

U. S. DEPARTMENT OF THE INTERIOR  
U. S. GEOLOGICAL SURVEY

An All-Weather Time-Lapse Video Recording Station

by

Henry Chezar, Joseph E. Thomas

Open-file Report 93-257

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American Stratigraphic Code. Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

## System Components and Operation

The device used to image the coastal scenes is a Sony EVO-9100<sup>1</sup> Hi8mm camera/recorder (camcorder). This camcorder is both compact and lightweight. It records on standard Hi8mm videotape with a camera horizontal resolution of 450 lines. The high resolution provides a broadcast level of video quality previously not possible with small camcorders. This format naturally lends itself to professional editing systems where several edited generations of tape will result in only minimal quality loss. The tape records up to two hours of continuous video on standard play which when sequentially shot in a time-lapse mode can be greatly expanded.

The camcorder with only minimal modification was made to fit inside an environmental housing measuring 84.5cm(33.25in)L x 30.5cm(12.0in)W x 21.0cm(8.3in)H (Fig. 1). A glass window in front allows for wide angle viewing . Also contained in the housing is the timer-sequencer electronics and DC-DC converter. For cold weather application a heater blanket thermostatically controlled is wrapped around the camcorder and all interior air spaces are custom fitted with high density polyurethane foam to help insulate the video camera.

Power for the system is derived from a standard 12 volt car battery housed in a plastic case fitted with a watertight electrical feedthru. A heavy duty 12/2 electrical cable runs from the battery box to the camera housing.

draw of the camera during recording, the entire system will draw less than 10 watts. With good insulation the temperature easily remains above 0°C for long periods of time.

The timer needed to provide 8 functions: (1) apply power, (2) wait for the camera to stabilize, (3) trigger the record mode, (4) wait as data is recorded, (5) trigger the stop sequence, (6) wait for the camera to stabilize, (7) kill the power, (8) and repeat the sequences.

Another requirement stated by Sony in both the operators and service manuals is that the camera must be electrically isolated. We meet this requirement by coupling the power magnetically through the DC-DC converter and using a relay to provide contact closure to the record switch on the "remote" handle. This is convenient because the camera is computer controlled and the handle already contains the appropriate code generator.

The timer consists of 6 basic circuits: a ten minute timer (XR2242), a two minute timer (XR2242) and 4 short interval timers (XR558). The ten minute timer provides the clock function by changing state every 5 minutes. The 2 minute timer closes relay (K<sub>1</sub>) enabling the DC-DC converter and simultaneously triggers the short interval timers that open and close (K<sub>2</sub>) which, in turn, provides contact closure to start and stop the tape. The 2 minute timer can only trigger on a positive pulse so it operates once every 10 minutes.

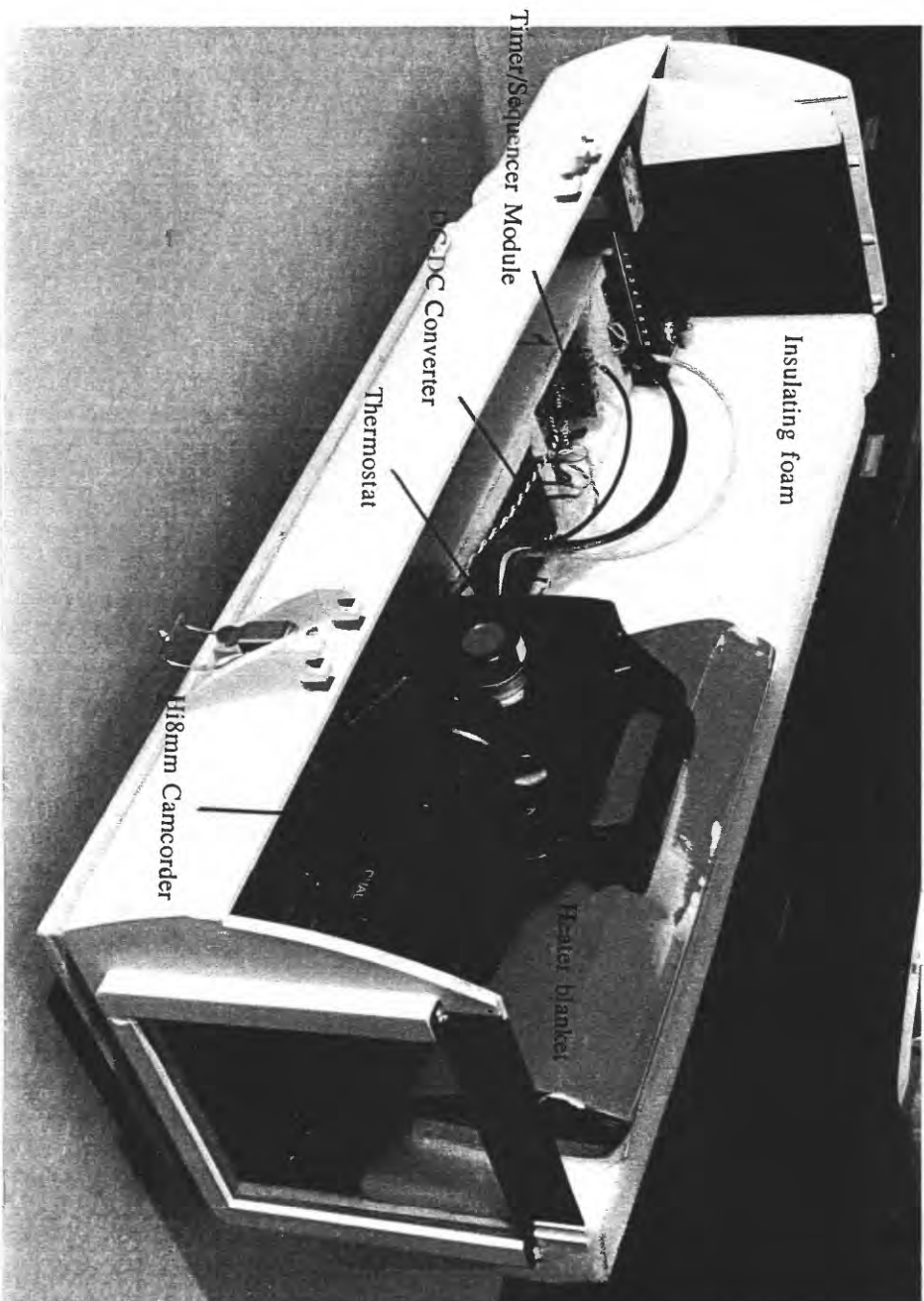


Fig: 1. With the housing opened all internal electrical and mechanical components are visible. During actual usage all air spaces are filled with insulating foam.

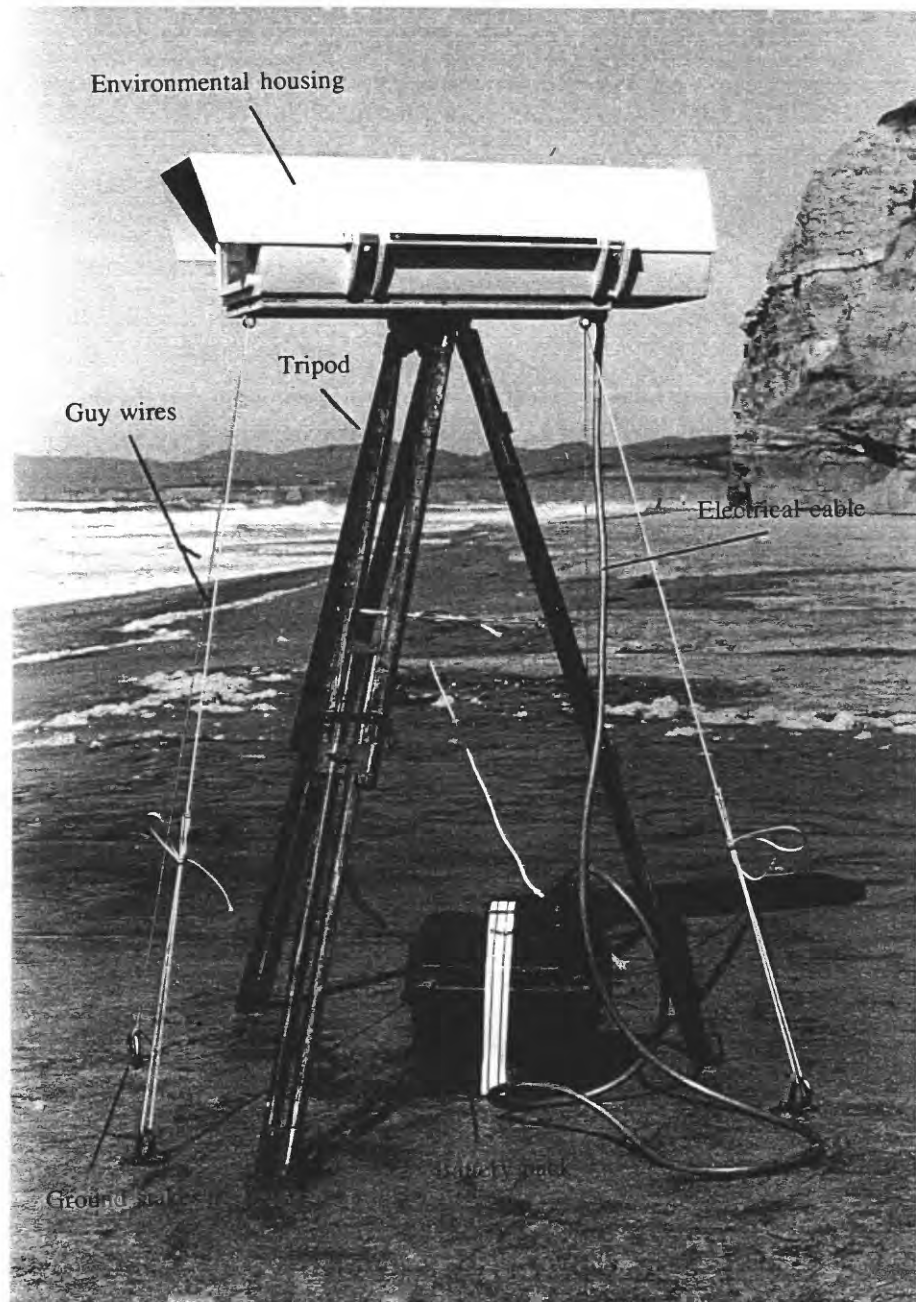
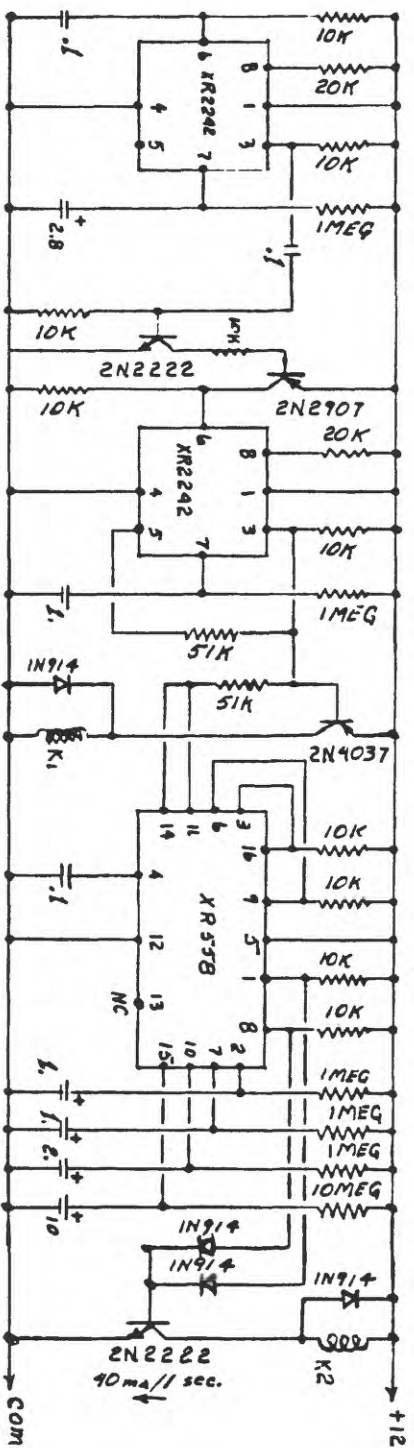
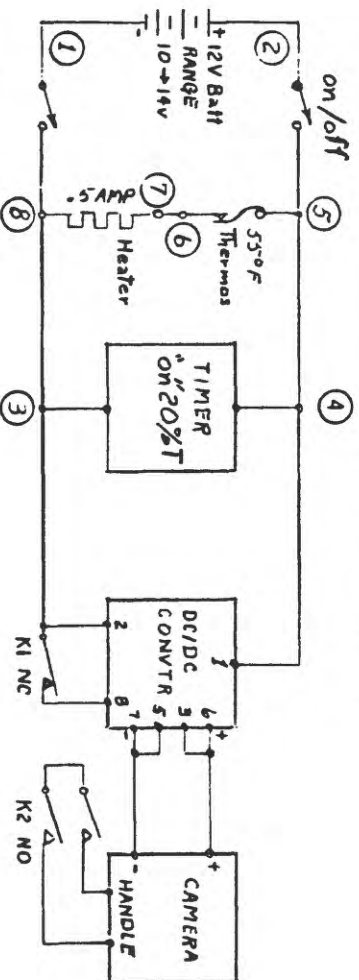


Fig. 2. Typical set-up of complete system as it would appear during field use.

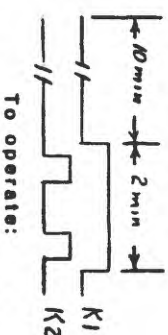
# Camera Timer & Sequencer Schematic



## Housing Schematic



- Terminal number
- DC/DC converter provides required isolation



To operate:  
Set camera & handle for "Std By"  
Set camera power to "Camera"  
Switch battery to "On"

Fig. 3. Electronic schematics of both the overall system and the timer/sequencer.