000		20.0000		EA	07
283-002	PLASTIC ADHESIVE 5 OZ	3M 4475	000000		0.2500		EA	06
400-001	LABEL PROD ID W/ADHESIVE	TRUETIME SPEC	000000		1.0000		EA	08
560-3043	EPROM PROGRAMMING		000000		1.0000		EA	11
800-1072-005	PANEL FRONT RD-4 TIME	MODIFY 800-1072	000000		1.0000		EA	04
800-1075	FAB LENS RD-4		000000		1.0000		EA	05
820-1016	ASSY RD-4 BASIC		000000		1.0000		EA	01
LA	LABOR ASSEMBLY COST HRS		000000		0		EA	
LT	LABOR TEST COST HOURS		000000		0		EA	

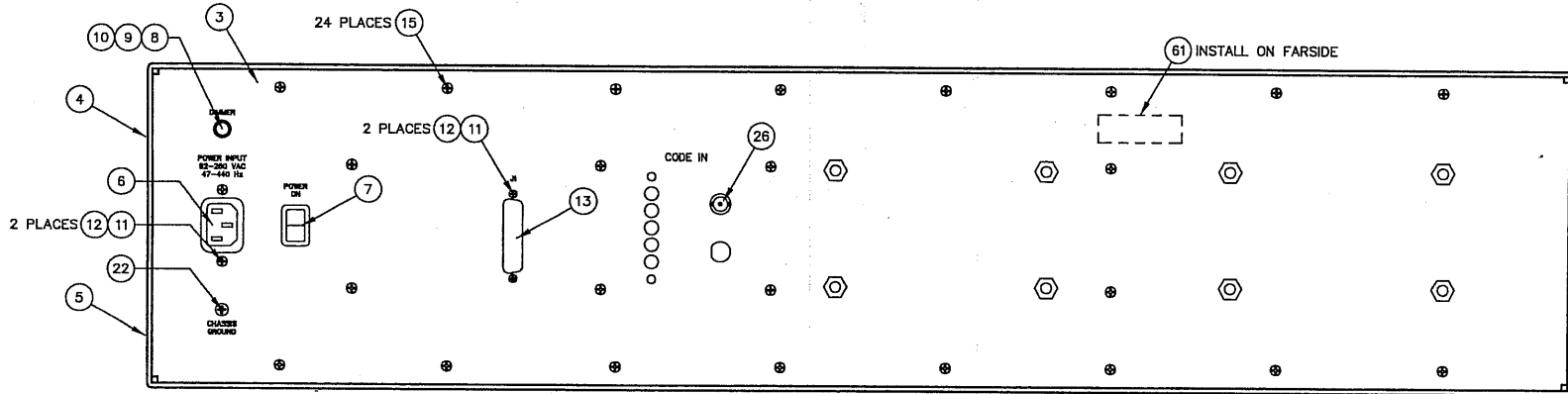
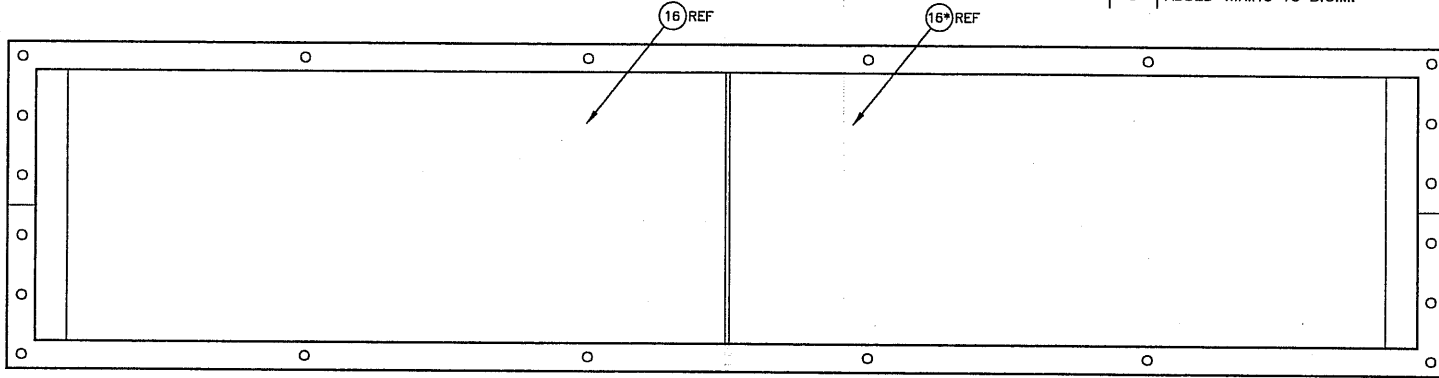
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REVISIONS

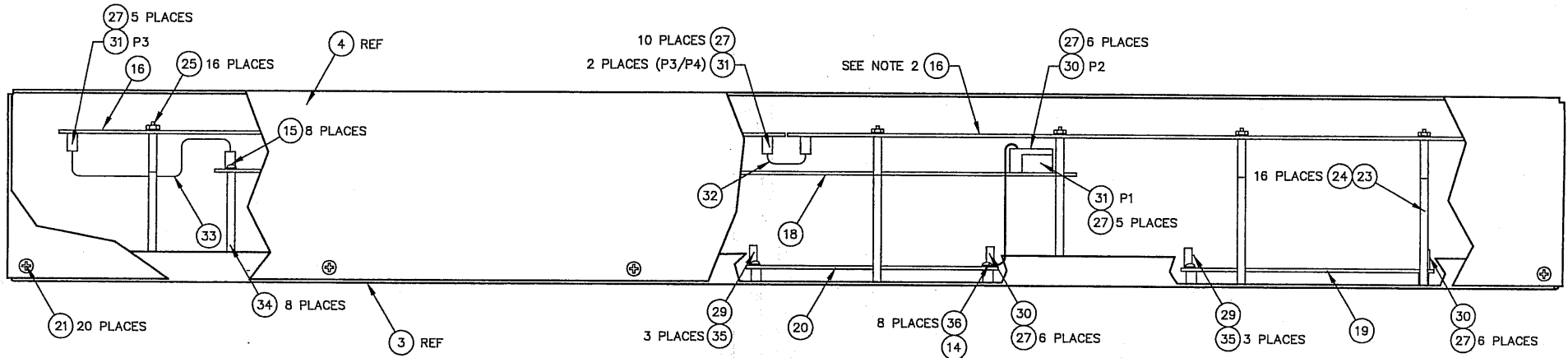
REV	DESCRIPTION	DATE	APPROVED
E	REDRAWN; UPDATED PER AS BUILT	01-21-94	
F	MOVED FRT PNL & LENS TO TOP ASSY	06-22-98	
G	ADDED WRING TO B.O.M.	08-26-98	



1. WIRE PER WIRING DIAGRAM ON SHEET 3.
NOTES: UNLESS OTHERWISE SPECIFIED

FILENAME: \820\1016A
DATE: 08-25-98

CONTRACT NO.		 <small>"Where Customer Satisfaction is our Highest Priority"</small> 2835 Duke Ct. Santa Rosa, CA 95407	
APPROVALS	DATE		
DRAWN BY D. EDILLOR	01-94		
CHECKED BY			
APPROVED BY RB	2-99	<h2 style="text-align: center;">ASSEMBLY, BASIC MODEL RD-4</h2>	
NEXT ASSY			
SIZE	CODE IDENT NO.	DRAWING NO.	REV
B		820-1016	G
SCALE NONE		SHEET 1 OF 3	

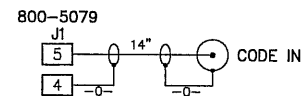
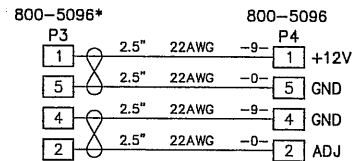
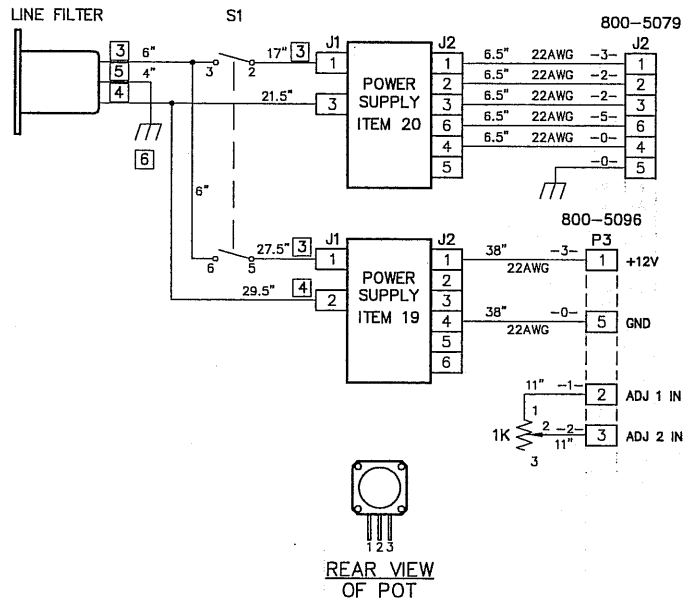


TOP VIEW

2. SEE 800-5096* NOTE ON SHEET 3. REMOVE R10 & R11 FROM THIS ASSEMBLY ONLY.
 NOTES: (CONT.)

FILENAME: \820\1016B
 DATE: 08-26-98

TrueTime <small>"Where Customer Satisfaction is our Highest Priority" 2835 Duke Ct. Santa Rosa, CA 95407</small>			
SIZE	CODE IDENT NO.	DRAWING NO.	REV
B		820-1016	G
SCALE NONE			SHEET 2 OF 3



9. USE # 232-003 (ITEM 62) TO HARNESS WIRING.
8. 800-5096* = MODIFY ASSEMBLY PER SHEET 2.
7. USE # 22AWG SIZE WIRE UNLESS OTHERWISE NOTED.
6. CONNECT CHASSIS GROUND TO REAR PANEL PEM NUT USING ITEMS 11 & 14.
5. USE TRUETIME # 315-016-189UL.
4. USE TRUETIME # 315-024-006UL.
3. USE TRUETIME # 315-024-001UL.

NOTES: (CONT.)

FILENAME: \820\1016C
DATE: 02-04-99

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SIZE	CODE IDENT NO.	DRAWING NO.	REV
B		820-1016	G
SCALE NONE		SHEET 3 OF 3	

MAX * BILL OF MATERIALS * SINGLE-LEVEL EXPLOSION BY PART IDENTIFIER W/REFERENCE

PART IDENTIFIER	DESCRIPTION 1	DESCRIPTION 2	EFF DATE	ECN #	QTY/ASSY	UOM	REV LVL	REFERENCE DESCRIPTION
820-1016	ASSY RD-4 BASIC						EA	
0000-APPROVAL	PARTS LIST APPROVAL		000000		1.0000	EA		RB 2-5-99
0000-PL	PARTS LIST REV LEVEL		000000		1.0000	EA		REV G (02-04-99)
0000-PRINT	REFERENCE PRINT		000000		1.0000	EA		820-1016 REV G
020-016	POT 1K	CLAROSTAT 308N1K(BOM NAV)	000000		1.0000	EA		08
064-012	SWITCH POWER DOUBLE POLE	ALCO XRM210N00	000000		1.0000	EA		07
088-80017	PWR SUPPLY +5, +/-12V 4A	COMPUTER PROD NFS40-7628	000000		1.0000	EA		20
088-NFS40-7612	POWER SUPPLY +12V 3A	COMP PRODUCTS NFS40-7612	000000		1.0000	EA		19
206-205-001	PLATE COVER D-HOLE 25-P	TT/206-205-1	000000		1.0000	EA		13
232-003	TIE WIRE 3.5INCH LG.BLACK	PANDUIT PLT1W-M30	000000		20.0000	EA		62
238-004-002	SCREW PH PN SEP 4-40X1/4	SCREW SEP	000000		8.0000	EA		36
238-006-002	SCREW PH PN SEP 6-32X1/4	INT SEP(STAINLESS STEEL)	000000		32.0000	EA		15
240-004-003	SCREW PH PN SS 4-40X3/8	SCREW PAN	000000		4.0000	EA		11
240-010-003	SCREW PH BH SS 10-32X3/8	AROW SBM-10F06-S-0 (NAV)	000000		1.0000	EA		22
241-006-002B	SCREW PH FH SS 6-32X1/4	SCREW FH BLACK 100 DEGREE	000000		20.0000	EA		21
251-004	NUT KEP SS 4-40	AROW KN-04C-S-0-M	000000		4.0000	EA		12
251-006	NUT KEP SS 6-32 .250 HEX	KEPNUT SMALL PATTERN	000000		16.0000	EA		25
255-006-013	SPCR ALU HEX 6-32X1-5/8		000000		8.0000	EA		34
255-6F-6M-32	SPCR ALU HEX 6-32 X 2	GLOBE A-7328-632-2	000000		16.0000	EA		23
255-6F-6M-7.5	SPCR ALU HEX 6-32 X 15/16	GLOBE A-7311-632-2	000000		16.0000	EA		24
256-004	LUG SOLDER BR 4	HH SMITH 1412-4	000000		1.0000	EA		14
315-016-189UL	WIRE 16 AWG GR/YLW UL1015	BELDEN 8917-189	000000		0.5000	FT		SEE WIRING
315-022-000	WIRE 22AWG PVC INS BLK/WT	1429-22/7-0-9 21TWIST/FT	000000		1.0000	FT		SEE WIRING
315-022-001	WIRE 22AWG PVC INS BROWN	UL1429-22/7-1	000000		1.0000	FT		SEE WIRING
315-022-002	WIRE 22AWG PVC INS RED	UL1429-22/7-2	000000		2.0000	FT		SEE WIRING
315-022-003	WIRE 22AWG PVC INS ORANGE	UL1429-22/7-3	000000		3.7500	FT		SEE WIRING
315-022-005	WIRE 22AWG PVC INS GREEN	UL1429-22/7-5	000000		0.7500	FT		SEE WIRING
315-022-010	WIRE 22AWG PVC INS BLACK	UL1429-22/7-0	000000		4.2500	FT		SEE WIRING
315-024-001UL	WIRE 24 AWG BROWN UL1015	BELDEN 9924-1	000000		4.2500	FT		SEE WIRING
315-024-006UL	WIRE 24 AWG BLUE UL1015	BELDEN 9924-6	000000		4.5000	FT		SEE WIRING
332-002	CORD POWER	BELDEN 17250	000000		1.0000	EA		SHIPPING KIT
342-001	SOCKET POWER & LINE FLTR	CORCOM 6EF1	000000		1.0000	EA		06
375-013	CONN BNC FM BULKHD INSUL	AMPHENOL 31-10	000000		1.0000	EA		26
377-004	TERM FEED THRU	ELECTRICAL IND ABS-63W-HP	000000		1.4000	EA		SEE WIRING
380-004	KNOB BLACK BASIC 800	ELMA 020-2220	000000		1.0000	EA		09
380-04A	CAP KNOB BASIC 800	ELMA #040-1020	000000		1.0000	EA		10
400-009	LABEL CAUTION DNGR VOLT	127431	000000		1.0000	EA		61
402-006T	PIN 22-26 AWG	MOLEX 08-52-0125	000000		38.0000	EA		27
402-007T	PIN 18-24 AWG	MOLEX 08-52-0113	000000		6.0000	EA		35
403-003T	CONN 3-P	MOLEX 026-03-4030	000000		2.0000	EA		29
403-006T	CONN 6-P	MOLEX 26-03-4061	000000		3.0000	EA		30
403-01-01-05	CONN 5-P CABLE MOUNT LCK	MOLEX 22-01-3057	000000		4.0000	EA		31
800-1073	FAB PANEL REAR RD-4		000000		1.0000	EA		03
800-1074-001	FAB COVER TOP RD-4		000000		1.0000	EA		04
800-1074-002	FAB COVER BOTTOM RD-4		000000		1.0000	EA		05
800-1077	KIT MOUNTING WALL/CEILING RD-4/RD-2 HAN & HCD		000000		1.0000	EA		SHIPPING KIT

MAX * BILL OF MATERIALS * SINGLE-LEVEL EXPLOSION BY PART IDENTIFIER W/REFERENCE

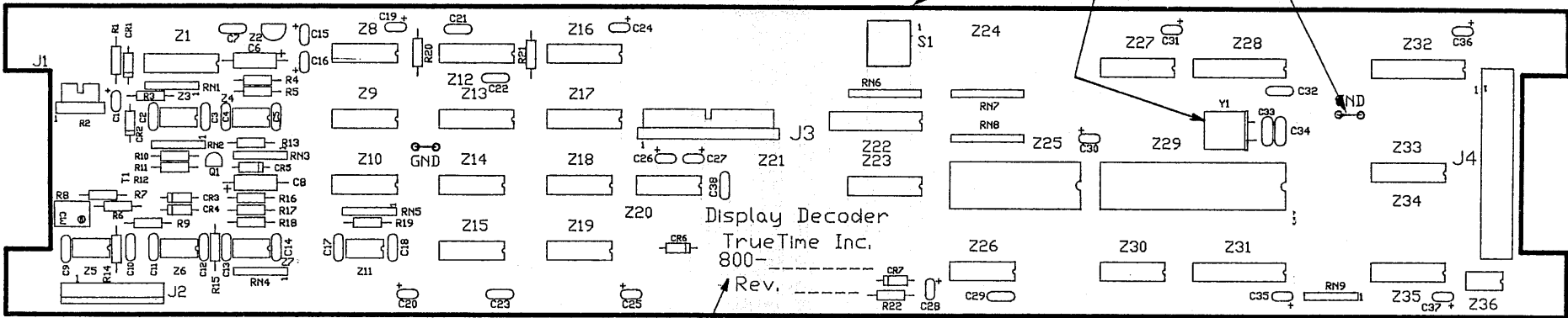
PART IDENTIFIER	DESCRIPTION 1	DESCRIPTION 2	EFF DATE	ECN #	QTY/ASSY	REV UOM LVL	REFERENCE DESCRIPTION
800-1078	ASSY CABLE 34-P 2-CONN		000000		1.0000	EA 33	
800-5079	ASSY DECODER		000000		1.0000	EA 18	
800-5096	ASSY DSPLY RD-4		000000		2.0000	EA 16	
900-1020	ASSY CABLE 34-P 2-CONN	SEE PART NOTES (BOM NAV)	000000		1.0000	EA 32	
LA	LABOR ASSEMBLY COST HRS		000000		0	EA	
LT	LABOR TEST COST HOURS		000000		0	EA	

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REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	C	REDRAWN; UPDATED PER REVISED PCB (DE)	11/5/01	DRS
	D	CHG PER ECO 617 DR	12.6.01	JW
	E	UPDATED PER ECO 618 (DE)	01/13/02	DRS
	F	ADD ITEM 3 DR	4.2.92	DR
	G	UPDATED PRINT PER 900-2020	07-20-93	DR
	H	ECO 902	DR 1.23.95	DR/JB
	I	ECO 1148	R 3-26-98	



STAMP PART N° & REV LEVEL

1. VALUES OF RESISTORS ARE IN Ω AND CAPACITORS ARE IN μf .
 NOTES: UNLESS OTHERWISE SPECIFIED

		UNLESS OTHERWISE SPECIFIED		CONTRACT NO.		KINEMATRICS/TRUETIME SANTA ROSA, CA	
		DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .xxx ± .		APPROVALS DATE			
		ALL THREADS TO BE CLASS 2 PER ANSI Y14.6 MACH COR - .005 TO .015R OR CHAM SH MATL - BREAK EDGES .015 MAX R DIM. AND TOL. APPLY FIN. TREAT.		DRAWN BY <i>AJE</i> 11-91		ASSEMBLY DECODER	
		MATERIAL		CHECKED <i>KC</i>			
		FINISH		APPROVED <i>DRS</i> 11-91		SIZE CODE IDENT NO. DRAWING NO. REV.	
NEXT ASSY		USED ON		NEXT ASSY		B 800-5079	
APPLICATION		DO NOT SCALE DRAWING				SCALE NONE SHEET 1 OF 1	

MAX * BILL OF MATERIALS * SINGLE-LEVEL EXPLOSION BY PART IDENTIFIER W/REFERENCE

PART IDENTIFIER	DESCRIPTION 1	DESCRIPTION 2	EFF DATE	ECN #	QTY/ASSY	UOM	REV LVL	REFERENCE DESCRIPTION
800-5079	ASSY DECODER						EA	
0000-APPROVAL	PARTS LIST APPROVAL		0000		1.0000		EA	<i>Curtis 3-30-9</i>
0000-PL	PARTS LIST REV LEVEL		0000		1.0000		EA	REV J (03-26-98)
0000-PRINT	REFERENCE PRINT		0000		1.0000		EA	800-5079 REV J
0000-REV	PCB REV LEVEL HERE >>>>		0000		1.0000		EA	800-2026 REV C
002-056	RES 200 OHM 1/4W 5%	222J201	0000		1.0000		EA	R6
002-063	RES 390 OHM 1/4W 5%	R25J391	0000		2.0000		EA	R4,9
002-073	RES 1K OHM 1/4W 5%	R25J102	0000		2.0000		EA	R3,20
002-084	RES 3K OHM 1/4W 5%		0000		1.0000		EA	R18
002-097	RES 10K OHM 1/4W 5%	R25J103	0000		3.0000		EA	R1,11,17
002-101	RES 15K OHM 1/4W 5%	R25J153	0000		1.0000		EA	R7
002-105	RES 22K OHM 1/4W 5%	R25J223	0000		2.0000		EA	R13,19
002-113	RES 47K OHM 1/4W 5%	R25J473	0000		1.0000		EA	R14
002-118	RES 75K OHM 1/4W 5%	R25J753	0000		1.0000		EA	R5
002-121	RES 100K OHM 1/4W 5%	R25J104	0000		1.0000		EA	R16
002-125	RES 150K OHM 1/4W 5%	R25J154	0000		2.0000		EA	R10,15
002-129	RES 220K OHM 1/4W 5%	R25J224	0000		1.0000		EA	R22
008-1431	RES 1.43K OHM 1/8W 1%	RN55D1431FJ	0000		1.0000		EA	R21
011-077-06S	RESNET 1.5K OHM 6-P ISL	DALE CSC06A03-152G	0000		2.0000		EA	RN3,5
011-089-06C	RESNET 4.7K OHM 6-P COM	DALE CSC06A01-472G	0000		2.0000		EA	RN4,9
011-089-06S	RESNET 4.7K OHM 6-P ISL	BOURNS 4606X-102-472	0000		2.0000		EA	RN1,2
011-089-08C	RESNET 4.7K OHM 8-P COM	BOURNS 4308R-101-472	0000		1.0000		EA	RN6
011-097-08C	RESNET 10K OHM 8-P COM	DALE CSC08A01-103G	0000		2.0000		EA	RN7,8
019-008	POT 20K 20 TURN T ADJ	BECKMAN 68WR20K	0000		1.0000		EA	R8
023-010-025	CAP AE 10UF 25V A	PANASONIC ECE-B1EU100	0000		1.0000		EA	C6
023-100-035	CAP AE 100UF 35V A	PANASONIC ECE-B1VU101	0000		1.0000		EA	C8
029-014	CAP MICA 18PF V R 5%	CORNELL CD15CD180D03	0000		2.0000		EA	C33,34
032-041-025	CAP TANT 10UF 25V R		0000		1.0000		EA	C1
036-095	CAP MONO 0.1UF 100V R 20%	MURATA RPE122Z5U104M50V	0000		18.0000		EA	
	C2-5,7,9-14,17,18,21-23,29,32							
037-033	CAP TANT 2.2UF 35V R	NEMCO TB2.2/35 K1	0000		14.0000		EA	
	C15,16,19,20,24,25-28,30,31,35-37							
055-914A	DIODE 1V 20MA	1N914A	0000		7.0000		EA	CR1-7
059-49152	XTAL 4.9152	MTRON MP1-4.9152	0000		1.0000		EA	Y1
065-004	SWITCH DIP 4-SEC	C&K BDO4	0000		1.0000		EA	S1
175-1087	XSISTOR FET P-CHANNEL	NATIONAL P1087	0000		1.0000		EA	Q1
176-082	TLO82CP DUAL OP AMP	TLO82CP	0000		2.0000		EA	Z3,4
176-231	MAX231 RS232 INTERFACE	MAXIM #MAX231	0000		1.0000		EA	Z20
176-311	LM311N VOLTAGE COMPARATOR	NATIONAL #LM311N	0000		4.0000		EA	Z5-7,11
176-40107	40107 DUAL 2-INPUT BUFFER	HARRIS CD40107BE	0000		1.0000		EA	Z36
176-63B03	63B03 PROCESSOR	HITACHI HD63B03RP	0000		1.0000		EA	Z29 SOCKETED
176-79L05	MC79L05ACP -5V REGULATOR	MC79L05ACP	0000		1.0000		EA	Z2
177-27256	CERAMIC 27C256 @ 200NS	INTEL,AMD,GI,TI,NATL ONLY	0000		1.0000		EA	Z25 SOCKETED
178-74HC00	MM74HC00N QUAD NAND GATE	MM74HC00N	0000		1.0000		EA	Z19
178-74HC08	MC74HC08 QUAD AND GATE	MC74HC08	0000		1.0000		EA	Z9
178-74HC107	74HC107 DUAL JK FLIP-FLOP	74HC107	0000		1.0000		EA	Z8

MAX * BILL OF MATERIALS * SINGLE-LEVEL EXPLOSION BY PART IDENTIFIER W/REFERENCE

PART IDENTIFIER	DESCRIPTION 1	DESCRIPTION 2	EFF DATE	ECN #	QTY/ASSY	REV UOM LVL	REFERENCE DESCRIPTION
178-74HC138	MC74HC138 1 OF 8 DECODER	MC74HC138	0000		2.0000	EA	Z27,33
178-74HC14	74HC14 HEX SCHM INVERTER	SN74HC14N	0000		2.0000	EA	Z14,26
178-74HC173	74HC173 QUAD D FLIP-FLOP	74HC173	0000		2.0000	EA	Z17,35
178-74HC193	74HC193N UP/DN COUNTER	74HC193N	0000		1.0000	EA	Z13
178-74HC221.7	ONE SHOT TIME CONT T=.7RC	HARRIS CD74HC221	0000		1.0000	EA	Z12
178-74HC244	MC74HC244 3-STATE BUFFER	MC74HC244	0000		3.0000	EA	Z22,31,32
178-74HC245	74HC245 8 BUS XCEIVER	74HC245	0000		1.0000	EA	Z28
178-74HC390	74HC390 DUAL BI-QUINARY	74HC390	0000		1.0000	EA	Z16
178-74HC4053	74HC4053 MULTIPLEXER	74HC4053	0000		2.0000	EA	Z1,23
178-74HC74	MC74HC74 DUAL D FLIP-FLOP	MOTOROLA MC74HC74AN	0000		4.0000	EA	Z10,15,18,30
273-009	TERMINAL TEST POINT	COMP CORP PJ-201-25	0000		2.0000	EA	02
290-001	TAPE FOAM DBL SIDE.5X1/16	3M# Y-4950	0000		0.1000	SI	03 SECURE Y1 TO BOARD
379-028-001	SOCKET IC 28 PIN MACHINE	ROBINSON NUGENT ICT286STG	0000		1.0000	EA	Z25
379-040	SOCKET IC 40 PIN MACHINE	ROBINSON NUGENT ICT406STG	0000		1.0000	EA	Z29
386-341	CONN 34-P ML PC MT HDR	THOMAS & BETTS 609-3427	0000		1.0000	EA	J4
401-01-01-06	CONN 6-P PC MT STRGHT	MOLEX 26-60-4060	0000		1.0000	EA	J2
401-02-01-05	CONN 5-P PC MT RT ANGLE	MOLEX 22-05-3051	0000		1.0000	EA	J1
401-02-01-15	CONN 15-P PC MT RT ANGLE	MOLEX 22-05-3151	0000		1.0000	EA	J3
800-2026	PCB DISPLAY DECODER		0000		1.0000	EA	01
LA	LABOR ASSEMBLY COST HRS		0000		0	EA	
LT	LABOR TEST COST HOURS		0000		0	EA	
OSV800-5079	OUTSIDE LABOR 800-5079		0000		1.0000	EA	

A

B

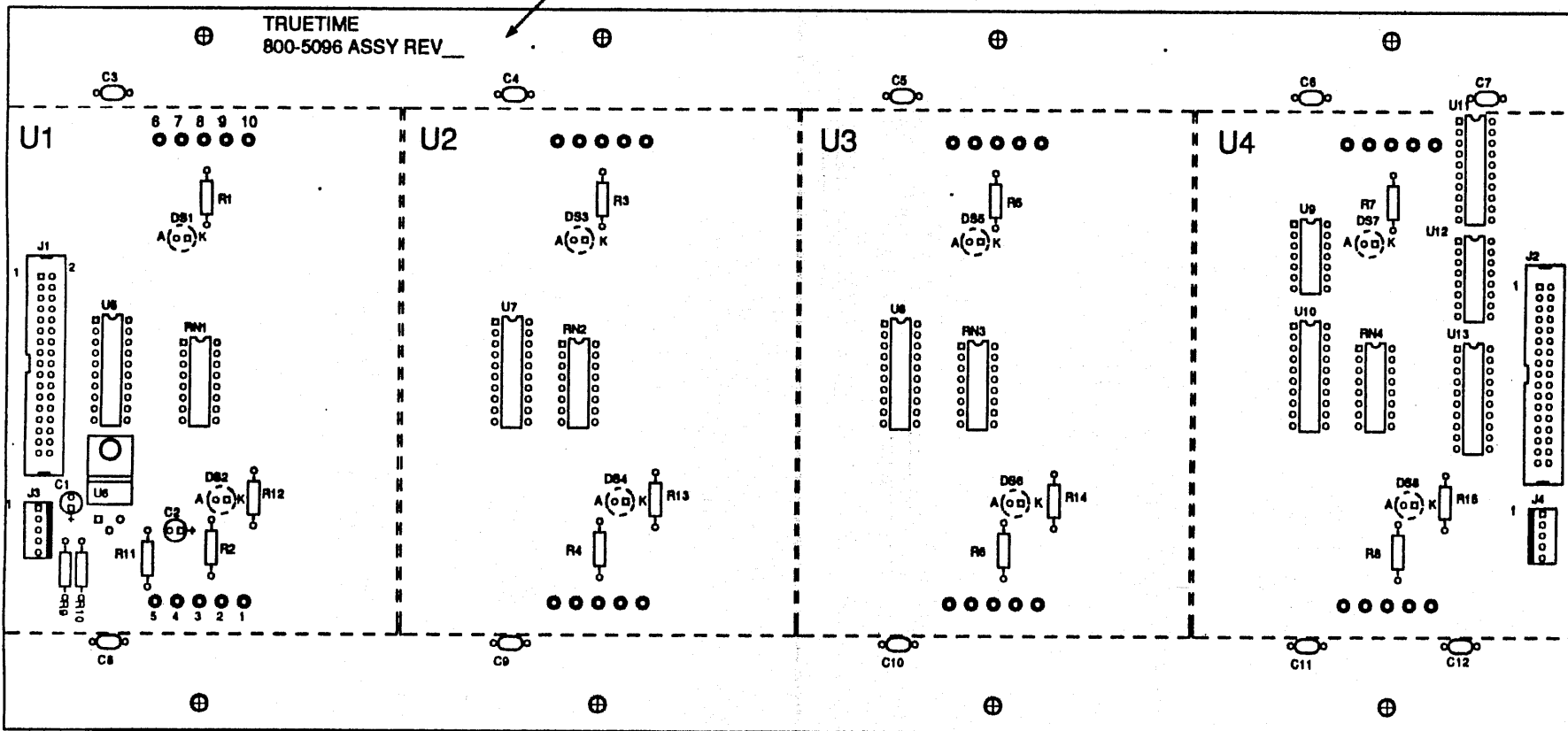
C

D

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	CHG PER ECO 616	12/71	<i>[Signature]</i>

STAMP ASSY REV LEVEL

⊕ TRUETIME
800-5096 ASSY REV



NOTES: UNLESS OTHERWISE SPECIFIED

- VALUES OF RESISTORS ARE IN OHMS AND CAPACITORS ARE IN μ f.
- COMPONENT SIDE SHOWN.

<small>UNLESS OTHERWISE SPECIFIED</small> DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS .005 .01 .02 .03 .04 .05 .06 .07 .08 .09 .10 .12 .15 .20 .25 .30 .375 .50 .625 .75 .875 1.00 1.25 1.50 1.75 2.00 ALL DIMENSIONS TO BE BLANK 2 PINS AFTER THE 0 HOLE SIZE - USE TO 21 IN OR SMALLER DIM. MATL. - BRASS DIMENSION 0.13 USE IN DIM AND TOL. APPLY FIN. TREAT.	CONTRACT NO.	TRUETIME SANTA ROSA, CA ASSY DRAWING 4" DISPLAY BOARD RD- 4		
	APPROVALS			DATE
	DRAWN BY RICHARD C.	10/28/81	SIZE	CODE IDENT NO.
	CHECKED		B	DRAWING NO.
APPROVED <i>[Signature]</i>	10/28/81	SCALE	800-5096	
MATERIAL	FILE NAME	REV.	Δ	
FINISH	NEXT ASSY	SHEET 1 OF 2		
DO NOT SCALE DRAWING				

A

B

C

D

MAX * BILL OF MATERIALS * SINGLE-LEVEL EXPLOSION BY PART IDENTIFIER W/REFERENCE

PART IDENTIFIER	DESCRIPTION 1	DESCRIPTION 2	EFF DATE	ECN #	QTY/ASSY	REV	
						UOM	LVL REFERENCE DESCRIPTION
800-5096	ASSY DSPLY RD-4						EA
0000-PL	PARTS LIST REV LEVEL				1.0000	EA	REV A (03-21-94)
0000-PRINT	REFERENCE PRINT				1.0000	EA	ASSY 800-5096 REV A
0000-REV	PCB REV LEVEL HERE >>>>				1.0000	EA	800-2039 REV A
002-053	RES 150 OHM 1/4W 5Z	R25J151			1.0000	EA	R11
002-063	RES 390 OHM 1/4W 5Z	R25J391			1.0000	EA	R10
002-069	RES 680 OHM 1/4W 5Z	R25J681			1.0000	EA	R9
002-073	RES 1K OHM 1/4W 5Z	R25J102			4.0000	EA	R12-15
002-091	RES 5.6K OHM 1/4W 5Z	R25J562			8.0000	EA	R1-8
011-049-165	RESNET 100 OHM 16-P ISL	BOURNS 4116R-001			4.0000	EA	RN1-4
036-101	CAP MOND .1UF 50V	KEMET C410C104(1)5U5CA			10.0000	EA	C3-12
037-033	CAP TANT 2.2UF 35V R	MEMCO TB2.2/35 K1			2.0000	EA	C1.2
176-317	LM317 ADJ. POS REGULATOR	NATIONAL #LM317T			1.0000	EA	U6
176-8310	DP8310N OCTAL LATCH	NATL DP8310N			4.0000	EA	U5,7,8,10
178-74HC138	MC74HC138 1 OF 8 DECODER	MC74HC138			1.0000	EA	U12
178-74HC244	MC74HC244 3-STATE BUFFER	MC74HC244			2.0000	EA	U11,13
178-74HC86	74HC86 QUAD EX OR GATE	SN74HC86N			1.0000	EA	U9
240-004-002	SCREW PH PN SS 4-40X1/4	SCREW PAN			1.0000	EA	F0R U6
251-004	NUT KEP SS 4-40	KEPNUT			1.0000	EA	F0R U6
386-341	CONN 34-P ML PC MT HDR ^	ANSLEY 609-3427			2.0000	EA	J1.2
401-01-01-05	CONN 5-P MLE STRGHT	MOLEX 22-23-2051			2.0000	EA	J3,4
800-2039	PCB DISPLAY 4 IN. DISPLAY	PCB FAB (RD-4)			1.0000	EA	PCB
LA	LABOR ASSEMBLY COST HRS				0	EA	
LT	LABOR TEST COST HOURS				0	EA	
OSV800-5096	OUTSIDE LABOR 800-5096	OSV-DISPLAY ASSY RD-4			1.0000	EA	