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RD-05 Display

Model 820-500

SERIAL NUMBER _____

May 1, 1998
Revision C

TRUETIME

3750 Westwind Boulevard
Santa Rosa, California 95403

t 707.528.1230
f 707.527.6640
w www.truetime.com

FCC Notice and Compliance Statement

Model:

XL-DC, 151-600
XL-DC, 151-601
XL-DC, 151-601-178-1
XL-DC, 151-602
XL-DC, 151-650
XL-DC, 151-652
XL-DC, 151-652-382
GPS-PC, 560-5500
PC-SG2, 560-5503
GPS-VME, 560-5600
VME-SG2, 560-5608
PCI-SG, 560-5900
GPS-PCI, 560-5900-3
GPS-PCI, 560-5901
GPS-PCI, 560-5901-1
GPS-605, 820-501-000
NMC-100, 820-501-001
GPS-605, 820-501-003
RD-05, 820-500
NTS-90, NTS-305
NTS-90, NTS-405
NTS-90, 600-210
NTS-90, 600-310
NTS-90, 600-410
NTS-90, NIC-205
NTS-90, NIC-305
NTS-90, NIC-405
NTS-100, 600-201
NTS-100, 600-301
NTS-100, 600-401
NTS-100i, NIC-215
NTS-100i, NIC-315
NTS-100i, NIC-415
NTS-200-101 (48 VDC)
TIMEVAULT 6000-100
56000 DRC, 560-197-10

FCC Notice

This device has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation. This device generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Caution: Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

FCC Compliance Statement

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

Addendum for 142-612
Antenna Assembly

PHYSICAL SPECIFICATIONS

Antenna Size:	2.625 in. dia. x 1.5 in. (6.67 cm. dia. x 3.81 cm.)

Note: The Antenna is mounted on a 12-inch long PVC nipple with a 3/4-inch Male Pipe Thread (MPT) on both ends. The above specified overall length of the Antenna. Units are therefore increased by approximately 11.25 inches when the mounting nipple is included.

Antenna Weight: (Including mtg. nipple)	0.55 lb (.250 Kg)
Antenna Cable, RG-59	Standard length = 50 ft. 1.2 lb (.545 Kg)
Optional Antenna Cable, RG-59	Available lengths to 200 ft. 2.7 lb (1.23 Kg) per 100 ft.

OPERATING SPECIFICATIONS

Antenna Power Regulated	+5 Volts DC @ <25mA
Antenna Frequency (L1)	1575.42 MHz
Code	Coarse Acquisition (C/A) Code

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature:	-40° to +70°C (-40° to +158°F)
Storage Temperature:	-55° to +85°C (-67° to +185°F)
Humidity:	100%, condensing

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Drawing Number	Title
820-500	Top Assembly
800-1158	Mounting Support Bracket, RD-05

CUSTOM OPTIONS / CONFIGURATIONS

The custom options described here may modify or supersede the specifications or operation described elsewhere in this manual.

This unit has no custom options.

SECTION ONE

GENERAL INFORMATION

1.1 SCOPE OF MANUAL

This manual contains the information necessary to operate and maintain a TrueTime model RD-05 Numeric Remote Display.

1.2 PURPOSE OF EQUIPMENT

The RD-05 display provides time information of days through seconds using 0.56 inch LED digits. The time information is derived from an input IRIG B signal.

1.3 PHYSICAL SPECIFICATIONS

Height:	1.6 in.
Width:	7.5 in. (9.0 in. with mounting bracket & knobs)
Depth:	3.6 in
Weight	1.5 lb.
Numeric Digit Size:	0.6 in.

1.4 ENVIRONMENTAL SPECIFICATIONS

Operating Temperature:	0° to +50°C (+32° to +122°F)
Storage Temperature:	-17° to +85°C (0° to +185°F)
Humidity:	95% relative, non-condensing
Cooling:	Convection

1.5 POWER SPECIFICATIONS

Voltage:	+8 to +30 Vdc
Power:	<3 Watts
Mating Connector:	5.5 mm by 2.0 mm (MCM Elect 27-130)

(Wall mount 115 Vac adapter is provided with the unit.)

1.6 SIGNAL SPECIFICATIONS

Amplitude Modulated Reference Code Input

Format:	Amplitude-modulated IRIG-B122
Amplitude:	0.5 to 10 Vpp
Impedance:	10k Ω to GND
Ratio:	2:1 to 5:1
Error Bypass:	3 frames
Phase Accuracy:	$<\pm 20$ µs
Phase Correction:	Step size 400 ns
Tracking Range:	$5x10^{-5}$
Connector:	BNC "CODE IN"

DC Shift Code Input

IRIG B RS-422:	RS-422 levels
Rate:	100 bps
Connector:	RJ11 “CODE I/O”
	Code in +, pin 4
	Code in -, pin 5

1.7 LIMITED WARRANTY

Each new product manufactured by TrueTime is warranted for defects in material or workmanship for a period of one year from the date of shipment ("Limited Warranty"). Defects in material or workmanship found within that period will be replaced or repaired, at TrueTime's option, without charge for material or labor, provided the customer returns the equipment, freight prepaid, to the TrueTime factory under this limited warranty. TrueTime will return the repaired equipment, freight prepaid, to the customer's facility. This one-year Limited Warranty does not apply to any software or to any product not manufactured by TrueTime. Unless otherwise stated, TrueTime provides new components, new or previously-integrated assemblies which have been fully evaluated, and finished products which are fully tested to data sheet or customer specifications. If on-site warranty repair or replacement is required, the customer will be charged the then-current field service rate for portal-to-portal travel time plus actual portal-to-portal travel charges. There is no charge for on-site warranty repair labor.

Products not manufactured by TrueTime but included as integral parts of a system (e.g. peripherals, options) are warranted for 90 days or longer, as provided for by the original manufacturer, from the date of shipment. Aside from the Limited Warranty set forth above, TrueTime makes no other warranties, express or implied, of merchantability, fitness for purpose or of any other kind of description whatsoever.

By purchasing any product manufactured by TrueTime, the buyer consents to and agrees with TrueTime that as a result of the exclusion of all warranties, expressed or implied, or merchantability, fitness for purpose, or otherwise, except for the limited one-year warranty for defects in material and workmanship for products manufactured by TrueTime, that the Buyer has the sole responsibility to assess and bear all losses relating to (1) the ability of the product or products purchased to pass without objection under the contract description among merchants and buyers in the trade; (2) the conformity of the product or products to fair average quality within its contract description; (3) the fitness of the product for the ordinary purposes for which such product is used; (4) the consistency of quality and quantity within each unit of product or products and among all units involved; (5) the adequacy of containers, packaging and labeling of the product or products; (6) the conformity of the product, promises or affirmations of fact (if any) made on its label or container; and (7) the conformity of the product to standards of quality observed by other merchants in the trade with respect to products of similar description.

1.8 LIMITATION OF LIABILITY

By purchasing any product from TrueTime the Buyer consents to and agrees that the Buyer's sole and exclusive remedy for any damages or losses incurred by the Buyer as a result of TrueTime's breach of its one-year Limited Warranty for defects in materials and workmanship or otherwise in connection with any claim respecting the product shall be limited to the repair or replacement of the product or a refund of the sales price of the product.

In no event shall the Buyer be entitled to recover consequential damages or any other damages of any kind or description whatsoever.

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SECTION TWO

INSTALLATION AND OPERATION

2.1 INTRODUCTION

The RD-05 is a time code display that provides time information using seven segment LED display digits. The unit will synchronize to an external IRIG B reference code. If the input code is removed or becomes unreadable the clock will continue to flywheel using the internal crystal time base.

2.2 INSTALLATION

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

The RD-05 is held in place by the mounting bracket provided. This bracket is suitable for desktop, wall, or ceiling installations. Install mounting bracket using two # 8 wood or toggle screws depending on the installation requirements (screws are not provided). The unit attaches to the mounting bracket using the threaded mounting knobs provided.

Fabricate any necessary cables (RG-58 coax with BNC connectors for analog reference code). Connect input IRIG B signal to the rear panel BNC identified as CODE IN or RJ11 connector labeled CODE I/O. The RD-05 is powered by an external DC wall mount AC adapter. Connect the power plug into the rear panel. The user may use their own DC power as long as it complies with the specifications described under Power Specifications in SECTION ONE. The power mating connector part number is also listed.

2.3 OPERATION

The RD-05 autodetects, decodes and phase locks it's time to a reference IRIG B time code that is input on the rear panel BNC connector labeled CODE IN or the RJ11 connector labeled CODE I/O. The unit will synchronize to within $\pm$20 microseconds of the input code. The unit will maintain time during loss of the input signal using an internal crystal time base. If input code is lost the decimal points will illuminate but time will continue to increment each second. No user intervention other than applying power and input reference code is required to display the input reference time.

2.3.1 MANUAL SWITCH CONTROLS

The RD-05 has two bi-directional, center-off toggle switches located on the rear panel. These switches control menu choices and input parameters to customize the displayed time. At anytime during the adjustment of display parameters, a pause of 20 seconds with no switch toggled will revert the unit back to displaying time. Any parameter or digit changed on the display will be retained immediately. This includes when the unit reverts back to time display.

Switch Operation

SELECT: Use to switch from time display to menu and sub-menu display, or to position the cursor to edit parameters.

ENTER: Use to cycle through menu choices.

↑↓ arrows: Use to change parameter values.

Toggling SELECT (inside switch up) will display the first menu choice for the unit. ENTER (inside switch down) will cycle through the different menus. Any time three dots appear after a menu choice indicates there is a sub-menu for the current selection. The first sub-menu choice is displayed using SELECT. ENTER is used to cycle through the sub-menu options. Once a sub-menu has been cycled through the unit will return to the originating, higher level, main menu choice.

The ↑↓ arrows (outside switch) are used to index a parameter value up or down. Parameter values differ in how they are edited. For example, the ↑↓ arrows will adjust the Intensity value between 1 and 15. However, in the local offset, each digit of the P hh:mm is edited individually. Digits are selected by using SELECT and changed using the ↑↓ arrows . The selected digit will flash on and off. Once the parameters are satisfactorily set the ENTER switch will accept the setting and display the next menu item.

Display Control Options

INtENSItY LED intensity can be adjusted in a range from 1 to 15 in integer increments. Low intensity setting is 1.

dISPLAY Display is the top level menu to enter into the time format related sub-menu. Toggling SELECT (inside switch up) will display the first Display sub menu option.

12-24 H 12/24 ↑↓ arrows toggle between 12 hour or 24 hour time format. (i.e. 3:30 or 15:30)

dAYS dSP ON/OFF ↑↓ arrows toggle between displaying the day of year or not.

t COrrECt Time correct is the top level menu to enter into the time correction related sub-menu. Toggling SELECT (inside switch up) will display the first Time Correct sub-menu option.

LCL OFF-hhmm Local offset from input reference time. Range is plus or minus 12 hours and 59 minutes. “P” is plus and “-” is minus.

YEAr yyyy Specifies the year. Range is 0000 to 9999.

dSt ON/OFF ↑↓ arrows toggle between correcting for daylights savings time or not. Start and stop times are defined below.

dSt StArt... Daylight savings time start sub-menu header. Toggling SELECT will display the daylight savings time input parameters one at a time.

HOUr hh The hour of the day for the time change to start is selected. Use ↑↓ arrows to choose between 0 and 23.

dAY d The day of week for the time change to start is selected. Use ↑↓ arrows to choose between 1 and 7. Sunday is day 1.

0-4 x The week of the month for the time change to start is selected. Use ↑↓ arrows to choose between 0 and 4. ***Zero is the last week of the month.***

1-12 xx The month of the year for the time change to start is selected. Use ↑↓ arrows to choose between 1 and 12.

dSt StOP... Daylight savings time stop sub-menu header. Toggling SELECT will display the daylight savings time input parameters one at a time.

HOUr hh The hour of the day for the time change to stop is selected. Use ↑↓ arrows to choose between 0 and 23.

dAY d The day of week for the time change to stop is selected. Use ↑↓ arrows to choose between 1 and 7. Sunday is day 1.

0-4 x The week of the month for the time change to stop is selected. Use ↑↓ arrows to choose between 0 and 4. ***Zero is the last week of the month.***

1-12 xx The month of the year for the time change to stop is selected. Use ↑↓ arrows to choose between 1 and 12.

VErSION x.xx Displays the firmware version installed in the unit.

LCL LOC OFF This menu item indicates the switch menu local lock-out is off. To enable the switch lock-out the series of switch commands below are executed when this menu is displayed. When local lock-out is enabled the control menu cannot be activated. Only by repeating the switch sequence can the local lock-out be disabled and the menu controls accessed.

Local Lock-out Password: ↓ ↑ SELECT ↑

Local Lock-out ON example:

1) Display the LCL LOC OFF menu.
2) Toggle the ↓ ↑ SELECT ↑ switches.
3) The time is displayed and the menu cannot be accessed.

Local Lock-out OFF example:

1) Toggle the ↓ ↑ SELECT ↑ switches.
2) The time continues to be displayed. Local Lock-out is now off.
3) Toggle the SELECT switch to enter menu.

Example Operation

Below is an example demonstrating the use of the manual switch controls. The task is to adjust the local offset to minus 10 hours and 30 minutes. Default setting is plus zero hours.

Switch Action	Display Response
SELECT	INtENSItY xx
ENTER	dISPLAY...
ENTER	t COrrECt...
SELECT	LCL OFF**P**0000 *(Bold & Underline= flashing)*
↑	LCL OFF-**-**0000
SELECT	LCL OFF-**0**000
↑	LCL OFF-**1**000
SELECT	LCL OFF-0**0**00
SELECT	LCL OFF-00**0**0
↑	LCL OFF-00**1**0
↑	LCL OFF-00**2**0
↑	LCL OFF-00**3**0
ENTER	YEAR **X**XXX
	Returns to time after 20 seconds or ENTER can be pressed until time is displayed.

SECTION THREE

MAINTENANCE AND TROUBLESHOOTING

3.1 INTRODUCTION

Effective maintenance and troubleshooting of this equipment requires a thorough knowledge of equipment characteristics, operating procedures, and theory of operation. Equipment characteristics and operating procedures are provided in SECTIONS ONE and TWO. It is recommended that this material be thoroughly read by all personnel responsible for maintenance and troubleshooting of this equipment.

3.2 PREVENTATIVE MAINTENANCE

Preventative maintenance consists of a systematic routine that maintains the operating efficiency and reduces the possibility of a malfunction. This routine includes inspection and cleaning of the equipment.

Equipment should be inspected at periodic intervals for loose or frayed connections. In the event damage is discovered it should be corrected immediately. As the equipment is inspected and tested, it should also be cleaned. A soft cloth and commercial cleaner may be used to clean the case and lens. Be careful not to get cleaner into any switches.

3.3 CORRECTIVE MAINTENANCE

Often what appears to be a malfunction, is the result of improper operation or application of the equipment. Upon encountering a problem, thoroughly evaluate the operating procedures used when the malfunction occurs. Use the display as a troubleshooting aid.

If the display does not illuminate, verify that the AC wall adapter is properly connected and that AC power is available. If DC power is provided from some other source be sure that the voltage level is satisfactory and that proper polarity has been observed (see section one for input power specifications).

If the time is incrementing but the decimal points are always illuminated this is an indication that the input reference code is bad. Verify that the IRIG B input signal is properly connected or that the generating source is functioning properly. Signal levels lower than 0.5 volts peak to peak may not be readable.

If the display does not illuminate when power is applied or the time will not increment this is an indication that a malfunction has occurred. Under these conditions consult TrueTime customer service for help.

SECTION FOUR

DRAWINGS

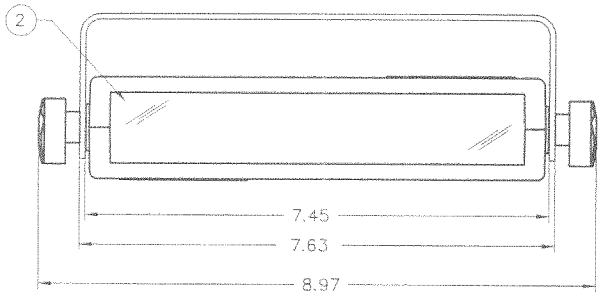
4.1 DETAILED DRAWINGS

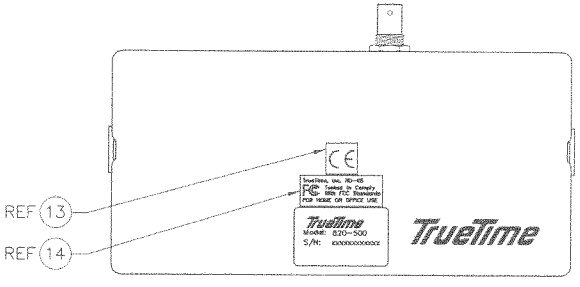
4.1.1 820-500 Top Assembly

4.1.2 800-1158 Mounting Support Bracket, RD-05

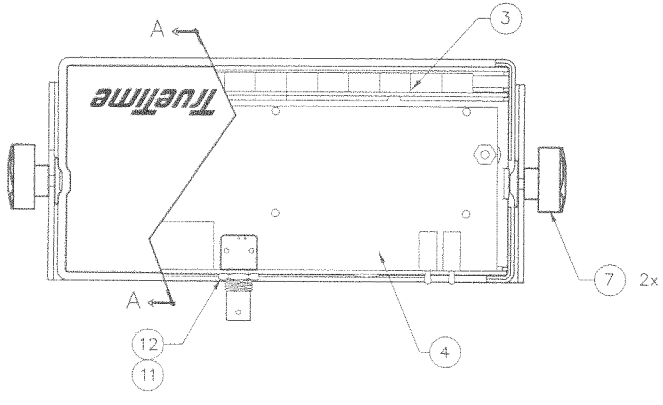
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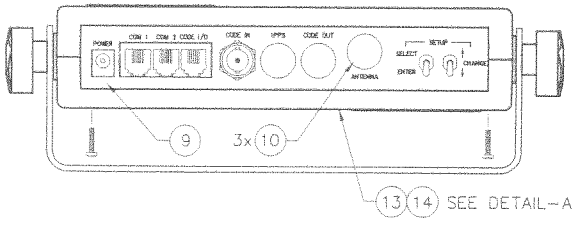
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	REDRAW PER PROTOTYPE BUILD	09-29-97	
B	REMOVE 1PPS CODE OUT CONNECTORS; (ECO 1137)	02-20-98	
C	ADD CE LABEL	04-28-98	MVDP/DR
D	ADD FCC LABEL (ECO 1167)	06-09-99	DR
E	CHANGE 800-5291 TO 800-5291-2	06-09-99	

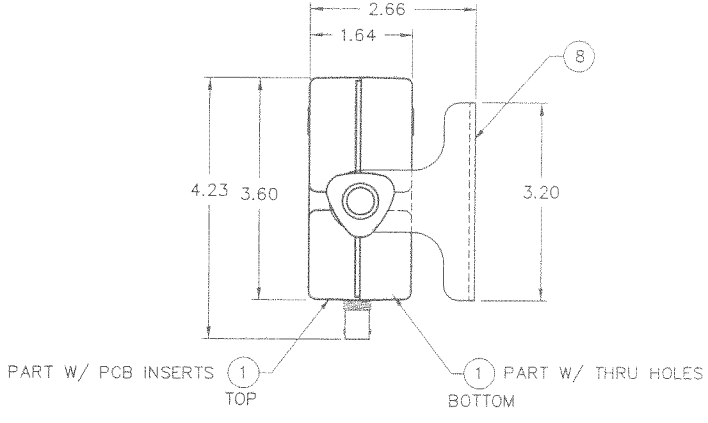


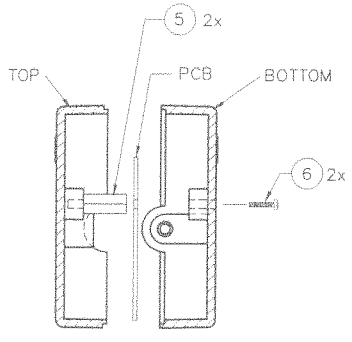


DETAIL-A
BOTTOM VIEW
BRACKET (ITEM 8) REMOVED FOR CLARITY









SECTION A-A

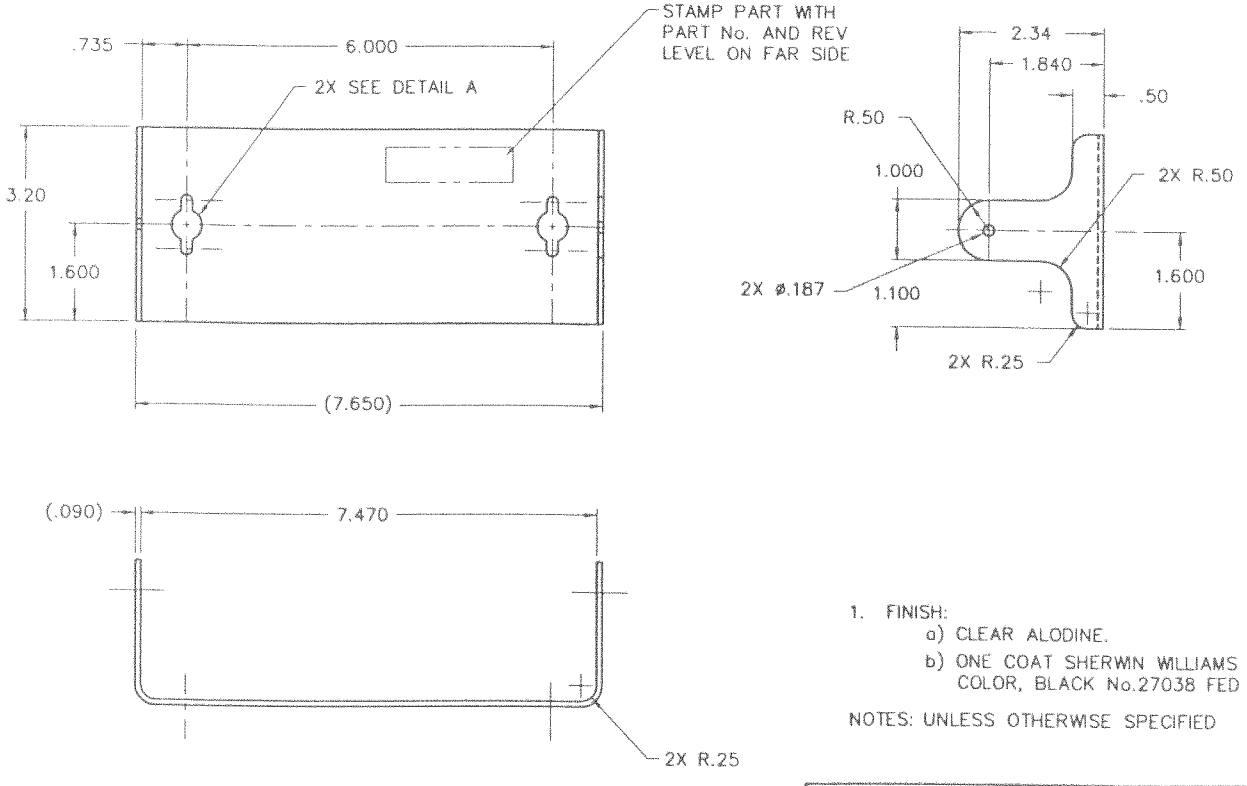
CONTRACT NO.		TrueTime® "Where Customer Satisfaction is our Highest Priority" 2835 Duke Ct. Santa Rosa, CA 95407
APPROVALS	DATE	
DRAWN BY RKLEIN	9/97	ASSY REMOTE DISPLAY (DESKTOP)
CHECKED BY		
APPROVED BY DR	8/99	
NEXT ASSY		SIZE B | CODE IDENT NO. | DRAWING NO. 820-500 | REV E
FILENAME: \820\500 DATE: 07-13-00		SCALE NONE | SHEET 1 OF 1

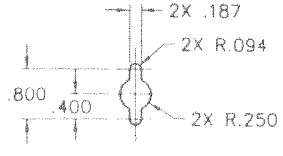
Parent Item / Component Item	Parent Description / Component Descripiton	Batch Quantity / Quantity Per	UM	Bubble Seq No / Type	Remarks / M	Level / Draw	Ty	Seq	T	Effective From	Effective Thru
820-500	REMOTE DISPLAY, DESKTOP		EA			820-500					
0000-PL	PARTS LIST REV LEVEL	1.00	EA		REV E (07-12-00)	1	S	2.0	M	1/1/00	12/31/10
0000-PRINT	REFERENCE PRINT	1.00	EA		820-500 REV E	1	S	3.0	M	1/1/00	12/31/10
178S-29C512IND	FLASH EPROM 64KX8/32PLCC	1.00	EA		U2 (ON 800-5291)	1	S	4.0	P	1/1/00	12/31/10
240-006-006	SCREW PH PN SS 6-32X3/4	2.00	EA		06	1	S	5.0	P	1/1/00	12/31/10
255-6F-6M-5.5	SPCR ALU HEX 6-32 X 11/16	2.00	EA		05	1	S	6.0	P	1/1/00	12/31/10
274-009	PLUG HOLE NYL BLK 1/2 IN.	3.00	EA		10	1	S	7.0	P	1/1/00	12/31/10
375-022	LOCKWASHER,BNC PC MT	1.00	EA		11	1	S	8.0	P	1/1/00	12/31/10
375-023	NUT BNC PC MT	1.00	EA		12	1	S	9.0	P	1/1/00	12/31/10
380-013	KNB CLAMP 8-32X.375 STUB	2.00	EA		07	1	S	10.0	P	1/1/00	12/31/10
400-052	LABEL,CE SYMBOL (SMALL)	1.00	EA		13	1	S	11.0	M	1/1/00	12/31/10
400-069	LABEL,FCC (RD-05)	1.00	EA		14	1	S	12.0	M	1/1/00	12/31/10
560-3173	EPROM PROGRAMMING	1.00	EA		U2 (ON 800-5291)	1	S	13.0	M	1/1/00	12/31/10
800-1154	CASE, DESKTOP DISPLAY	1.00	EA		01 TOP & BOTTOM	1	S	14.0	P	1/1/00	12/31/10
800-1156	LENS, RD-BK (FRONT PNL)	1.00	EA		02	1	S	15.0	P	1/1/00	12/31/10
800-1157	REAR PANEL, RD-BK	1.00	EA		09	1	S	16.0	P	1/1/00	12/31/10
800-1158	BRACKET,RD-BK MTG SUPPORT	1.00	EA		08	1	S	17.0	P	1/1/00	12/31/10
800-5290	ASSY DISPLAY RD-BK	1.00	EA		03	1	S	18.0	P	1/1/00	12/31/10
800-5291-2	ASSY CPU RD-05	1.00	EA		04	1	S	19.0	M	1/1/00	12/31/10
TL-3-PS	PWR SUP 12VDC	1.00	EA		SHIPPING KIT	1	S	22.0	P	1/1/00	12/31/10

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REVISIONS

REV	DESCRIPTION	DATE	APPROVED
A	.187 DIA HOLE WAS .125 DIA	11/20/97	





DETAIL A

1. FINISH:
   a) CLEAR ALODINE.
   b) ONE COAT SHERWIN WILLIAMS POLANE HIGH SOLIDS POLYURETHANE T+2.8 COLOR, BLACK No.27038 FED STD 595B (LIGHT TEXTURE).

NOTES: UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE
FRACTIONS ± DECIMALS .XX=±.02 .XXX=±.010 ANGLES ±2°
ALL THREADS TO BE CLASS 2 PER ANSI Y14.6
MACH CON - .005 TO .015R OR CHAM
SH MATL - DEBURR & BREAK EDGES .015 MAX R
DIM AND TOL APPLY FIN TREAT

MATERIAL: AL 5052-H32 .090 THK.
FINISH: SEE NOTE 1
FILENAME: \800\1158
DATE: 11-20-97

CONTRACT NO.

APPROVALS	DATE
DRAWN BY RKLEIN	7/97
CHECKED BY RK	
APPROVED BY	11/97

NEXT ASSY

TrueTime
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