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DIBBUK USERS GUIDE

INTRODUCTION

DIBBUK is a computer aided system for DATACON instrumented beams based on user keyboard commands. It replaces a variety of obsolete manual controls of secondary beam line power supplies and collimators that have been used at the AGS. At present, DIBBUK performs such functions as commanding magnet power supplies and collimators, monitoring them and alarming on faults, saving and restoring different running configurations, providing a TUNE BOX for a computer aided manual control and logging experiment status and power consumption. This users guide will be updated as other types of devices are added to the system. The report consists of six sections. Section I describes the available tasks and how they may be used, while Sections II and III describe the instruction formats and nomenclatures used. Sections IV and V apply only to the console terminal (EAO). Section VI describes the DATACON-CAMAC module specifications.

I. TASK DESCRIPTION

A. ABORT

The ABORT task terminates the execution of all active tasks at the user terminal.

B. CALBRT

The CALBRT task calibrates the digitizing circuitry.

This task may be scheduled by the user, although it is automatically scheduled by the other tasks. Unlike the other tasks, CALBRT will not automatically remove an element from deferred status when it is initially scheduled.

C. DUMP and RESTOR

These two tasks permit the user to store (DUMP) and retrieve (RESTOR) up to 20 element parameter files. Every user has a preassigned core area and disk space where the element parameters are stored. With the SET and TUNE tasks (as described elsewhere), the user may specify the setpoint, tolerance, and polarity of any element. These new parameters may be stored for a future running configuration by scheduling DUMP. The task requests the user to specify the file where the information is to be stored (I2 format). If the file number is not within range, the task exits. If the task experiences a disk hardware error, the user is informed and asked to tell the EAO Watch. RESTOR types back the time and date when the requested file was created. RESTOR does not alter the element settings.

D. IDLE

To bring an element to its minimum regulating current, one uses the IDLE task. The element must have its rectifiers on to be affected.

E. LIST

The LIST task outputs the present status of the specified elements and the total consumed power. The first output line consists of the file number that is being used, the terminal number, date, time of day and the beam momentum. If there is a discrepancy between the polarity read back and that which is stored in the working file, a pair of brackets < > is placed around the polarity. If a particular element has had its shunt replaced, a pair of brackets ( ) is placed around the setpoint value. This is to inform the user to check with EAO as to the shunt calibration. If a particular element is being monitored, a * is printed. If a particular element is considered "high risk", a @ is printed. LIST is automatically scheduled to run at one minute intervals when MONITR is running.

F. MONITR

MONITR examines the status of the specified elements every five seconds. Should an element be out of tolerance, off, etc., the element will be placed on deferred status. This results in a written message, an audible alarm on the TUNE BOX (there is a reset button), a contact closure available at the BNC connectors on the front of the TUNE BOX and a LAM in the DATACON-CAMAC module. If an element is deferred, it ceases being monitored. To continue the monitoring process for this element, one must schedule the UNDEFR task. In addition, there is a time interval select switch and an audible alarm or light switch on the TUNE BOX that controls the maximum allowable time interval for no transmissions from the computer. If for example, one sets the dial for a 10 second sampling period and there have been no transmissions during this time, an alarm is sounded. This is of particular use when the user is running MONITR, but is not near his terminal and he does not notice that DIBBUK has gone down. To terminate the MONITR task, one schedules ENDMON by typing EM.

The status of all active elements, whether or not a particular one is being monitored, is sent to the DATACON-CAMAC module every five seconds (see Section VI). This module is accessed only when MONITR is active.

G. OFF

To bring an element to rectifiers and blowers off, one uses the OFF task. The element must be in the standby state to be affected. Should the element have its rectifiers on, it will be deferred.

H. ON

To bring an element to rectifiers and blowers on, one uses the ON task. The element is not necessarily in regulation. The initial state of the element is of no consequence.

I. OPEN and CLOSE

To bring a collimator to a specified setpoint, one uses the OPEN task. To bring a collimator to a closed position, one uses the CLOSE task.

J. SET

SET allows one to change the stored setpoint, tolerance, polarity software bit, the hardware polarity of an element and enter the beam momentum. The task queries for input with the character #.

1. To alter the stored setpoint, one types
   /D03S < CR > (e.g. change the setpoint of D03).
   Task then requests input. Typing a line feed
   does not alter the old value.

2. To alter the stored tolerance one types,
   /D03T < CR >.

3. To set the polarity software bit to 'A' polarity, one types,
   /D03A < CR >.

4. To set the polarity software bit to 'B' polarity, one types,
   /D03B < CR >.

5. To reverse the element polarity (hardware), one types,
   /D03P < CR >.

   When a hardware polarity change is requested, the element is first read. If the element has its rectifier on, the request is not honored. If during the process of a polarity change there is a fault indication, several attempts are made to reset, and if that fails, the element is placed on deferred status.

6. To scale all setpoints by a factor between 0 and 10.0, one types,
   A < CR >.

   The task then requests the scale factor and then alters the stored setpoints for all active elements. The element magnitudes are not affected. One must schedule the UP task to change the elements themselves. If the new stored setpoint exceeds the maximum allowable value, the task stores the extrema as the new setpoint.

7. To enter the beam momentum, one types,
   M < CR >.

   The task requests that the beam momentum be entered in ± GeV/c. Should the AGS limit be exceeded, the SET task requests the entry of a new command.

8. To exit from the SET task, one types,
   ES < CR >

   The ABORT task will not be scheduled when SET is active.

K. STNDBY

To bring an element to rectifiers off and blowers on, one uses the STNDBY task. The standby state is mandatory when the AGS is in a "Save-A-Watt" mode. The initial state of the element is of no consequence.

L. TUNE

The TUNE task permits the user to alter the element magnitude by manually changing the value of an up-down counter (TUNE BOX). The element specified by the dialed in octal address must be on, otherwise a new device will be requested. At the termination of tuning an element, the setpoint is set to the final tuned magnitude. TUNE instructs the user via a series of messages as to how to proceed. The green "locked in" light on the TUNE BOX indicates that the computer is actively scanning the box. After following the outputed instructions, the red "tuning" light will also come on. This indicates that a particular element is actually being modified, i.e., being tuned. An element may be tuned even though MONITR is running and even if it is on deferred status. Should an element cease to be tuned, the audible alarm will momentarily be activated. When the tune switch is turned off, the element ceases to be tuned. The task can be terminated at any time by scheduling EXTUNE (ET).

M. UNDEFR

The UNDEFR task allows the user to remove the specified elements from deferred status; i.e., temporary software inactive status. UNDEFR can be run while MONITR is running. Except for the CALBRT task, it is not necessary to run UNDEFR when initially executing a task.

N. UP

To bring an element (not collimators) to a specified setpoint, one uses the UP task. The initial state of the element is of no consequence.

II. SCHEDULING TASKS

All tasks are scheduled (enable or disabled) by typing at the experimenters console in one of the following formats:

1. Task < CR > < CR > = Return
2. Task, AL < CR >
3. Task, AL, D07 < CR >
4. Task, D03, Q45 ..... < CR >
5. Task, X, D03, Q45 ..... < CR >
6. Task, R <CR >

Task refers to the name of the function desired. Only the first two letters of the task name are acceptable, otherwise the task is not scheduled. All elements are designated by a single character digit and a two character number. D03 or D3 is a valid entry. D037 is interpreted as D03.

The type (1) format requests that the task named should begin execution. This applies to those tasks that require only the task name, (see next page). The LIST task, as an exception, requires only the task name if all elements are to be listed.

The type (2) format requests that the task named, acts upon all the active and non-high risk (ON, UP, IDLE and STANDBY tasks only) elements that belong to that terminal. "Active" means that the element is powered and available, i.e., not "inactive". "High risk" means that the element must be specified by name in addition to 'ALL' when calling the ON, UP, IDLE and STANDBY tasks (type 3).

The type (4) format specifies which elements should be affected by the task named.

The type (5) format specifies that all elements except those named should be affected by the task named.

The type (6) format specifies, for MONITR, LIST and UNDEFR only, that the previously defined operation subset for that task be repeated again. This for example, obviates the necessity of retyping the string of elements to be listed every time one wants that list updated, i.e., it is a repeat command.

The software is structured to prevent the simultaneous running of logically conflicting tasks. If one requests a task that cannot run with one that is already running, a message to that affect is made. For example, one can run UP, MONITR, TUNE and LIST simultaneously, however, OFF and UP, cannot be. A bit pattern is typed out which specifies as to what is running (see below). One must either terminate (ABORT) or wait for the natural termination of the conflicting task before one can schedule the new task.

The bit pattern of active tasks is:

BIT #	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	Terminal Active = Ø Inactive = 1	UNUSED	UNUSED	IDLE/OFF/ON/STNDBY/UP/ OPEN/CLOSE	MONITR/ENDMON	UNDEFR	UNUSED	DUMP/RESTOR	SET	LIST	TUNE/EXTUNE	UNUSED	CALBRT	ABORT	UNUSED	UNUSED

The following tasks require only the task name. All other input is ignored:

1.	ABORT	(AB)	4.	EXTUNE	(ET)	7.	TUNE (TU)
2.	DUMP	(DU)	5.	RESTOR	(RE)		
3.	ENDMON	(EM)	6.	SET	(SE)		

The SET and TUNE tasks request their own element information. See separate task writeups.

Upon the initial scheduling of MONITR, IDLE, OFF, ON, STNDBY, UP, OPEN and CLOSE, those elements that are to be acted upon and are on a deferred status are removed from the deferred state. This is NOT the case for CALBRT.

III. NOMENCLATURE

1. Deferred Status: Status which prevents, other than by a user intervention, the software from acting upon the specified element. Elements that experience faults, drift out of tolerance, etc., are placed on this status.

2. Idle Status: An element that is at its minimum current setting is defined to be at idle.

3. Inactive Status: The specified element is unavailable for any computer operations.

4. High Risk Status: The element cannot be accessed by the ON, UP, IDLE, STNDBY tasks unless it is specified in format #3 or #4.

5. Invalid ADC Conversion: Hardware error. The hardware has sensed a faulty voltage digitization by the A/D circuitry.

6. Invalid Transmission: Hardware error. The computer was unable to successfully read or set the magnitude and status bits of a particular element.

7. Minimum Value: The minimum regulated shunt voltage obtainable by the specified element.

8. Not = Shunt: The digitizing circuitry (A/D) is looking at a calibration reference or hall voltage. The element shunt is currently not being monitored.

9. Off Status: The specified element is completely shutdown; i.e., blowers and rectifiers are off.

10. On Status: The specified element has its rectifiers on.

11. Reversing Switch Fault: Hardware error. The polarity reversing switch is sensed to be in an indeterminate state.

12. Setpoint Value: The stored magnitude at which the element is to be during its normal operation (target point).

13. Shared Status: Elements that are controlled and/or monitored by more than one user are said to be shared. The shared designation for a given user implies that he can only read the magnitude and status for that element, and that in no way can he interfere with the operation of that element.

14. Software Polarity Bit: That polarity which the software expects the element to be at.

15. Standby Status: The specified element has its blowers on and its rectifiers off.

16. Sub-Address: The hardware multiplexer address which defines the voltage input presented to the digitizing circuitry (A/D).

17. Task: A task is any set of programmed logic that is separate from other sets of programmed logic, and whose execution can be directed by the operating system and whose initiation is caused by the user.

18. Tuning Status: An element which is tracking the magnitude settings of the TUNE BOX is said to be in TUNE status.

IV. CONSOLE TERMINAL TASKS (EAO only)

The console terminal has the ability to run three tasks that are not available to other users. They are BEAMS, FAILSF and STATUS. Terminals are numbered 0-6.

BEAMS

BEAMS lists, on the console terminal or the line printer, the status of the specified beam line elements. The following are examples of how to run BEAMS.

(1) List terminal #2 just once.

```
↑C
.SC,BEAMS,2 < CR >
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(2) List terminal #2 and repeat it every 120 seconds.

↑C

.SC,BEAMS,2, 120 < CR >

(3) Stop listing.

↑C

.DE,BEAMS < CR >

(4) To output to the line printer.

↑C

.AS LP:,CTY < CR >

(5) To return output to the console terminal.

↑C

.AS,,CTY < CR >

FAILSF

FAILSF saves the user running files on a preassigned disk area, scans the user on/off status switches, transmits the user status and power consumption to the AGS PDP-10. This is done every 30 seconds. FAILSF need only be scheduled at the initial loading of the system from the disk. The disk must be write enabled, otherwise FAILSF will print back an error message that there is a disk error. It this occurs, one must correct the problem. The following is an example of how to run FAILSF.

(1) To enter the Julian date.

↑C

.SC,FAILSF,2 < CR >

Enter Julian date (DDD)

#072 < CR > (Type 3 character date; e.g., 72 is not acceptable.)

(2) To start failsafe updating procedure.

↑C

.SC,FAILSF,1 < CR >

NOTE: The command SC,FAILSF < CR > is not to be used. This command starts the failsafe procedure by taking what is in memory and storing it onto the disk. The correct procedure is to take what is stored on the disk and loading it into memory.

(3) To enter the time of day.

↑C

.TI HH:MM:SS < CR >

STATUS

This task enables the console user to alter the status of any element recognized by DIBBUK. The task is scheduled by typing.

↑C

.SC,STATUS < CR >

It types back, #.

Should it not respond or type a ?, then type X < CR > and start the sequence over again.

(1) To make an element active.

2,Q13,A < CR > (Terminal #2, element Q13)

(2) To make an element inactive.

2,Q13,I < CR >

(3) To change the software polarity bit of an element.

2,Q13,P < CR >

(4) To make an element shared.

2,Q13,S,X < CR >

X = terminal number where controlling element is to be found.

(5) To remove an element from shared status.

2,Q13,N < CR >

(6) To alter the maximum setpoint permitted for an element.

2,Q13,M,3824 < CR > (Maximum is set to 3824)

(7) To alter a power supply number.

2,Q13,#,476 < CR >

To remove the new shunt (power supply) indication, retype #7 with the same power supply number.

(8) To make an element "High Risk"

2,Q13,H < CR >

(9) To remove an element from "High Risk" status.

2,Q13,L < CR >

(10) To enter the element shunt, type

2,Q13,T,N where N = 0-15

N	Amperes/Computer Count
0	1.0
1	1.250
2	0.015
3	0.0075
4	0.03125
5	0.0625
6	0.075
7	0.10
8	0.125
9	0.20
10	0.250
11	0.30
12	0.375
13	0.50
14	0.625
15	0.750

(11) To enter the element resistance.

2,Q13,R,N where N = resistance in milliohms $0 \leq R \leq 255$

(12) To disable a user terminal.

2,,D < CR >

(13) To enable a user terminal.

2,,E < CR >

(14) To bring all active elements to a "rectifier off" status. This command disables all user terminals and is intended for use after a power outage.

EMER < CR >

(15) To exit from the task.

X < CR >

V. DIBBUK Loading Procedure

1. Depress computer reload switch.

2. A series of numbers followed by a $ will be typed on the main console. Then type DK < RETURN >

3. DIBBUK will then load. If everything has gone well, DIBBUK will respond on the console terminal with:

W350 POWRFL 000001

4. Start FAILSAFE program by typing:

CNTL C (Depress CNTL and C simultaneously)
SC, FAILSF, 1 < RETURN >

5. Assign printer to be the error device. Type:

CNTL C
AS LP:,ERR < RETURN >

6. Enter date by typing

CNTL C
SC, FAILSF, 2 < RETURN >

Follow instructions for entering the Julian date.

e.g. Jan. 2 = 002, Oct. 24 = 297.

7. Enter time by typing:

CNTL C
TI HH:MM:SS < RETURN >

8. You are done!

VI. DATACON-CAMAC SPECIFICATIONS

The DATACON-CAMAC unit provides secondary beam line information through the CAMAC Dataway to the experimenters computer. Each element, e.g., magnet power supply, consists of two successive 16 bit words. There are a total of 64 words per module with the first element being words #0 and #1 and the rest in sequential order. The elements are loaded in the same order as is presented by the LIST task. The module is loaded with updated values only when the MONITR task is active, i.e. once every five seconds when MONITR is running. All elements are updated even though they may not have been specified to be monitored or are deferred. Should an element become deferred, a LAM is generated. The DATACON and CAMAC operations are asynchronous with respect to each other. The data format is the following:

WORD 1:	Bits	0-7	=	Element DATACON Address	
	Bit	8	=	1	= Deferred by MONITR task
	Bits	9-12	=	0	= Controlling reference voltage- (Typically the shunt)
				1	= 25 mV Calibration Reference
				2	= 75 mV Calibration Reference
				3	= Hall Voltage
				4	= Hall Current
				5-17	= Not Used
	Bit	13	=	1	= "A" Polarity
				0	= "B" Polarity
	Bit	14	=	1	= Rectifier On or Collimator in Motion
				0	= Rectifier Off or Collimator Stopped
	Bit	15	=	1	= Standby On or Collimator Powered
				0	= Standby Off or Collimator Off
WORD 2:	Bits	0-13	=	Magnitude from subaddress specified in Word 1.	
	Bits	14-15	=	Unused	

CAMAC Specifications

The CAMAC command functions are the following:

COMMAND					ACTION
F(0)	-	A(i)	(i = 0-15)		Gates External "Group One" Data Onto Dataway (Words 0-15)
F(1)	-	A(i)	(i = 0-15)		Gates External "Group Two" Data Onto Dataway (Words 16-31)
F(2)	-	A(i)	(i = 0-15)		Gates External "Group Three" Data Onto Dataway (Words 32-47)
F(3)	-	A(i)	(i = 0-15)		Gates External "Group Four" Data Onto Dataway (Words 48-63)
F(8)	-	A(0)			Returns Q if LAM is set.
F(10)	-	A(0)	-	S1	Clear LAM
F(24)	-	A(0)	-	S1	Disable LAM
F(26)	-	A(0)	-	S1	Enable LAM
C - S2					Clears LAM
Z - S2					Clears LAM - Disable LAM

Status Indications

The front panel status indications are the following:

N light flashes whenever module is addressed by CAMAC.
LE light on whenever LAM is enabled.
L light on whenever a LAM is pending.
DR light flashes whenever accepting DATACON data.

DATACON Specifications

All transmissions must have the SET/READ bit enabled. A LAM is generated with bit C6. The CAMAC module address may be adjusted via slide switches to any address between $0\text{-}77_8$.

C5 - C0	Memory Address ($0 - 77_8$)
C6	LAM Set Flag
M15 - M0	Magnitude

Distr.: EAO Watch
Experimenters