



Personal Scope APS230 Advanced Personal Scope Technical Doc



12/01/2004



A division of Velleman® Components

**Legen Heirweg 33
9890 Gavere
BELGIUM Europe**



A division of Velleman Components

SAMPLE FOR APPROVAL

Model type : APS230

Description : Advanced Personal Scope

Sample number:

Customer :

Remarks / modifications to previous sample:

None

Includes:

Prepared by:

Approved by:

Customer acceptance by:
Please return signed copy

DATE :

DATE :

DATE :

Packaging



RS232 CABLE



2x ISOLATED SCOPE PROBES

Package includes:

- ☒ APS230 unit
- ☒ RS232 cable (9 pole sub D)
- ☒ 2 Insulated 60MHz X10 measuring probes
- ☒ User manual
- ☒ Adaptor (110Vac 60Hz / 230Vac 50Hz)
- ☒ 1800mA / 6V battery pack



PS0906RP

Options:

Extra battery pack: BPAPS230

Soft bag: GIB

**Minwa Electronics Co., Ltd.**

22/F, Far East Finance Centre,
16 Harcourt Rd.,
Admiralty,
Hong Kong.



DECLARATION OF CONFORMITY

Certificate of Conformity
Directive for Electromagnetic Compatibility
89/336/EEC
Low Voltage Directive 73/23/EEC
as last amended by EEC Directive 93/68/EEC

Certification Number: PRSZR00008-A

Product : AC/DC Adaptor

Type Designation : MWS935-9V

Construction Same As Our Model Type : MWS935CE

Tested According To EMC Standard :

EN50081-1:1992(EN55022:1994+A1:1995+A2:1997); EN61000-3-2:1995+A1:1998+A2:1998;
EN61000-3-3:1995; EN50082-1:1997(EN61000-4-2:1995+A1:1998, EN61000-4-3:1995,
EN61000-4-4:1995, EN 61000-4-5:1995, EN61000-4-6:1996, EN61000-4-11:1994)

This is to declare that the EUT of the above model/product technically complies with the European Union
89/336/EEC directive requirement.

Tested According To LVD Standard :

EN61558-1:1997+A1 EN61558-2-6:1997

This refers to the above mentioned product. This is to declare that the model is in conformity with Annex I of
the Low Voltage Directive 73/23/EEC, and in its latest amended version.

Date : 18-DEC-2003

Name : Mr. Martin Wong

For and on behalf of

Minwa Electronics Co., Ltd.

FOR AND ON BEHALF OF

MINWA ELECTRONICS CO., LTD.



Authorized Signature

Authorized Signature



Declaration of Conformity

We, Manufacturer

**Velleman Components
Legen Heirweg 33
9890 Gavere
Belgium**



declare that the product

APS230 Advanced 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)
EN 50082-1	Electromagnetic Compatibility - Generic immunity standard
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: 19/12/2003

Signature: _____



Name: Stephan Santens
R&D manager

VELLEMAN Instruments

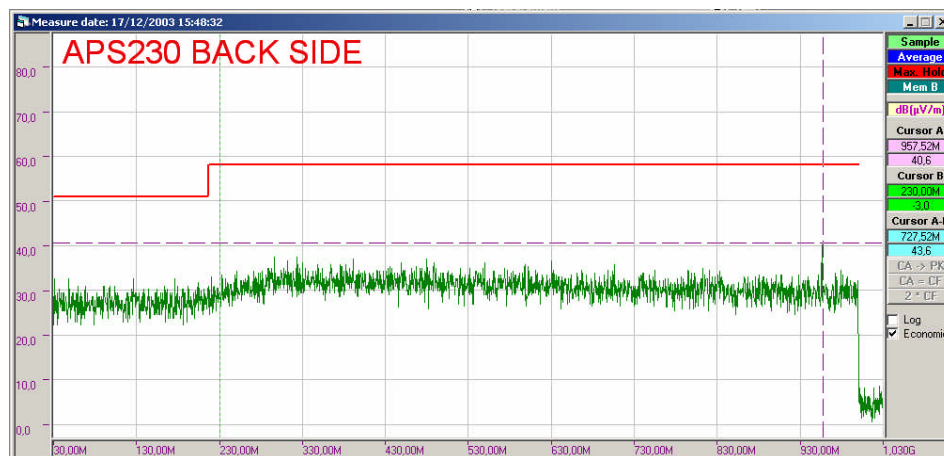
Start frequency: 30MHz

APS230 Advanced Personal Scope

End frequency: 1GHz

EN55022 Field strength (emission)

30dB Probe correction attenuation



APS230 Technical Doc_____



DATE	REVISION OVERVIEW
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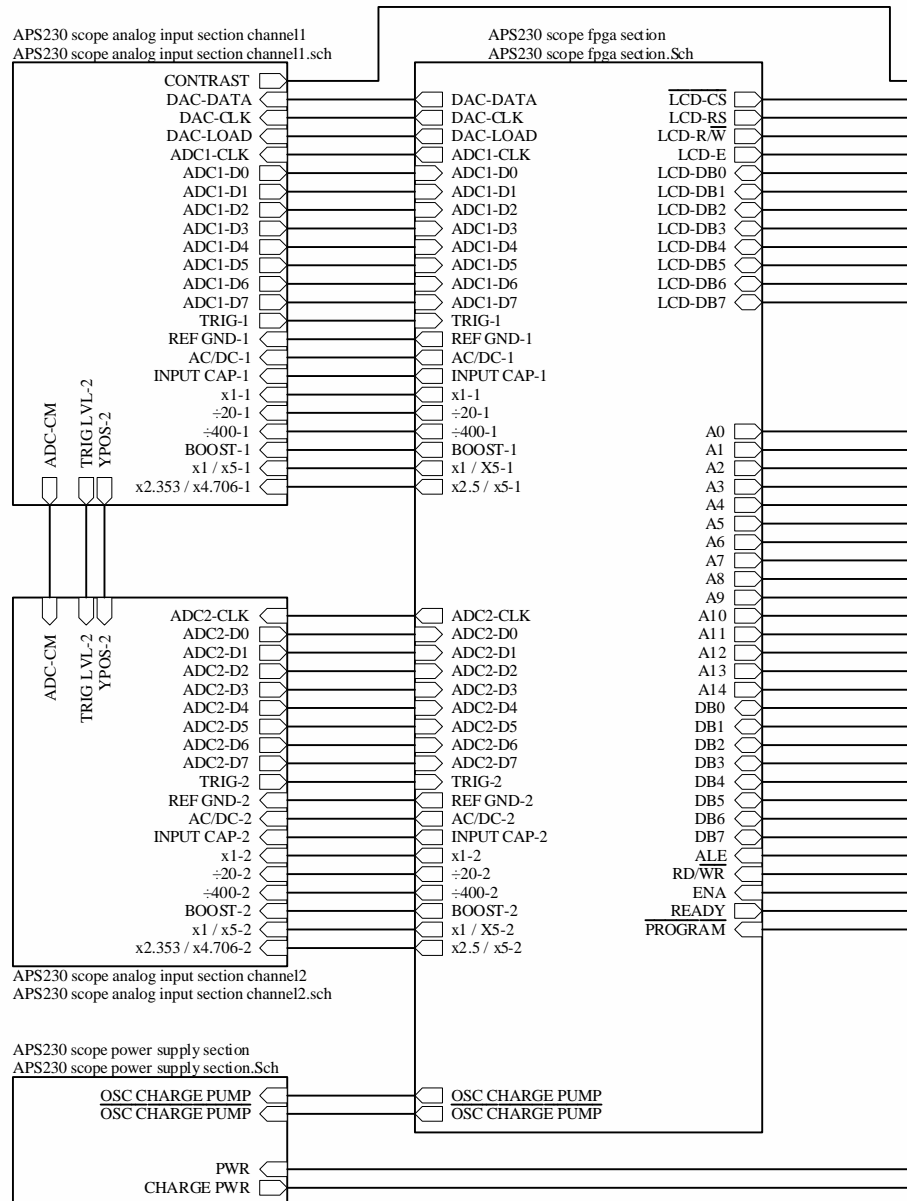
APS230 PARTS		
ASSEMBL_APS230	Assembly components for APS230	
ENCLAPS230	Enclosure for APS230 + screws	1
FOOT10X5	Adhesive rubber foot 10x5mm / 1,5mm thickness	2
FOOTD10	Adhesive rubber foot diameter 10mm / 1,5mm thickness	4
LOGOINSTR	Logo Velleman instruments	1
PANHEADSCREW	Screw for PCB fixation	14
SCREEN_APS230E	Screenfoil for enclosure APS230	1
SCREENAPS230F	Metal screen frame for APS230	1
SCREENAPS230T	Metal screen top & bottom panel for APS230	2
SERIALNR	production serial nr (YY-MM- 00000)	1
STICK_APS230	Back side info sticker APS230	1
WINDAPS230	Display window for APS230	1
CAP_APS230	Capacitors for APS230	
_1μ	smd capacitor	1
_10μ	smd tantalum capacitor	32
_10μ/50V	smd electrolytic capacitor 50V	1
_100μ/16V	smd electrolytic capacitor 16V	25
_100N	smd capacitor	97
_100P	smd capacitor	11
_10N	smd capacitor	3
_10P	smd capacitor	6
_150P/200V	smd capacitor 200V	2
_15P	smd capacitor	2
_1N5/200V	smd capacitor 200V	2
_20P/TRIM	smd ceramic capacitor trimmer	4
_22N	smd capacitor	18
_2N2	smd capacitor	2
_33μ/25V	smd electrolytic capacitor 25V	1
_33μ/35V	smd electrolytic capacitor 35V	2
_39P	smd capacitor	2
_4μ7/25V	smd electrolytic capacitor 25V	1
_47N/200V	smd capacitor 200V	4
_47P	smd capacitor	4
_50P/TRIM	smd ceramic capacitor trimmer	2
CHOKE_APS230	Chokes for APS230	
BD30160808-601	smd multilayer suppres 600 Ohm@100MHz/0,6 Ohm/100mA	32
CON_APS230	Connectors for APS230	
BATCON	battery connector	1
BNCICHAS	BNC FEMALE, CHASSIS MOUNTING INSULATED, IE1010	2
CC019	9-PIN SUB D CONNECTOR FEMALE, RIGHT-ANGLE PCB MOUNTING	1
DJ-005	DC JACK 2.1mm / 5.5mm SOLDER CONNECTIONS	1
HDR10FEM	Female header 10 pole connector	1
HDR1X10/15MM	pin header 10-pole total length 15mm	1
HDR1X20/15MM	pin header 20-pole total length 15mm	1

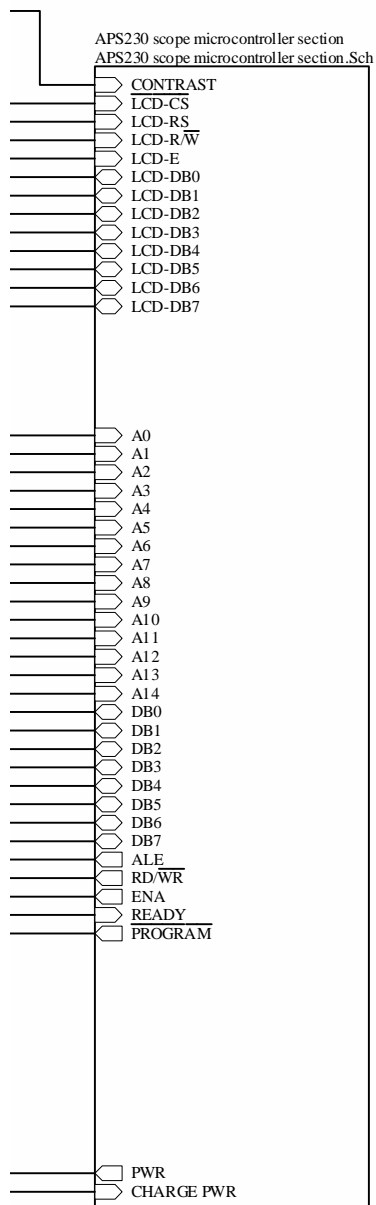
DIODE_APS230	Diodes for APS230	
BAS45AL	smd low-leakage diode	4
BAS85	smd Schottky barrier diode	1
BAT54S	smd Schottky barrier double diode	4
BAV70	SMD high speed double diode	12
BAW56	smd high speed double diode	1
LED3GL	LED 3mm GREEN 4.0mcd TD UNIVERSAL	1
LED3RL	LED 3mm RED 1.0mcd TD UNIVERSAL	1
_PRLL4001	smd rectifier diode	1
_PRLL5817	smd Schottky barrier diode	1
DISPLAY_APS230	Display assembly for APS230	
HDR20FEM	Female header 20 pole connector	1
LCG192128W	Graphic LCD 192x128 - no negative supply/white backlight	1
IC_APS230	IC's for APS230	
44PLCC	LEADLESS CHIP CARRIER 44P NON-STAGGERED	1
8P	8P DIL IC SOCKET 300MIL	1
ADS830E	A/D Converter 8-bit 60Mhz	2
_CY62256VLL-70	smd low power 32K x 8 static RAM (CYPRESS CY62256VLL-70SNC)	1
_IL213AT	smd high current transfer ratio (min 100%) optocoupler (Infineon)	2
_LM7301IM	smd low power, 4MHz GBW, rail-to-rail input-output operational amplifier	1
_LMV7219M5	smd 7ns, 2.7V to 5V comparator with rail-to-rail output (National)	2
_MAX712CSE	smd NiCd/NiMH battery fast-charger controller	1
_OPA2681U	smd dual wideband, current feedback operational amplifier	2
_OPA350UA	smd single high-speed, single supply, Rail-to-Rail operational amplifier	2
_TLC5620CD	smd quadruple 8-bit digital-to-analog converter	1
_TLE2071CD	smd excalibur low-noise high-speed JFET-input operational amplifier	3
VKAPS230-IC13	Programmed fpga configuration PROM for APS230 - IC13	1
VKAPS230-IC18	Programmed μ P for APS230 - IC18	1
XC2S30-5TQ144C	Spartan-II 2.5V Field Programmable Gate Array	1
PACKING_APS230	Packing and accesories	
DAPS230	Printed packing box for APS230	1
HAPS230'1	User manual for APS230	1
_PROBE60SB	Probe 60S in bulk for hand held scopes (only probe + clamp)	2
_RS232CABLE230	RS232 cable male/female 9-pole	1
BPAPS230	Rechargeable battery pack 6V/1800mAh for APS230	1
PS0906RP	REGULATED UNIVERSAL VOLTAGE ADAPTER 600mA puls width modulation	1
PCB_APS230	Printed circuit boards for APS230	
PAPS230'3	Four layer PCB for advanced personal scope APS230	1
PAPS230KB'2	Gold plated two layer keyboard PCB for handheld scope APS230	1
QUARTZ_APS230	Crystal, oscillator for APS230	
6MHZ	smd crystal	1
_XO-60MHZ	smd 60MHz crystal clock oscillator 3.3V	1

RC_APS230	Resistors/capacitor network arrays for APS230	
RC4A-470-101	smd resistor-capacitor array 4x 47 / 100pF	5
REG_APS230	Voltage regulators for APS230	
TPS76633D	smd low-quiescent current 3.3V/250mA low-dropout	2
TPS76650D	smd low quiescent current 5V/250mA low-dropout	3
TPS77825D	smd fast transient response 2.5V/750mA low-dropout	1
RELAY_APS230	Relays for APS230	
VR05R051AS	Reed relais 5VDC / 0.5A / 50mW SIL 1 FORM A	18
RES_APS230	Resistors for APS230	
100 (0603)	smd resistor	4
100 (1206)	smd resistor	4
100/1% (0603)	smd resistor 1%	6
100/TRIM	smd resistor trimmer	2
100K (0603)	smd resistor	5
10K (0603)	smd resistor	6
150 (0603)	smd resistor	1
150K (0603)	smd resistor	2
16/1% (0603)	smd resistor 1%	2
1K (0603)	smd resistor	7
1R5 (0603)	smd resistor	2
1R8 (0603)	smd resistor	3
200 (0603)	smd resistor	2
200/1% (0603)	smd resistor 1%	2
22K (0603)	smd resistor	4
240/1% (0603)	smd resistor 1%	2
270 (0603)	smd resistor 1%	1
270K (0603)	smd resistor	1
2K2 (0603)	smd resistor	2
2K4/1% (0603)	smd resistor 1%	4
300/1% (0603)	smd resistor 1%	8
330 (0603)	smd resistor	1
36/1% (0603)	smd resistor 1%	2
39 (0603)	smd resistor	4
39/1% (0603)	smd resistor 1%	2
39K (0603)	smd resistor	1
39K/1% (0603)	smd resistor 1%	2
47 (0603)	smd resistor	19
470 (0603)	smd resistor	3
470K (0603)	smd resistor	1
47K (0603)	smd resistor	34
47K/1% (0603)	smd resistor 1%	2
4K7 (0603)	smd resistor	23
510/1% (0603)	smd resistor 1%	4
560 (0603)	smd resistor	1
68/1% (0603)	smd resistor 1%	4
68K (0603)	smd resistor	2
75/1% (0603)	smd resistor 1%	2
820K (0603)	smd resistor	1
910K/1% (0603)	smd resistor 1%	2

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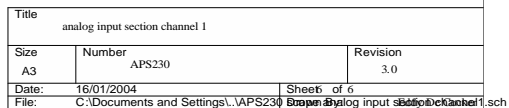
DIAGRAMS

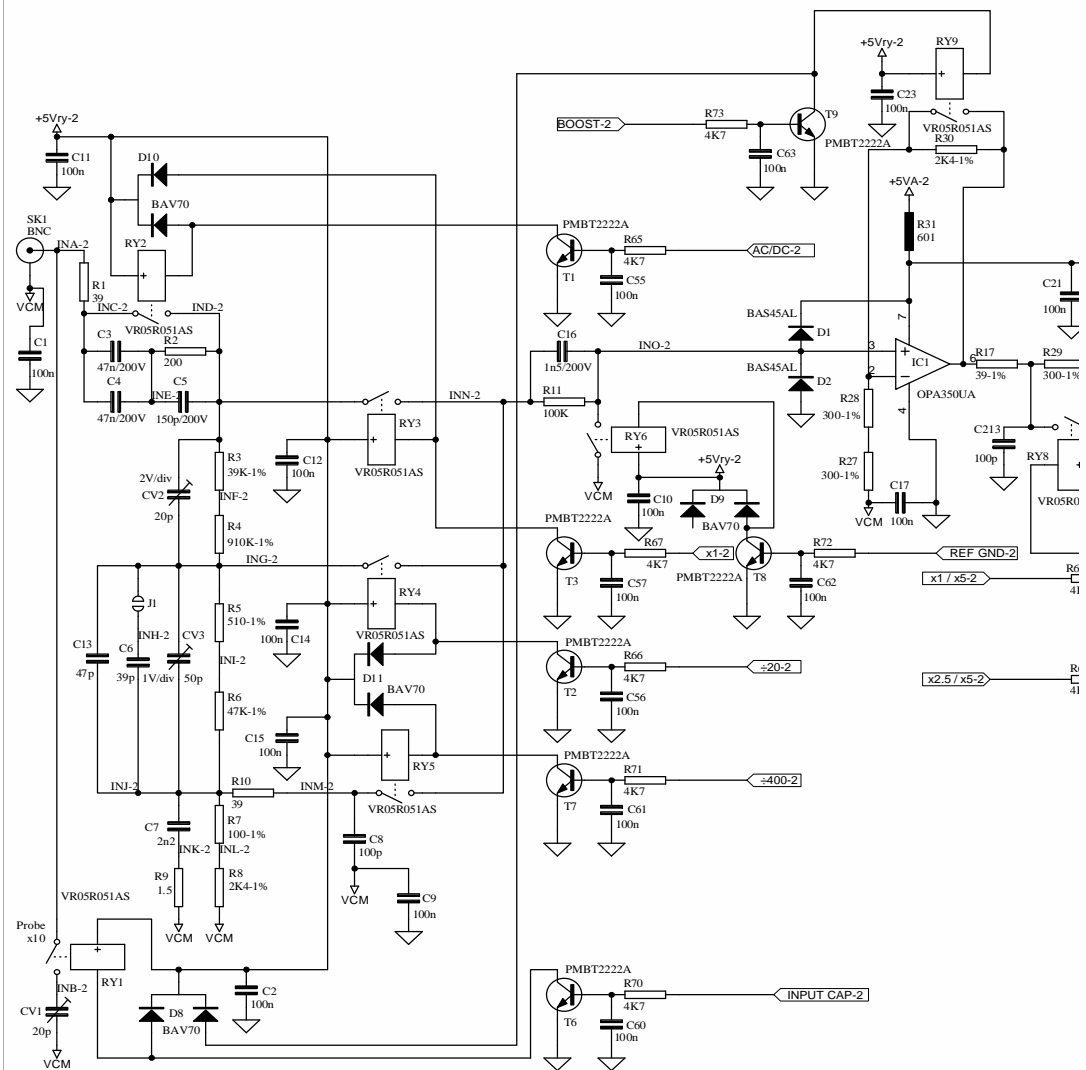


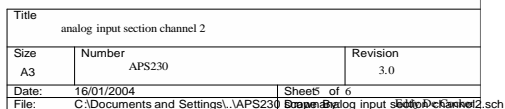


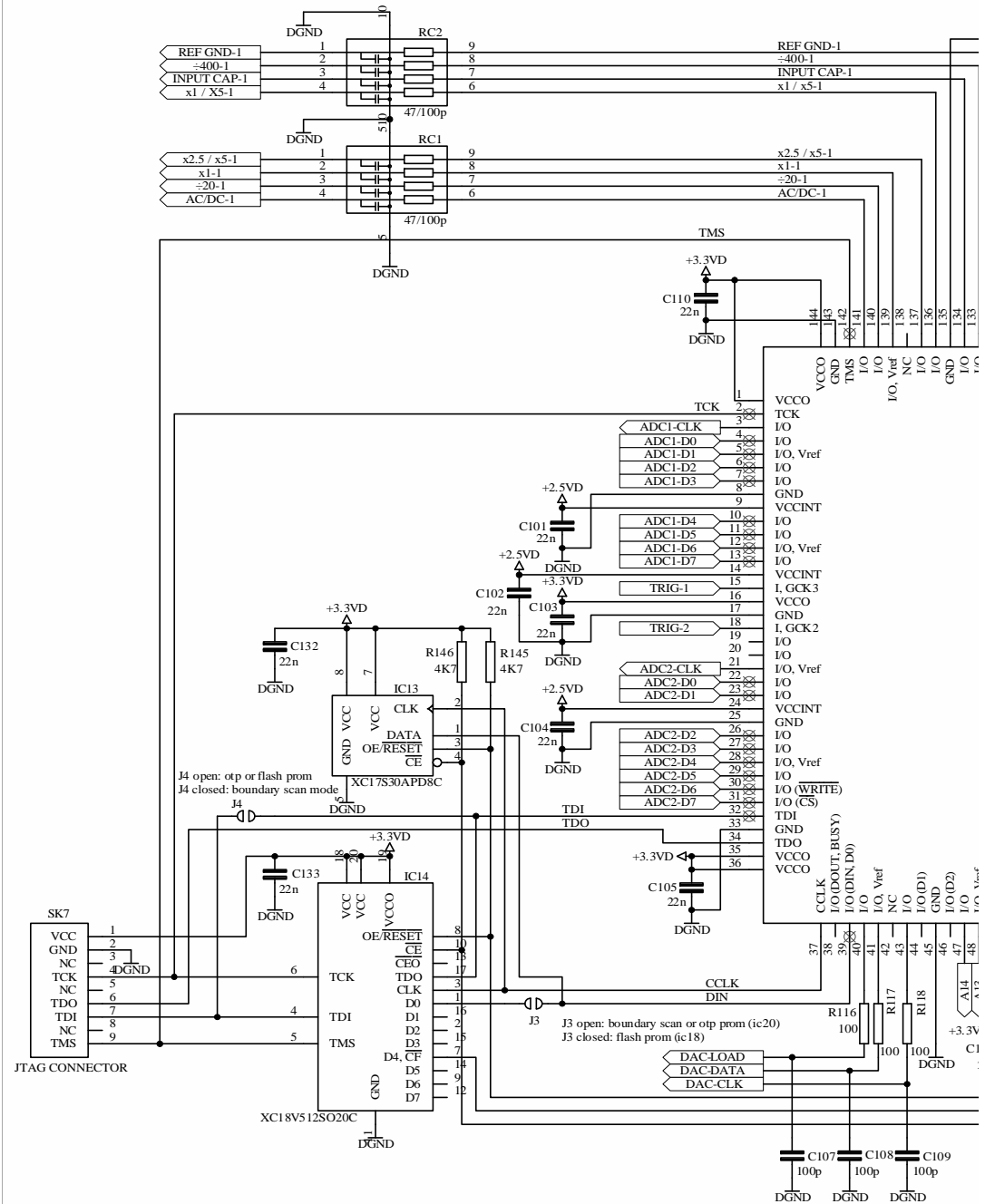
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Main project		
Size	Number	Revision
A4	APS230	3.0
Date:	16/01/2004	Sheet 1 of 6
File:	C:\Documents and Settings\...\APS230 scope microcontroller section.Sch	
Drawn by:		Eddy De Cocker





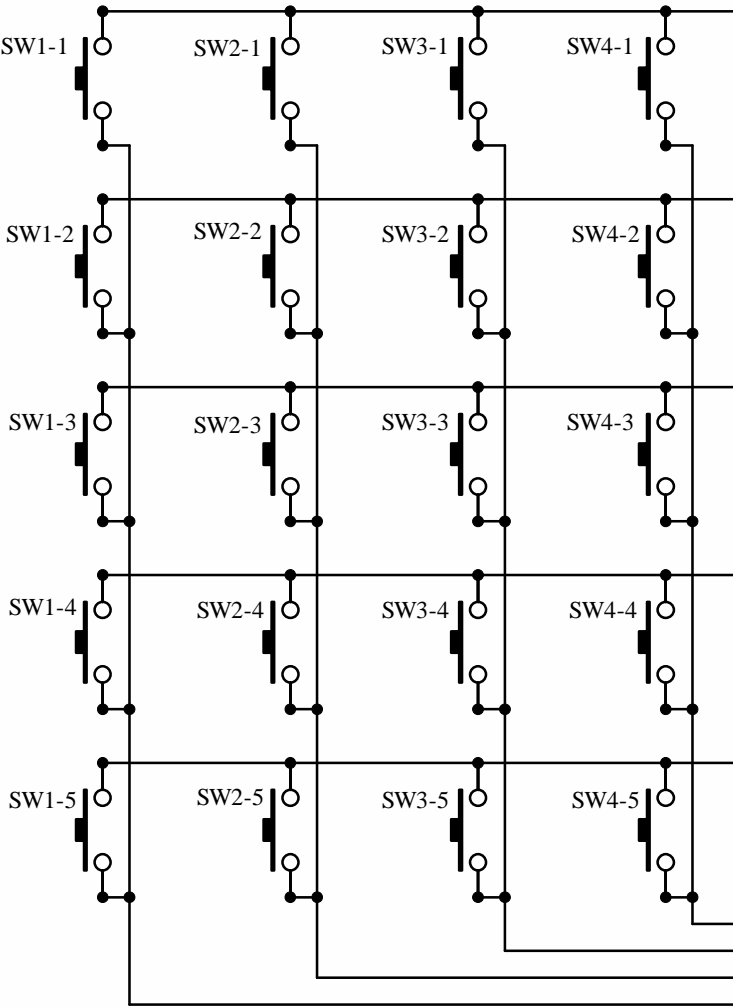


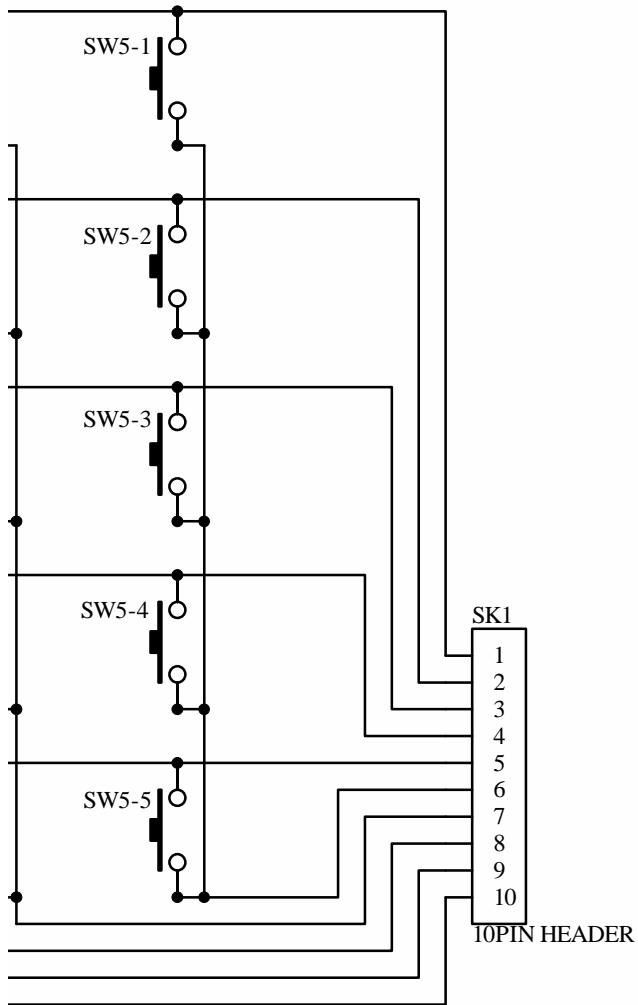




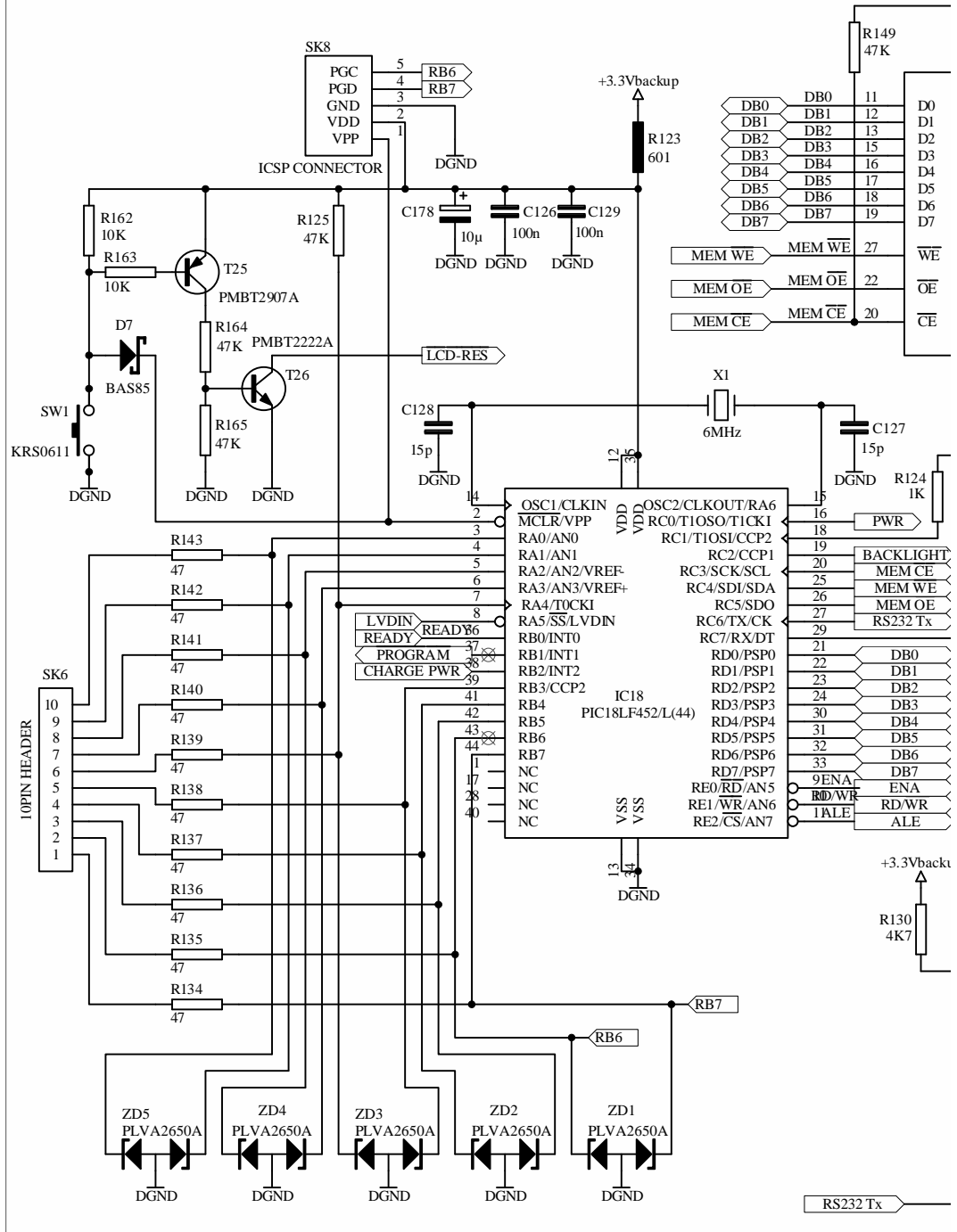


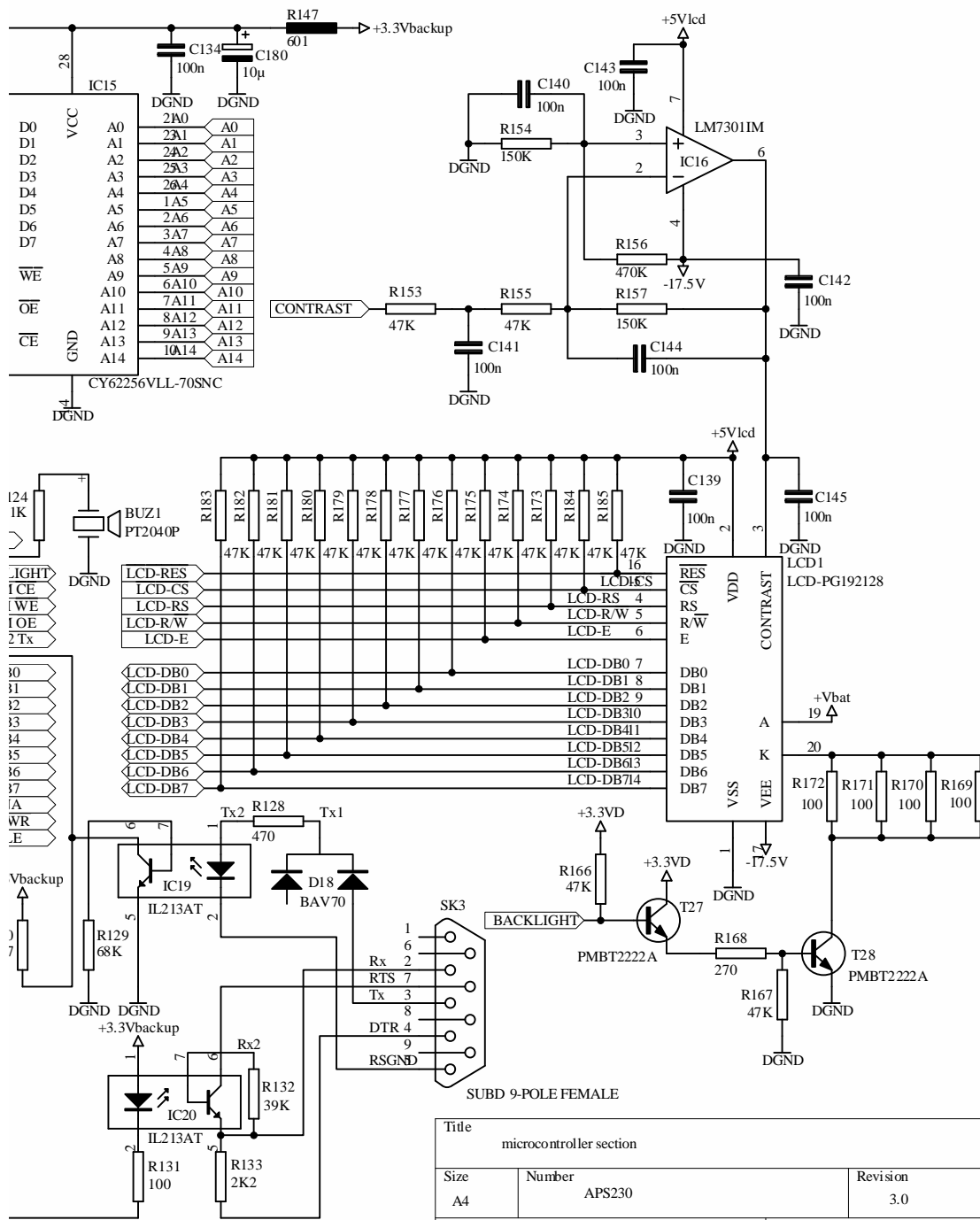
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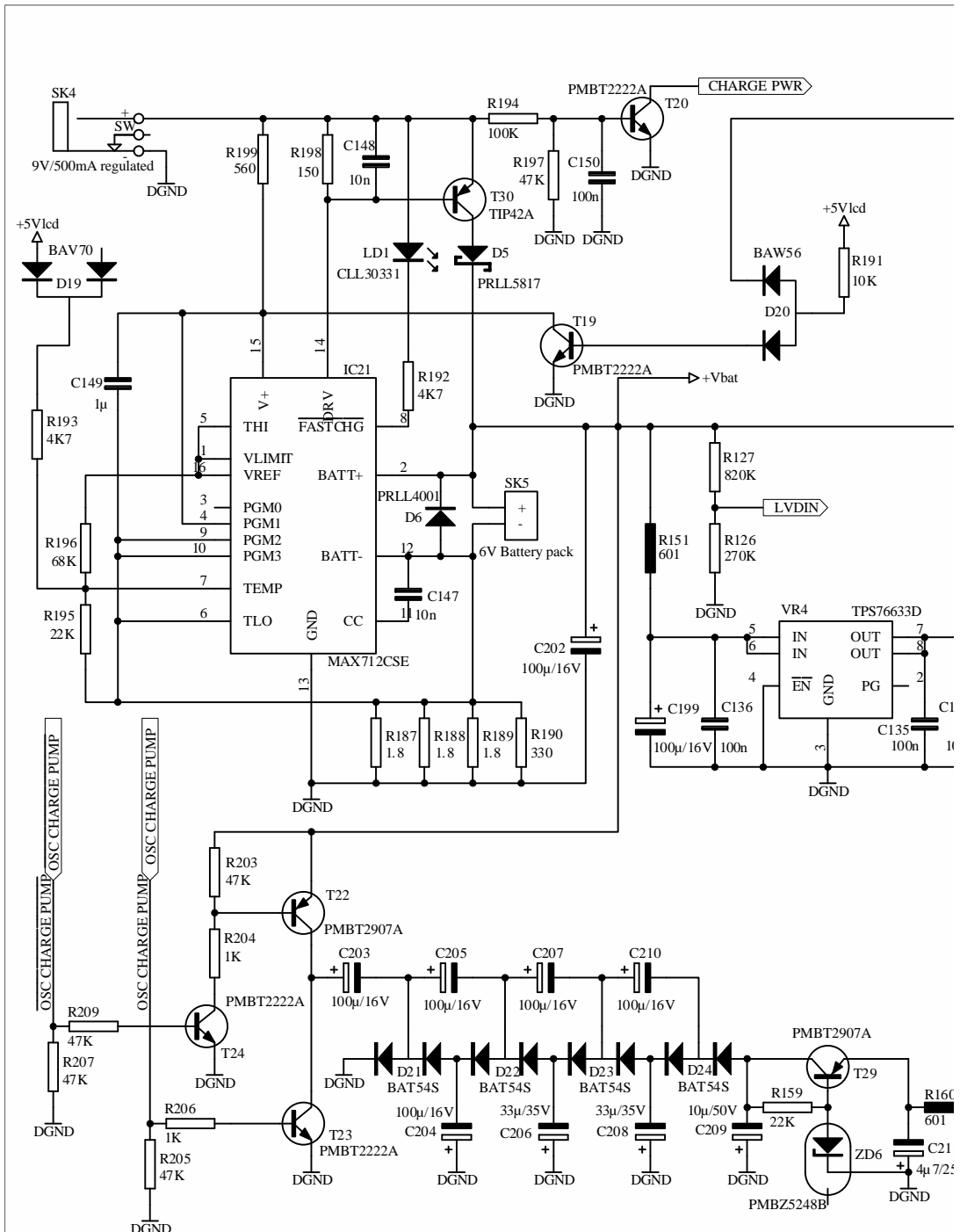


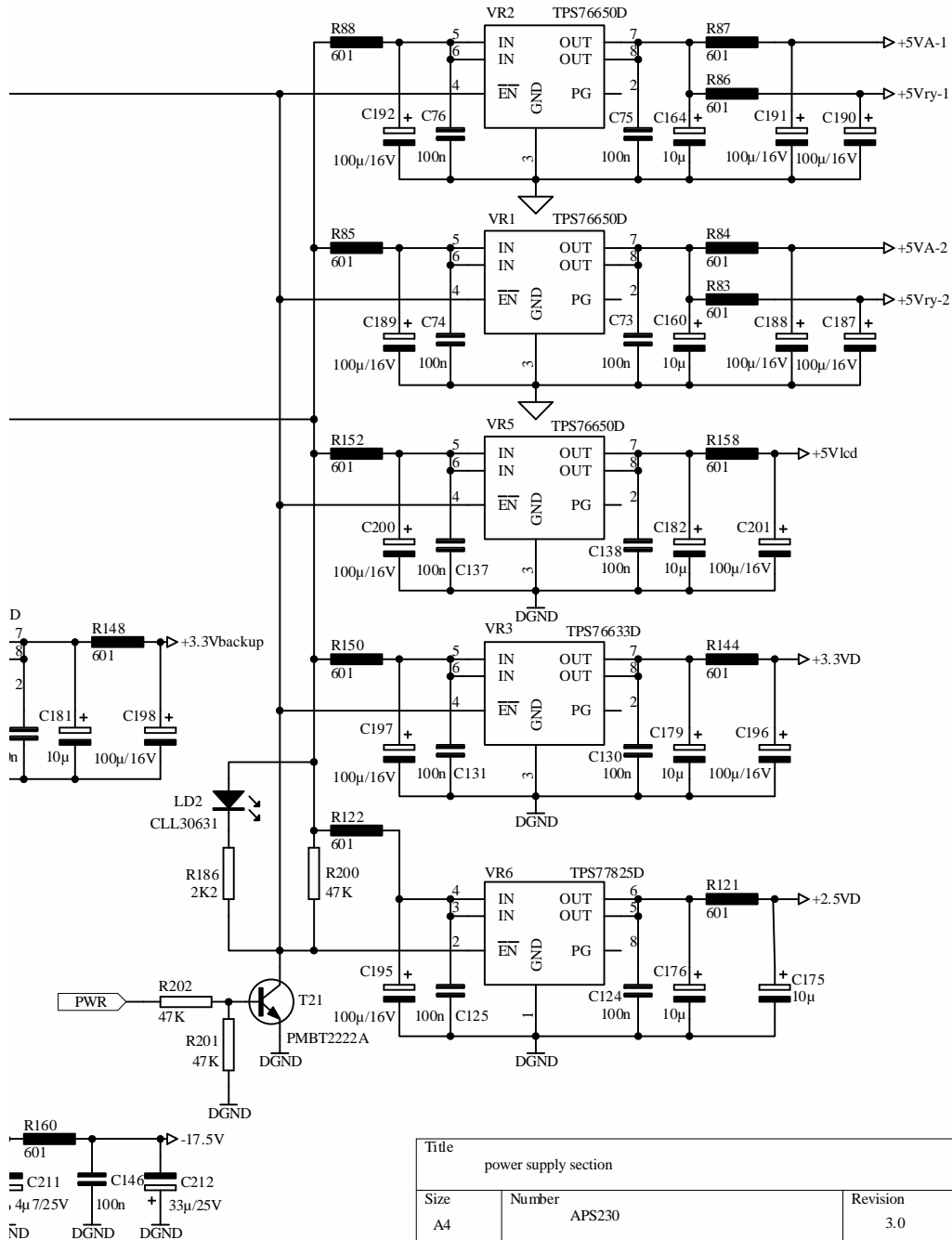


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Keyboard section		
Size	Number	Revision
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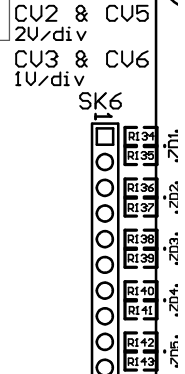


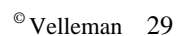






Title		
power supply section		
Size	Number	Revision
A4	APS230	3.0
Date:	16/01/2004	Sheet 2 of 6
File:	C:\Documents and Settings\... APS230 scdp\PowerSupply section Edit De Cocker	





TECHNICAL SPECIFICATIONS:

Maximum sample rate
Maximum input amplifier bandwidth
Input impedance
Maximum input voltage
Input coupling
Vertical resolution
Trigger modes
Trigger level
LCD Graphics
Signal storage
dBm measurement (0dBm= 0.775V)
dBV measurements (0dBV= 1V)
True-rms measurement
Timebase range in 35 steps
Input sensitivity range in 14 steps
Probe calibration output
Supply voltage
Batteries
Charge current for rechargeable batteries
Battery current (average)
Operating temperature
Fysical characteristics
Interface to PC
Firmware
Protection

2x 240MS/s for repetitive signals (2x 60MS/s for single shot events)

30MHz per channel (except 1mV and 2mV boost range)

1Mohm // 20pF (standard oscilloscope probe)

100Vpeak (AC + DC), 200Vpeak-peak (AC only)

DC, AC and GND (GND for auto zero reference)

8 bit \pm 1bit linearity

Run, Normal, Once, Roll mode for 10s/div and slower timebase

Adjustable with positive or negative slope selection

128 x 192 pixels with WHITE LED backlight

256 samples per channel, 2047 in roll mode

From -80dB tot +40dB (up to 60dB with X10 probe) \pm 0.5dB accuracy

From -78dB tot +38dB (up to 58dB with X10 probe) \pm 0.5dB accuracy

From 0.03mV to 80V (up to 400Vrms with X10 probe) 2.5% accuracy

25ns to 1hour/division

1mV to 20V/division at X1 - 10mV to 200V/div at X10

1,2KHz / 3Vpp

9VDC/ min 500mA regulated adapter

6V / 1800mA battery pack NiMH rechargeable

400mA fast charge

On: 350mA, with backlight: 400mA, standby current: < 100 μ A

0 to 50°C (32 to 122°F)

Dim: 230x150x50mm (9x5.9x1.97") Weight: 830g incl. Batteries

Internal optical isolated RS232, 57600bd for screen and data load/set

Upgradable through internet

IEC1010, 600V CATII, pollution degree 1 (IP40)



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www.vellemaninstruments.com

APS230TD1.0