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USER´S MANUAL FOR SCT-LV POWER SUPPLY SYSTEM

This document contains the necessary information for using the LV Power Supply System installed in Bat. 186 for **Systemtests**.

Overview of LV Power Supply Module/Card.

LV-card: VME 6U containing two LV modules.
Powering: 5V, 12V, -12V;

LV module provides six voltages for SCT on-detector electronics with following parameters:

	Vanalog	VI1	Vdigital	LDC0	LDC1	PIN
Vmax [V]	3.8	1.2	4.5	6.6	6.6	10.2
Vmin [V]	3.2	0,0	3.5	0.0	0.0	0.0

The analog and digital voltages on SCT module are controlled through two pairs of sensing wires.

Hardware protection against over-voltage
LV module turns OFF if the analog and/or digital output voltage at power supply from any reason is greater than:

	Vanalog	Vdigital
Over-voltage trip [V]	6.0	6.0

In the next prototype all voltages will be protected.

Hardware protection against over-current.
The maximum available currents provided by LV module are following:

	Vanalog	VI1	Vdigital	LDC0	LDC1	PIN
Current limit [mA]	1100	10	490 750$^{*)}$	10	10	2
Hardware trip [mA]	1300	-	650 850	-	-	-

Over-current trip turns OFF the LV module.
$^{*)}$ Upgrade

Digital current limit setting.
For voltages VI1, LDC0 and LDC1 the hardware current limits are adjustable by LV Control System. For the analog and digital voltages the setted current limits does not act on hardware but they will generate a warning message for LV Control System in the case of an over-current.

Digital voltage setting.
Five voltages are adjustable by the LV Control System but for PIN bias, the trimmer on front panel of the LV-card is available only.

Monitoring & setting resolution.
All six voltages and five currents (without PIN current) are monitored with a resolution:

	Vanalog	VI1	Vdigital	LDC0	LDC1	PIN
Voltage [mV]	10	5	10	40	40	40
Current [mA]	5	0.1	5	0.1	0.1	--

RESET and CLOCK levels are switched HIGH/LOW by the LV Control System. Signal RESET has negative logic. Current status is monitored.

Each LV card contains temperature sensor. If temperature is higher than 60 C then LED burns (red) on front panel. Temperature is also monitored.

Status word of each LV module which is available for LV Control System contains the **ERROR messages:**

Message	Situation	Action
* Over-voltage trip	LV module is turned OFF	Restart by Control System Repeat restart if necessary
* Current limit flag	LV module is ON	Change current limit by LV Control System
* Communication error - no answer from Vdig - no answer from Vanal - parity error – Vdig - parity error – Vanal	LV module is turned OFF	Restart by Control System, Repeat restart if necessary

Addressing of LV card/module/crate

Number/address of the LV card (N-card) in the VME crate must be defined by user. N-card is number 0-15 and is adjustable manually on the LV card (see Fig.1.). In the case that several LV cards will be placed in the crate then an addressing must be setted continously.

Number of the LV module (N-lvm) is defined by N-card:
CHO : N-lvm = 2 * N-card
CH1 : N-lvm = 2 * N-card + 1
This convention is used in the LV Control System.

Addressing of the VME crate needs the help of an expert.
For the Systemtest are now used VIC8251 interfaces controlled by RAID.

VME crate 7 - is placed in LV&HV power supply rack.
Baseaddr=0x70FFX000 where X=N-card;
VME crate 6 - is a part of DAQ for testing SCT modules.
Baseaddr=0x60FFX000;
This convention is used in LV Control System

LV control system

Program is available in directory SCTLV of **atsct01** (RAID) Name of the program: **lvpower-n**

Input values:

* Number of the VME crate (6 or 7 at present time-see ADDRESSING)
* Max number of the LV module in the crate (VIC-6: 1; VIC-7: 13)
* Min number of the LV module in the crate (VIC-6: 0; VIC-7:   8)

*Default voltages for all LV modules:

Example	Vanalog	VI1	Vdigital	LDC0	LDC1
[V]	3.5	0	4.0	6	6

* Default current limits for all LV modules:

Example	Ianalog	Ivil	Idigital	ILDC0	ILDC1
[mA]	900	2.5	490	5	5

* Default RESET and CLOCK levels:

Example	RESET: 0	(Output is HIGH – due to negative logic).
	CLOCK: 1	(Output is HIGH)

Control commands for the „command mode“ of the program

Basically each command begins with the number of LV module, N-lvm, and is followed by the control character, C-com, which are: I,C,P,O,F,R,N.

Command: N-lvm I

In a dialog user can change a set of voltages, current limits, Reset&Clock.“Return“ means that the set of values are kept unchanged in a memory.
Action: Program saves new values in a memory and sends them to LV module.

Command: N-lvm C

It allows to set one voltage, current limit, Reset or Clock.
This command must be followed by the next command consisting of two control characters and the value:

Voltage	V control Characters	I control characters	SELECT	Control characters
Analog	Va	Ia		
VI1	Vi	Ii	RESET	S0
Digital	Vd	Id	CLOCK	S1
LDC0	V0	I1		
LDC1	V1	I1		

Examples: Va 3.51; V1 0; I0 6.35; S1 1;

Action: Program saves new value in a memory and sends it to LV module.

Command: N-lvm P

Action: Program prints all setted values and also real time monitored values in case that LV module was previously switched ON.

Command: N-lvm O:

Action: LV module is switched ON with the last set of voltages, current limits, RESET and CLOCK and program will print all setted and monitored values ~10 miliseconds after switching ON.

Command: N-lvm F
Action: Program turns OFF the LV module and prints monitored values ~10 miliseconds after switching OFF.

Command: N-lvm R
Action: Program will tray to restart/turn ON the LV module which was automatically switched OFF due to:

∗COMMUNICATION ERROR
∗ OVER-VOLTAGE TRIP
The sets of voltages, current limits, Reset and Clock are taken from a memory.

Command: N-lvm N (for experts)
Action: Program prints details step by step.

Control commands for the „monitoring mode“ of the program are: E and „return“.

Command: 0 E
Action: Program switches from the „command mode“ to the „monitoring mode“ and begins to monitore all LV modules automatically each 4 seconds and prints each ~20 seconds alternatelly the last
∗ status words of all LV modules in the crate (ON and OFF) and/or
∗ all monitored values for LV modules which are ON.

ERROR message is printed each ~4 seconds together with the last status word and monitored values.

Command „return“ (Key board)
Action: Program switches back to the „command mode“.

LV monitoring and output files

Program for monitoring and writing data into file(s).
Name of the program: **lvmonit**

Program lvmonit:

∗ User defines name of the output file
and number of LV module
∗ Monitoring is done each 4 seconds
∗ 500 events are stored in one file
∗ 4 files are open with the total name: nameN-lvm.datN-file
N-file = 0 – 3

PAW is used for graphics: **lvmonit.kumac**

∗ User has to define four parameters:
- N-lvm,
- name of file,
- number of files, N-file,
- number of events on each file (500)