TECHNICAL DOCUMENTATION

COMMERCIAL CODE: HPS140 / HPS140i

PRODUCT NAME:
Handheld Pocket Scope

DATE: 19/07/2010

REVISION: 01

MANUFACTURED BY

Velleman NV
Legen Heirweg 33
9890 Gavere
Belgium

PREPARED BY	APPROVED BY
Stephan Santens	/
Date:19/07/2010	Date:

PRODUCT DESCRIPTION:

HPS140 Handheld Pocket Scope

- 40 MS/s sampling rate
- 10 MHz analog bandwith (-3 or -4dB in selected range)
- 0.1 mV sensitivity
- 1mV to 20V/div in 14 steps
- 250ns to 1 hour/div time base in 32 steps
- ultra fast full auto set up option
- adjustable trigger level
- X and Y position signal shift
- DVM readout
- audio, power calculation (rms and peak)
- dBm, dBV, DC, rms ... measurements
- signal markers for voltage and time
- frequency readout (through markers)
- recorder function (roll mode)
- signal storage (2 memories)
- LCD backlight
- NiMH 4.8V batteries included
- included:
    - USB charging adaptor
    - insulated measurement probe x1 / x10: PROBE60S with HPS140i

PRODUCT PICTURE:

(Probe with HPS140i)

APPLICABLE NORMATIONS

EMC

APP	STANDARDS	DESCRIPTION
x	EN55022	Radiated disturbance field, CISPR22 limits
	EN55014	Conducted disturbance at mains port, CISPR14 limits
	EN61000-4-2	Electrostatic discharge level (IEC801/2)
	EN61000-4-3	Radiated immunity level (IEC801/3)
	EN61000-4-4	Electrostatic fast transient / burst requirements (IEC801/4)
	EN61000-4-5	Surge immunity requirements (IEC801/5)
	ETS300683	EMC standard for short range device 9Khz -25GHz

LOW VOLTAGE / SAFETY

APP	STANDARDS	DESCRIPTION
	IEC60669-2-1	Electronic switches ans associated extension units for household and similar fixed electrical installations.
	IEC60065	Audio, Video and similar apparatus, safety requirements
x	IEC1010-1	Safety requirements for measurement, control and laboratory use

SPECTRUM

APP	STANDARDS	DESCRIPTION
	ETS300-220	Electromagnetic compatibility and Radio spectrum matters

REMARKS / OTHER STANDARDS:

See battery addendum

Declaration of Conformity

CE

We, Manufacturer

Velleman Components
Legen Heirweg 33
9890 Gavere
Belgium

declare that the product

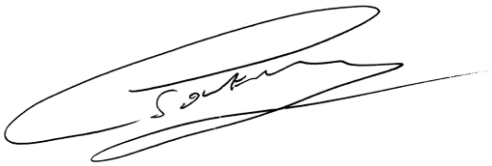
HPS140 / 140i Personal Scope

if used according the instructions included with the unit meet the directives
in accordance with 89/336/EEC-EMC Directive
and

EN 55022	Limits and methods of measurement of radio interference characteristics of information technology equipment (CISPR22 limits)
IEC 1010-1	Safety requirements for equipment for measurement, control and laboratory use (*) (*) if equipment used with safety measurement probes
FCC Part 15	Part B Unintentional radiators

For the manufacturer

Date: 19/07/2010



Signature: _____

Name: Stephan Santens
Technical Director

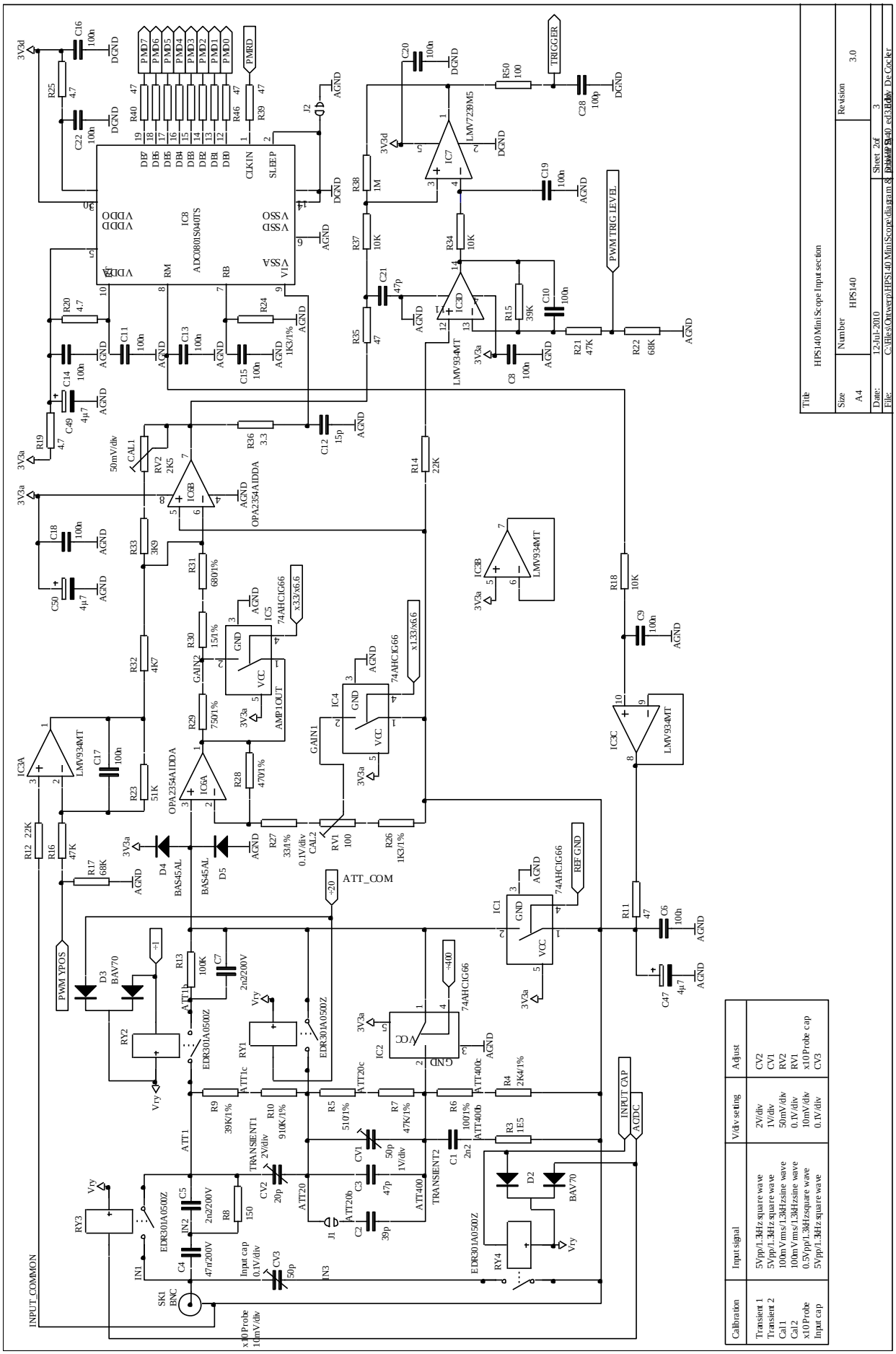
DIAGRAMS

PARTSLIST

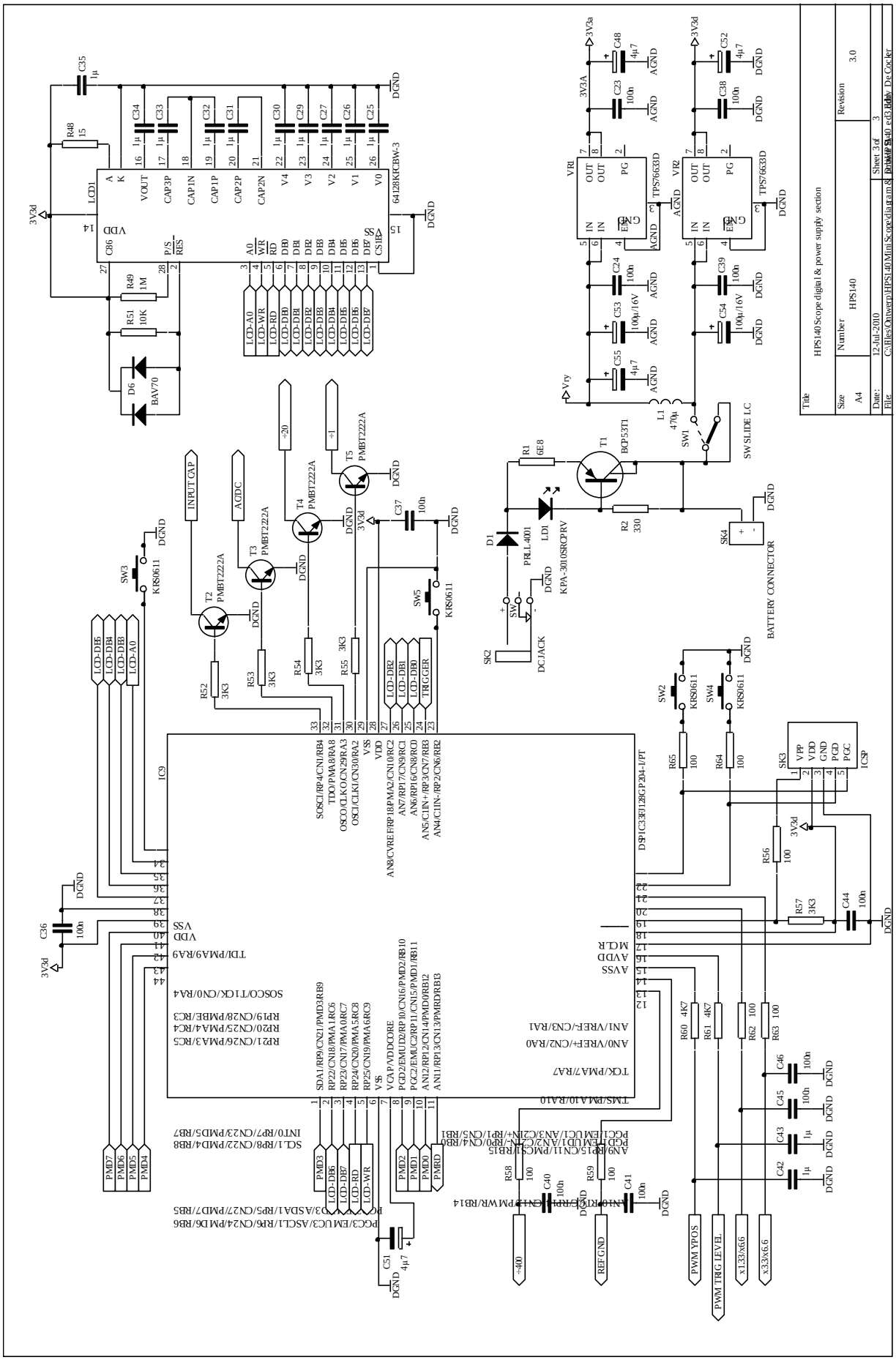
AND

MEASUREMENT RESULTS

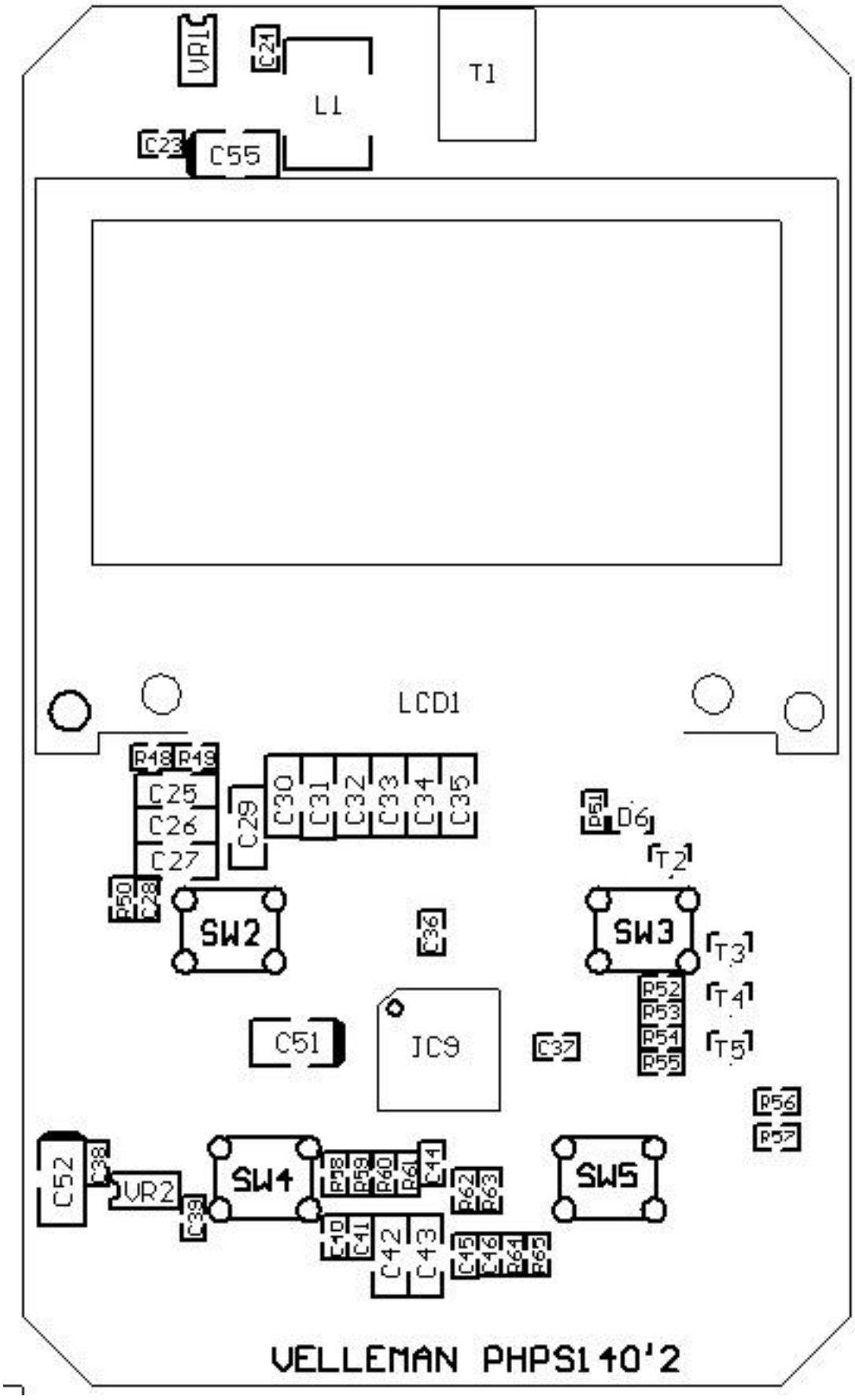
INPUT SECTION

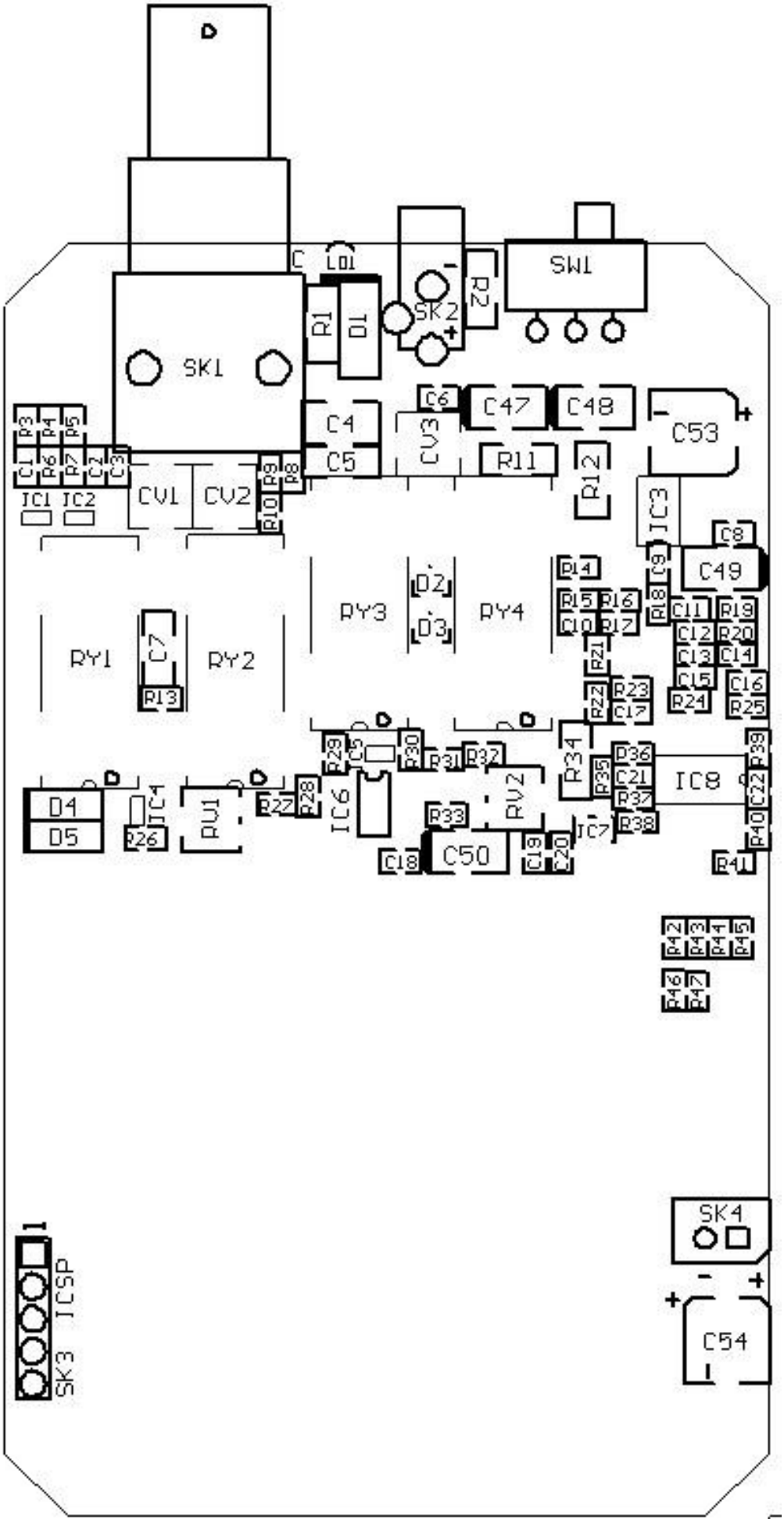


DIGITAL SECTION



ASSEMBLY


VR1
C21
L1
T1
C23
C55
LCD1
R48
R49
C25
C26
C27
C29
C30
C31
C32
C33
C34
C35
R50
R28
SW2
C36
R51
D6
T2
SW3
T3
T4
T5
R52
R53
R54
R55
C51
IC9
C37
R56
R57
C52
C38
VR2
C39
SW4
R58
R59
R60
R61
C44
R62
R63
SW5
C40
C41
C42
C43
C45
C46
R64
R65
VELLEMAN PHPS140'2


SK1
SK2
SW1
L1
R1
D1
P2
C4
C5
CV3
C6
C47
C48
C53
R11
R12
IC3
C8
C49
CV1
CV2
IC1
IC2
RY1
RY2
RY3
RY4
C7
R13
D2
D3
IC8
IC6
IC7
RV1
RV2
D4
D5
IC4
C50
SK4
C54
SK3 ICSP

Assembly components

BPHPS140	Rechargeable battery pack 4 x AAA/800mAh NiMH for HPS140
CKSHPS140	Metal screen on bottom layer for HPS140
DYWINDOWHPS140	Display window (59x33x1mm Polycarbonate Clear Lexan)

Capacitors

1µ	C25...C27,C29...C35,C42,C43
100µ/16V	C53,C54
100N	C6,C8...C11,C13...C20,C22...C24,C36...C41,C44...C46
100P	C28
15P	C12
20P/TRIM	CV2
2N2	C1
2N2/200V	C5,C7
39P	C2
4µ7	C47...C52,C55
47N/200V	C4
47P	C3,C21
50P/TRIM	CV1,CV3

Chokes

470µH	L1

Connectors

AJ218B	SK2 DC jack
BNC057	SK1
HDR1X5	SK3
MOLEX48152-02	SK4

Diodes

BAS45AL	D4,D5
BAV70	D2,D3,D6
KPA-3010SRCPRV	LD1
PRLL4001	D1

Display assembly

64128KFCBC-3	LCD1

IC's

74AHC1G66	IC1,IC2,IC4,IC5
LMV7239M5	IC7
LMV934MT	IC3
OPA2354UA	IC6
ADC0801S040TS	IC8
DSPIC33FJ64	IC9

Printed circuit board

PHPS140'3

Voltage regulators

TPS76633D	VR1,VR2

Relays

EDR301A0500	RY1...RY4

Resistors

100 (0603)	R50,R56,R58,R59,R62...R65

100/1% (0603)	R6
100/TRIM	RV1
100K (0603)	R13
10K (0603)	R18,R37,R51
10K (1206)	R34
15 (0603)	R48
15/1% (0603)	R30
150 (0603)	R8
1K3/1% (0603)	R24,R26
1M (0603)	R38,R49
1R5 (0603)	R3
22K (0603)	R14
22K (1206)	R12
2K4/1% (0603)	R4
2K5/TRIM	RV2
33/1% (0603)	R27
330 (1206)	R2
39K (0603)	R15
39K/1% (0603)	R9
3K3 (0603)	R52...R55,R57
3K9 (0603)	R33
3R3 (0603)	R36
47 (0603)	R35,R39...R47
47 (1206)	R11
470/1% (0603)	R28
47K (0603)	R16,R21
47K/1% (0603)	R7
4K7 (0603)	R32,R60,R61
4R7 (0603)	R19,R20,R25
510/1% (0603)	R5
51K/1% (0603)	R23
680/1% (0603)	R31
68K (0603)	R17,R22
6R8 (1206)	R1
750/1% (0603)	R29
910K/1% (0603)	R10

Switches

KRS0611	SW2...SW5
TS-13PLC	SW1

Transistors

BCP53T1	T1
PMBT2222A	T2...T5

Final assembly

BHPS140	Enclosure for HPS140 (4 parts)
HHPS140	Flexible Holster for HPS140

Packaging

USB adaptor	5 to 9V/200mA ASB adaptor from Minwa
Manual	

Radiation test measurement:

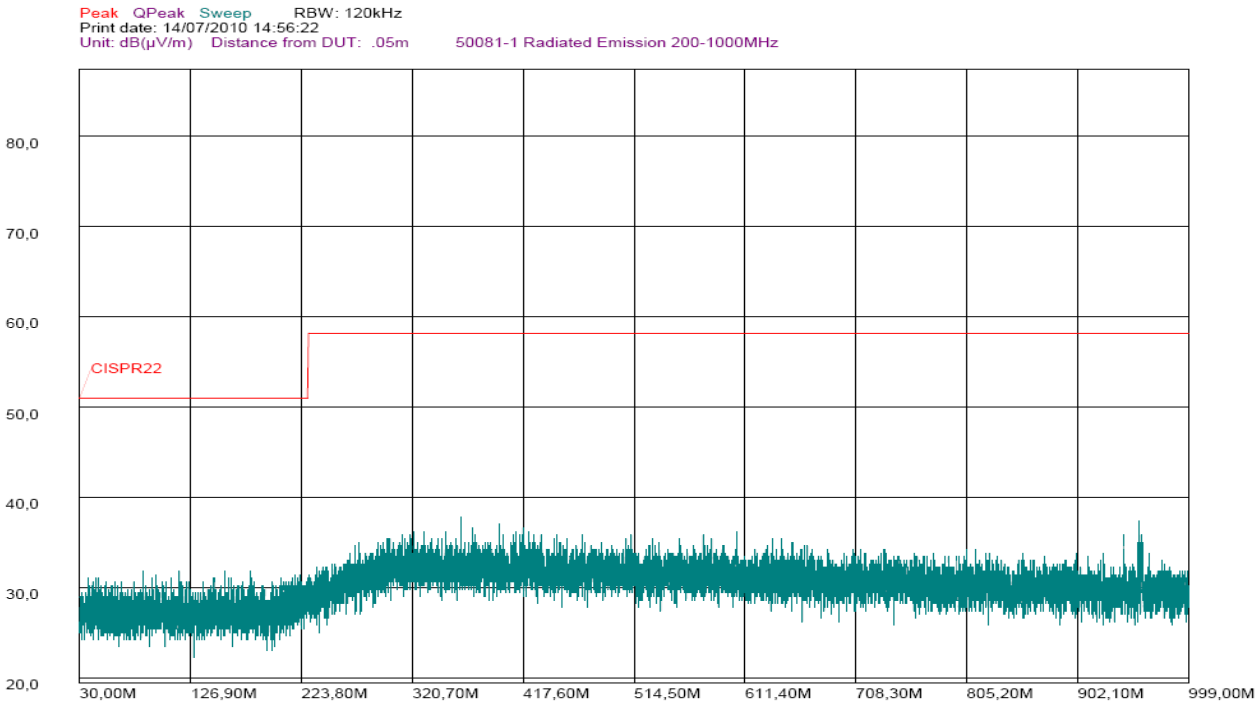
WORST POSITION TEST PROBE

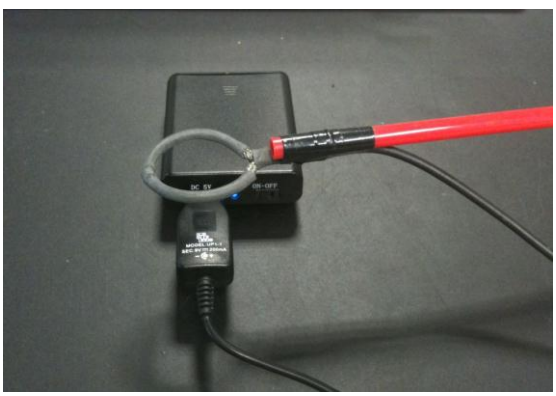
Peak QPeak Sweep
Print date: 14/07/2010 14:57:21
Unit: dB(µV/m) Distance from DUT: .05m 50081-1 Radiated Emission 200-1000MHz

Notes:

Velleman instruments
HPS140 USB charger
Worst position

EN55022 Field strenght
Start: 30MHz
Stop: 1GHz



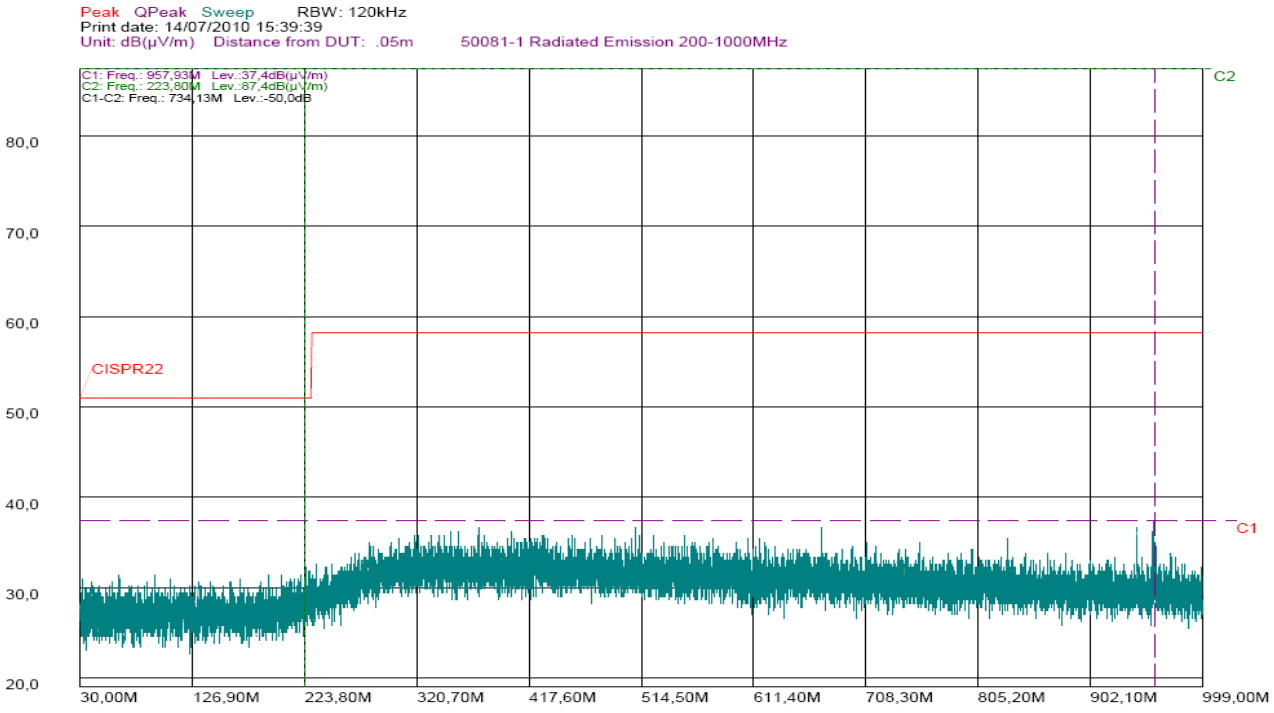


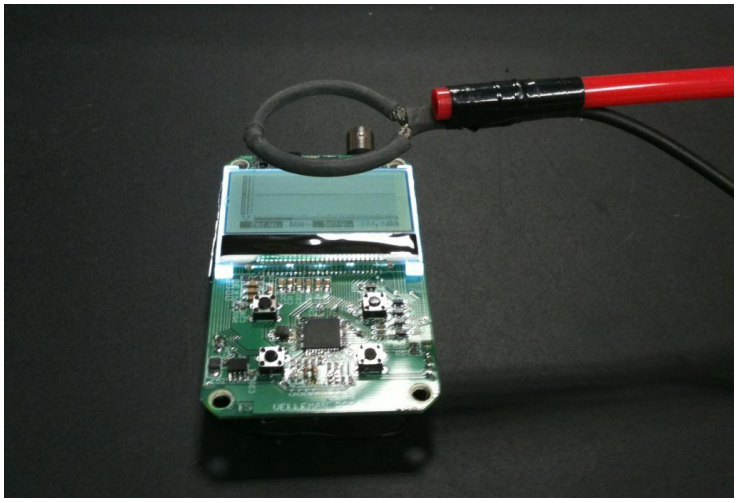
Peak QPeak Sweep
Print date: 14/07/2010 15:40:11
Unit: dB(µV/m) Distance from DUT: .05m 50081-1 Radiated Emission 200-1000MHz

Notes:

Velleman instruments
HPS140 Handheld Pocket Scope
Worst position

EN55022 Field strenght
Start: 30MHz
Stop: 1GHz





Addendum:

Battery information:

Cyber-Power Electronic Corporation

BATTERY SPECIFICATION *Model: CYH-44AAA800*

Basic

Type		Sealed Rechargeable Ni-MH
Model		CYH-44AAA800
Size		AAA
Nominal Voltage (V)		1.2
Nominal Capacity (mAh)		800
Dimension	Diameter (mm)	$10.5^{0}_{-0.7}$
	Height (mm)	$44.0^{\pm 0.5}$
Standard Charging	Current (mA)	80
	Time (h)	16
Quick Charging	Current (mA)	240
	Time (h)	4
Rapid Charging	Current (mA)	400
	Time (h)	2.2
Operation Temperature(℃)	Standard Charging	0~45
	Rapid Charging	10~40
	Discharging	-20~65
	Storage	-20~35(RH≤85%)
Permanent Charging Current (mA)		27~45
Maximum Discharging Current (mA)(continuous)		1600
Charge Impedance (mΩ)		≤40 (1000Hz)
Discharge Cut-off Voltage (V)		1.00
Charge Retention (20°C)		≥60%
Weight Approx. (g)		13. 5

B. Test Report

Tests are carried out within one month of delivery under the following condition:

1. Ambient Conditions:

Room Temperature 20±5 ℃

Relative Humidity 65%±20%

2. Capacity Testing

2.1 Standard Charging

0.2C discharge to 1.00V/cell

0.1C charging for 16 hours

Rest for 1 hours

0.2C discharge to 1.00V/cell.

Within 3 charge/discharge cycles, the minimum capacity is no less than 760mAh, the typical capacity is no less than 800mAh.

Doc. NO. : SDQ-T1–1102 Edition: A2 Date:

Approved by: Checked by: Prepared by:

MATERIAL SAFETY DATA SHEET

Section I – Product Identification

Product Name: Nickel Metal Hydride Battery (All models)
Trade Name: Cyber-Power Nominal Voltage: 1.2V
Chemical System: Nickel/Metal Hydride Designated for Recharge:
_X_Yes ___ No

Section II – Hazardous Ingredients

IMPORTANT NOTE: The battery cell is contained in a hermetically-sealed case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, hazardous materials are fully contained inside the battery cell. The battery cell should not be opened or exposed to heat because exposure to the following ingredients contained within could be harmful under some circumstances. The following information is provided for the user's information only.

Chemical Name	Content (approx. wt%)	CAS number:
Nickel	4.9%	7440-02-0
Nickel hydroxide	23.9%	12054-48-7
Cobalt Monoxide	2.7%	7440-48-4
Teflon (PTFE)	0.4%	9002-84-0
Mischmetal Powder（Co+Ni+La+Ce）	34.3%	Co：7440-48-4 Ni：7440-02-0 La：7439-91-0 Ce：7440-45-1
Copper	5.4%	7440-50-8
Nickel （plated steel）	16.9%	7439-89-6（ 12054-48-7）
Rubber	0.3%	25038-36-2
Nylon	0.6%	32131-17-2
Polypropylene	2.0%	9003-07-0
KOH+NaOH+LiOH	3.2%	1310-58-3 1310-73-2 1310-66-3
H2O (Water)	5.5%	7732-18-5

Section III—Physical Data for Battery

Melting Point (。F) NA	Boiling Point (。F) NA	% Volatile volume NA
Vapor Pressure (mm Hg) NA	Evaporation Rate	Vapor Density (Air=1) NA
Specific Gravity (H2O) NA	Solubility in Water NA	Appearance and Odor No Ordor

Section IV—Fire and Explosion Hazard Data

Flash Point: NA Lower Explosive Limit: NA Upper Explosive Limit: NA

Extinguishing Media: Any class of extinguishing medium may be used on the batteries or their packing material.

Special Fire Fighting Procedures: Exposure to temperatures of above 212 deg. F can cause venting of the liquid electrolyte. Internal shorting could also cause venting of the electrolyte. There is potential exposure to iron, nickel, cobalt, rare earth metals (cerium, lanthanum neodymium, and praseodymium), manganese, and aluminum fumes during fire; use self-contained breathing apparatus.

Section V- Health Hazard Data

Threshold Limit Values: See Section II

Effects of a Single (Acute) Overexposure:

Inhalation: During Normal use inhalation is an unlikely route of exposure due to containment of hazardous materials within the battery case. However, should the batteries be exposed to extreme heat or pressure causing a breach in the battery cell case, exposure to the constituents may occur. Inhalation of cobalt dusts may result in pulmonary burns.

Ingestion: If the battery case is breached in the digestive tract, the electrolyte may cause localized burns.

Skin Absorption: No evidence of adverse effects from available data.

Skin Contact: Exposure to the electrolyte contained inside the battery may result in chemical burns. Exposure to nickel may cause dermatitis in some sensitive individuals.

Eye Contact: Exposure to the electrolyte contained inside the battery may result in severe irritation and chemical burns.

Carcinogenicity:

Nickel has been identified by the National Toxicology Program (NTP) as reasonably anticipated to be a carcinogen. Cobalt has been identified by IARC as a 2B carcinogen.

Other Effects of Repeated (Chronic) Exposure:

Chronic overexposure to nickel may result in cancer; dermal contact may result in dermatitis in sensitive individuals.

Medical Conditions Aggravated by Overexposure:

A knowledge of the available toxicology information and of the physical and chemical and chemical properties of the material suggests that overexposure is unlikely to aggravate existing medical conditions.

Emergency and First Aid Procedures:

Swallowing: Do not induce vomiting. Seek medical attention immediately.

Skin: If the internal cell material of an opened battery cell comes into contact with the skin, immediately flush with water for at least 15 minutes.

Inhalation: If potential for exposure to fumes or dusts occurs, remove immediately to fresh air and seek medical attention.

Eyes: If the contents from an opened battery come into contact with the eyes, immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention.

Section VI - Reactivity Data

The batteries are stable under normal operating conditions.

Hazardous polymerization will not occur.

Hazardous decomposition products: oxides of nickel, cobalt, manganese, lanthanum, and cerium.

Conditions to avoid: heat, open flames, sparks, and moisture.

Potential incompatibilities (i.e., material to avoid contact with): The battery cells are encased in a non-reactive container; however, if the container is breached, avoid contact of internal battery components with acids, aldehydes, and carbonate compounds.

Section VII – Spill and Leak Procedures

Spill and leaks are unlikely because cells are contained in a hermetically-sealed case. If the battery case is breached, don protective clothing that is impervious to caustic materials and absorb or pack spill residues in inert material. Dispose in accordance with applicable state and federal regulations.

Section VIII—Safe Handling and Use (Personal Protective Equipment)

Ventilation Requirements: Not required under normal use.
Respiratory Protection: Not required under normal use.
Eye Protection: Not required under normal use.
Gloves: Not required under normal use.

Section IX- Precautions for Safe Handling and Use

Storage: Store in a cool place, but prevent condensation on cell or battery terminals. Elevated temperatures may result in reduced battery life. Optimum storage temperatures are between –31。F and 95。F.

Mechanical containment: If there are special encapsulation or sealing requirements, consult Cyber-Power about possible cell hazard precautions or limitations.

Handling: Accidental short circuit will bring high temperature elevation to the battery as well as shorten the battery life. Be sure to avoid prolonged short circuit since the heat can burn attendant skin and even rupture of the battery cell case. Batteries packaged in bulk containers should not be shaken. Metal covered tables or belts used for assembly of batteries into devices can be the source of short circuits; apply insulating material to assembly work surface.
If soldering or welding to the case of the battery is required, consult Cyber-Power for proper precautions to prevent seal damage or external short circuit.

Charging: This battery is designed for recharging. A loss of voltage and capacity of batteries due to self-discharge during prolonged storage is unavoidable. Charge battery before use. Observe the specified charge rate since higher rates can cause a rise in internal gas pressure, which may result in damaging heat generation or cell rupture and/or venting.

Labeling: If normal label warning is not visible, it is important to provide a device label stating:

CAUTION: Do not dispose in fire, mix with other battery types, charge above specified rate, connect improperly, or short circuit, which may result in overheating, explosion or leakage of cell contents.

Section X- Recycling and Disposal

Cyber-Power encourages battery recycling. Our Nickel Metal Hydride batteries are not defined by the government as hazardous waste and are safe for disposal in the normal municipal waste stream. These batteries, however, do contain recyclable materials.

DO NOT INCINERATE or subject battery cells to temperatures in excess of 212 deg. F. Such treatment can cause cell rupture.

Section XI – Transportation

Sealed Nickel Metal Hydride batteries are considered to be “dry cell” batteries and are not subject to dangerous goods regulation for the purpose of transportation by the U. S. Department of Transportation, the International Civil Aviation Organization, the International Air Transport Association or the International Maritime Dangerous Goods regulations. The only DOT requirements for shipping Nickel Cadmium batteries is Special Provision 130 which states: “Batteries, dry are not subject to the requirements of this subchapter only when they are offered for transportation in a manner that prevents the dangerous evolution of heat (for example, by the effective insulation of exposed terminals).” IATA requires that batteries being transported by air must be protected from short-circuiting and protect from movement that could lead to short-circuiting.

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