SNAP 19 VIKING PROGRAM

BIMONTHLY TECHNICAL PROGRESS REPORT

TES-32066-3

February 1980 and March 1980

TES--32066-3

DE84 010248

C.J. Goebel
Program Manager

Prepared for
The U.S. Department of Energy
under Contract DE-AC01-80ET32066

DISCLAIMER

TELEDYNE ENERGY SYSTEMS
110 W. Timonium Rd.
Timonium, Md. 21093

DISCLAIMER

NOTICE

DESIGN AND SYSTEM ENGINEERING

A. Accomplishments

1. Viking 1 Lander power system data has not been available during this reporting period. Summary reports indicate no anomalies in performance. Specific updates of Viking 1 landed power system history will be presented in a future report.

2. Monitoring and evaluation of Viking 2 Lander power system data continued. Figures 1 through 9 show typical SOL day cycles for Mission Days 1139,1170 and 1203. The RTG series power range as measured at the PCDA was 68 to 72 watts at fin root temperatures between 240°F and 310°F. The data was gathered between 11/18/79 and 1/23/80 during a period when spring turned into summer on Mars. Temperature data were similar to those 23 months ago, but combined RTG output power was down by 7 watts from the 75 watts recorded in February of 1978. Internal pressures of both generators were stable.

3. On February 1, 1980, during a scheduled relay transmission the Lander 2 battery voltage dropped below 26.5 volts and supply to the undervoltage bus was automatically terminated. This turned off the tape recorders, the cameras, and the antenna-pointing device.

The cause of the problem may have been an extra power drain on the batteries, related in some way to the currently high seasonal temperatures on Mars which had given the lander other problems in the past. Performance of the two thermoelectric generators was consistent up to 1/28/80, the last day for which data were available for this analysis. Viking project personnel at JPL report "good" RTG data for SOL 1212, the day of the power shutdown.

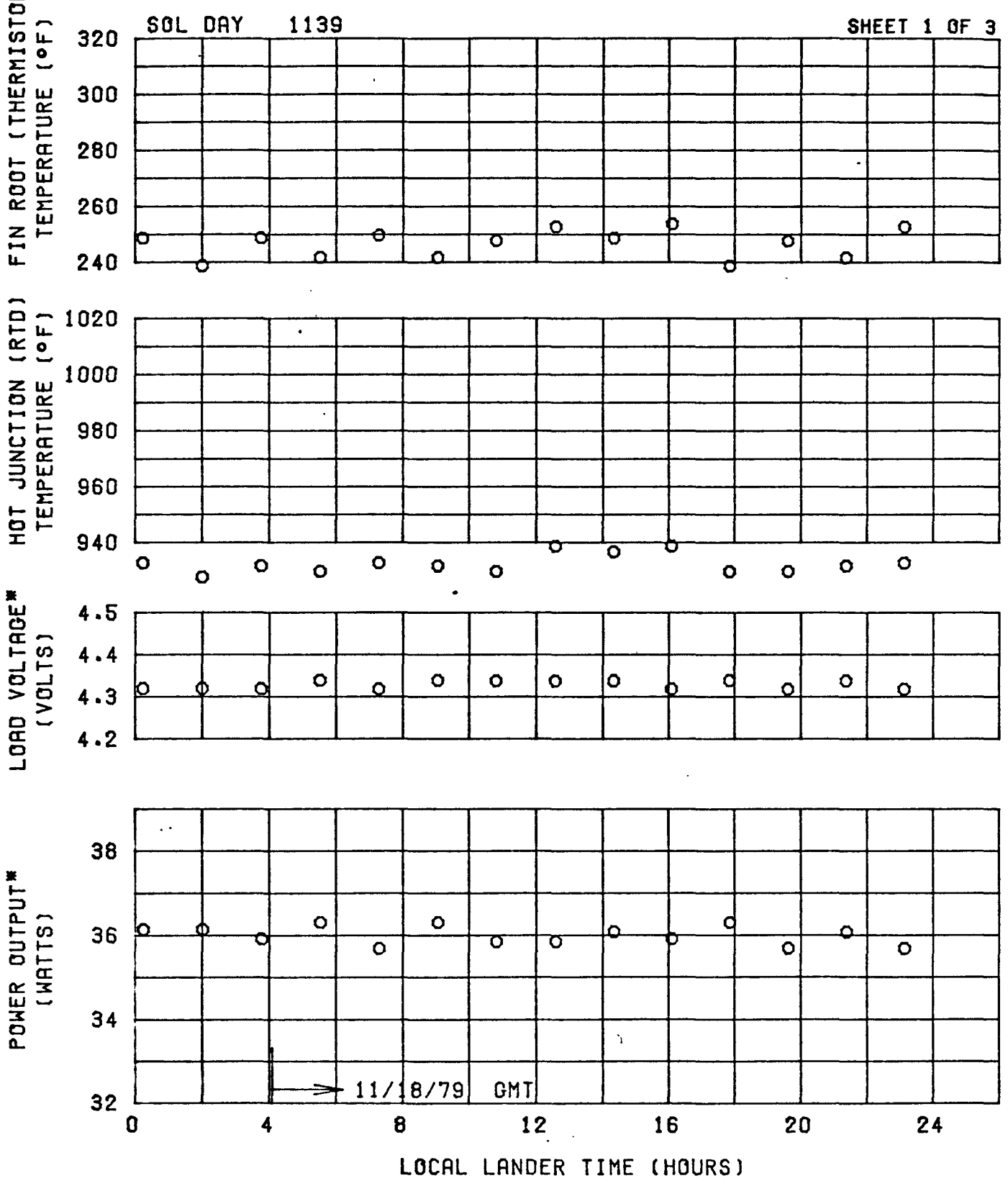
With the orbiter attitude control gas supply nearly depleted and the space network stations required for Voyager encounter with Saturn later this year, the final relay from Viking Lander 2 had been scheduled to take place on April 11. The attempt was made but no data were received. The Viking 2 Mission, therefore, is concluded.

4. Power system performance data for Pioneer 10 and Pioneer Saturn (initially designated Pioneer 11) were monitored through the reporting period and are shown in Figure 1. After adjusting for the telemetry characteristics, the estimated RTG system net power was 115 watts for both, Pioneer 10 and Pioneer Saturn. The telemetry signal quality from Pioneer Saturn remains excellent. Pioneer 10, for the first time, shows a loss of signal strength as evidenced by frequent and erratic excursions of more than one step per parameter. In addition, on-board voltage converter input voltage finally adjusted downward, an event which will result in a temporary but rather sudden reduction in indicated system power level. These data will be presented in the following report.

FIGURE 1

VIKING LANDER CAPSULE NO. 2

RTG S/N 113 MARS DAY/NIGHT PERFORMANCE CYCLE



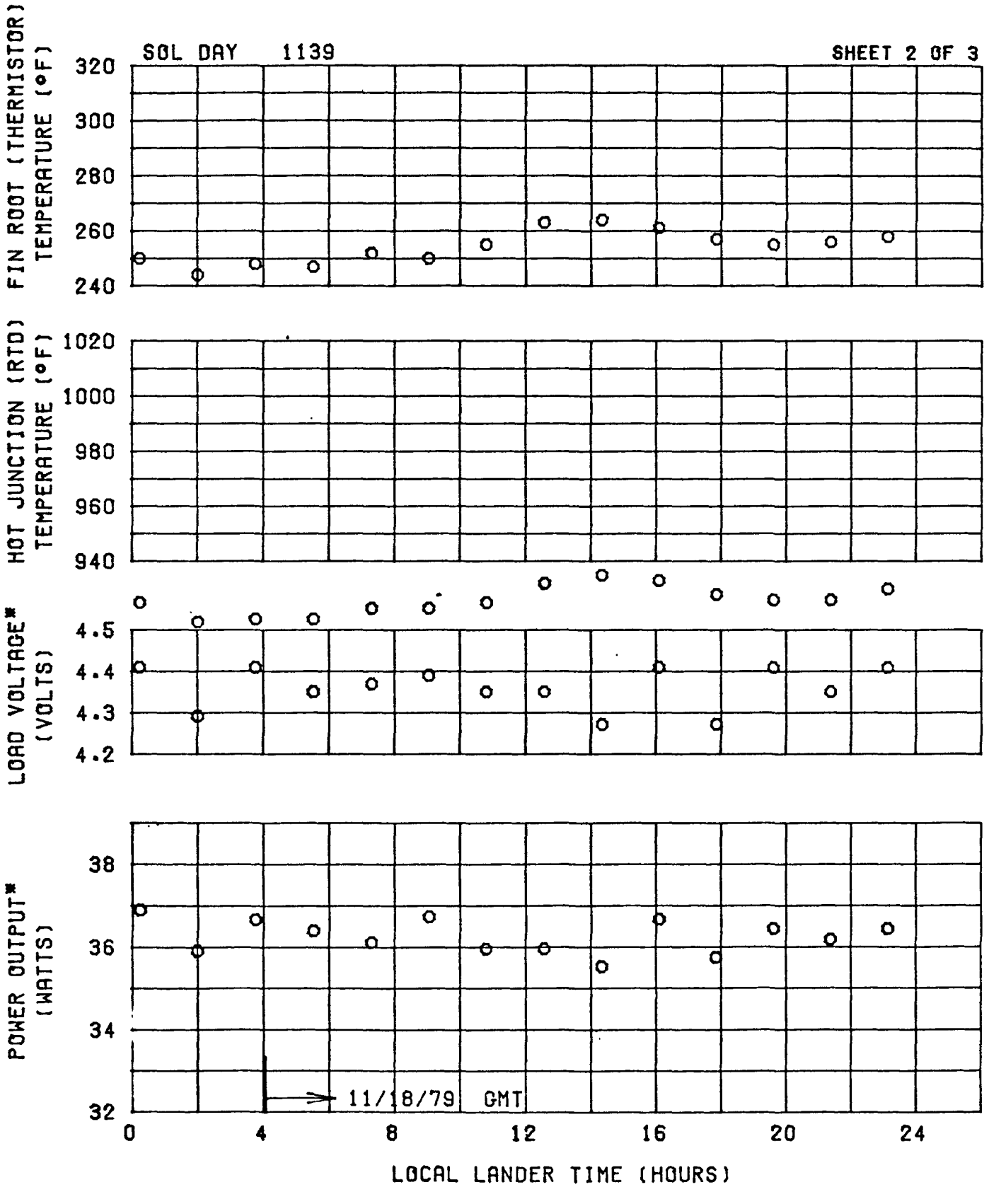
*CALCULATED PARAMETERS AT RTG OUTPUT RECEPTACLE

TELEDYNE ENERGY SYSTEMS

FIGURE 2

VIKING LANDER CAPSULE NO. 2

RTG S/N 114 MARS DAY/NIGHT PERFORMANCE CYCLE

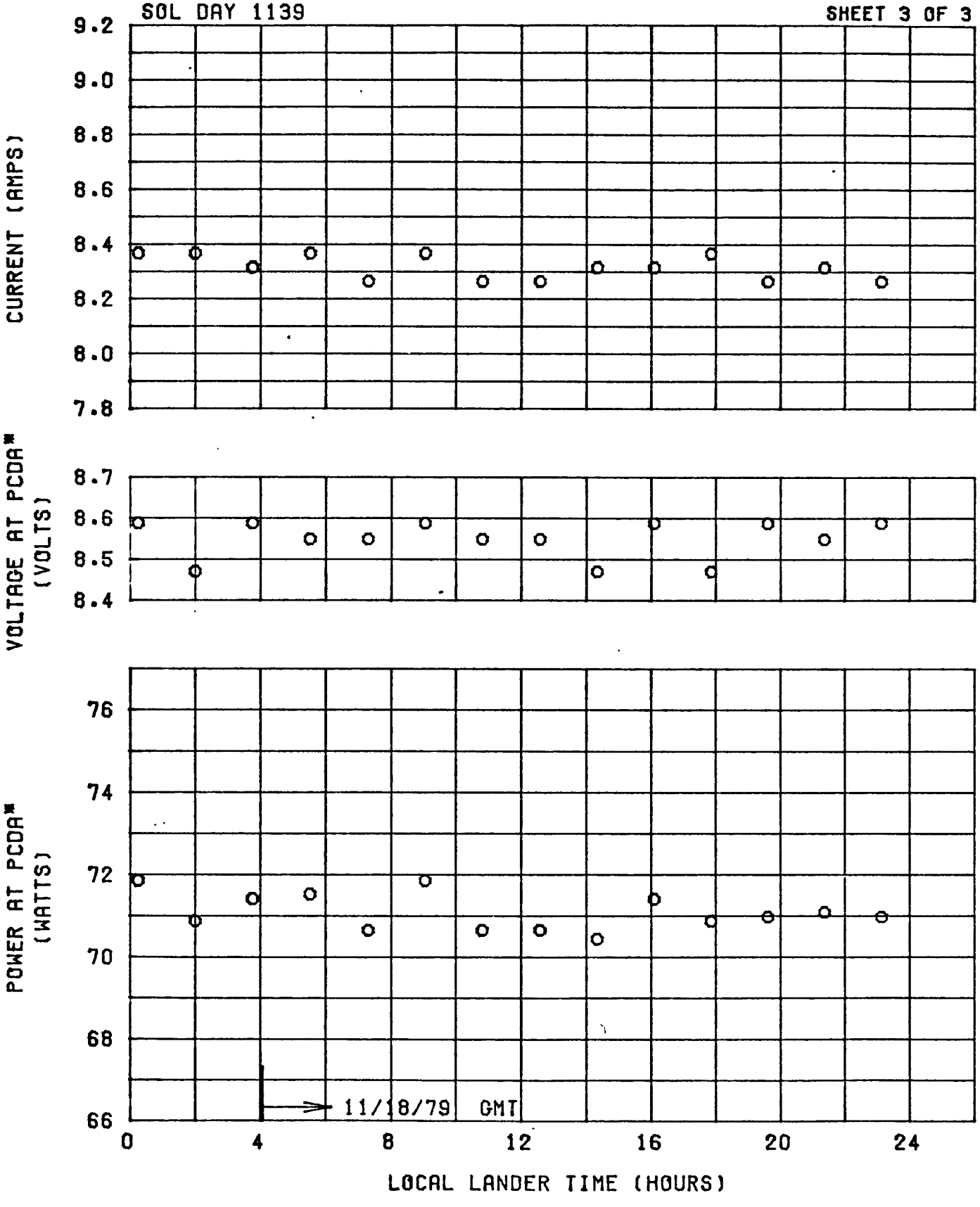


*CALCULATED PARAMETERS AT RTG OUTPUT RECEPTACLE

TELEDYNE ENERGY SYSTEMS

FIGURE 3
VIKING LANDER CAPSULE NO. 2
RTG SERIES MARS DAY/NIGHT PERFORMANCE CYCLE

SOL DAY 1139



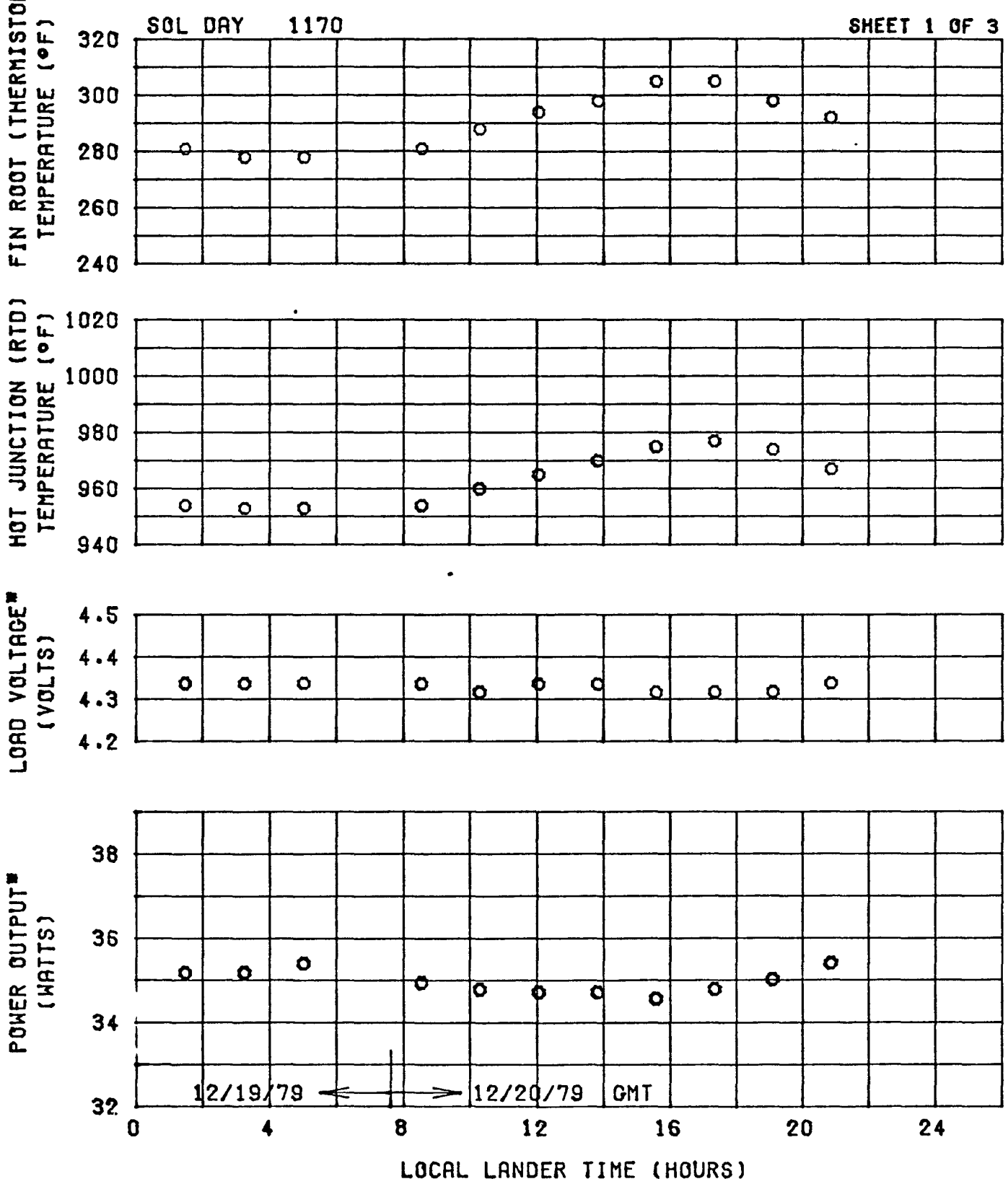
*POWER CONDITIONING AND DISTRIBUTION ASSEMBLY

TELEDYNE ENERGY SYSTEMS

FIGURE 4

VIKING LANDER CAPSULE NO. 2

RTG S/N 113 MARS DAY/NIGHT PERFORMANCE CYCLE



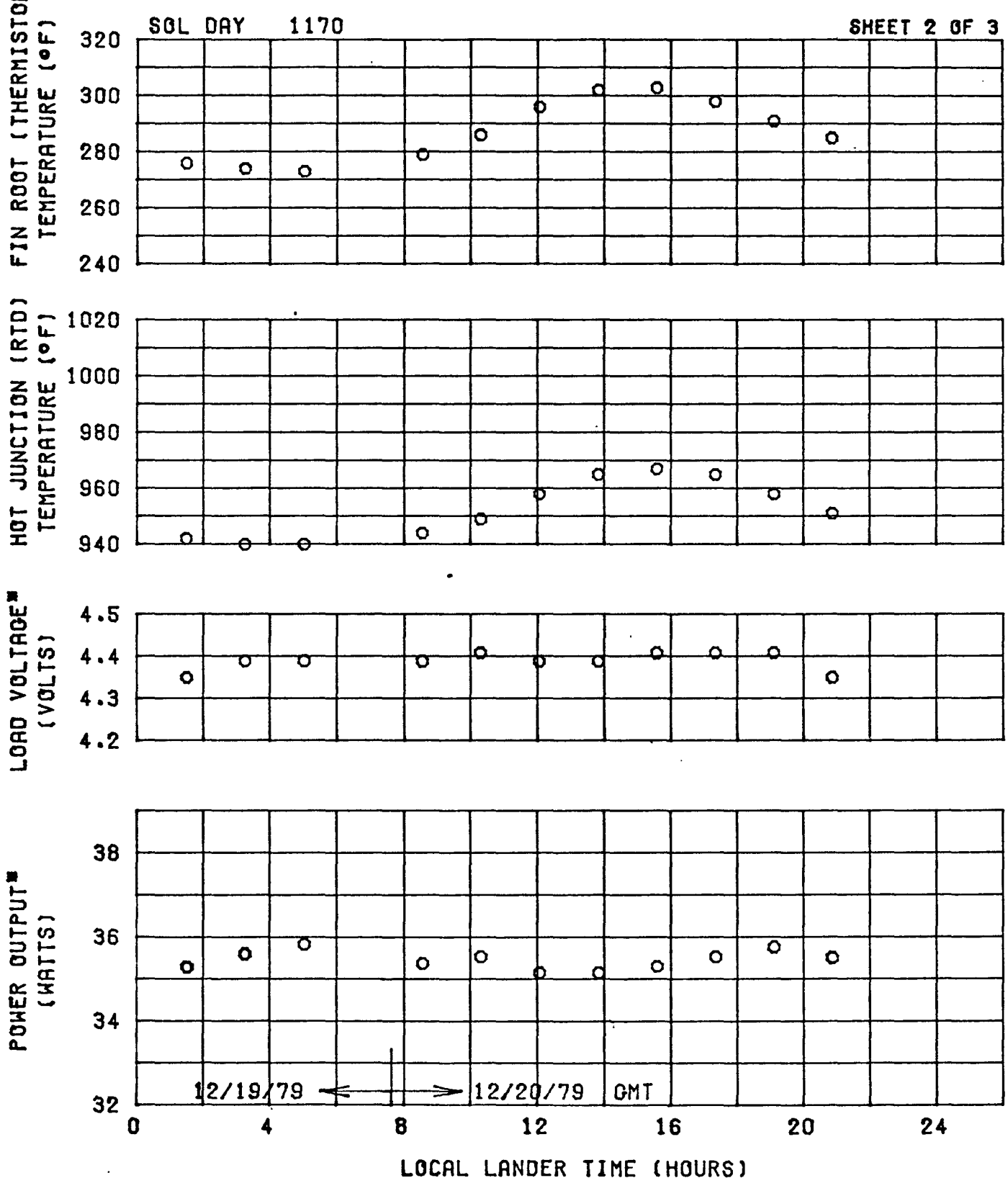
*CALCULATED PARAMETERS AT RTG OUTPUT RECEPTACLE

TELEDYNE ENERGY SYSTEMS

FIGURE 5

VIKING LANDER CAPSULE NO. 2

RTG S/N 114 MARS DAY/NIGHT PERFORMANCE CYCLE



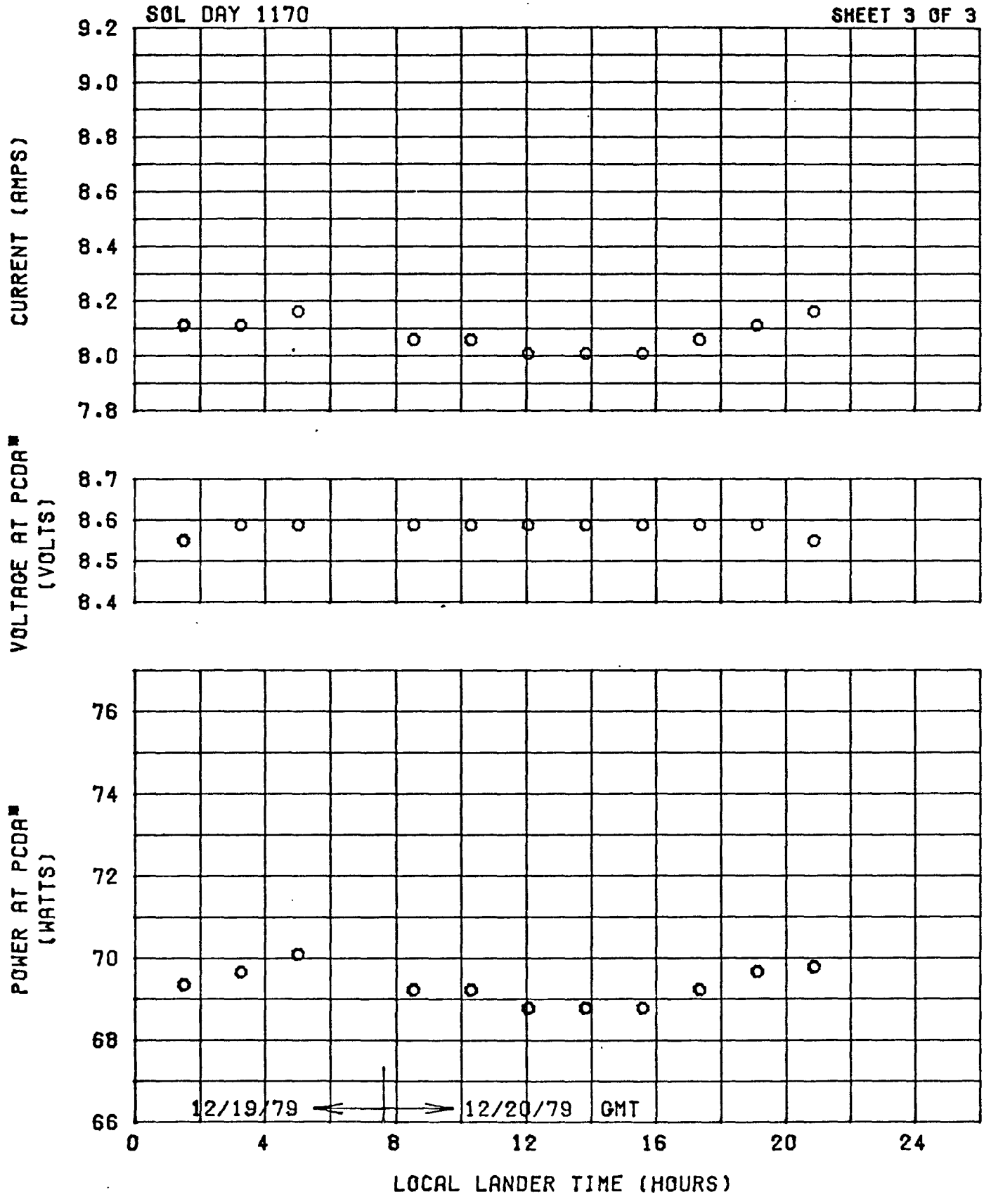
*CALCULATED PARAMETERS AT RTG OUTPUT RECEPTACLE

TELEDYNE ENERGY SYSTEMS

FIGURE 6

VIKING LANDER CAPSULE NO. 2

RTG SERIES MARS DAY/NIGHT PERFORMANCE CYCLE



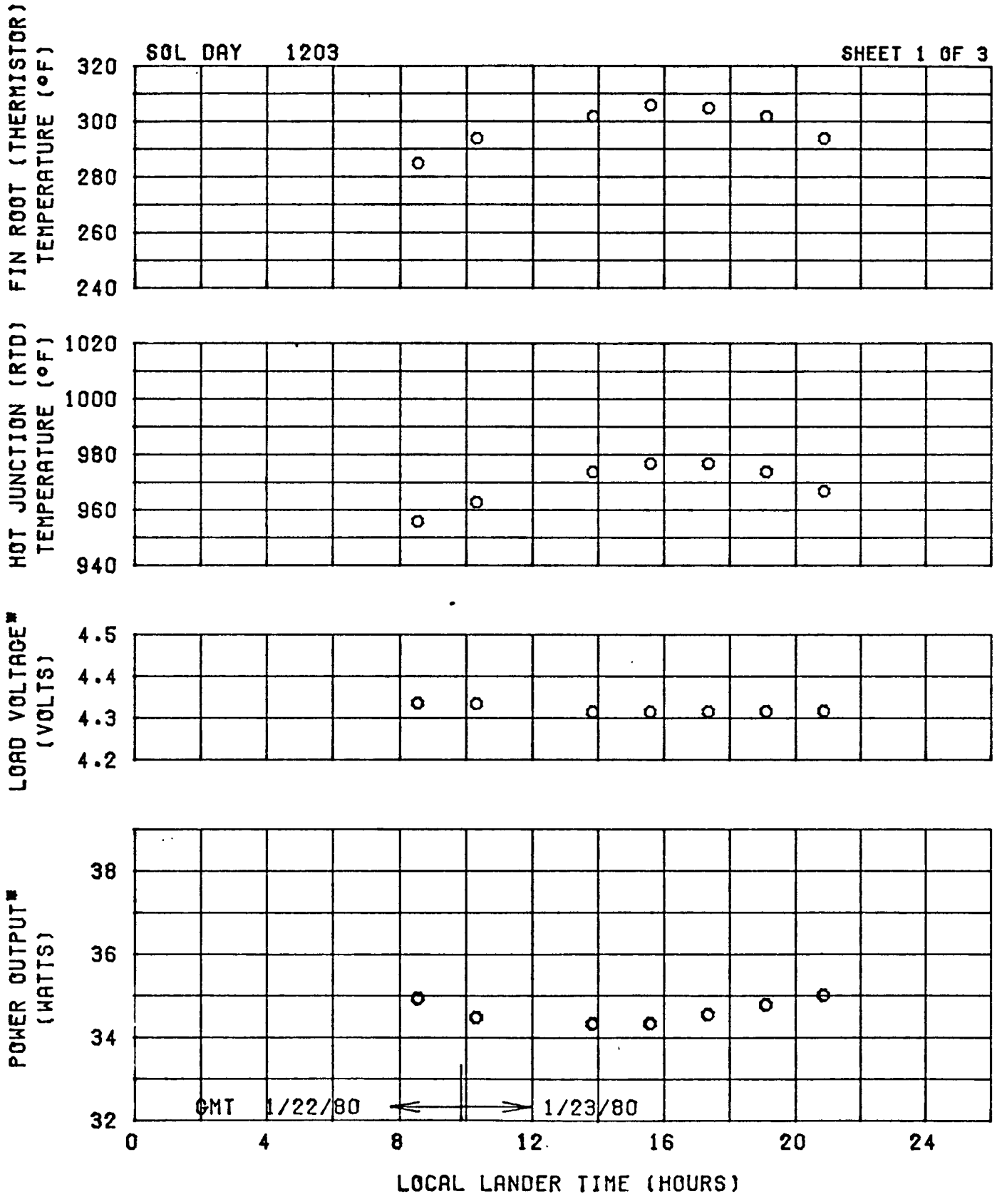
*POWER CONDITIONING AND DISTRIBUTION ASSEMBLY

TELEDYNE ENERGY SYSTEMS

FIGURE 7

VIKING LANDER CAPSULE NO. 2

RTG S/N 113 MARS DAY/NIGHT PERFORMANCE CYCLE



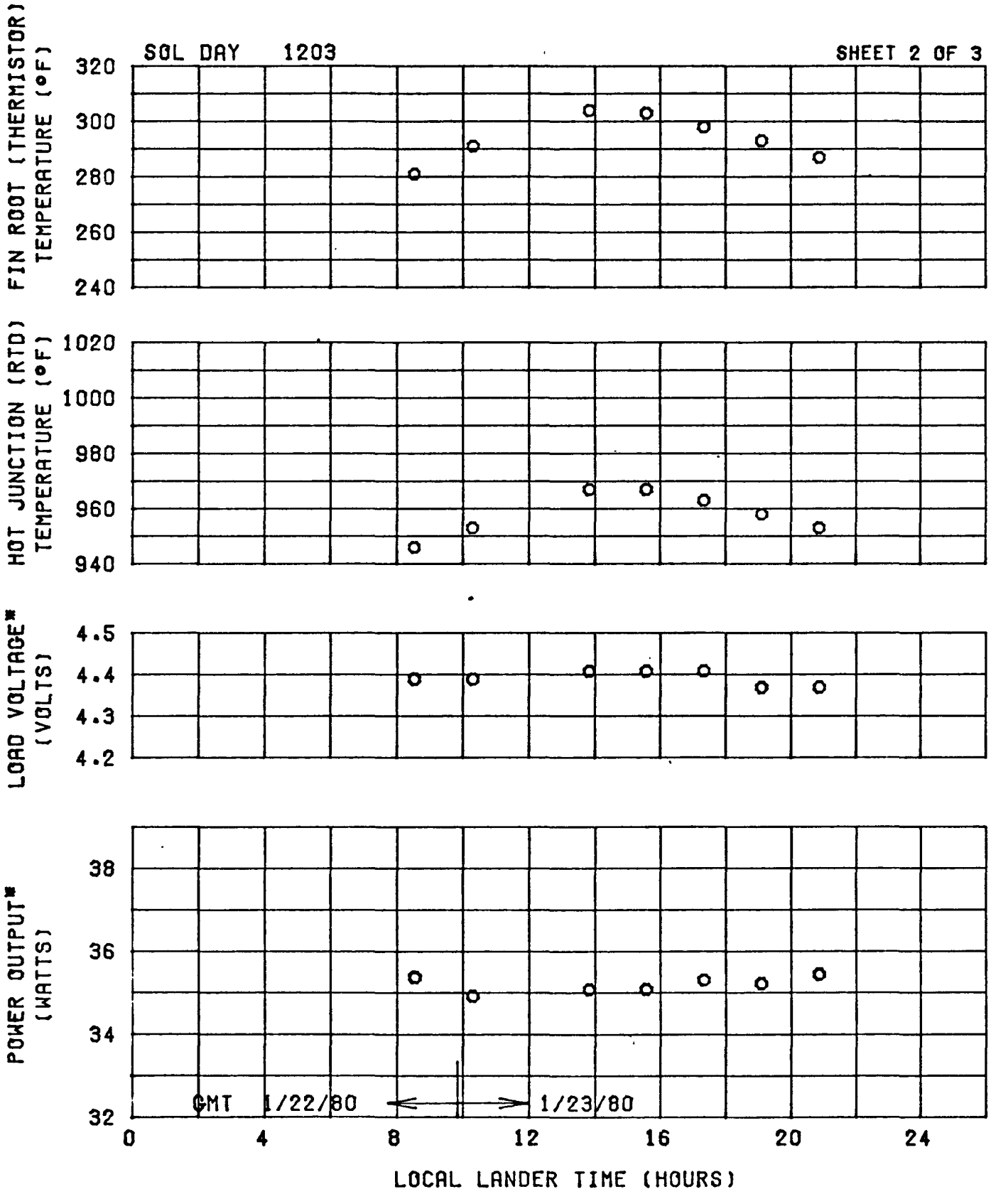
*CALCULATED PARAMETERS AT RTG OUTPUT RECEPTACLE

TELEDYNE ENERGY SYSTEMS

FIGURE 8

VIKING LANDER CAPSULE NO. 2

RTG S/N 114 MARS DAY/NIGHT PERFORMANCE CYCLE



*CALCULATED PARAMETERS AT RTG OUTPUT RECEPTACLE

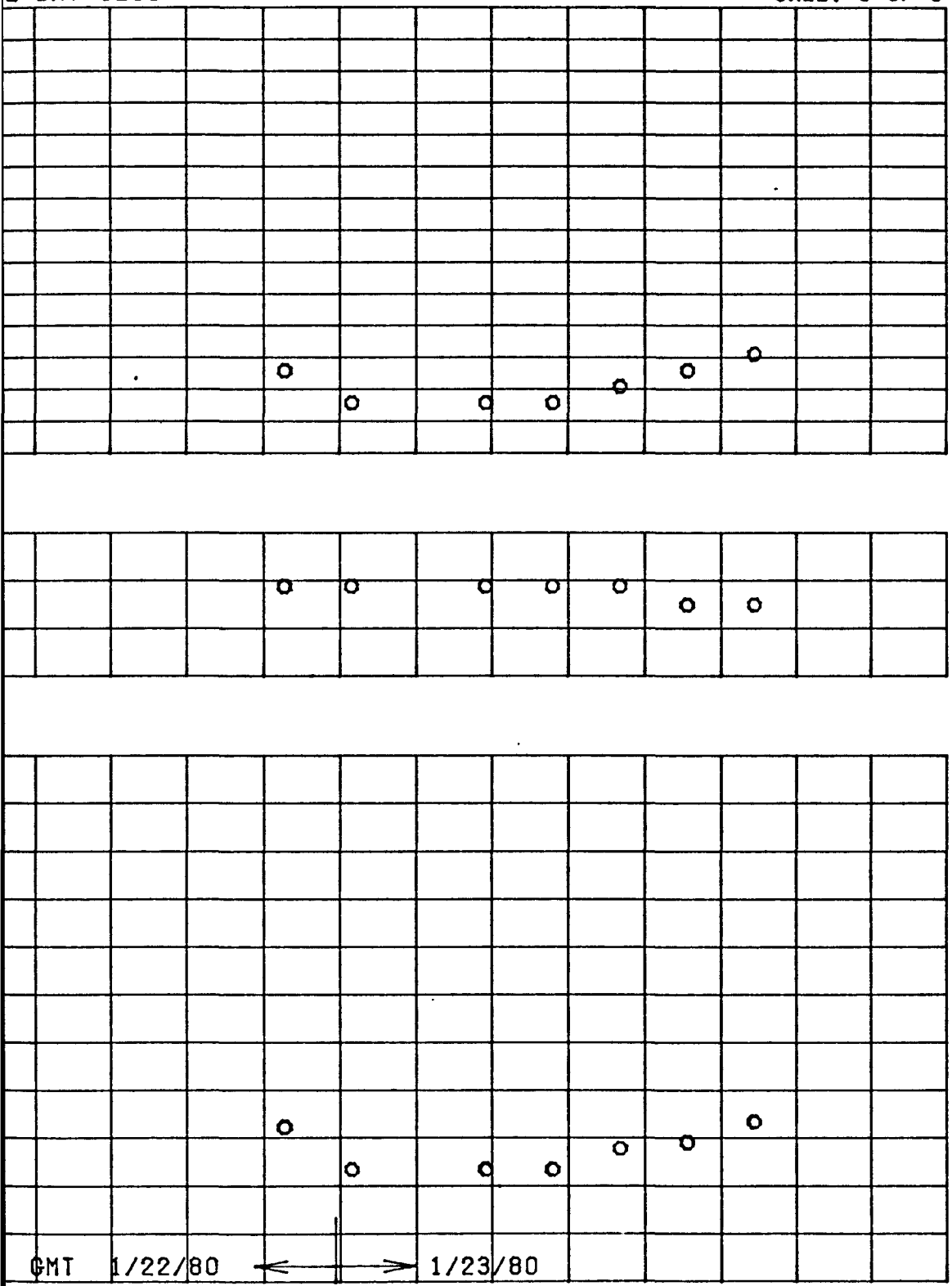
TELEDYNE ENERGY SYSTEMS

FIGURE 9

VIKING LANDER CAPSULE NO. 2

RTG SERIES MARS DAY/NIGHT PERFORMANCE CYCLE

L DAY 1203



ONING AND DISTRIBUTION ASSEMBLY