

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

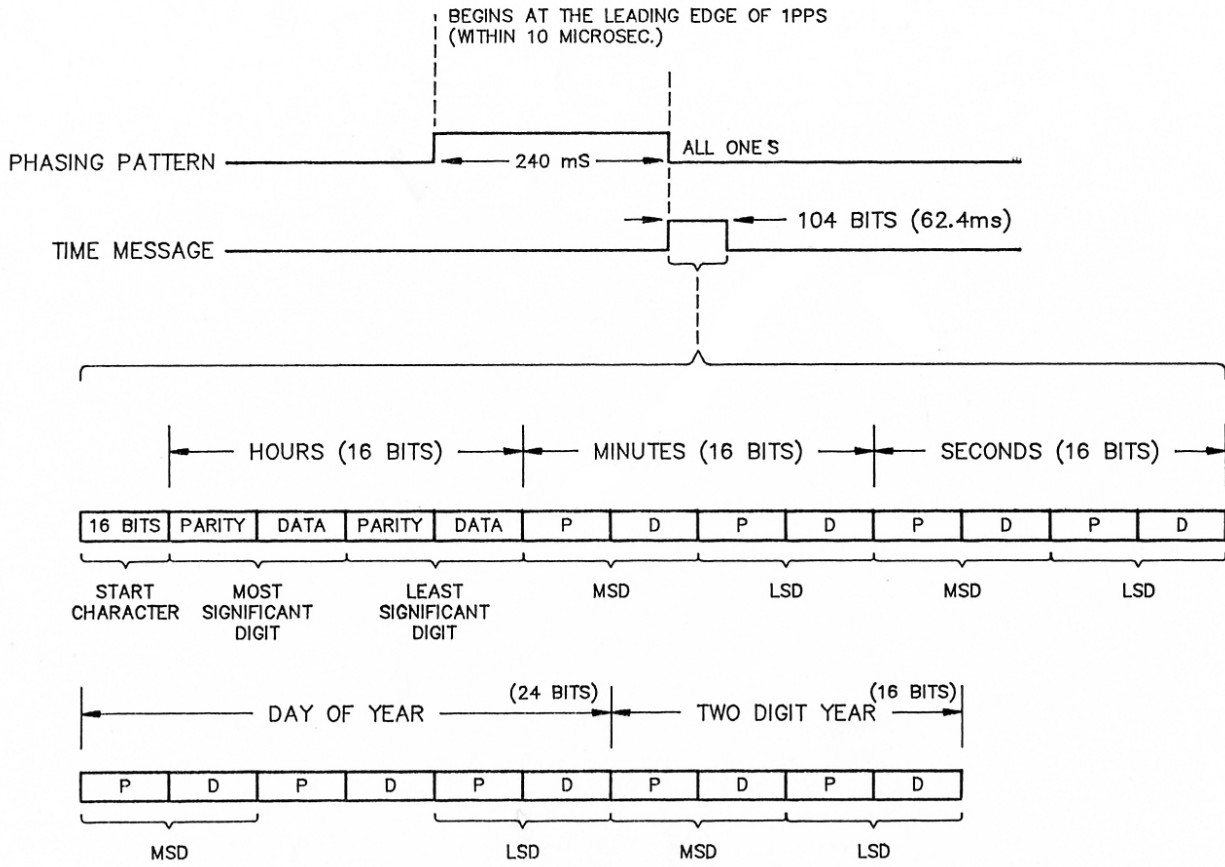


FIGURE 3-1 HAVE QUICK II TOD OUTPUT FORMAT AND TIMING

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 that 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