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MuSR User Guide

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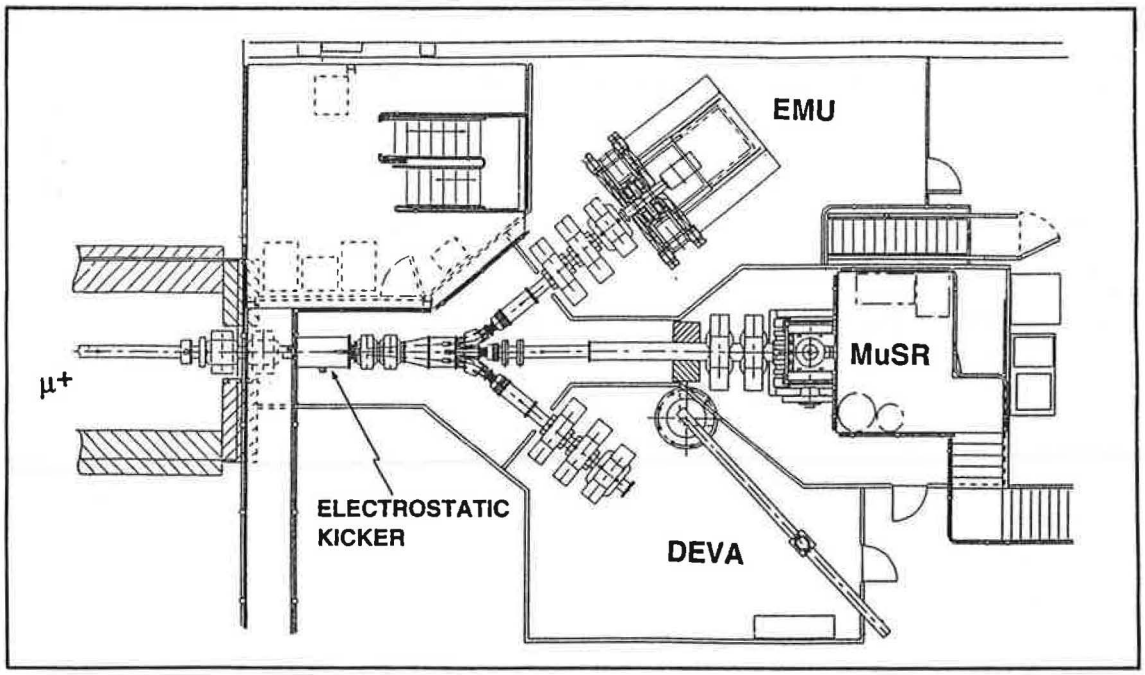
Layout of the ISIS muon facility beamlines



1. Setting up

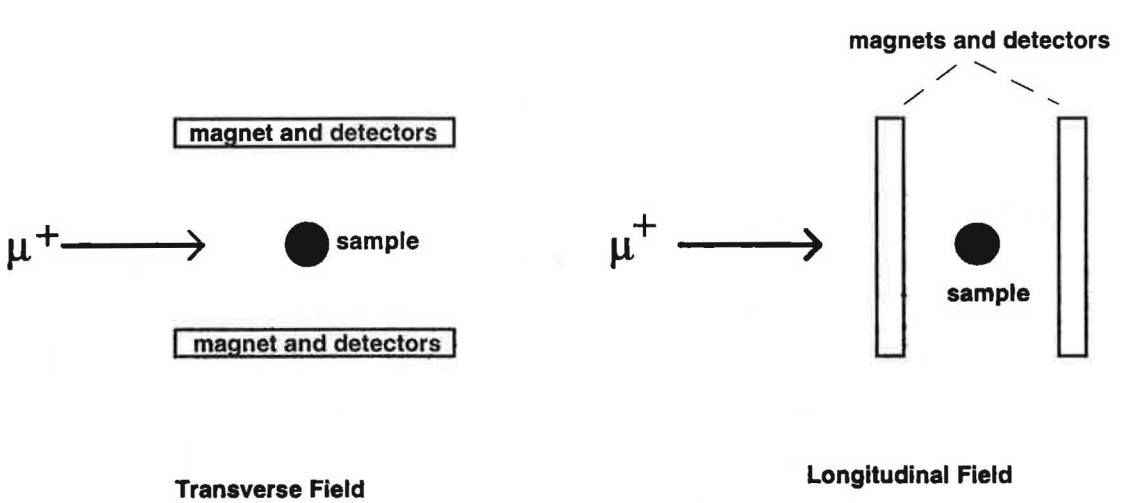
Before starting their data collection users should check the following points :

- **correct instrument geometry**
- **correct sample environment and control parameters**
- **correct magnetic field for (a) calibrations**
  (b) measurements
- **appropriate x-slit width**
- **steering magnets matched to transverse field setting**
- **high voltage to photomultiplier tubes is on**

These points are expanded upon in the following sections.

1.1. Instrument geometry

Before starting an experiment various decisions about the spectrometer geometry have to be made. On MuSR data can be collected in longitudinal fields up to 2000 gauss or transverse fields up to 600 gauss. The direction of this field is determined by the geometry of the spectrometer as shown below.



MuSR can be rotated between transverse and longitudinal geometry in about 45 minutes. However, it is important to speak to your local contact before rotating the instrument: careless actions during the rotation of MuSR can damage either the photomultiplier tubes (PMTs) or puncture the windows of the dilution refrigeratior or the beam line. It is recommended that at least three people carry out the instrument rotation as described in Appendix 2.

PLEASE DO NOT ATTEMPT TO ROTATE MuSR WITHOUT SUPERVISION

1.2. Sample environment

Generally the choice of sample environment will have been made several weeks before the start of the experiment and will have been prepared and provided by the ISIS sample environment (SE) group. Although the SE group will help in the preparation of cryostats, users cannot assume support 24 hours a day from this group and therefore should be able to change samples and temperatures unaided.

Three temperature ranges are available on MuSR: 40mK to 5K in the dilution refrigeratior system, 2K to 300K in the "orange" cryostat and 12K to 340K in the closed cycle refrigerator.

1.2.1. CEA-TBT Dilution refrigerator

Users of the dilution refrigerator (DR) are expected to arrive at ISIS at least 24 hours before the start of an experiment. This gives sufficient time to work with the local contact mounting a sample, and starting the precooling process. This can all take place out of the beam during the previous users experimental time. Once the DR is prepared it has to be lowered into the beam by a licensed crane driver. As few users hold a crane driver's license this will involve the local contact or, in emergencies, a member of the ISIS crew. Data collection and sample environment in the DR is controlled by the software "MCD". Details of all DR procedures are in the manual on top of the DR platform.

1.2.2. Orange cryostat

The orange cryostat, (OC), will have been prepared off-beam by a member of the ISIS SE group. During a change-over the cryostat will be craned into position by the local contact. After changing the sensor numbers and temperature parameter file in MCS using the command *@orange_TC820* the OC can be controlled by the Eurotherm in exactly the same way as the closed cycle refrigerator.
More information about running an orange cryostat, including filling with helium and changing a sample can be found in the following RAL reports:

- *Use of cryogenic liquids on ISIS instruments*
  J Chauhan, A V Belushkin and J Tomkinson, RAL-92-041
- *Changing a sample on ISIS instruments*
  J Chauhan, A V Belushkin and J Tomkinson RAL-93-006

1.2.3. Closed-cycle refrigerator (CCR)

Users will need to know how to change the sample in the closed cycle refrigerator (CCR). In preparation for a sample change the temperature should be set to 300K and the compressor turned off. Once the CCR has reached a reasonably high temperature (>270K) the following procedure can be carried out to open the CCR:

- Close the large isolation valve on the top of the pump
- Switch off the pump
- Open the vent valves to vent the pump and CCR
- Swing the CCR out from between the magnet faces
- Remove the CCR tails and unscrew the sample plate from the copper block

TAKE CARE NOT TO BEND THE RhFe THERMOMETER LEADS

After mounting a new sample close and restart the CCR as follows

- Dry the CCR, heat shield and outer tail. Replace the tails checking that the windows are aligned and facing the muon beam pipe window.
- Swing the CCR back into place taking care not to knock the calibration coils.
- Check the vent valves are closed.
- Start the vacuum pump and switch on the Pirani gauge.
- When the Pirani gauge reads $<10^{-1}$ torr the Penning gauge automatically switches on.
- Below 5×10^{-3} torr the compressor may be switched on by turning the switch on the front the central compressor (outside the area) from 0 to 1.

Users can test the thermal fuse by attempting to maintain a high temperature before cooling. DO NOT HEAT THE THERMAL FUSE TO OVER 70°C (340K)

For the first run on the CCR after running the DR or OC set sensor values and PID parameters by typing *@ccr_TC820* at the MCS prompt.

1.3. Magnetic fields

1.3.1. Zero field

Three pairs of orthogonal coils mounted around the sample position are used to cancel the earth's magnetic field. They are powered from a triple Gossen power supply unit (labelled L V and T) in the electronics rack inside the MuSR area. The field is measured using a triple axis fluxgate magnetometer which can be fixed at the sample position while setting the output of the Gossen.

Once the field is set to zero remove the probe from the sample position.

If varying the current does not change the field at the sample position check that the coils have been reconnected to the box on the fence between MuSR and EMU.

1.3.2. Calibration field

When working in longitudinal geometry it is usual to start each section of runs (after a sample change or change from CCR to cryostat for example) with a calibration measurement in a transverse field of approximately 20 gauss. These measurements are usually quite short (<5 Mevents) and are often referred to as "T20" runs. Two small coils, which hang either side of the sample, are used to provide a small transverse field. They are powered by a second Gossen power supply and controlled by the computer through MCS with the command *@tf20*.

1.3.3. Applied magnetic fields

Magnetic fields are provided using the large Helmholtz coils powered by the Danfysik PSU. This is controlled by MCS via a GPIB interface. The maximum field available on MuSR is 2000 gauss. The Danfysik is operated as follows:

- Turn "CONTROL" power on.
- Select "REMOTE" operation at the Danfysik PSU.
- Turn "MAIN" power on using trailing box.
- Set the manual control to zero
- Set a field using MCS. A read-out of the field is given on the computer screen in the "MAGNET" window.

Whenever the beam blocker is lowered the field generated by the Danfysik is automatically set to zero. It is possible to over-ride this ramping down process by carrying out the following procedure:

- Turn the key on the panel by the entrance to the experimental area to "over-ride" **before** lowering the blocker
- Open and close up the area as usual, but return the over-ride key to its original position **before** raising the blocker
- Check there are no red lights illuminated on the Danfysik power supply

If the power supply trips at any time it can usually be reset by switching the power off and on again. If this is not successful check the trip switches on the top of the workshop.

1.4. Selecting the beam size

- The muon beam can be tailored in the x direction using a set of slits situated in the beam pipe after the electrostatic kicker.
- The slit control panel is located beneath the suspended floor (behind EMU).
- As a guide, set the x-slit 1.5 times the x dimension of the sample, then check the data collection rate. (Too high a rate will cause a significant distortion in the spectra at short times because of electronic dead times, too low a rate will be an inefficient use of the beam time. Rates of 12-18 Mevents/hour are a good compromise between these two situations).
- **CARE SHOULD BE TAKEN TO CHANGE ONLY THE MuSR SLITS**

1.5. Setting the steering magnets

It is possible to steer the muon beam in the horizontal and vertical direction using the steering magnets in the beam line. The Kingshill power supplies for these magnets are situated in the back of the MuSR cabin at the bottom of the left hand electronics rack. The currents are set on the front of each panel. In transverse geometry with a transverse field applied to the sample the muon beam has to be

steered back onto the sample position by the VSM. The most recent settings of the magnet current as a function of field are displayed in the MuSR cabin and are written in the common log book.

1.6. Photomultiplier tubes

The photomultiplier tubes are powered from one of the LeCroy crates in the EMU cabin. (They are labelled MuSR and EMU - make sure you switch the correct one on or off). Slots 2 and 3 are used for MuSR PMTs with 16 outputs from each slot. Once the LeCroy crate is powered up it can be controlled from the terminal in the back of the MuSR cabin. It should only be necessary to modify the PMT voltages in two circumstances:

- when rotating the instrument all tubes should be **OFF**
- if there is a light leak please switch off the voltage to that particular PMT tube

The most commonly used commands are shown in the table below.

Command	Action
ON,OFF	switch the voltage on all tubes on or off
R(2-3,0-15)	displays the voltage on all MuSR PMT tubes
R(slot,o/p channel)	displays the voltage on one tube
W(slot,o/p channel)V	sets the voltage on a single tube to V volts
W(slot,o/p channel)0	zeros the voltage on a single tube
Ctrl C	stops screen scrolling

2. Sample environment control, data collection

2.1. μSR Control System (MCS)

The sample environment and data collection on MuSR are controlled by a computer program "MCS" running on the MuSR computer (right hand terminal).

Start the program by typing "MCS" at the [MUSR]> prompt.

To ensure the correct calibration tables etc are in use run the appropriate command file (eg *@CCR*_TC820 or *@ORANGE_TC820*) for the sample environment equipment in use.

2.2. MCS and the Dilution Refrigerator

There is a second version of MCS to control the Dilution Refrigerator temperature. Users must check the two data switches (in back of MuSR cabin and in experimental area) so that the computer controls the Epson rather than the Eurotherm or ITC5.
To run this program type "MCD" at the [MUSR]> prompt. Depending on the mode of operation type either *@DS-LO.* (for the dilution stick with thermal shunt (30mK - 400mK)) or *@DS-HI* (dilution stick without thermal shunt (40mK - 4.2K))

NB. If MCS exits normally then it will be reset to control the CCR. If MCS cannot exit normally (eg a computer crash) then MCS can be reset to the CCR by first initialising MCD and then exiting normally.

If there are any serious problems with, or comments about, MCS and MCD then the MCS manager (C A Scott) should be notified. This can be done immediately by phone or bleeper if the problems are affecting data collection, or by letter / E-mail (CAS@UK.AC.RL.ISISE) if it is something that does not require urgent attention.

2.3. Commonly used MCS commands.

Command	Action
NEW	Starts new data collection point, asks several questions of the user about sample conditions.
STOP RUN	Stops a data collection run
START RUN	Re-starts a stopped unsaved data run.
SAVE	Saves a run on disk after confirmation of label details.
SET TEMP/SET=* * *	Sets the sample temperature in Kelvin.
SET MAG/SET=* * *	Sets the magnetic field in gauss.
@TF20	Switches the calibration coils on
@LF0	Switches all magnetic fields off.
@CCR_TC820	Sets up instrument with CCR+Eurotherm defaults
@ORANGE_TC820	Sets up instrument with OC+Eurotherm defaults
SET TEMP/LOG/TLOG	Enables the temperature logging and logging of process communications.
SET DISP/LEFT=10/RIGHT=500	Displays data over the range 10 - 500 bins
SET DISP/NUM=A/FIRST=B	Displays A (=1,2,8,16,32) histograms starting with histogram number B (=1 to 32)
HELP	Information about running an experiment under MCS

2.2. Writing a command file to control the experiment

It is possible to run MCS in automatic mode using a command file generated by either MKSCRIPT or MKSCRIPT2.

1. MKSCRIPT. This is used to program a series of temperature scans at a fixed field. It is run from account MUSR by typing "RUN MKSCRIPT" or from within MCS by typing "SYS RUN MKSCRIPT".

2. MKSCRIPT2. This is similar to MKSCRIPT but allows for changes in both field and temperature. As with MKSCRIPT it is run by typing "RUN MKSCRIPT2" from MUSR or by typing "SYS RUN MKSCRIPT2" from within MCS.

In both cases the screen changes to a dashboard from which the user can enter the temperature (and field) change for each point. If the temperature (or field) is to remain at the value used for the previous point the option "KEEP" can be selected (this is the usual input for the first run).
NB The first point must not be a T20 calibration.

Examples of the commands in MKSCRIPT(2)

Command	Action
ADD	Add an entry to the script, setting temperature and event limit
DELETE	Remove an entry from any point in the script
READ	Read a previously written script from disk
WRITE	Save script to a file. Program prompts for name
T20	Automatically perform a calibration point

The saved script file is written to MUSR$DISK0:[MUSR] <NAME>.COM.
To initiate the automatic control type "@name" after starting the first run manually.

3. Computing

This is a very short guide to the computing facilities available to MuSR users. For more details about computing at ISIS see the PuNCH MANUAL MiniGuide1 written by the ISIS Science Computer Support Group.

3.1. General Information

- The three computers available for MuSR users are **MUSR, MUWK1** and **ISISE.**

- MUSR is the **data acquisition computer** and should not be used for other purposes: even seemingly simple tasks can lock up the data collection or in some cases crash the whole MCS facility.

- **To logon to MUSR** move the mouse or press the space bar. A window will appear and prompt you for a user name and a password. The most recent password can be obtained from the local contact.

- MUWK1 can be used for **data analysis** on MUWK1 or as an ISISE terminal. It is set up to request a user name and password immediately (as MUSR).

- Details about running DECwindows/MOTIF on a workstation can be found in the PuNCH manual chapter 7

- **Logging in through a Graphon, Falco, or Pericom terminal.** These terminals are available for users in the Data Acquisition Centre (DAC) in R55 and in the visitors' office in R3. At the Vista> or Local> prompt type "CONNECT ISISE", (or CONNECT MUWK1). The computer will then prompt for your user name and password. (See PuNCH manual chapter 3)

3.2. Data files

3.2.1. Changing format of data files

The binary files written by MCS can be converted into ASCII format. The conversion program is run by typing

CONVERT_ASCII

the program asks for the instrument and then if the data was collected pre-May'93 (old numbering scheme) or post-May'93 (new numbering scheme). The program prompts for the first and last run numbers of the files to be converted and writes the converted files to the area in which you are currently working.

3.2.2. Header listing

A list of data files together with temperature and field is available by running a program called MCS_HEADER from within account [MUSR]. The list is automatically produced on SYS$LSR5 (laser5) in the MuSR cabin.

3.2.3. TLOG files

A plot of the temperature log for a data run may be produced by running program TLOGGER.EXE by logging in as MUSR01 and typing "TLOGGER" from your sub-directory. The program will prompt for a terminal type and then a file number, the file number need not have preceding zeros, the highest version of TLOG file is plotted. Lower versions are plotted by typing the complete file ending: e.g. 00123.tlog;1 will plot R00123.TLOG;1 Laser printout is from SYS$LSR5 (laser5) in the MuSR cabin.

3.2.4. Writing a TK50 tape

A TK50 drive is available for users in the R3 Computer Support Office. A full set of instructions can be found close to the tape drive.

3.3. Printers

The following printers are available for Users:

(a) Black and white laser printers

LSR0	R3 Computer Support Office
LSR1	R3 2nd floor
LSR2	R55, DAC
LSR3	MARI cabin
LSR4	CRISP cabin
LSR5	MuSR cabin
LSR7	PRISMA cabin
LSR8	SXD cabin
LSR10	R3 Computer Support Office
LSR11	HET cabin

(b)Colour printers

COLOR$PS - R3 Computer Support Office
POST$INK0 - Deskjet 1200 in MARI
POST$INK2 - Deskjet 1200 in DAC
POST$INK4 - Deskjet 1200 in CRISP

4. Troubleshooting

4.1. No muons

- Check the machine is running at a reasonable rate. In the MuSR cabin and under the ISIS clock are proton per pulse (PPP) monitors displaying the pulse intensity in μA. If these read 00 there are no protons, if the MuSR PPP is flashing any number then ISIS is not running at 50Hz and therefore the count rate will be lower than usual.

- If ISIS is not running, check the facility status by typing "ISISNEWS" then selecting option C (current status).

- Check the beam blocker is open: the gate must be closed and locked to allow this. The area will be illuminated by blue light if this has been done correctly.

- Check the 'BEAM OFF' button on the fence in the zone is not pressed. Release it then restart the bending magnet power supply, B1/2, above the workshop using only the 'START' button.

- Check that all the magnets are working by checking the PSU's above the workshop, if necessary, reset or restart using the values given on each supply.

4.2. Computer problems

- If there is no communication via the keyboard then check the 'HOLD SCREEN'. It is not a good idea to use the "hold screen" option for any length of time as it eventually crashes the computer.

- Check any process of MCS by typing "SHOW PROC", then a number in the range 1 to 5 to select the process. A stopped process may be restarted by typing "START PROC" at the MCS> prompt.

The processes in MCS are as follows :

1 MACQ
2 MTEMP
3 MWSDISPLAY
4 MWSWINDOWS
5 MMAG

- Quit MCS by typing EXIT, logout using the command LOGOUT. Logon with user name MUSR and current password, restart MCS by typing "MCS" then proceed as usual.

4.3. Temperature control and MTEMP

MCS controls the sample temperature, via the Eurotherm, using a section of the program known as MTEMP. This process very occasionally crashes while writing a temperature to the Eurotherm. To restart MTEMP carry out the following procedure

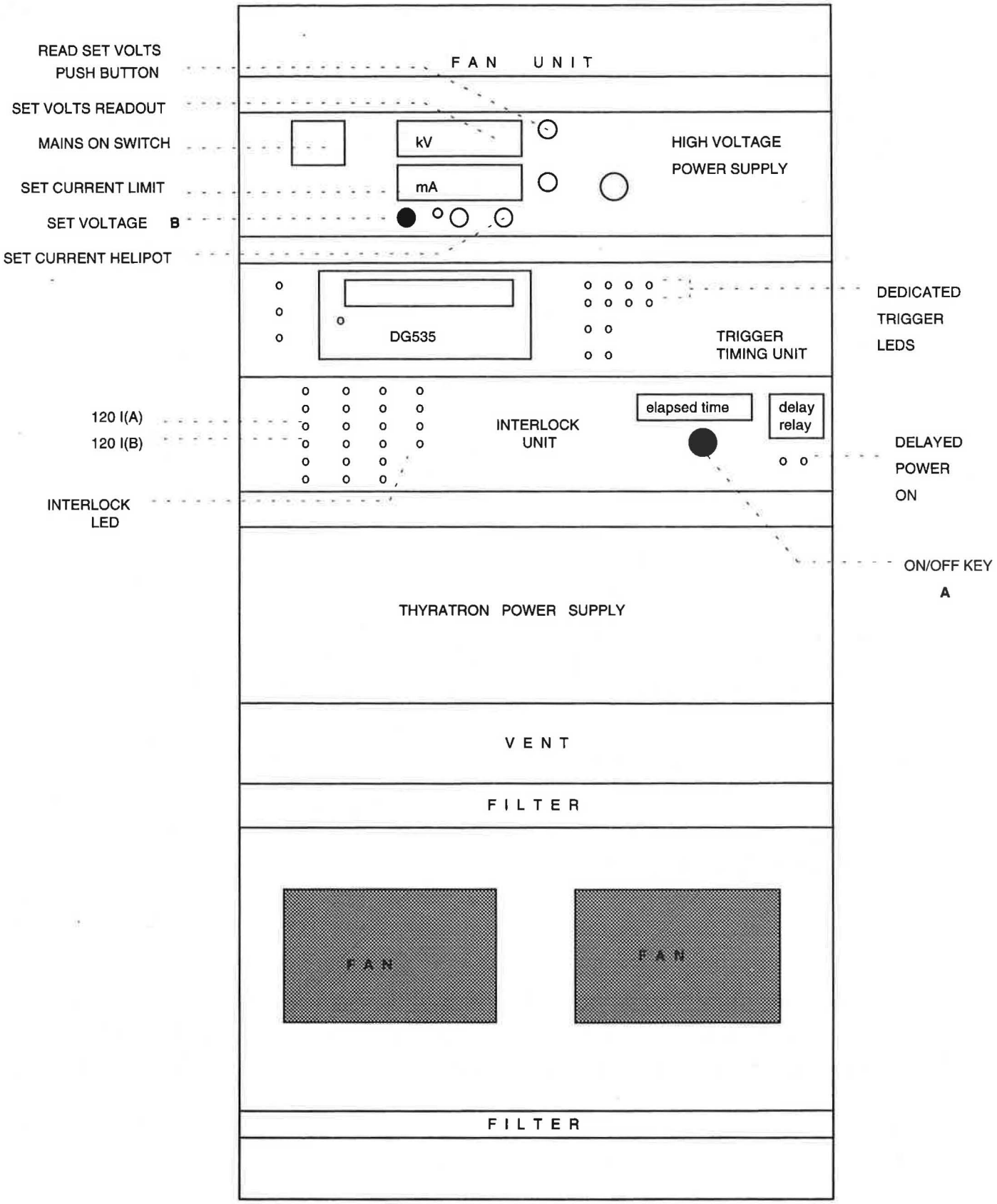
- Stop the script if one is running
- type "START PROC"
- At prompt reply "2"
- Restart temperature logging by typing "SET TEMP/TLOG"
- Amend and restart the script (if required)

4.4. Double pulse - failure of the electrostatic kicker

If the single detector spectrum displayed on the MuSR data acquisition screen shows a double pulse the electrostatic kicker has failed and all the muons are passing undeflected through to MuSR. Before resetting the kicker check with the EMU and DEVA users that they have lost all beam. In most cases EMU and DEVA users will notice a kicker failure before MuSR users.

The instructions for resetting the kicker are given below and are also attached to the kicker power supply unit.

- Turn key switch **A** through 90° to OFF position
- Turn helipot **B** fully anticlockwise to 0.0 volts
- Wait a few seconds
- Turn key switch **A** through 90° back to ON position
- Observe LED display on front panel. Only the +120I(A) and +120I(B) and the (large) "DELAYED POWER ON" should be unlit at this stage
- After 120s the +120I(A) and +120I(B) LEDs will light
- After a further 180s the "DELAYED POWER ON" will light and the high voltage power supply will be powered up
- Dedicated trigger should light
- While pressing the "READ SET VOLTS" push button turn helipot **B** slowly clockwise to obtain a set volts readout of 32.5kV. The current read-out will be ~ 2.02mA when the push button is released



The electrostatic kicker control panel

5. Telephone Numbers

Steve Brown	**5352**	
Stephen Cottrell	**5352**	**bleeper 255**
Steve Cox	5477	
Gordon Eaton	5464	
Sue Kilcoyne	**5805**	**bleeper 254**
Christopher Scott	**5135**	**bleeper 214**
Gavin Williams	5599	

British Rail (enquiries)	0865 722333		
Computer support	5414	or	3029 (mobile)
Cosener's House	3007	or	0235 523198
DEVA cabin (R55)	(To be installed)		
EMU cabin (R55)	6831		
Health Physics	6696		
Bottled gas supply	6166		
Main control room	6789		
MuSR cabin (R55)	6135		
Taxi	5592 (day)	or	6789 (night)
University Liaison Office	5592		

ISIS FAX number	0235 445720
Liaison Office FAX	0235 445103

From outside the laboratory certain extensions may be direct dialled using the prefix 44 eg: Abingdon (0235) 44xxxx, where `xxxx' is the required extension. To call offsite prefix the number by 9 to connect to the switchboard.

The instrument scientists can be contacted by radio pager by typing:

70-(tone)-bleeper number-(click)-your extension-(tone)-replace handset

They will then phone you on the extension number specified.

Appendix 1

The μSR data analysis program - UDA

(i) Introduction

UDA is the simplified μSR data analysis program. There are three menus in UDA, the Main Data menu, the UDA data Grouping menu and the UDA data Analysis menu.

On start up the program will always enter the Main menu. At this menu you can read and write data files, plot spectra and make changes to the data loaded.

In the data Grouping menu you can select how to map your raw histograms into the "groups" that are used when plotting or analysing. Two different grouping schemes can be used, the Simple (straight, TF) grouping, or the F-B (LF,ZF) grouping.

In the Analysis menu you can select a model function and make a least squares fitting of the model parameters. The fitting result can also be plotted from this menu.

(ii) Running UDA

To access UDA from an area designed by SETUP.COM type RUNUDA. This will run the most recent version of UDA. The display will be redrawn as a dashboard and the cursor will automatically select the option "Mcsfile" in the Main menu. To select any other item from the menu you may use the cursor (arrow) keys or you may simply type the first letter of that item (e.g. 'P' for Plot).

(iii) UDA Menu Structure

1. The Main Data Menu. The Main Data menu allows you to read, write and modify experimental data. The options available from this menu are listed below.

McsFile	Read a MCS run file in the format used by the data acquisition software.
Usr file	Read a uSR file from the disk. (ASCII format)
OldFile	Read one of the old (PDP) run files.
Write	Write (grouped) data on Usrfile.
Inspect	Inspect run and all histograms.
Group	Enter the Grouping Menu
Change	Change run file parameters.
Plot	Plot one or more groups on the terminal screen.
Analyse	Enter the analysis menu.
Setup	Set program configuration parameters.
Help	Enter the VAX/VMS help facility to read the UDA help library.
Quit	Exit UDA and return to VMS prompt.

2. The Grouping Menu. The grouping menu is accessed through the option "Group" from the Main menu, and defines the grouping and correction of raw histogram data. There are currently two ways of grouping the histograms:

a) the Simple grouping, where histograms are simply added together.

b) the Forward-Backward (F-B) grouping, where the 'asymmetry ratio' (F-aB)/(F+aB) is calculated.

The options available for grouping and correcting data are shown below.

Change	Change histogram grouping.
Read	Read grouping table from disk.
Write	Write grouping table to disk.
DeadT	Correct the data for distortion caused by dead time and finite channel width.
Alpha	Select (F-B) scaling factor
Guess	Estimate alpha for a T20 run
Bunch	Select channel bunching
Help	Display help text. (Don't panic)
Exit	return to UDA Data (main) menu.

3. UDA Analysis Menu. The Analysis menu is entered by selecting the option "Analyze" in the UDA Main menu. Using the options outlined below it is possible to select a model function and make a least squares fitting of the model parameters. The results of the fit can also be plotted.

Select	Select a group and a channel range to work on. The bunching of channels can be set to 2 to add channels together in 2's.
Plot	Plot data and fit
Fit	Run fitting routine using values displayed in right hand window
Help	Enter the help system at the Analysis menu level.
Values	Enter the parameter display to change parameter values/status. To move in the parameter display use UP or DOWN cursor keys. To change a value use the ENTER key. Status codes are changed by typing ~ (vary parameter), ! (fix parameter) or = (tie parameters together). Return to the menu by the LEFT cursor key.
Theory	Select a theory function, number of sub-components and lineshape
Alpha	Change value of alpha
Undo	Undo fit and restore original parameters
Exit	Exit this menu and return to the main UDA menu.
Write	Write parameters out to a file
Read	Read parameters in from a file
Dist	Distribute parameters to all groups (necessary for transverse geometry)

(iv) Computer files

These files must be copied into the area you are working in. If the area has been generated by SETUP.COM they will have been copied to the new area automatically.

SETUP.UDA	UDA reads some variables from the file SETUP.UDA. In particular the directory addresses of the data and the source code are set-up in this way. Of particular interest are the FORTRAN format strings used to convert a run number to a full file name.
GRP1.UDA	default transversal grouping
GRP2.UDA	default longitudinal grouping
PDF1_1.UDA	parameter definition file, transverse, lorentzian
PDF1_2.UDA	parameter definition file, transverse, gaussian
PDF1_3.UDA	parameter definition file, transverse, abragam
PDF2_4.UDA	parameter definition file, ZF, static K-T
PDF2_5.UDA	parameter definition file, longitudinal, lorentzian
PDF2_6.UDA	parameter definition file, longitudinal, gaussian
PDTF.UDA	parameter definition file
PDZF.UDA	parameter definition file
UDAHELP.HLP	help library source, UDA matters

Appendix 2

Rotating MuSR

- Turn off the high voltage supply to the PMTs

- Lower the instrument onto the rails by unscrewing the supporting legs.

- Check the CCR is in the upright position. Disconnect the compensation coils from the panel on the fence, then the whole instrument can be pulled back along the rails. Take care to keep cables away from the wheels and from resting them on the PMT tubes or light guides.

- Lower the CCR. Remove the locking pin and rotate the table through 90°. Again watch all cables.

- Once the spectrometer has been rotated reconnect any cables, reinsert the CCR and push the whole instrument back towards the end of the beam pipe. It is at this point that the dilution refrigerator tail is most susceptible to damage. If the fridge has been lowered close to the centre of the platform the cables on the top PMT tubes will have to be disconnected. **CHECK THE HIGH VOLTAGE IS SWITCHED OFF BEFORE DOING THIS.** Take care not to puncture the beam line window.

- The instrument can then be raised using the support legs. MuSR has now been surveyed on to the correct beam height and collars put on the support legs showing how far to screw them in. These collars are a far more reliable guide than any optical method as the muon beam does not leave the beam pipe through the centre of the window.

- Switch on the high voltage to PMT tubes.

- Reconnect the zero field compensation coils

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@CCR_TC820	load CCR settings into MCS
@ORANGE_TC820	load cryostat settings into MCS
SET TEMP/SET= ###	set new temperature (in K)
SET MAG/SET= ###	set new field (in gauss)
@TF20	set up 20 gauss calibration run
@LF0	switches all magnetic fields off
NEW	start new run
STOP RUN	pause data collection
START RUN	resume data collection
SAVE	stop run and save data