

Dear Bruce

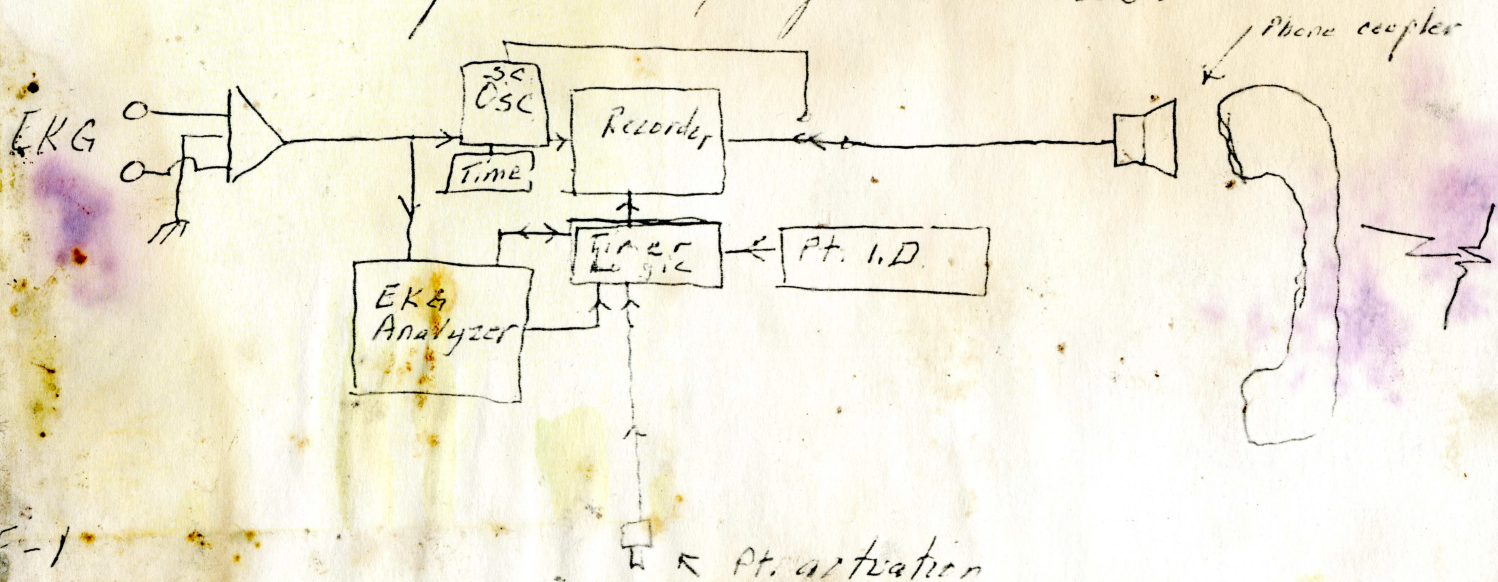
21. Nov. 73

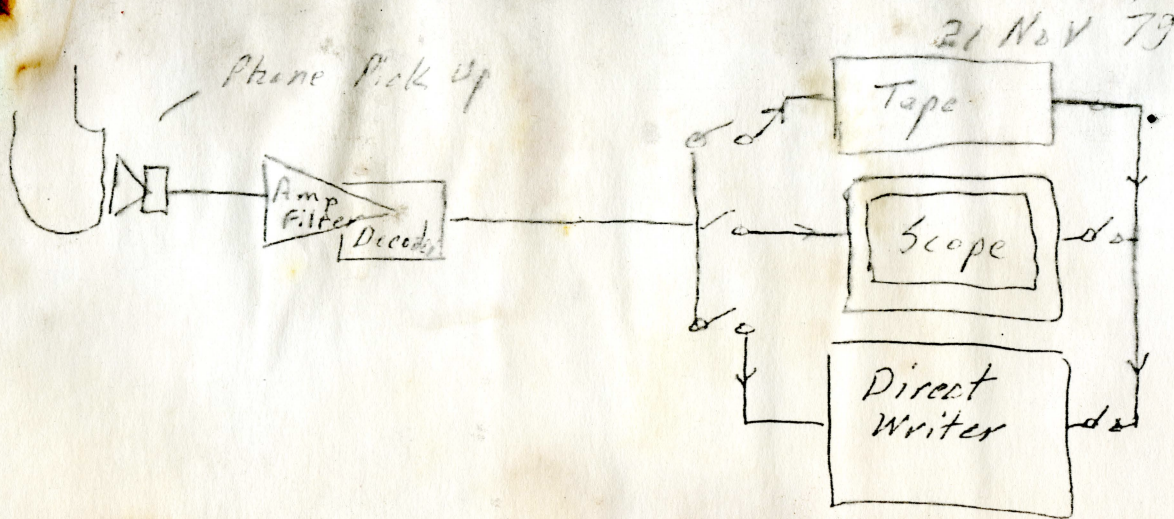
Enclosed is the P111 literature. After talking to you about an obvious error, I finally read the whole thing critically. It must have been written by a sales person who got whatever he could from engineering. In any case there is no understanding of the device and much less of the way it is supposed to be used. ~~Let~~ Don't put something like this out. Burn every one and if someone wants to try a rewrite, send me a draft copy.

Bruce, one reason I put so much effort into this thing was to try to make an example of how something can be properly developed in conjunction with the medical profession. We got through most of the ~~the~~ engineering hurdles by overworking a couple of people but now I'm convinced that some sort of conspiracy exists at the sales level. No one could screw up a presentation of a major new instrument this thoroughly by accident.

That worries me as to what may happen to any material we prepare. I've heard nothing further, nor has Wallace, about a scientific exhibit at the Am. College mtg.

There is an obvious need for a combination of some of the features of a Holter and a phone monitor. The heart of it should be a new continuous loop recorder of very limited size. It would record a ~~short~~ limited period of time on 1) pt. command 2) internal command of an S.T./arrhythmia detector.



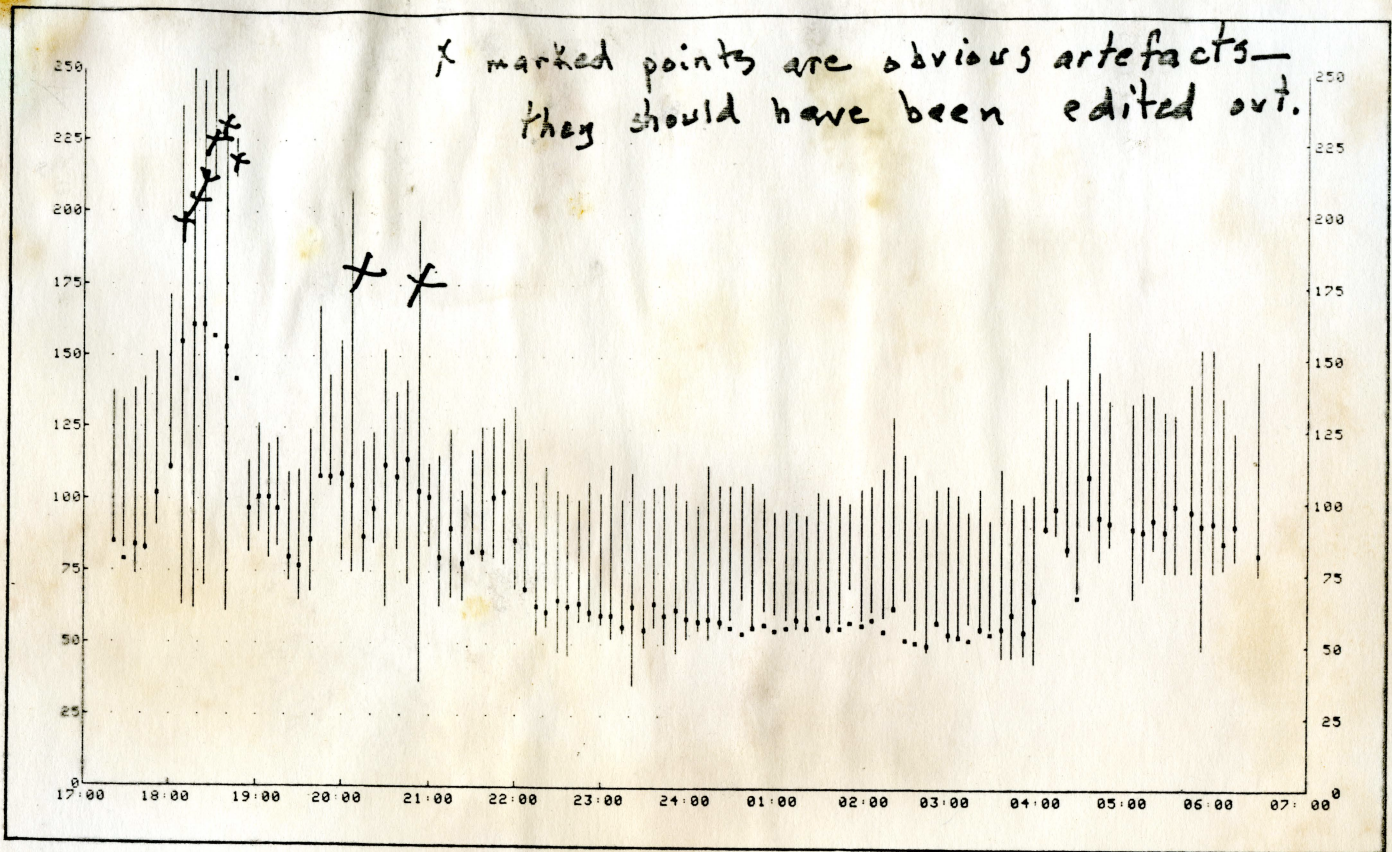


F-2

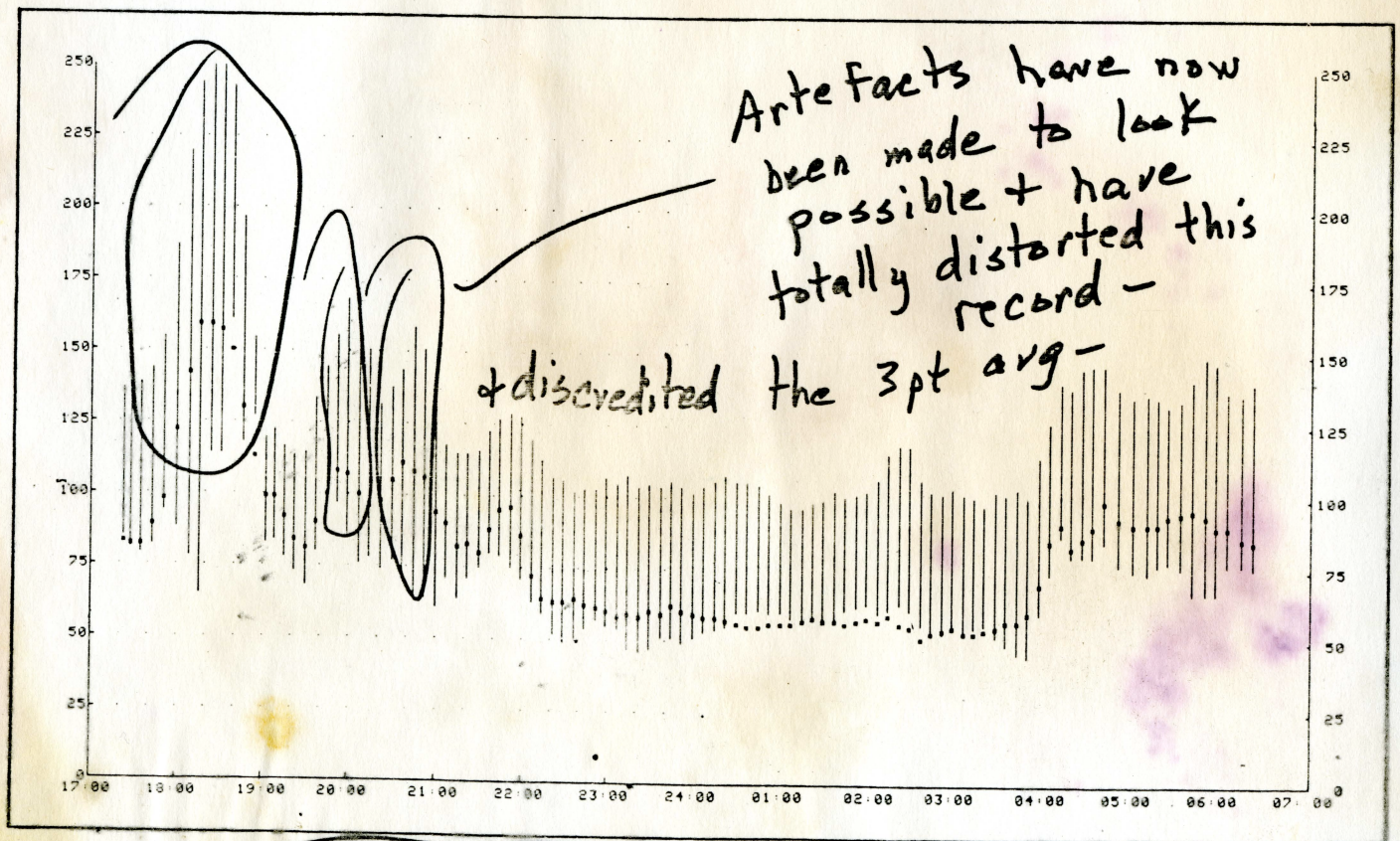
All of the gear in F-1 would be carried by the pt. for a week or whatever fall in one small pkg. ~~The~~ ^{the} recorder is integral - no changing tapes etc. Amps + analyzer are CMOS (low drain). The pt. would activate the recorder for say a 1 min. run, whenever he had sp. and could not reach a phone. In addition any abnormalities such as arry. or S.T. would activate a recorder burst. Logic would be present to limit the recorder usage to bursts such that ~~a~~ ^{the} ~~condition~~ the same continued condition would not run out the tape. If it persisted it might ~~may~~ make a repeat run of 10 mins. and would make a repeat run if it went away + returned after a delay period. At a new (different) condition would also trigger it. The analyzer + all the rest would be simple. On the receiving end ⁱⁿ there would be the 3 elements for complete recording monitoring in real or delayed time.

This could fill an obvious gap between Holter which is too expensive to use repeatedly & a telephone monitor which will miss many events. It will have to be simple - will require a new recorder and above all should be made in prototype + tested. Squires & the mechanical group would be a good combination. It should be tested in the field & I would like to do such a study to properly fill the gap left by the CIRCULATION article. It can't be a bells & whistle - lets make the next show deal -

Best wishes
Bill



Real-time bar-graph of systolic and diastolic blood pressure, plus plot of heart rate trend.



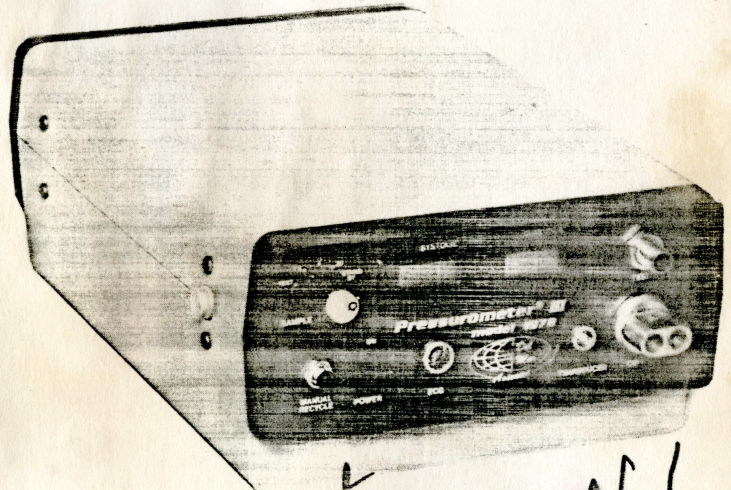
Three reading sliding averages of blood pressure and heart rate. Averaging smooths out sporadic data for ease of interpretation.

This is a demo of how not! to use a sliding avg -

DEL MAR AVIONICS**Pressurometer® III Ambulatory
Blood Pressure Monitor****Model 1978**

IT IS A
RECORDER!
Look up the words

**24-Hour Automatic
Non-Invasive Blood
Pressure and Heart Rate
Monitoring with Tabular
and Trend Write-Outs**

**Product Information**

Inadequate

The Del Mar Avionics Model 1978 Pressurometer III Ambulatory Blood Pressure Monitor is a portable, non-invasive device which automatically measures a patient's systolic and diastolic blood pressure and heart rate in up to 200 pre-programmed intervals over a 24-hour period. Data is stored in solid-state memory and is transferred by direct cable interconnect into either a Del Mar Avionics Model 1979 Blood Pressurometer Charter or a Del Mar Avionics Model 1981 Blood Pressurometer Data Analysis System. The Model 1979 provides time-correlated digital printouts and graphic plots of 24-hour blood pressure and heart rate data. The Model 1981 provides similar printouts and plots, as well as histograms of blood pressure and heart rate. It also permits storage of patient data on magnetic cards or floppy discs for subsequent retrieval and analysis. In addition, the Model 1981 offers operator software programming capability for maximum system flexibility.

The compact, lightweight Model 1978 allows the patient to pursue normal daily activities while blood pressure and heart rate measurements are automatically computed, displayed, and stored in memory. Repetitive measurements are achieved through pre-selection of time intervals of 7.5, 15, or 30 minutes to initiate cuff inflation cycles. Up to 200 measurements may be made, dependent on the time interval chosen.

The unit is powered by a rechargeable nickel-cadmium battery, which also charges a memory back-up battery. The

Too much detail here

internal board-mounted back-up battery is utilized for data retention when the main battery is discharged or removed. This feature permits the retention of patient data in memory for a minimum of 96 hours, and eliminates the necessity for immediate processing and printout.

In operation, a transducer is secured over the patient's brachial artery beneath a conventional cuff which is inflated by a built-in pneumatic pump. As the cuff bleeds down, the transducer detects Korotkoff (K) sounds which are presented as systolic and diastolic pressure on a digital liquid crystal display on the Pressurometer III, and are simultaneously stored in memory. Accuracy is achieved through a "closed loop" design where cuff bleed-down and K-sound detection are governed by R-wave signals from the patient's QRS complexes. Detected K-sounds are accepted only when preceded by an R-wave signal, thereby reducing artifact sensitivity. Cuff bleed-down is limited to 3 mm of mercury per R-wave to further improve measurement accuracy. For patient safety, cuff pressure is released automatically should an inflation/deflation cycle exceed two minutes.

Heart rate is detected through three electrodes which are applied to the patient in a modified CM lead configuration. Heart rate is subsequently presented in both digital and plot form on the same time-correlated charts on which blood pressure information is printed.