

**DEL MAR AVIONICS**

TO: C. Sanctuary and R. Cherry  
FROM: A. Wong  
SUBJECT: EEG MONITOR  
CC: D. Anderson

NO.: ENG-349-81

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At the present time, I am reviewing the display requirements and I have several questions that need further clarification.

My problems are to provide a display with proper vertical deflection at various sweep speeds. The vertical deflection sensitivity is  $50\mu$  V/cm at 30 mm/s and full scale deflection is 5 cm. The sweep speeds specified, are as follows:

- 1) 2.5 mm/s
- 2) 5 mm/s
- 3) 15 mm/s, and
- 4) 30 mm/s

My first problem is that if I keep the vertical deflection in the correct proportion, then at 2.5 mm/s or 5 mm/s sweep speed, the vertical deflection of a  $50\mu$  V signal will be 0.88 mm or 1.67 mm which is very small. Consequently, all we can see at these two sweep speeds, is baseline movement. As you know, in 9400/9401 Heartscreen, we have accentuated the R waves in the 30 or 60 minutes page display.

My other problem concerns the 15 mm/s and 30 mm/s displays. We have a total of 25 cm vertical display height. If we provide 5 cm deflection per trace at 30 mm/s, we will have 5 traces. Since we have two channels of EEG data, we can only display four traces with 5 cm of empty space. Similarly, if we provide 2.5 cm per trace at 15 mm/sec., we will have 10 traces total and 5 lines per channel. This will make a "1 min. 40 second" page. In our current design, each page starts at the "even" minute.

I would like to propose the following solutions for your consideration.

- 1) I would like to propose that we drop the 2.5 mm/s and 5 mm/s sweep speed. They are similar to the 60/30 minutes display in the 9400/9401 HEARTSCREEN. My feed back from the field is that these two displays are not very useful. However, if we do not drop these two sweep speeds, we should consider accentuating the vertical deflection to provide a more meaningful display.

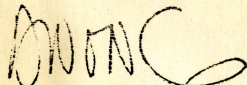


- 2) To resolve the second problem, I would like to propose that we place each trace 4 cm apart at 30 mm/s and 2 cm apart at 15 mm/s. This means that we will have 10% overlap between adjacent traces. However, we can have 6 traces on the 30 mm/s display and 12 traces on the 15 mm/s display. The result is that we will maximize the display area at 30 mm/s display and that, at 15 mm/s, we end up with a display of 2 minutes per page per channel.

In addition, we have another "tricky" display requirement. The problem is to provide a 30 mm/s display on screen and 30 mm/s hard copy. As you know, the screen size is 1.6 times larger than the hard copy write-out. To solve this problem, I would like to propose the following display format. We will always store the last two minutes of EEG data from stop time. The data stored in solid state memory can provide four pages of 30 seconds of both channels on screen in the refresh mode. This is very similar to the page display of ECG data in Trendsetter. In this mode, the display sweep speed is 30 mm/s and the user can scan through these four pages rapidly. In addition, we will also have a "slide" mode, in which the display data will be expended 1.6 times. The data can be slid back and forth, similar to the slide mode in Trendsetter. When the desired section is selected, the data can be transferred to the 9431 Heartprint with a 30 mm/s sweep speed on paper.

I would appreciate hearing from you concerning the above proposal, and the direction you want me to take.

AW:mef



A. Wong