Fermilab

$\bar{p}$ Note #366
(Revised-June 1984)

VAX DATA BASE NAMES FOR THE ANTIPROTON SOURCE

D. McConnell

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REVISED REVISED REVISED REVISED REVISED REVISED

VAX DATA BASE NAMES FOR THE ANTIPROTON SOURCE

D. MCCONNELL

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VAX data base names are the names for devices that are used on ACNET parameter pages for accelerator control and data plots. Since many people will use(type) these names many times, a hopefully easily learnable naming system that meets or exceeds ACNET requirements has been devised and revised.

To meet ACNET requirements, all device names in the Antiproton source must be an 8 character string that begins with either A: or D: or one of the other beginning letter designators already in use in the ACNET database (like L: B: M: T: S: .....). For many reasons, the operations group desires to keep the number of beginning letter designators small.

All device names in the Antiproton source will fit the following division of devices. ("X" stands for any uppercase letter or digit)

A:XXXXXX	Exclusively for Accumulator devices location/number in the range 100 to 614
D:XXXXXX	Debuncher devices if location/number is in the range 101 to 619
M:XXXXXX	Proton line (120-150 GeV) devices location/number in the range 100 to 109
M:XXXXXX	Proton line reverse (8 Gev) devices location/number in the range 200 to 207
D:XXXXXX	Injection line devices location/number in the range 700 to 733
D:XXXXXX	Transfer line devices location/number in the range 800 to 807
D:XXXXXX	Extraction line devices location/number in the range 900 to 929
B:XXXXXX	Booster test line devices location/number in the range 100 to 110

For almost all device names, the first two characters following the colon contain device type information or information which determines which antiproton source subsystem this device belongs to. (like LL=low level RF)
When possible, the device location/number is specified as after a particular quadrupole magnet, but before the next quadrupole magnet. (some examples will clarify this)

Detailed drawings of the ring and beamline location system are available. A legend for the device function characters, as well as an up to date listing of devices and VAX data base names is available in the PBAR controls equipment data base.

The following are some examples and explanations of device names.

A:SP309B

ACCUMULATOR	A:
SUBLIMATION PUMP	SP
IN SECTOR 30	3
BETWEEN QUAD 9 AND QUAD 10	09
THE SECOND ONE	B

A:BS507

ACCUMULATOR	A:
DIPOLE	B
SHUNT	S
IN SECTOR 50	5
BETWEEN QUAD 7 AND QUAD 8	07

D:H108

DEBUNCHER	D:
HORIZONTAL	H
CORRECTION DIPOLE	
IN SECTOR 10	1
BETWEEN QUAD 8 AND QUAD 9	08

D:Q716

INJECTION LINE	7
QUADRUPOLE BUS	Q
BEGINNING QUADRUPOLE 16	16

D:LLRG1

DEBUNCHER LOW LEVEL RF.....D:LL
ROTATION GATE LEVEL
AND ENABLE.....RG
THE FIRST ONE.....1

D:R1A8V

DEBUNCHER RF HIGH
GRAIDENT SYSTEM.....D:R1
ANODE VOLTAGE FOR
CAVITY NUMBER 8.....A8V

D:DVAW2

DEBUNCHER VERTICAL
BETATRON COOLING.....D:DV
1 WATT AMP.....AW
THE SECOND ONE.....2

D:SPTO11

DEBUNCHER STACK TAIL
MOMENTUM COOLING.....D:SP
.5 NSEC TROMBONE LINE.....TO
THE ELEVENTH ONE.....11

Suggestions to clarify and simplify the device naming system are welcomed. Also anyone with strong opinions on names for their devices should contact Ernie Malamud or Dennis Mcconnell.

Following is a partial list of nemonics for Antiproton Source devices

VACUUM DEVICE MNEMONICS

BV=BEAM VALVE
CC=COLD CATHODE
IG=ION GUAGE
IP=ION PUMP
RP=ROUGHING PUMP
RV=ROUGHING VALVE
SP=SUBLIMATION PUMP
TC=PIRANI-PENNING GUAGE
TP=TURBO PUMP

MAGNET DEVICE MNEMONICS

B=BENDING DIPOLE IN RING
D=DEFOCUSING
F=FOCUSING IF EMBEDDED
H=HORIZONTAL
Q=QUADRUPOLE
S=SHUNT
T=TRIM OR TUNING
V=VERTICAL
C&S=CONTROL AND STATUS (NOT A DB NAME)
KIK=KICKER
OCT=OCTUPOLE
SEP=SEPTUM
SEX=SEXTUPOLE

STOCHASTIC COOLING DEVICE MNEMONICS

SP=STACK TAIL MOMENTUM
SH=STACK TAIL HORIZONTAL BETATRON
SV=STACK TAIL VERTICAL BETATRON
CP=CORE MOMENTUM
CH=CORE HORIZONTAL BETATRON
CV=CORE VERTICAL BETATRON
DH=DEBUNCHER HORIZONTAL BETATRON
DV=DEBUNCHER VERTICAL BETATRON
AW=ONE WATT AMP
AL=LOW LEVEL AMP
2T=TWO-THROW SWITCH
4T=FOUR-THROW SWITCH
6T=SIX-THROW SWITCH
8T=EIGHT-THROW SWITCH
XT=TRANSFER SWITCH
T0=TROMBONE LINE .5 NSEC
T1=TROMBONE LINE 1.5 NSEC
PS=PIN SWITCH
PA=PIN ATTENUATOR
PM=TWT PROTECTION MONITOR
TC=THERMOCOUPLE

RF DEVICE MNEMONICS

D: R1=DEBUNCHER HIGH GRADIENT SYSTEM
D: R2=DEBUNCHER GAP & DIAGNOSTIC SYSTEM
D: LL=DEBUNCHER LOW LEVEL RF
D: RF=DEBUNCHER GENERAL RF
A: R1=ACCMLTR STACKING SYSTEM (IF USED)
A: R2=ACCUMULATOR UNSTACKING SYSTEM
A: R3=ACCUMULATOR BUNCH NARROWING SYSTEM
A: R4=ACCUMULATOR EXTRACTION SYSTEM ??
A: LL=ACCUMULATOR LOW LEVEL RF
A: RF=ACCUMULATOR GENERAL RF
F=POWER AMPLIFIERL (FINAL)
D=DRIVER AMPLIFIER
C=CAVITY
T=TUNING POWER SUPPLY
A=ANODE POWER SUPPLY
G=GRID POWER SUPPLY
C=CONTROL IF AT END
S=STATUS IF AT END
T=TRIGGER OR TIMING
RG=ROTATION GATE
DG=DEBUNCH GATE
PH=PHASE
PS=PHASE SHIFTER
PW=POWER SUPPLY
PGM=PG=PROGRAM
PPG=PARAPHASE PROGRAM
FB=FAN BACK
PF=POWER FOWARD (RF IN)
PR=POWER REVERSE (RF OUT)
HT=HEATER
TP=TEMPERATURE
V=VOLTAGE

TARGET STATION DEVICE MNEMONICS

D: BS=BEAM STOP DEVICES
D: SM=TARGETING SEMS DEVICES
D: TR=TARGET DEVICES
D: LN=LITHIUM LENS DEVICES
D: PM=PULSED MAGNET DEVICES
D: BD=BEAM DUMP DEVICES
D: AR=TARGET AIR SYSTEM DEVICES
X=HORIZONTAL POSITION
Y=VERTICAL POSITION
Z=POSITION ALONG BEAM
RT=ROTATION POSITION
OE=OUTER ECCENTRIC POSITION
IE=INNER ECCENTRIC POSITION
H=HORIZONTAL
V=VERTICAL OR VOLTAGE
HV=HIGH VOLTAGE
LV=LOW VOLTAGE
PK=PEAK QUANITY
BM=QUANITY AT BEAM
B=MAGNETIC FIELD
KPS=STRAIN GUAGE READING
TC=TEMPERATURE OR VACUUM GUAGE
T=TIMING OR TRIGGER
P=AIR PRESSURE
M=AIR FLOW
ARP=ARGON PRESSURE
WP=WATER PRESSURE
WM=WATER FLOW
WN=WATER CONDUCTIVITY
RH=RELATIVITY HUMIDITY

INVENTORY AND COST ESTIMATE FOR CONTROLS FOR ANTIPROTON SOURCE

84/06/14

D MCCONNELL

DEFINATIONS FOR COLUMN HEADERS

ENGRES = ENGINEER RESPONSIBLE
UNIT = UNIT COST
REFE = REFERENCE FOR UNIT COST ESTIMATE
A = R. J. DUCAR 28 SEPT 83 REVIEWED 8 JUN 84
B = DIXON BOGERT 12 JUN 84
C = ED CORLETT (LECROY) 1 JUN 84
D = K. SEINO 17 FEB 84 REVIEWED 8 JUN 84
E = A. FRANCK 17 FEB 84
F = L. BARTELSON 17 FEB 84 REVIEWED 8 JUN 84
G = D. VOY 17 FEB 84 REVIEWED 12 JUN 84
H = D. BEECHY 22 FEB 84
I = J. ZAGEL 28 FEB 84 REVIEWED 8 JUN 84
J = ENGELBRECHT 28 FEB 84
K = R. BERIG 1 MAR 84 REVIEWED 8 JUN 84
L = R. PASQUINELLI 1 APR 84
Z = FROM PURCHASE REQUISITION
FIRST = DELEVERY DATE OF FIRST ITEM
ALL = DELEVERY DATE OF ALL ITEMS

ITEM	AP10	AP30	AP50	APTB	F23	F27	BSE	UKN	SPAR	TOTAL	MAG	VAC	RF	STOC	TAR	DIA	OTHE	SPAR	TOTAL
032	4	3	4	6	5	4	0	0	4	30	0	0	0	0	3	23	0	4	30
052	5	13	0	1	0	0	0	0	2	21	0	0	18	0	1	0	0	2	21
053	11	7	4	0	2	0	1	6	3	34	27	0	4	0	0	0	0	3	34
054	5	6	6	2	0	0	0	0	3	22	19	0	0	0	0	0	0	3	22
057	0	0	0	1	0	0	0	0	1	2	0	0	0	0	1	0	0	1	2
058	2	5	0	0	0	0	0	0	2	9	0	0	0	7	0	0	0	2	9
064	1	0	0	0	0	0	0	0	1	2	0	0	1	0	0	0	0	1	2
070	3	0	0	0	0	0	0	0	1	4	0	0	3	0	0	0	0	1	4
071	6	0	0	0	0	0	0	0	1	7	0	0	6	0	0	0	0	1	7
080	8	17	6	0	0	0	0	0	3	34	0	6	0	13	0	12	0	3	34
119	9	17	25	9	23	3	9	3	10	108	96	0	0	0	2	0	0	10	108
165	0	0	0	0	6	0	0	0	1	7	6	0	0	0	0	0	0	1	7
170	2	2	2	1	1	1	0	1	2	12	0	9	1	0	0	0	0	2	12
177	14	8	10	6	3	1	1	9	5	57	19	0	7	3	2	20	1	5	57
178	1	0	0	0	0	0	0	5	1	7	5	0	1	0	0	0	0	1	7
180	4	4	3	1	0	0	0	0	2	14	0	0	3	8	1	0	0	2	14
181	1	1	4	3	1	1	0	0	2	13	0	0	3	0	1	7	0	2	13
182	21	12	13	0	0	0	0	0	4	50	8	0	8	30	0	0	0	4	50
190	6	4	8	5	2	2	1	0	3	31	17	0	6	2	3	0	0	3	31
191	0	0	0	5	0	0	0	5	1	11	0	0	0	0	5	5	0	1	11
200	0	0	0	0	0	0	0	15	0	15	0	0	0	0	0	0	15	0	15
488 GPIB/RS232 INT	6	3	6	1	0	0	0	3	3	22	5	3	3	4	1	3	0	3	22
BAKEOUT MULTIBUS	2	2	2	0	0	0	0	0	1	7	0	6	0	0	0	0	0	1	7
TSCC	13	10	11	5	3	2	1	0	5	50	19	0	6	8	2	6	4	5	50
CAMAC CRATES	13	10	11	5	3	2	1	0	5	50	19	0	6	8	2	6	4	5	50
NIM STANDARD CRATE	2	2	2	0	0	0	0	0	1	7	0	0	0	0	0	6	0	1	7
REPEATER CRATES	4	3	3	2	1	1	0	0	4	18	0	0	0	0	0	0	14	4	18
FAN-IN	8	6	6	4	2	2	0	0	3	31	0	0	0	0	0	0	28	3	31
FAN-OUT	6	6	6	4	2	2	0	0	3	29	0	0	0	0	0	0	26	3	29

ITEM	AP10	AP30	AP50	APTB	F23	F27	BSE	UKN	SPAR	TOTAL	MAG	VAC	RF	STOC	TAR	DIA	OTHE	SPAR	TOTAL
UNIVERSAL REPEATER	11	0	0	0	0	0	0	0	2	13	0	0	0	0	0	0	11	2	13
UR-PS	4	3	3	2	1	1	0	0	4	18	0	0	0	0	0	0	14	4	18
DFB RF TUNING	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
CIA CRATES	3	3	2	1	0	0	0	1	1	11	0	9	1	0	0	0	0	1	11
CIA REAR PANEL	3	3	2	1	0	0	0	1	1	11	0	9	1	0	0	0	0	1	11
ION PUMP/GUAGE CRD	8	11	8	2	0	0	0	0	4	33	0	29	0	0	0	0	0	4	33
SUB PUMP/ROUGH CRD	7	9	5	1	0	0	0	0	4	26	0	22	0	0	0	0	0	4	26
TC GUAGE CARD	2	2	2	1	0	0	0	0	2	9	0	7	0	0	0	0	0	2	9
CC GUAGE CARD	2	2	2	1	0	0	0	0	2	9	0	7	0	0	0	0	0	2	9
SECTOR VALVE CARD	4	4	4	2	0	0	0	0	2	16	0	14	0	0	0	0	0	2	16
RELAY CARD	2	2	2	1	0	0	0	0	1	8	0	7	0	0	0	0	0	1	8
EUROCARD CAGE & PS	4	4	2	1	0	0	0	0	2	13	0	0	2	8	1	0	0	2	13
BOX & FAN (STOC)	4	4	2	1	0	0	0	0	2	13	0	0	2	8	1	0	0	2	13
DIGITAL CONT CARD	18	12	0	0	0	0	0	0	5	35	0	0	0	30	0	0	0	5	35
STATUS RDBK CARD	19	14	16	8	0	0	0	0	6	63	0	0	16	33	8	0	0	6	63
TWT PROT MON	0	33	0	0	0	0	0	0	7	40	0	0	0	33	0	0	0	7	40
TWT COMPUTER	0	7	0	0	0	0	0	0	3	10	0	0	0	7	0	0	0	3	10
12-BIT MADC	5	3	7	3	1	1	1	3	2	26	11	0	6	2	2	0	3	2	26
ANALOG FAN-IN	5	3	7	3	1	1	1	3	2	26	11	0	6	2	2	0	3	2	26
14-BIT CONTROLLER	1	1	1	1	1	1	0	0	2	8	6	0	0	0	0	0	0	2	8
14-BIT ADC MODULE	10	10	15	7	24	7	0	0	8	81	73	0	0	0	0	0	0	8	81
14-BIT TRANS LINE	1	1	1	1	1	1	0	0	2	8	6	0	0	0	0	0	0	2	8
SAMPLE & HOLD	0	0	0	1	0	0	0	0	1	2	0	0	0	0	1	0	0	1	2
XMR	0	0	0	0	0	0	0	30	0	30	30	0	0	0	0	0	0	0	30
XMR X-MITTER	0	0	0	0	0	0	0	1	1	2	0	0	1	0	0	0	0	1	2
MOTOR MULTIPLEXER	0	0	0	1	0	0	0	0	1	2	0	0	0	0	1	0	0	1	2
BPM/BLM CONTROL	4	4	4	0	0	0	0	0	2	14	0	0	0	0	0	12	0	2	14
BPM ANALOG BOX	4	4	4	0	0	0	0	0	0	12	0	0	0	0	0	12	0	0	12
PINGER CONTROLS	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	4	0	0	4

ITEM	AP10	AP30	AP50	APTB	F23	F27	BSE	UKN	SPAR	TOTAL	MAC	VAC	RF	STOC	TAR	DIA	OTHE	SPAR	TOTAL
FLYING WIRE CONT	0	0	0	0	0	0	0	5	0	5	0	0	0	0	0	5	0	0	5
SCANNING WIRE	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	4	0	0	4
REF CONTROLLER	2	1	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	3
LECROY 4434	0	0	0	0	0	0	0	5	1	6	0	0	0	0	0	5	0	1	6
LECROY 4222	3	2	2	0	0	0	1	2	1	11	10	0	0	0	0	0	0	1	11
LECROY 4208	1	1	1	0	0	0	0	0	1	4	3	0	0	0	0	0	0	1	4
TV SYSTEM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1
MR RF CONTROLS	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	1

ITEM	ENGRES	UNIT	REFE	TOTAL	FIRST	ALL	
032	J ZAGEL	460	Z	13800	1 MAY 84	1 JUN 84	
052	R J DUCAR	500	A	10500	1 AUG 84	1 AUG 84	
053	R J DUCAR	500	A	17000	NOW	1 JUL 84	
054	R. J. DUCAR	600	A	13200	1 MAY 84	1 SEP 84	
057	W. KNOPF	500	A	1000	NOW	1 OCT 84	
058	W. KNOPF	500	A	4500	1 SEP 84	1 DEC 84	
064	R. J. DUCAR	300	A	600	NOW	1 AUG 84	
070	R. J. DUCAR	1000	A	4000	NOW	NOW	
071	R. J. DUCAR	1000	A	7000	NOW	1 JUL 84	
080	R. J. DUCAR	900	A	30600	NOW	1 AUG 84	SEE NOTE 1
119	W. KNOPF	600	A	64800	NOW	1 OCT 84	
165	W. KNOPF	750	A	5250	NOW	1 SEP 84	
170	J. ZAGEL	500	A	6000	NOW	NOW	
177	A. FRANCK	500	A	28500	NOW	NOW	
178	D. BEECHY	450	A	3150	NOW	1 APR 84	
180	R. J. DUCAR	400	A	5600	NOW	1 JUL 84	
181	R. J. DUCAR	400	A	5200	NOW	1 JUL 84	
182	R. J. DUCAR	400	A	20000	15 APR 84	1 AUG 84	
190	W. KNOPF	1000	A	31000	1 MAR 84	1 SEP 84	
191	W. KNOPF	1000	–	11000	1 APR 84	1 SEP 84	
200	R. J. DUCAR	1000	A	15000	NOW	1 AUG 84	
488 GPIB/RS232 INT	K. SEINO	1500	D	33000	15 JUL 84	15 SEP 84	SEE NOTE 1
BAKEOUT MULTIBUS	D. BEECHY	3900	B	27300	U	U	SEE NOTE 1
TSCC	R. J. DUCAR	1000	A	50000	NOW	1 AUG 84	
CAMAC CRATES	R. J. DUCAR	1700	A	85000	NOW	NOW	
NIM STANDARD CRATE	E. MALAMUD	-0-	–	0	U	U	
REPEATER CRATES	R. J. DUCAR	1000	A	18000	NOW	NOW	
FAN-IN	R. J. DUCAR	200	A	6200	NOW	1 APR 84	
FAN-OUT	R. J. DUCAR	200	A	5800	NOW	1 APR 84	

ITEM	ENGRES	UNIT	REFE	TOTAL	FIRST	ALL
UNIVERSAL REPEATER	R. J. DUCAR	200	A	2600	NOW	1 APR 84
UR-PS	R. J. DUCAR	200	A	3600	NOW	NOW
DEB RF TUNING	J. ZAGEL	3000	I	3000	1 SEP 84	15 OCT 84
CIA CRATES	J. ZAGEL	1100	A	12100	NOW	15 AUG 84
CIA REAR PANEL	BARTELSON	800	F	8800	-	15 JUN 84
ION PUMP/GUAGE CRD	BARTELSON	70	F	2310	-	15 APR 84
SUB PUMP/ROUGH CRD	BARTELSON	100	F	2600	-	15 AUG 84
TC GUAGE CARD	BARTELSON	100	F	900	-	NOW
CC GUAGE CARD	BARTELSON	100	F	900	-	1 AUG 84
SECTOR VALVE CARD	BARTELSON	90	F	1440	-	15 APR 84
RELAY CARD	BARTELSON	70	F	560	-	15 APR 84
EUROCARD CAGE & PS	D. BEECHY	700	H	9100	1 MAY 84	1 AUG 84
BOX & FAN (STOC)	D. BEECHY	400	H	5200	1 MAY 84	1 AUG 84
DIGITAL CONT CARD	D. BEECHY	250	H	8750	1 MAY 84	1 AUG 84
STATUS RDBK CARD	D. BEECHY	250	H	15750	1 MAY 84	1 AUG 84
TWT PROT MON	D. VOY	1300	L	52000	16 APR 84	1 DEC 84
TWT COMPUTER	D. VOY	5000	G	50000	1 JUN 84	1 DEC 84
12-BIT MADC	K. SEINO	2500	A	65000	15 MAY 84	JUN&OCT 84
ANALOG FAN-IN	K. SEINO	500	A	13000	15 MAY 84	JUN&OCT 84
14-BIT CONTROLLER	K. SEINO	1720	D	13760	1 SEP 84	15 DEC 84
14-BIT ADC MODULE	K. SEINO	680	D	55080	1 SEP 84	15 DEC 84
14-BIT TRANS LINE	K. SEINO	1430	D	11440	1 SEP 84	15 DEC 84
SAMPLE & HOLD	A. FRANCK	1500	E	3000	1 JUL 84	U
XMR	D. BEECHY	1000	A	30000	15 JUN 84	U
XMR X-MITTER	D. BEECHY	2000	H	4000	15 JUN 84	U
MOTOR MULTIPLEXER	A. FRANCK	2500	E	5000	1 JUL 84	U
BPM/BLM CONTROL	J. ZAGEL	8000	I	112000	1 JUN 84	1 AUG 84
BPM ANALOG BOX	GERIG/ZAGE	1784	K	21408	U	1 NOV 84
PINGER CONTROLS	U	-0-	-	0	U	U

SEE APPENDIX

ITEM	ENGRES		UNIT	REF	TOTAL	FIRST	ALL
FLYING WIRE CONT	U		-0-		0	U	U
SCANNING WIRE	U		-0-	-	0	U	U
RF CONTROLLER	J	ZAGEL	7800	A	23400	NOW	1 AUG 84
LECROY 4434	E.	MALAMUD	2390	C	14280	PREP	PREP
LECROY 4222	E.	MALAMUD	3970	C	43670	ORDER	2-3 MONTHS
LECROY 4208	E.	MALAMUD	3840	C	15360	ORDER	2-3 MONTHS
TV SYSTEM	ENGELBRECH		30531	J	30531	U	U
MR RF CONTROLS	MACLACHLAN		4600	-	4600	NOW	NOW

SEE NOTE 2

SUM TOTAL
1168139

NOTE 1

The accumulator bakeout GPIB interface could either be a CAMAC 080/MULTIBUS system or a CAMAC 488 system. Final decision will have to wait for an accurate determination of bakeout memory requirements. The CAMAC 080/MULTIBUS system is currently expected to be required.

NOTE 2

The MAIN RING RF controls for the bunch coalescing cavities are nearly completely installed in service building FO. These controls consist of:

CAMAC 071	2 (?)	AT	1000	=	2000
CAMAC 181	3	AT	400	=	1200
CAMAC 182	1	AT	400	=	400
CAMAC 154	1	AT	500 (?)	=	500
CAMAC 053	1	AT	500	=	500
CAMAC 190	EXISTING				-
MADC	EXISTING				-
		TOTAL		=	$4600

EXPLAINATION OF 12-BIT MADC COUNT

At present, the allocation of MADC channels for beamline magnet power supplies, ring and beamline correction elements and shunts does not include reference(digitizing the dac output) channels. Since these supplies are not ramped supplies, it is expected that reference channels will find littel utility. Experience from the operation of similar equipment in Switchyard shows that the control room procedure when a problem with a power supply exists is to drive out to the supply with a replacement camac card and change the card, and then see if the problem is corrected.

The following table summarizes MADC usage:

CATAGORY / LOCATION	MAGNETS	VACUUM	RF	STOCHASTIC	TARGET	DIAGNOSTIC	OTHER	SPARE	TOTAL
AP10	3	0	1	1	0	0	0	0	5
AP30	2	0	0	1	0	0	0	0	3
AP50	2	0	5	0	0	0	0	0	7
F27	1	0	0	0	0	0	0	0	1
APTB	1	0	0	0	2	0	0	0	3
F23	1	0	0	0	0	0	0	0	1
BSE	1	0	0	0	0	0	0	0	1
UNKNOWN	0	0	0	0	0	0	3	0	3
SPARE	0	0	0	0	0	0	0	2	2
TOTAL	11	0	6	2	2	0	3	2	26

21 UNITS + 3 UNITS + 2 SPARES = 26 UNITS
reference
expansion

TABLE NOTES

(1) Diagnostic catagory has 108 distributed (BPM/BLM System) madc channels counted in the Magnet and RF catagories.

(2) Stochastic cooling use of MADC channels is for thermocouples, 60 channels in AP10 and 20 channels in AP30.

(3) As per Dixon Bogert request, 3 MADC units (other catagory) are included in the count should the need ever arise to provide reference channels. The required capacity easily exists in the Target building, F23, F27, and BSE. One unit would be required in buildings 10, 30, and 50, thus the 3 "other" units.

UTILITY MONITORING FOR THE ANTIPROTON SOURCE

Dennis McConnell

11 June 1984

The purpose of the utility portion of the FIRUS system is to alert humans in the main control room, at Phillips farm, and in building 10 control room when either environmental conditions are unhealthy for antiproton source devices, or electrical or mechanical equipment is malfunctioning. When first envisioned, the FIRUS system consisted of the following equipment:

(1) 2 FIRUS mini-computers (wall mounted, 1 fire, 1 utility)
(2) emergency power supply (also wall mounted)
(3) coax hardline communication cable
(4) junction boxes
(5) contact points and analog transducers
(6) three-pair 18 gage shielded cable
(7) silent printer

Each mini can monitor 16 contact points or 15 analog points or a combination of contact and analog points. Each contact point can be more than one physical point if the points are wired in series. An alarm then indicates any one of a group of points has opened.

The following devices/quantities are proposed to be monitored by the utility portion of the FIRUS system:

(1) sump pumps
(2) LCW (Low Conductivity Water)
(3) auxiliary generator
(4) service building temperatures
(5) stub room/tunnel temperature
(6) stub room/tunnel humidity

After the number of quantities to be monitored (see table I) was determined, it was found that two or three minis would be required, or a FIRUS crate could be used. A FIRUS crate is an "old beam transfer crate" with 25 slots which hold cards to either monitor 16 contact points or 15 analog points. The space requirement for the crate system is about half a relay rack. The emergency power supply could remain wall mounted, or it could be rack mounted with the firus crate. Conversations with Al Franck and Rich Mahler concerning availability, expandability, cabling, and cost indicate that the FIRUS crate is the preperable option for the antiproton source.

Two contact sets per sump pump would be used. The first opens when a controlling float reaches a high water position, and the second opens upon loss of 120 VAC power to the pump.

The LCW cooling system for the rings enclosure will be derived from new equipment in the Central utility building (CUB). One transducer for water pressure and one transducer for water temperature will located just downstream of the 1000gpm, 150psi pump in CUB. The LCW cooling system for the antiproton target hall and pretarget enclosure will be extended from the main ring LCW system at service building F-23. Since the main ring LCW system is already monitored by FIRUS, no additional monitoring is necessary, as is true of the hot water (HTW) and chilled water (CHW) systems used for heating and airconditioning.

The auxiliary power generator (to be located outside service building 50) has a panel (to be located inside service building 50) with 8 monitors of contacts. A FIRUS contact will be wired such that if any one of these 8 monitors trips, the FIRUS contact will open, indicating trouble with the auxiliary power system.

Service building temperatures are proposed to be monitored with either one to three distributed contacts that open upon a high temperature limit and one contact that opens upon a low temperature limit or two distributed analog temperature sensors with FIRUS software set limits. The service buildings are heated and airconditioned, so temperature monitoring provides a check on the correct operation of the air handling units. The high temperature limit will insure a healthy environment for the electronic equipment, and the low temperature limit will protect water pipes from freezing in winter.

An analog temperature sensor with FIRUS software set limits is proposed for the stub rooms. Human access to the antiproton rings enclosure will be prohibited if a beam is present. Remote monitoring of environmental temperature allows an operator to comfortably assess any long term danger to electronic equipment and decide if and when an access should be preformed to investigate a high temperature indication. Also, during bakeout of the accumulator, access to the rings enclosure will be possible, but not comfortable. The high temperature limit for electronics is higher when the electronics are not operating, and the flexibility of a analog temperature sensor would be very useful.

The rings enclosure is heated and indirectly airconditioned by service building forced air ventilation. The possibility of electrical equipment damage due to condensation exists in the summer when warm, humid air could be cooled in the nearly constant temperature, below ground rings enclosure. An analog humidity sensor, with a FIRUS software set limit is proposed in sselected stubrooms to provide a check on the ventilation system.

Because of the limited access to the rings enclosure, the selection of temperature and humidity transducers to be located there should emphasize high reliability and no periodic maintenance or calibration.

Following is a list of monitor points (table I) and a list of sensor hardware (table II).

FIRUS

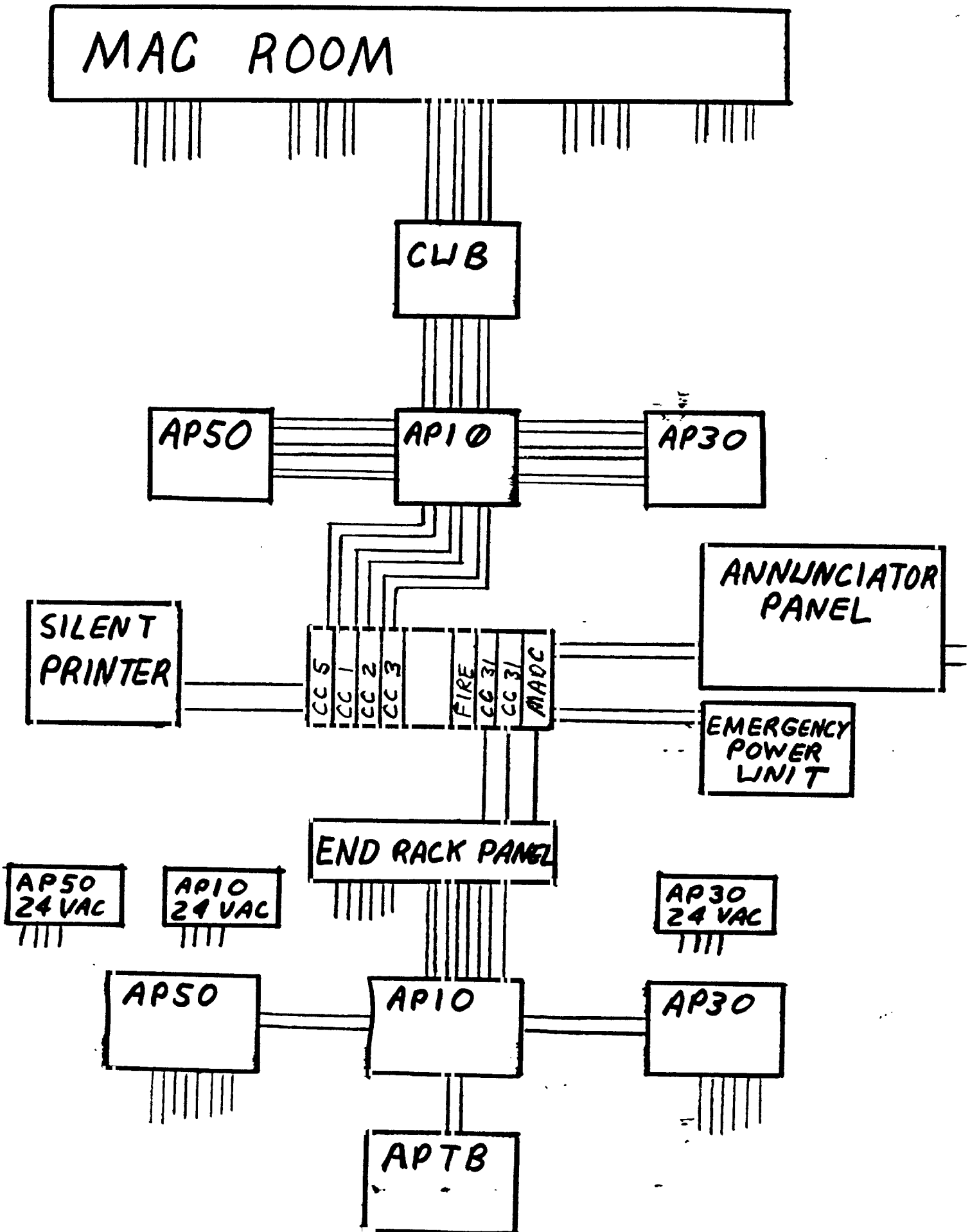
MAC ROOM
CWB
AP50
AP10
AP30
ANNUNCIATOR PANEL
SILENT PRINTER
CC 5
CC 1
CC 2
CC 3
FIRE
CC 31
CC 31
MADC
EMERGENCY POWER UNIT
END RACK PANEL
AP50 24 VAC
AP10 24 VAC
AP30 24 VAC
AP50
AP10
AP30
APTB

TABLE I

ANTIPROTON UTILITY MONITORING POINTS
TYPE, C = RELAY CONTACT, A = ANALOG

POINT	NAME	LOCATION	DESCRIPTION	TYPE
1-1	SP-1	AP10 TUNNEL	SUMP PUMP PIT HIGH WATER	C
1-2	SP-1	AP10 TUNNEL	SUMP PUMP PIT LOSS 120 VAC	C
1-1	SP-2	AP10 TUNNEL	" "	C
1-2	SP-2	AP10 TUNNEL	" "	C
1-3	SP-3	AP30 TUNNEL	" "	C
1-4	SP-3	"		C
1-3	SP-4	"	" "	C
1-4	SP-4	"		C
1-5	SP-5	AP50 TUNNEL	" "	C
1-5	SP-5	"		C
1-6	SP-6	"	" "	C
1-6	SP-6	"		C
2018-12	SP-7	BSE ENCLOSURE	" "	C
2018-13	SP-7	"		C
2018-12	SP-8	"	" "	C
2018-13	SP-8	"		C
2018-12	SP-9	"	" "	C
2018-13	SP-9	"		C
1-7	SP-10	TRANSPORT ENCLOSURE	" "	C
1-8	SP-10	" "		C
1-9	SP-11	TARGET STATION	" "	C
1-10	SP-11	"		C
1-9	SP-12	"	" "	C
1-10	SP-12	"		C
1-11	SP-13	PRETARGET ENCLOSURE	" "	C
1-12	SP-13	" "		C
1521-7	LCW-T	CWB	95° LCW TEMPERATURE	A
1521-8	LCW-P	CWB	95° LCW PRESSURE	A
1-13	AUX-PW	AP50	AUXILIARY GENERATOR STATUS	C

TABLE I

POINT	NAME	LOCATION	DESCRIPTION			TYPE
2-1	AP10-T1	AP10 - A11	AIR	TEMPERATURE	LIMITS	C
2-2	AP10-T2	AP10 - A14	"	"	"	C
2-3	AP10-T3	AP10 - A17	"	"	"	C
2-4	AP30-T1	AP30 - A31	"	"	"	C
2-5	AP30-T2	AP30 - A34	"	"	"	C
2-6	AP30-T3	AP30 - A37	"	"	"	C
2-7	AP50-T1	AP50 - A51	"	"	"	C
2-8	AP50-T2	AP50 - A54	"	"	"	C
2-9	AP50-T3	AP50 - A57	"	"	"	C
2-10	APTB-T1	APTB - B1	"	"	"	C
2-11	APTB-T2	APTB - B6	"	"	"	C
2-12	F23-T	F23	"	"	"	C
2-13	F27-T	F27	"	"	"	C
3-1	T-T6	A60 TUNNEL	AIR	TEMPERATURE LIMITS		A
3-2	T-T1A	A10 STUB	AIR	TEMPERATURE LIMITS		A
3-3	T-H1	A10 STUB	AIR	HUMIDITY		A
3-4	T-T1B	D10 STUB	AIR	TEMPERATURE LIMITS		A
3-5	T-T2	A20 TUNNEL	AIR	TEMPERATURE LIMITS		A
3-6	T-T3	A30 STUB	AIR	TEMPERATURE LIMITS		A
3-7	T-H3	A30 STUB	AIR	HUMIDITY		A
3-8	T-T4	A40 STUB	AIR	TEMPERATURE LIMITS		A
3-9	T-T5	A50 STUB	AIR	TEMPERATURE LIMITS		A
3-10	T-H5	A50 STUB	AIR	HUMIDITY		A

TABLE II FIRWS SENSOR HARDWARE

ITEM	SUPPLIER	MODEL	REQUIRES PW SUP	UNIT COST	QUANTITY	COST
RELAY CONTACTS (SUMP PUMPS & AUX GEN)	POTTER BRUMFIELD	KAP11AG	NO	$15	27	405
TEMP LIMIT SWITCH (DUAL LIMITS)	UNITED ELECTRIC CONTROLS	C54A	NO	$63	13	819
LCW PRESSURE	CONSOLIDATED	415630	28±4 VDC	$500	1	500
LCW TEMPERATURE	ROCHESTER	SC-1374	28±4 VDC	$500	1	500
ANALOG TEMPERATURE	MAMAC SYSTEMS	TE-210	24 VAC	$85	7	595
ANALOG HUMIDITY	MAMAC SYSTEMS	HW-222	24 VAC	$505	3	1515
JUNCTION BOXES	?	?	NO	$50	4	200
24 VAC TRANSFORMER	STOCK ITEM	1165-0250	—	$5.76	3	18
3-CONDUCTOR CABLE	STOCK ITEM	1170-0680	—	$.19/ft	1260'	240
18 GAGE 3-PAIR CABLE	STOCK ITEM	1170-0100	—	$.32/ft	7350'	2352
19-PAIR TRUNK CABLE	?	?	—	$1.25 ft	3071'	3839

TOTAL $10,983

APPENDIX A

CABLE LENGTH CALCULATION

THREE TYPES OF CABLE ARE USED IN THE UTILITY MONITORING SYSTEM, MULTI-CONDUCTOR TRUNK CABLE FOR LONG CABLE RUNS BETWEEN BUILDINGS, 3-PAIR CABLE FOR SHORT CABLE RUNS, AND 3-CONDUCTOR CABLE FOR 24 VAC. 3-CONDUCTOR AND 3-PAIR CABLE ARE FERMILAB STOCK ITEMS, WHILE THE MULTICONDUCTOR CABLE MUST BE ORDERED. DESCRIPTIONS FOLLOW:

MULTICONDUCTOR

19 TWISTED PAIR, INDIVIDUALLY SHIELDED, 18 GAGE, STRANDED, WITH VINYL JACKET OR EQUAL. ≈ $1.25/FOOT

3-PAIR

FT .32
1170-0100 CABLE, AUDIO AND DATA, 3 PAIR INDIVIDUALLY SHIELDED, CHROME VINYL W/ ORANGE STRIPED JACKET, CONSOLIDATED WIRE NO.5353 OR EQUAL, 18 GAGE, 16X30 STRAND.
03

3-CONDUCTOR

FT .19
1170-0680 CABLE, G.P. MULTICONDUCTOR-CONTROL, TINNED COPPER BRAIDED SHIELDING PVC PRIMARY INSULATION AND JACKET, AWG 16, 3 CONDUCTOR.
03

FROM	#PAIR AVAIL	#PAIR USED	#CABLE	DIST	TO	TOTAL RUN
AP10 JUNCTION BOX	19	10	1	700'	AP30 JUNCTION BOX	700'
AP10 JUNCTION BOX	19	8	1	700'	AP50 JUNCTION BOX	700'
AP10 JUNCTION BOX	19	8	1	1525'	APTB JUNCTION BOX	1525'
SP-1	3	2	1	250'	SP-2	250'
SP-2	3	2	1	165'	FIRWS CRATE	165'
SP-4	3	2	1	250'	SP-3	250'
SP-3	3	2	1	165'	AP30 J-BOX	165'
SP-5	3	2	1	250'	SP-6	250'
SP-6	3	2	1	165'	A50 J-BOX	165'
SP-7	3	2	1	15'	SP-8	15'
SP-8	3	2	1	15'	SP-9	15'
SP-9	3	2	1	500'	MIM 2018-12	500'
SP-10	3	2	1	455'	AP30 J-BOX	455'
SP-12	3	2	1	15'	SP-11	15'
SP-11	3	2	1	220'	APTB J-BOX	220'
SP-13	3	2	1	540'	APTB J-BOX	540'
LCW TEMP	3	2	1	400'	MIMI 1521-7	400'
LCW PRES	3	2	1	400'	MIMI 1521-8	400'
AUX-PW	3	1	1	120'	AP50 J-BOX	120'

FROM	#PAIR AVIAL	#PAIR USED	#CABLE	DIST	TO	TOTAL RUN
AP10-T1	3	1	1	135'	FIRWS CRATE	135'
AP10-T2	3	1	1	15'	FIRWS CRATE	15'
AP10-T3	3	1	1	135'	FIRWS CRATE	135'
AP30-T1	3	1	1	120'	AP30 J-BOX	120'
AP30-T2	3	1	1	5'	AP30 J-BOX	5'
AP30-T3	3	1	1	120'	AP30 J-BOX	120'
AP50-T1	3	1	1	120'	AP50 J-BOX	120'
AP50-T2	3	1	1	5'	AP50 J-BOX	5'
AP50-T3	3	1	1	120'	AP50 J-BOX	120'
APTB-T1	3	1	1	120'	APTB J-BOX	120'
APTB-T2	3	1	1	5'	APTB J-BOX	5'
F23-T	3	1	1	290'	APTB J-BOX	290'
F27-T	3	1	1	360'	APTB J-BOX	360'

FROM	#PAIR AVAIL	#PAIR USED	#CABLE	DIST	TO	TOTAL RUN
A60 TUNNEL	3	1	1	335'	FIRWS CRATE	355'
A10 STUB	3	2	1	95'	FIRWS CRATE	95'
D10 STUB	3	1	1	185'	FIRWS CRATE	185'
A20 TUNNEL	3	1	1	355'	FIRWS CRATE	355'
A30 STUB	3	2	1	140'	AP30 J-BOX	140'
A40 STUB	3	1	1	315'	AP30 J-BOX	315'
A50 STUB	3	2	1	100'	AP50 J-BOX	100'
A60 TUNNEL	3 COND.		1	290'	AP10 STUB	290'
A10 STUB	3 COND.		1	95'	AP10 24 VAC	95'
D10 STUB	3 COND.		1	90'	A10 STUB	90'
A20 TUNNEL	3 COND.		1	170'	A10 STUB	170'
A30 STUB	3 COND.		1	140'	AP30 24 VAC	140'
A40 STUB	3 COND.		1	315'	AP30 24 VAC	315'
A50 STUB	3 COND.		1	100'	AP50 24 VAC	100'

19-PAIR CABLE = 2925' + 5% = 3071'

3-PAIR CABLE = 7000' + 5% = 7350'

3-COND. CABLE = 1200' + 5% = 1260'