

SECTION XXXII

HAVE QUICK II OPTION

SECTION 32-1 GENERAL INFORMATION

INTRODUCTION

The Have Quick II Option outputs time of day, day of year, and year in Have Quick II format to a rear panel interface. Section 32-3 describes this format in detail.

This option consists of a circuit card assembly 86-396 and special software.

HAVE QUICK II INTERFACE SPECIFICATIONS

Format:	Have Quick II conforming to ICD-GPS-060
Bit Period:	600 \pm 10 μ s
Bit Rate:	Approximately 1667 BPS
Standard Output	HCMOS (Pins 1 & 2 of P2)
Optional Output	RS-422 (Pins 4 & 5 of P2)
Frame Rate:	1 frame/sec
Frame Length:	504 bits
Synchronization:	First bit starts within 10 μ s of leading edge of the 1 PPS
Connector:	Isolated female BNC

SECTION 32-2 INSTALLATION

INTRODUCTION

No installation is required when this option is purchased with the receiver. The following installation instructions apply only to installation after the initial purchase of the receiver.

FIELD INSTALLATION

Supplied with the Time Interval/Event Timing Option are the following items:

1. Assembly 86-396
2. Mounting hardware
3. EPROM set and replacement instructions

Warning: Only a qualified technician should attempt installation of this option. Dangerous voltages are present which can cause electric shock that could result in severe injury or even death. Disconnect all power before disassembling the unit!

The only equipment required for installation is a Phillips screwdriver and an EPROM extraction tool.

If the receiver is rack mounted, first remove it from the rack as described in SECTION II of this manual. Installation requires inserting the 86-396 assembly into an empty option slot.

Remove the top lid and retain the screws. Remove the cover plate of an empty option slot and save the screws. Slide the option assembly into the guides on the side rails of the slot and firmly press the assembly connector into the Bus Backplane Assembly connector. Secure the option to the chassis with the previously saved screws. Install the new EPROMs as described in the EPROM Replacement Instructions sent with the option. Replace the lid and secure with the previously saved screws.

Fabricate any coaxial cables required.

SECTION 32-3 OPERATION

The Have Quick II Option outputs time of day, day of year, and year in Have Quick II format to a rear panel port at the rising edge of the GPS-DC timing 1 Hz. Have Quick II employs bi-phase (Manchester II) encoded transmission at approximately 1667 bits per second. A 1-bit is encoded by a high state lasting 300 μ s, followed by a low state lasting 300 μ s, whereas a zero bit is encoded by a low state lasting 300 μ s, followed by high state lasting 300 μ s. As shown in Figure 3-1, the Have Quick II message format starts with a 240 ms bit stream of 400 logic 1 bits. This is followed by a 9.6 ms 16-bit start-of-message indicator (00010001 11101001) and 52.8 ms of time data (hours, minutes, seconds, day of year, and year). Each 8-bit character in the time data message consists of a 4-bit BCD digit preceded by 4 bits of parity. Parity bits are derived from the modified 8:4 Hamming Code as shown in Table 32-1 below.

TABLE 32-1

MODIFIED HAMMING CODE

Character	Transmitted Code							
	Parity Data				BCD Data			
	8	4	2	1	8	4	2	1
0	0	0	0	0	0	0	0	0
1	1	1	1	0	0	0	0	1
2	0	1	1	1	0	0	1	0
3	1	0	0	1	0	0	1	1
4	1	0	1	1	0	1	0	0
5	0	1	0	1	0	1	0	1
6	1	1	0	0	0	1	1	0
7	0	0	1	0	0	1	1	1
8	1	1	0	1	1	0	0	0
9	0	0	1	1	1	0	0	1

The Have Quick II interface outputs time shortly after power-up. However, the availability of valid UTC time and synchronization is dependent upon almanac and ephemeris data and satellite acquisition as described in SECTION III of this manual under GPS-DC STARTUP and SATELLITE ACQUISITION.

No user intervention other than power-up is required.

SECTION 32-4 THEORY OF OPERATION

INTRODUCTION

The Processor Assembly 86-320, Timing Assembly 86-330, and Assembly 86-396 implement the Have Quick II Option. Refer to Section IV of the manual for the theory of operation of all assemblies except the Have Quick II Assembly, which is explained below.

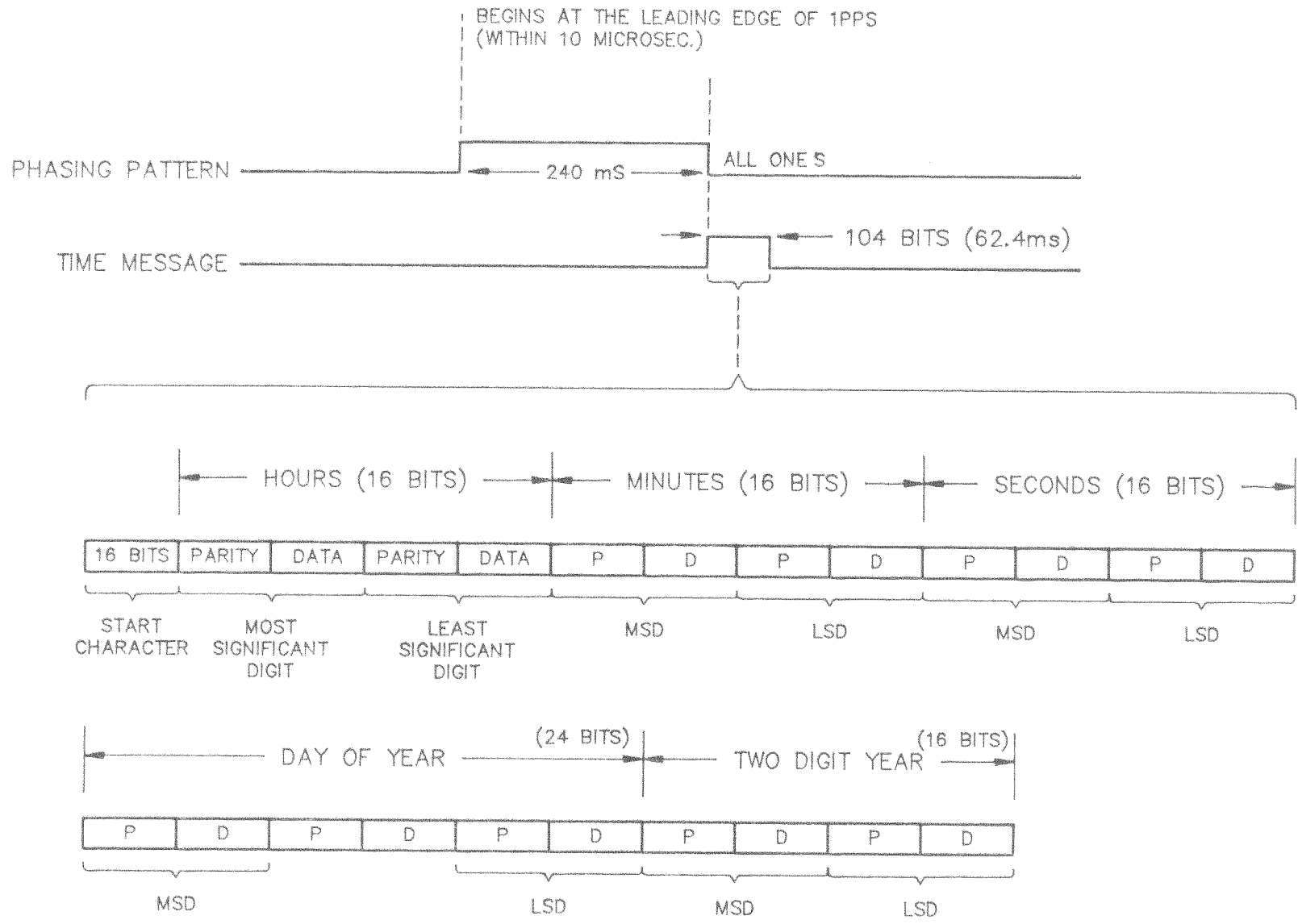


FIGURE 3-1 HAVE QUICK II TOD OUTPUT FORMAT AND TIMING

HAVE QUICK II ASSEMBLY 86-396

Reference drawing 86-396, sheet 2. The Processor Assembly 86-320 provides time data in binary format to dual port RAM U3. PAL U1 handles address decoding.

ROM U4 stores control software for micro controller U5. This software accesses U3, retrieves time information, and then translates it into Have Quick II format.

Timing Assembly 86-330 provides the Have Quick Option Assembly with 1 MHz, 1 kHz, and 1 Hz timing signals synchronized (when possible) to UTC-USNO.

Phase-locked loop U7 uses the 1 MHz signal to produce an 8 MHz signal which is used by U5 to generate its internal 2 MHz clock.

U5 uses the 1 kHz signal (which causes interrupts) and the 1 Hz signal (which is polled) to schedule various events such as the start of the next second's Have Quick II frame. U5 uses internal interrupts to generate the Have Quick II bit stream.

SECTION 32-5 MAINTENANCE AND TROUBLESHOOTING

INTRODUCTION

This option has been designed to provide maintenance-free operation. Under normal use, it will require no calibration or adjustment. This section contains basic troubleshooting techniques.

TROUBLESHOOTING

Before proceeding, refer to Section 32-3 OPERATION for a description of normal operation. Use the following paragraphs to isolate the problem to a specific assembly. Use the assembly drawing and schematic in Section 32-6 and the detailed circuit descriptions in Section 32-4 to troubleshoot the individual assemblies. Only the procedures for the 86-396 assembly are given here. See Section V for troubleshooting procedures for all other assemblies.

EQUIPMENT REQUIRED

The following test equipment is required for troubleshooting and adjustments:

100 MHz Oscilloscope

INCORRECT OUTPUT

Before assuming a clock malfunction, first be certain that the instrument using the Have Quick II output is functioning properly and that you understand what response is normal for this custom output. Refer to Section 32-3. Verify that all connectors are secure and that coax cables are good. Verify that the GPS-DC has acquired satellite signal and remains locked. If not, refer to "SATELLITE SIGNAL LOST PERMANENTLY OR NEVER ACQUIRED" in Section V.

If the instrument using the Have Quick II output accepts time data less frequently than once per second, it may be that the GPS-DC did not have valid UTC time when the last data was accepted. Therefore, if the GPS-DC has now acquired satellite signal and remains locked, try accepting new time. Refer to your instrument's manual.

If the problem does not go away, use an oscilloscope (preferably a digital one) to display the Have Quick II output, triggering on the 1 PPS output. If the Have Quick II option does not output or the timing of the output is incorrect, check the 1 PPS output. Refer to "BAD CODE OR PULSE OUTPUTS" in Section V.

If the 1 PPS functions correctly, the Have Quick II option PCB has failed and should be returned to the factory for repair.

SECTION 32-6 ASSEMBLIES AND PARTS LISTS

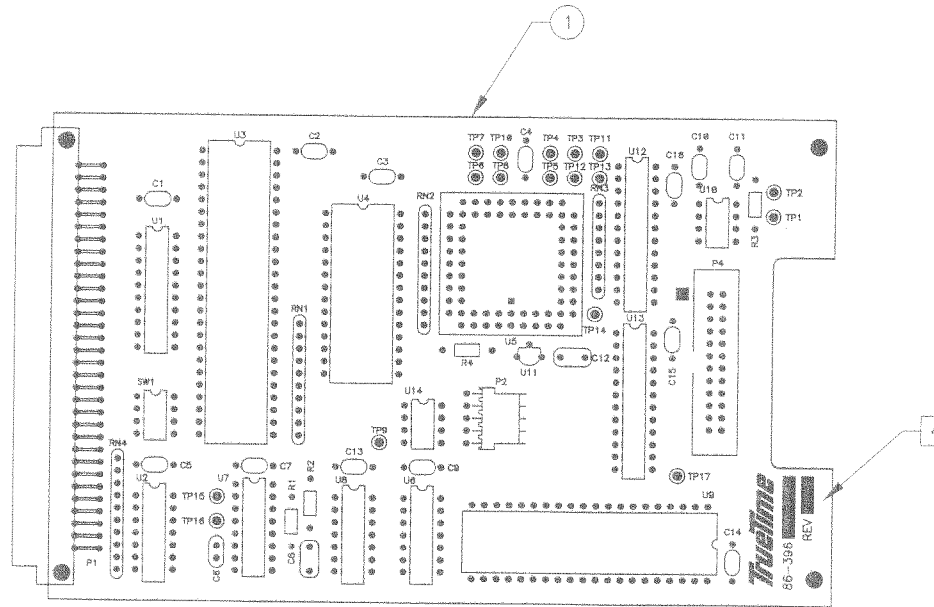
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REVISIONS


REV	DESCRIPTION	DATE	APPROVED
A	ASSY WAS MADE FROM 86-386; CREATED ETCH 085-386	11/24/97	
B	CORRECTED LAYOUT	05/07/99	
C	VALUE CHANGE	05/07/99	
D	ECO 1636	08/20/02	<i>[Signature]</i>

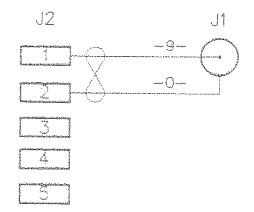
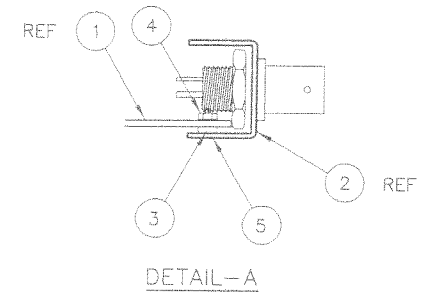
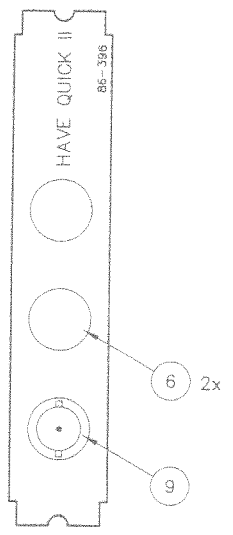
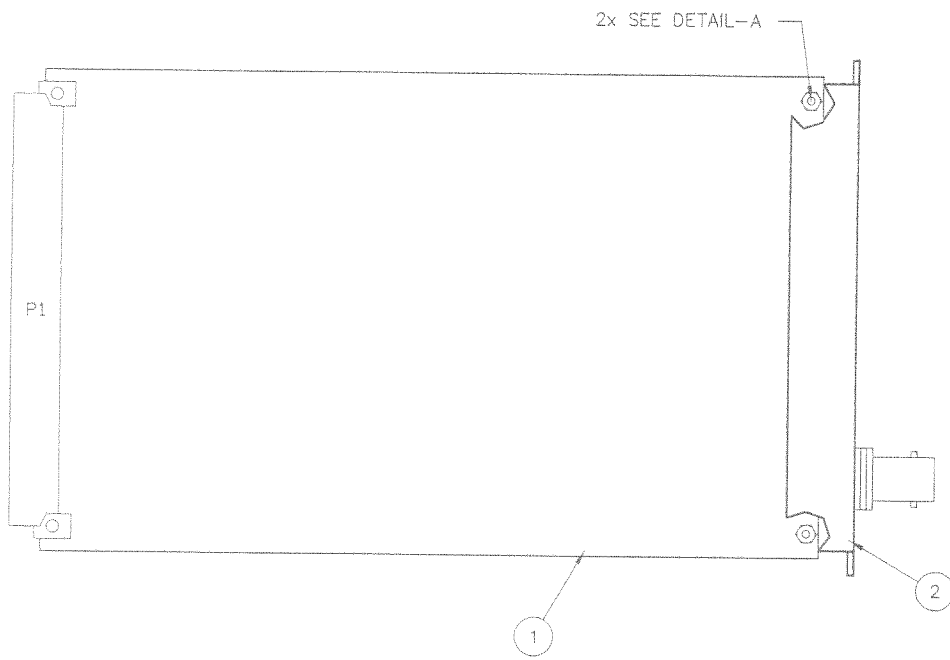


- 4 STAMP DASH NUMBER AND REVISION LEVEL IN AREA INDICATED.
- 3. POLARIZED CAPACITORS RE SHOWN WITH A ROUNDED EDGE INDICATING THE POSITIVE SIDE.
- 2. RESISTOR VALUES IN OHMS, CAPACITORS IN MICRO FARADS.
- 1. ASSEMBLE PER ASSEMBLY REQUIREMENTS DOCUMENT 421-11.

NOTES: UNLESS OTHERWISE SPECIFIED

FILENAME: 86-396A
DATE: 08-20-02

APPROVALS		DATE	 ASSY, TOP SIDE HAVE QUICK II		
DRAWN BY	BAS	11/05/97			
CHECKED BY					
APPROVED BY	DR	10/99			
NEXT ASSY		SIZE	CODE IDENT NO.	DRAWING NO.	REV
		B		86-396	D
		SCALE NONE			SHEET 1 OF 4



WIRING DETAIL



FILENAME: 86-396B
DATE: 08-20-02

SIZE	CODE IDENT NO.	DRAWING NO.	REV
B		86-396	D
SCALE NONE		SHEET 2 OF 4	

ORIGINAL

Doc

Parent Item Component Item	Parent Description Component Description	Batch Quantity Quantity Per	Bubble		Remarks	Effective								
			UM	Seq No		Level	Ty	Seq	T	From	Thru			
86-396	ASSY HAVE QUICK II		EA	Type M	Rev C	Draw								
0000-PL	PARTS LIST REV LEVEL	1.00	EA		REV D (08-27-02)		1	S	2.0	M	1/1/2000	12/31/2010		
0000-PRINT	REFERENCE PRINT	1.00	EA		86-396 REV D		1	S	3.0	M	1/1/2000	12/31/2010		
0000-REV	PCB REV LEVEL HERE >>>>	1.00	EA		085-396 REV B		1	S	4.0	M	1/1/2000	12/31/2010		
002-075	RES 1.2K OHM 1/4W 5%	1.00	EA		SEE BOM NOTE 1.		1	S	5.0	P	1/1/2000	12/31/2010		
	R1													
002-089	RES 4.7K OHM 1/4W 5%	2.00	EA				1	S	6.0	P	1/1/2000	12/31/2010		
	R3 R4													
002-121	RES 100K OHM 1/4W 5% R25J104	1.00	EA				1	S	7.0	P	1/1/2000	12/31/2010		
	R2													
011-089-10C	RESNET 4.7K OHM 10-P COM	3.00	EA				1	S	8.0	P	1/1/2000	12/31/2010		
	RN1 RN2 RN4													
011-121-008	RESNET 100K OHM 8-P COM	1.00	EA				1	S	9.0	P	1/1/2000	12/31/2010		
	RN3													
036-050	CAP MONO 470PF 100V R	1.00	EA		SEE BOM NOTE 1.		1	S	10.0	P	1/1/2000	12/31/2010		
	C6													
036-101	CAP MONO .1UF 50V	13.00	EA				1	S	11.0	P	1/1/2000	12/31/2010		
	C1 C10 C11 C13 C14 C15 C16 C2 C3 C4													
	C5 C7 C9													
036-120	CAP MONO 1UF 50V Z5U TYPE	2.00	EA				1	S	12.0	P	1/1/2000	12/31/2010		
	C12 C8													
065-004	SWITCH DIP 4-SEC	1.00	EA				1	S	13.0	P	1/1/2000	12/31/2010		
	SW1													
085-396	PCB HAVE QUICK II	1.00	EA		1		1	S	14.0	P	1/1/2000	12/31/2010		
176-68HC11F1	IC, CPU	1.00	EA		U5 SOCKETED		1	S	15.0	P	1/1/2000	12/31/2010		

Parent Item Component Item	Parent Description Component Description	Batch Quantity Quantity Per	UM	Bubble Seq No	Remarks	Effective					
						Level	Ty	Seq	T	From	Thru
176-74LS04	74LS04	1.00	EA			1	S	16.0	P	1/1/2000	12/31/2010
	U2										
176-75155P	UART TRANSCEIVER RS-232	1.00	EA			1	S	17.0	P	1/1/2000	12/31/2010
	U10										
176-IDT7130	DUAL PORT RAM	1.00	EA			1	S	18.0	P	1/1/2000	12/31/2010
	U3										
176-LTC485	LTC485 XSCVR SEVERE TEMP	1.00	EA			1	S	19.0	P	1/1/2000	12/31/2010
	U14										
176-MC33064	UNDER VOLTAGE DETECTOR	1.00	EA			1	S	20.0	P	1/1/2000	12/31/2010
	U11										
177-27256	CERAMIC 27C256 @ 200NS	1.00	EA		U4 SOCKETED	1	S	21.0	P	1/1/2000	12/31/2010
178-74HC00	MM74HC00N QUAD NAND GATE	1.00	EA			1	S	22.0	P	1/1/2000	12/31/2010
	U6										
178-74HC4046	MC74HC4046 PLL	1.00	EA		SEE BOM NOTE 1.	1	S	23.0	P	1/1/2000	12/31/2010
	U7										
178-74HC74	MC74HC74 DUAL D FLIP-FLOP	1.00	EA			1	S	24.0	P	1/1/2000	12/31/2010
	U8										
181-017	PROG DEV GAL16V8(RAL16L8)	1.00	EA		U1 SOCKETED	1	S	25.0	M	1/1/2000	12/31/2010
182-010	EPROM PROGRAMMING	1.00	EA		FOR U4 SOCKETED	1	S	26.0	M	1/1/2000	12/31/2010
218-337	REAR PNL PLT, 3 BNC HOLES RE-LABEL PANEL AS SHOWN ON DWG SHEET 2.	1.00	EA	2		1	S	27.0	P	1/1/2000	12/31/2010
241-004-003	SCREW PH FH SS 4-40X3/8 100'	2.00	EA	5		1	S	28.0	P	1/1/2000	12/31/2010
251-004	NUT KEP SS 4-40	2.00	EA	4		1	S	29.0	P	1/1/2000	12/31/2010
269-004	WSHR FLAT NYL 4 1/16 1/4"OD	2.00	EA	3		1	S	30.0	P	1/1/2000	12/31/2010

Parent Item Component Item	Parent Description Component Description	Batch Quantity		Bubble		Remarks	Level	Ty	Seq	T	Effective	
		Quantity	Per	UM	Seq No						From	Thru
273-015	TERM TEST POINT (WHITE)	17.00		EA			1	S	31.0	P	1/1/2000	12/31/2010
	TP1 TP10 TP11 TP12 TP13 TP14 TP15 TP16 TP17 TP2											
274-005	PLUG HOLE NYL 3/8 DIA	2.00		EA	6		1	S	32.0	P	1/1/2000	12/31/2010
315-022-000	WIRE 22AWG PVC INS BLK/WT	.50		FT		SEE WIRING	1	S	33.0	P	1/1/2000	12/31/2010
372-64P-001	CONN 64-P MALE RT AGL	1.00		EA			1	S	34.0	P	1/1/2000	12/31/2010
	P1											
375-014	CONN FM BULKHD RECP INSUL	1.00		EA	9		1	S	35.0	P	1/1/2000	12/31/2010
379-020	SOCKET IC 20 PIN MACHINE	1.00		EA		FOR U1	1	S	36.0	P	1/1/2000	12/31/2010
379-028-001	SOCKET IC 28 PIN MACHINE	1.00		EA		FOR U4	1	S	37.0	P	1/1/2000	12/31/2010
379-068-002	SOCKET PLCC 68-PIN	1.00		EA		FOR U5	1	S	38.0	P	1/1/2000	12/31/2010
401-02-01-05	CONN 5-P PC MT RT ANGLE	1.00		EA			1	S	39.0	P	1/1/2000	12/31/2010
	P2											
402-001	PIN 22-30 AWG MINI-KK	2.00		EA		SEE WIRING	1	S	40.0	P	1/1/2000	12/31/2010
403-01-01-05	CONN 5-P CABLE MOUNT LCK	1.00		EA		SEE WIRING	1	S	41.0	P	1/1/2000	12/31/2010
NOTE 1	NOTE	1.00		EA			1	S	42.0	M	8/27/2002	12/31/2010
	IF 178-74HC4046 IS A FAIRCHILD PART, CHANGE R1 TO 2.2K (002-081) AND CHANGE C6 TO 27PF (036-018).											
	IF 178-74HC4046 IS AN ON PART, VALUES FOR R1 AND C6 REMAIN AS SHOWN.											