

# MEASUREMENT / TECHNICAL REPORT

## OP COMPUTERS

FCC ID: NJH98PEMBSL

JANUARY 22th, 1998

This report concerns (check one): Original grant <input checked="" type="checkbox"/> Class II change <input type="checkbox"/>	
Equipment type: PERIPHERAL EXPANSION MODULE (ex.: computer, printer, modem, etc.)	
Deferred grant request per 47 CFR 0.457(d)(1)(ii)? yes <input type="checkbox"/> no <input checked="" type="checkbox"/>	
If yes, defer until: _____ date	
Company Name agrees to notify the Commission by _____ date of the intended date of announcement of the product so that the grant can be issued on that date.	
Report prepared by:	P. Antonio VELO <i>P. Antonio Velo</i>
	Corrado GARBASSO <i>Corrado Garbasso</i>
Ing. C. Olivetti & C. S.p.A./QSL srl Via Montalenghe 8 10010 Scarmagno (TO) ITALY	
Phone : 0125 - 569711 Phone : 0125 527308 Fax : 0125 529840	

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## **1 GENERAL INFORMATION**

### **1.1 Product Description**

The EUT is a Peripheral Expansion Module (model PEM) intended to be connected to Personal Computers through the SCSI interface with the aim to increase the data storage capability of the system. It is provided with a metal enclosure and with one or two Switched Mode Power Supply Units model 3783-45-2 made by MAGNETEK (the second one is optional).

The EUT is available in different configurations up to a maximum of 12 mass storage shelves (HDU's).

### **1.2 Related Submittal(s)/Grant(s)**

None

### 1.3 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

Model & Serial No.	FCC ID	Description	Cable Descriptions
PEM (1) s/n EMI-97-0112	NJH98PEMBSL	Peripheral expansion module SCSI I/F	Shielded SCSI cables Unshielded power cord
NETSTRADA 3200 s/n EMI-97-0111	NJH97COPPER2	Personal Computer	Unshielded power cord
DSM 50-175 s/n 602000008	BGBTFM8705K	Monitor	Shielded video cable (2)
RS 6000 s/n G0035713	GDDG83-6000	Keyboard	Unshielded power cord Shielded keyboard cable
M-S34-6MD s/n LZA61402207	DZL211029	Mouse	Shielded mouse cable
SONY MDR-V100 s/n none	none	Headphones	Shielded audio cable
DM 119 s/n 3031602	DYKDM119	Printer, parallel I/F	Shielded parallel cable Unshielded power cord
HP 7440A s/n 2539A94848	BSD8537440	Plotter, serial I/F	Shielded serial cable Unshielded power cord
remotely connected through LAN cable :			
MPR 10T/S s/n 91TY28014813	none	LAN HUB	Unshielded LAN cables Unshielded power cord
Modulo 200 DT s/n none	DYK96AUG	Personal Computer	Unshielded power cord

- ( 1 ) EUT submitted for grant  
( 2 ) Ferrite core removed from shielded video cable

#### 1.4 Test Methodology

Both conducted and radiated testing were performed according to the ANSI C63.4-1992 test procedures. Radiated testing was performed at an antenna to EUT distance of 3 meters.

#### 1.5 Test Facility

##### Olivetti test site No. 1

The open area test site and conducted measurement facility used to collect the radiated data are located at Via Montalenghe 8, Scarmagno and Via Jervis 11, Ivrea, Italy. This site has been fully described in a report dated March 25, 1997 submitted to your office, and accepted in a letter dated June 13, 1997 (31040/SIT-1300F2) .

#### 1.6 Test equipment used:

Test receiver	Rohde & Schwarz ESH3	s/n 881364/012
LISN	Schwarzbeck NNLA8120	s/n 8120399
Test receiver	Rohde & Schwarz ESVP	s/n 892372/023
Spectrum analyzer	HP 8562A	s/n 3043A05627
Biconical antenna	EMCO 3104	s/n 2951
Log-periodic antenna	EMCO 3146	s/n 1492
Double ridged guide horn ant.	EMCO 3115	s/n 3572

### **3 SYSTEM TEST CONFIGURATION**

#### **3.1 Justification**

The EUT in its maximum available configuration (that is provided with 12 HDU's) was connected to the SCSI ports of a Personal Computer and operated in standard mode (i.e. sending data frames from its magnetic peripherals to the PC and recording / storing data frames received from the PC on the same units), reproducing its typical operating mode (as a customer would normally use it).

#### **3.2 EUT Exercise Software**

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software, contained on a 3-1/2 inch disc, was inserted into drive A and is auto-starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is: an H is printed on the monitor, speaker beep, mass storage devices exercised (on both PC and PEM), plotter and printer print an H. The complete cycle takes about 2 seconds and is repeated continuously. As the keyboard and mouse are strictly input devices, no data is transmitted to them during test. They are, however, continuously scanned for data input activity. The PC was also operating in multimedia mode (sound from CD to headset) and was finally sending data frames to a remote Personal Computer through LAN.

#### **3.3 Special Accessories**

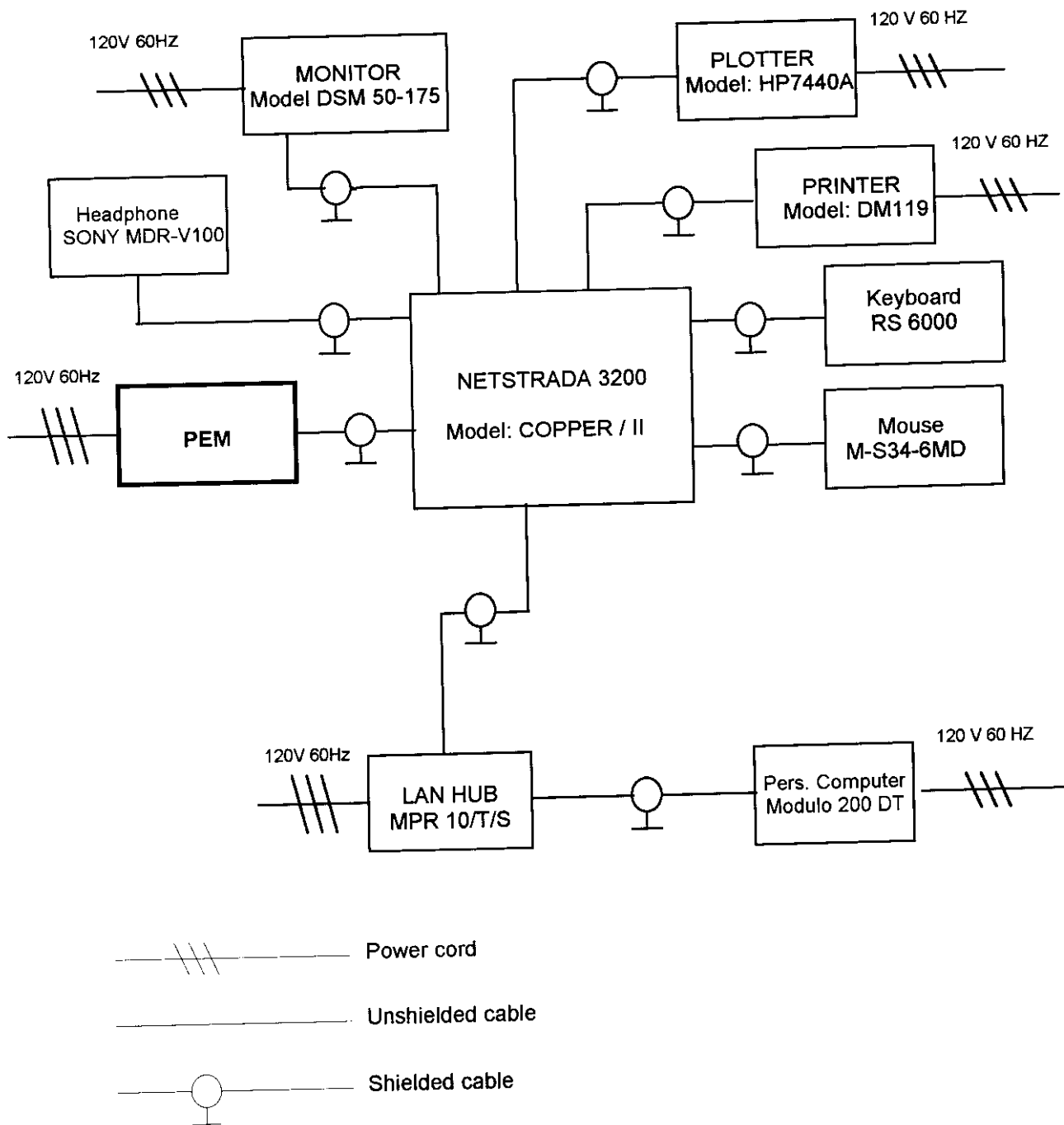
As shown in the Figure 3.1, all interface cables used for compliance testing are shielded as normally supplied by the vendors. These cable model and part numbers are marketed with the peripherals to the end user, and appear on the related product price list supplied to the customers. All cable connectors feature integral metal hoods for shielding.

#### **3.4 Equipment Modifications**

To achieve compliance to Class B levels, no changes were made during compliance testing.

### 3.5. Configuration of the Tested Systems

Figure 3.1 - Configuration of the Tested System



## 6 CONDUCTED EMISSION DATA

### 6.1 Tests of the worst case configuration

The conducted tests are performed with a receiver in quasi-peak mode.

	Frequency (MHz)	Measured* (dB $\mu$ V)	Limit (dB $\mu$ V)
neutral	0.45	47	48
	0.53	38	
	0.63	38	
	2.4	33	
	20.7	37	
	23.6	37	
line	0.45	47	48
	0.53	39	
	0.63	39	
	2.4	32	
	20.7	38	
	23.6	36	

\* All readings are quasi-peak

Test Personnel:

Tester Signature *G. Mechia* Date December 17, 1997  
Typed/Printed Name Giuseppe MECCHIA



## 7 RADIATED EMISSION DATA ( Frequency range 30 MHz- 2GHz)

### 7.1 Tests of the worst case configuration

The following data list the significant emission frequencies, measured levels, correction factors (including cable and antenna corrections), the corrected reading, plus the limit. Field strenght calculation is given in paragraph 7.2.

Judgement: Passed by 1.5 dB

Frequency (MHz)	Polarity (V/H)	Receiver* Reading (dB $\mu$ V)	Correction Factor (dB/m)	Corrected Reading (dB $\mu$ V/m)	3 Meter Limit (dB $\mu$ V/m)
86.4	V	19.4	11.6	31	40
199.9	H	20.8	19.2	40	43.5
209.9	H	26.9	15.1	42	43.5
333.3	H	21.9	19.1	41	46
466.5	H	15.8	23	38.8	46
800	H	11	28.1	39.1	46

\* In the frequency range 30 MHz - 1 GHz all readings are quasi-peak, with an IF bandwidth of 120 kHz.

Note: no emission detected in the frequency range 1 to 2 GHz.

Test Personnel :

Tester Signature *G. Meccia* Date December 12, 1997

Typed/Printed Name Giuseppe MECCHIA

## 7.2 Field Strength Calculation

7.2.1 The field strength is calculated by adding the Antenna and the Cable Factor to the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

where

FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 19.4 dB $\mu$ V is obtained. The Antenna and Cable Factors of 11.6 dB/m are added, giving a field strength of 31 dB $\mu$ V/m. The 31 dB $\mu$ V/m value was mathematically converted to its corresponding level in  $\mu$ V/m.

$$FS = 19.4 + 11.6 = 31 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(31 \text{ dB}\mu\text{V/m})/20] = 35.5 \mu\text{V/m}$$

## **8 PHOTOS OF THE EUT**

The following photos are attached :

- Fig. 8.1 Overall front view**
- Fig. 8.2 Overall rear view**
- Fig. 8.3 Internal left side view with metal panel opened**
- Fig. 8.4 Internal right side view with metal panel opened**
- Fig. 8.5 IF 2079 SAF-TE board - Components side**
- Fig. 8.6 IF 2079 SAF-TE board - Foil side**
- Fig. 8.7 IF 2067 interconnection board - Components side**
- Fig. 8.8 IF 2067 interconnection board - Foil side**
- Fig. 8.9 IF 2093 interconnection board - Components side**
- Fig. 8.10 IF 2093 interconnection board - Foil side**
- Fig. 8.11 Power Supply Unit MAGNETEK model 3783-45-2. Overall view**
- Fig. 8.12 Power Supply Unit MAGNETEK model 3783-45-2. Components Side**
- Fig. 8.13 Power Supply Unit MAGNETEK model 3783-45-2. Foil Side**