APPENDIX

A Serial Port Interface Remote Control

The System 824 is fully controllable remotely via the Serial Port interface. Settings and the operational mode can be changed by sending commands through the serial port. Data can also be downloaded to and settings queried and set by the controlling computer.

The System 824 may be connected to the computer directly or through a modem. A network of many instruments can be formed, all controlled by one computer by using the address-ability mode.

This chapter will describe the Serial Port interfacing of the System 824 and the various interface commands with their syntax. Modem control is also covered.

Command text files and programming examples are available upon request via email to techsupport@LarsonDavis.com.

Interface Cables

The communication parameters are the following: The baud rate is adjustable from 300 to 115200 baud, 8 data bits, parity is "None" and stop bits are "1". See section Communication on page 3-34 for a description of the communication parameters)

Serial Port communications are made through the 8-pin connector at

the base of the Model 824. The instrument's signals conform to the RS-422 standard and are compatible with RS-232C. The connectors use the same pin out and cables as Apple® Macintosh® computers.

CBL006	824 to computer cable (9 pin female 'D')
CBL002	824 to serial printer (25-pin male 'D')
CBL003	824 to modem cable (25 pin male 'D')
CBL091	824 to HP LaserJet (9 pin male 'D')

Connection to a computer using CBL006

Step 1 With the instrument turned off, insert the cable connector in the instrument's 8-pin port.

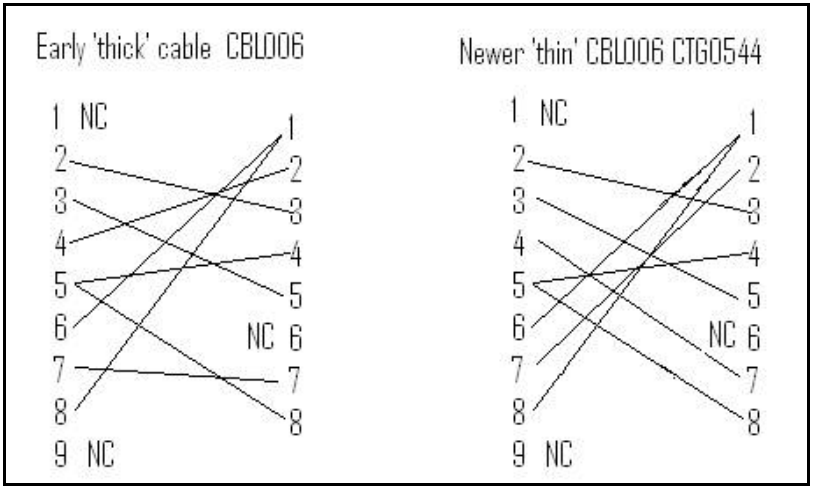
Step 2 Connect the CBL006 cable to the serial port of the computer, using the supplied 9 to 25 pin adapter as necessary.

Pin configurations for the CBL006

824 8-pin Connector End		Type		Computer 9-pin RS-232 Connector End		Type
HSO	Pin 1 Handshake Out	O	RS-232	DSR CTS	Pin 6 DataSetReady Pin 8 Clear to Sent	I O
HSI	Pin 2 Handshake In	O	RS-232	DTR	Pin 4 Data Terminal Ready	O
TXD-	Pin 3 Transmitted Data (-)	O	RS-422	RD	Pin 2 Receive Data	I
GND	Pin 4 Ground	X	RS-422	GND	Pin 5 Ground	X
RXD-	Pin 5 Received Data (-)	I	RS-422	SD	Pin 3 Send Data	O
TXD+	Pin 6 Transmitted Data (+)	O	RS-422		No Connection	
CXI	Pin 7 Com. Extra Input	I	RS-232		No Connection	
RXD+	Pin 8 Received Data (+)	I	RS-422	GND	Pin 5 Ground	

Note that the pin configurations for the newer "thin" CBL006 with the wrap-around label are slightly different as

shown below. Both versions work properly with the Model 824.



‘Daisy Chain Addressing

The following instruments are compatible on a common network: Models 712, 720, 812, 814, 824, 870, and TAC100. Future instruments may also be compatible with this network.

A network of instruments may be interconnected to one computer using the appropriate cabling, and each may be controlled individually. Each is given a unique address. By default, all 824s are given an address based on their serial number from 1 to 100. Serial numbers that end with two zeros will be addressed as 100. The addresses are sent as a single byte ranging in value from 129 to 228 representing address 1 to 100 respectively (address plus 128), while addresses 101 through 127 are reserved. At power-on all 824s are address enabled (as if they had just received their address). Whenever an address byte is received, only the corresponding instrument is enabled to receive and respond to commands.

A broadcast command can be sent. By sending an address of zero, CHR$(128), all units on the chain will become addressed and accept the commands that follow. Only the device with an address of 1 will respond to the commands. This will allow all units to be started at the same moment, or to have the same setting sent to all devices with one command, i.e. set all clocks to the current time.

824 Network, Addressing Commands

NOTE: Hexidecimal notation: The dollar symbol "$" is used to indicate hexidecimal notation. Example: $1A is the hexidecimal notation for the decimal value of 26.

The addressing of multiple 824s on a RS-422 network has been enhanced so as to allow binary data blocks to be sent to the 824 (and not be interpreted as an address), to automatically identify all 824s on the network, and to control the baud rate from the computer more easily. The command details follow:

Command	Description
0	Address 0 ($80), Broadcast, will enable addressing of all 824s on the net in a broadcast receive mode. Only the 824 with address 1 will respond; all will receive the command.
127	Address 127 ($FF), Address All, will enable all 824s to receive and respond to commands; in other words it will disable the addressing feature of all 824s on the net. Useful when only one device is connected.
126	Address 126 ($FE), Disable All, will disable all 824s and none will respond to commands received. This is useful when trying to communicate with one device on the net that has addressing disabled by having its address set to zero.
125	Address 125 ($FD), Lock, will lock the current addressing of all 824s on the net so that binary setting data may be sent to the currently addressed 824. To cancel the lock so that addressing may be changed a <break> is sent.

124	Address 124 ($FC), Auto ID, will initiate an Auto-Identification of all 824s on the net using a timing scheme based on each unit's address. The data received will be the address byte from every device on the net delayed by 10mS times the address; thus it will take a maximum of 1 second to receive the byte from unit 100.
<break>	A short break will cancel the addressing lock initiated with the 125 address command, so that addressing may be changed.
<break> <break>	Two breaks in a row will re-initialize the I/O and Printer tasks and the clear the data and command buffers. It will also address all instruments (first command should be an address).
<break> <break> <break>	Three breaks in a row will cause all 824s on the network to temporarily change to 9600 baud to ensure that all devices on the net can be communicated with. Note: The baud rate is not changed if in modem mode and connected. These should be “Long” breaks (>50ms) to accommodate a unit set at 300 bps. Use the S2283, n command to temporarily set the I/O baud rate where ‘n’ indicates the new rate (see pg. B-30)

Commands

The commands are a series of ASCII characters with an alpha command and one or two numeric operands followed by a carriage return, ASCII 13. The commands may be spelled out though only the first character is significant. i.e. READ 123 may be abbreviated to R123. Every command has a response to acknowledge that it was received correctly and to provide data requested. For high reliability systems there is an error-checking protocol that will ensure proper command data transferal. See “Error Checking Protocol”.

Commands will be discussed according to the following list:

Commands	Symbol
Mode Commands	M
Read Commands	R
Settings Commands	S
History Oriented Commands	E, I, D, L, C, H, T
Print Commands	P
Error Messages & Warnings Commands	
Modem Control Commands	
Miscellaneous Commands (unsupported)	
Key Simulation Commands	K

Remote Control Commands (Detailed)

Mode Commands

Format for the Mode Commands is:

Command	Description
M1	Power On (clear error message list and reset display functions to "–a" windows)
M2	Power Off (cease sending further commands or the 824 will power back on)
M3	Run (begin accumulating data)
M4	Stop (stop accumulating data)
M4,1	Pause/Continue or View/End view (if stopped) (See R152 through R154)
M5	View (view the current Sound Pressure Level without accumulating data)
M6 or M6,0	Set standard mark
M6,1	Set mark 1, Aircraft
M6,2	Set mark 2, Automobile
M6,3	Set mark 3, Truck
M6,4	Set mark 4, Train
M6,5	Set mark 5, Animal
M7 or M7,0	Reset current data (instantly resets the current data set)
M7,1	Overall Reset (Resets the Current and Overall SLM function and histories [synonym of S1,1 Reset-All command]
M7,2	Purge All (Resets ALL data and erases ALL data files [To purge, error checking must be on; the check character for M7,2 is "b"; therefore, the complete purge command is M7,2b (case is significant!)]
M 8	Reset Histories Only (clears all histories and places a RESET record in the run log)

M 9,1	Enable High Resolution Levels (nnn.nn for all sound level data (to I/O channel))
M 10	Lock 824 (leaves 824's power on)
M 11	Lock 824 and Power Off (cease sending further commands)
M 12	Disconnect Modem (terminate connection and hang up)
M 13	Extend Modem Connect Time-out (can be set up to 255 seconds and allows time for modem diagnostics)
M1000	Test RAM (non-destructive walking bit test; data left intact)
M1001	Test RAM (destructive pattern fill & test, setup recalled from EEPROM)
M2222	Store current setup to EEPROM (Response ("Stored!") takes ~20 seconds)
@	Enable I/O Error Check Scheme (documentation available on request. S205,0F or 2 to 3 <CR> in a row will disable Error Checking)

"Read" Commands (Reads out data variables)

The various read commands are detailed in the following tables. The tables list the variable number, the variable name, a description, data format, and instrument types for which it is valid. Some of the Read commands also utilize a second operand.

Syntax	Instru-ment Type	Description	Response
R 1	All	Device manf. and model (30 characters)	String

R1, 1	All	Option feature identification. (8 characters) Used to determine optional features of the system. The returned string will show the availability of a filter card, the ENV firmware option and the memory options. The filter has 3 options: None (F0), 1/1 octave filters (F1) and 1/1 plus 1/3 octave filters (F3). The Environmental noise analyzer option is either present (E1) or not (E0). The memory has 4 options. Standard 1/2 megabyte (M0), 1 megabyte (M1), 1.5 megabyte (M2) and 2 megabyte (M3). Example: “F3 E0 M3” means there is a 1/3 octave filter installed, there is no ENV option, and the memory is the standard 2 megabytes.	F3 E0 M3
R1,2	All	Read Model string “824”	824
R1,3	All	Read Flash Identification “hhhh” Manf/Device Code (IF 13)	IF 13
R1,4	All	hhhh (options installed in hex)	
R1,5	All	Reads out the RTC’s (real-time clock) serial number in hexadecimal	
R1,128	All	Read ConfigFlag “hh” (in hex)	
R1, n	All	Test selected bits in Configflag. (n=129-255)	

Selected bits in ConfigFlag can be tested. If any of the specified bits are set = 1, then the response will be “Yes” otherwise the response is “No”. The following examples show how bits in ConfigFlag can be tested. (The binary number shown is the binary value of the decimal operand of the R1 command.)

Command	Instrument Type	Binary Value	ConfigFlag Bits Tested
R1,129	All	10000001	0
R1,130	All	10000010	1

R1,132	All	10000100	2
R1,192	All	11000000	6
R1,170	All	10101010	1,3,5

NOTE: the 7th bit of ConfigFlag cannot be tested.

Syntax	Instrument Type	Description	Response
R2	ALL	Current Date and Time	ddd ddmmmyyyy hh:mm:ss
R3	ALL	Status	Run mode, Lock, Logic In, Alarm, Archive 0
R3,1	ALL	Short status string	cccccc
R3,2	ALL	Short status string and reset alarm tripped status	cccccc

A short status string for R3,1 and R3,2 has a 6 character response (cccccc).

- The first character is an “s” when stabilizing or a space when stable.
- The second character is the current mode: “S” for Stopped, “R” for Running, “P” for Paused, “C” for Calibrating, “V” for View mode, “O” for stopped with overall data reset and “C” for stopped with Current data set reset.
- The third character is the instrument Lock Status and is either an “L” or a “U”.
- The fourth character is the Logic Input Status and is a “1” if high and a “0” if low.
- The fifth character will be an “a” if an Alarm has been detected, otherwise it will be a space.
- The sixth character is the modified status of the active setup (ID), space for unmodified and “A” for archive.

R3,3	ALL	Status of Active ID Archive Status, “A” indicates that it has been modified since being uploaded. Changed Status, “C” indicates that it has been changed and not saved back to it’s ID. ID from file, “F” indicates that it has been recalled from a data file.	ccc
R3,4	ALL	Active File Number	ccc
R3,5	ALL	Reads out the number of DEMOs used	xx
R4,x	ALL	Current SPL	nnn.nn dB
R5	ALL	OverAll Runtime	hhhhh:mm:ss.s
R6	ALL	OverAll Start Date and Time	ddmmmyy hh:mm:ss
R7	ALL	Current Runtime	hhhhh:mm:ss.s
R8	ALL	Current Start Date and Time	ddmmmyy hh:mm:ss
R9,w	LOG	Overall TWA (Time Wght Avg)	nnn.n dB
R10	SSA, ISM, LOG	Overall Exchange Rate Text	ccccc
R11,w	SSA, ISM, LOG	Current TWA (Time Wght Avg)	nnn.n dB
R 12	SSA, ISM, LOG	Current Exchange Rate Text	ccccc
R13,w	LOG	Overall SEL	nnn.n dB
R14,w	SSA, ISM, LOG	Current SEL	nnn.n dB
R15,x	LOG	OverAll Minimum Level	nnn.n dB
R16,x	LOG	OverAll Lmin Date and Time	ddmmmyy hh:mm:ss

R17,x	SSA, ISM, LOG	Current Minimum Level	nnn.n dB
R18,x	SSA, ISM, LOG	Current Lmin Date and Time	ddmmmyy hh:mm:ss
R19,x	LOG	OverAll Maximum Level	nnn.n dB
R20,x	LOG	OverAll Lmax Date and Time	ddmmmyy hh:mm:ss
R21,x	SSA, ISM, LOG	Current Maximum Level	nnn.n dB
R22,x	SSA, ISM, LOG	Current Lmax Date and Time	ddmmmyy hh:mm:ss
R23,w	LOG	OverAll Peak Level	nnn.n dB
R24,w	LOG	OverAll Lpeak Date and Time	ddmmmyy hh:mm:ss
R25,w	SSA, ISM, LOG	Current Peak Level	nnn.n dB
R 26,w	SSA, ISM, LOG	Current Lpeak Date and Time	ddmmmyy hh:mm:ss
R27,w	LOG	OverAll UWPk Level (Peak Level 1)	nnn.n dB
R28,w	LOG	OverAll Luwpk Date and Time	ddmmmyy hh:mm:ss
R29,w	SSA, ISM, LOG	Current UWPk Level (Peak Level 1)	nnn.n dB
R30,w	SSA, ISM, LOG	Current UWPk Date and Time	ddmmmyy hh:mm:ss
R31	LOG	OverAll RMS Exceedances #1	nnnnn
R32	LOG	OverAll RMS Exceedances #2	nnnnn
R33	LOG	OverAll Peak Exceedances	nnnnn
R 34	LOG	OverAll UWPk Exceedances	nnnnn
R35	ALL	Overloads	nnnnn
R36	ALL	Number of PAUSES	nnnnn

R37	ALL	PAUSE Time (OFF Time not inc.)	hhhhh:mm:ss
R38	LOG, SSA	Ln 1	nnn.n dB
R39	LOG, SSA	Ln 2	nnn.n dB
R 40	LOG, SSA	Ln 3	nnn.n dB
R 41	LOG, SSA	Ln 4	nnn.n dB
R42	LOG, SSA	Ln 5	nnn.n dB
R43	LOG, SSA	Ln 6	nnn.n dB
R44	LOG	Overall Dose	nnnnn.n%
R45	SSA, ISM,	Current Dose	nnnnn.n%
R46	LOG	Overall Projected Dose	nnnnn.n%
R47	SSA, ISM, LOG	Current Projected Dose	nnnnn.n%
R54	ALL	Last Level Relative to REFLVL	-nnn.n
R55	LOG	Display Histogram Selected	ccc
R 56	LOG	Display Total Counts in Ln Table	nnnnnk
R 57	LOG	Overall Leq	nnn.n dB
R 58	LOG	Daily Leq	nnn.n dB
R 59	LOG	Current Hourly Leq	nnn.n dB
R60,h	LOG	Hourly Leq (h= 0-23)	nnn.n dB
R61,h	LOG	Hourly Leq partial indicator(h=0-23)	nnn.n dB
R62	LOG	Overall LDN	nnn.n dB
R63	LOG	Daily LDN	nnn.n dB
R64	LOG	Hourly LDN	nnn.n dB
R65	LOG	Overall CNEL	nnn.n dB
R66	LOG	Daily CNEL	nnn.n dB

R67	LOG	Hourly CNEL	nnn.n dB
R68	LOG	Total EXCD Leq	nnn.n dB
R69	LOG	Total EXCD Time	hhhhh:mm:ss.s

NOTE: The exceedance Leq, R68, and exceedance time, R69, include data from qualified events that are stored in the EXCD History. If an event is discarded because it was shorter than the minimum duration then it will not be included in these values.

R70	LOG	Background Leq	nnn.n dB
R86	ALL	Battery Level	nnn%
R87	ALL	Battery Source (INT/EXT)	ccc
R88	ALL	Temperature	-nnn.n
R89	ALL	Serial Number	ccccc
R90	ALL	Firmware Rev. & Rev. Date	n.nnn ddmmmyyyy
R91	ALL	Free Memory	nnnnnnn
R92	LOG	Number of RUN/STOP Records	nnnnn
R93	LOG	Number of EXCD Records	nnnnn
R94	ALL	Number of INTV Records	nnnnn
R95	LOG	Number of HIST Records	nnnnnnn
R96	LOG	Number of Daily Records	nnnnn
R97	LOG	Number of Cal Records	nnnnn
R98,n	ALL	Error Message List (n= 1 to 8)	ccccccccccccccccccccc n = 1 to the last error. If n=0 or omitted then the 8 error codes are output as number. (nnn, nnn, . . . nnn).

R99	ALL	Logic Output 1 State	[On/Off}
R100	ALL	Logic Output 2 State	[On/Off}
R101	ALL	Report Number	nnnnn
R102	ALL	Page Number	nnnnn
R103	ALL	Printer Line Number	nnn
R104	ALL	Calibration Date/Time	ddmmmyy hh:mm:ss
R105	ALL	Cal Check Date/Time	ddmmmyy hh:mm:ss
R106	ALL	Cal Offset	nnn.n
R107	ALL	Cal check Level	nnn.n + OFFSET
R108	SSA, ISM, LOG	RMS Exceedance Flag 1	*
R109	SSA, ISM, LOG	RMS Exceedance Flag 2	*
R110	SSA, ISM, LOG	PEAK Exceedance Flag	*
R111	SSA, ISM, LOG	UWPK Exceedance Flag	*
R112	ALL	System Overload Flag	*
R113	LOG	Excd Exchange Rate Text	ccccc
R114	LOG	Intv Exchange Rate Text	ccccc
R115	ALL	Auto-Advance History Indicator	+
R116	ALL	Current Wind Speed, Frequency or Tach	nnn.n or nnnnn
R132	LOG	Today's Minimum Level	nnn.n dB
R 133	LOG	Today's Maximum Level	nnn.n dB
R 134	LOG	Today's Peak Level	nnn.n dB
R135	LOG	Today's UWPk Level	nnn.n dB
R136	LOG	Today's Runtime	hh:mm:ss | mm:ss.ss
R137	SSA, LOG	Next Alarm Time	hh:mm

R138	SSA, LOG	Interval Date and Time of Occurrence	ddmmmyy hh:mm:ss
R139	SSA, LOG	Interval Duration	hh:mm:ss / mm:ss.ss
R140	SSA, LOG	Interval Lint	nnn.n dB
R141	SSA, LOG	Interval SEL	nnn.n dB
R142	SSA, LOG	Interval Lmin	nnn.n dB
R143	SSA, LOG	Interval Lmax	nnn.n dB
R144	SSA, LOG	Interval Lpeak	nnn.n dB
R145	SSA, LOG	Interval UnWeighted Peak	nnn.n dB
R146	SSA, LOG	AUTO-SEND HISTORY LEQ	nnn.n dB
R150	ALL	Number of RUNS & CONTINUES	nnnnn
R151	ALL	Power On Fault Cause Character D - Data Checksum Corrupt E - EEPROM Checksum Corrupt K - Key Reset (⏻+ l+ v) P - setting Checksum Corrupt O - Opcode Error R - RAM Setup Register Corrupt T - Test Memory Corrupt W - Watchdog Reset	c

An indicator has been added to the ON display on the top line of the 824's display to show faults that were detected by the power on test procedure. The R151 command will display the fault character to a computer.

R152	ALL	Internal RMS detector level	nnn.nn dB
R153	ALL	Internal PEAK detector level	nnn.nn dB

R154	ALL	Internal UwPk detector level	nnn.nn dB
R155	ALL	Number of Bytes in Keyboard Stack This is used with keyboard simulation to prevent the loss of keys.	nnn

R156	LOG	Background Leq Time	hhhhh:mm:ss.ss
R157	ALL	Calibration Status	Done, Wait, Waiting, Stable, Unstable, Too High, Too Low.
R158	ALL	Total Memory Available	nnnnnn
R159	ALL	Memory Available in percent	nnn.nn
R160	ALL	OVERALL OVERLOAD FLAG	c
R161	RTA	Number of RTA Records	nnnnn
R162	LOG	Overall Sound Exposure	nnnnn.n P^2H

Sound Exposure (E) is calculated and displayed in pascal squared hours as needed in some of the European Countries. This value is read with the R162 command and is available in the top line of the DOSE-a display. The formula used is:

$E = T \bullet (10\text{^}(Leq/10)) \bullet 20\mu Pa^2$,

where E is the Exposure, T is the elapsed time in hours, and $20\mu Pa^2$ is the reference sound pressure 20 micro pascal squared.

R163,x	SSA, ISM, LOG	TAKT 3	nnn.n dB
R164,x	SSA, ISM, LOG	TAKT 5	nnn.n dB
R165	LOG	PassBy Time of Occurrence	ddmmmyy hh:mm:ss
R166	LOG	PassBy Event Duration	hh:mm:ss / mm:ss.ss
R167	LOG	PassBy Lmax	nnn.n
R168	LOG	PassBy Leq	nnn.n
R169	LOG	PassBy SEL	nnn.n
R170	ALL	External Battery Level in Volts	nn.n V
R171,f	SSA, AUD, TAL	RTA filter - LIVE Level *f is ANSI filter	nnn.n dB
R172,f	SSA, TAL	RTA filter - CURRENT Leq *f is ANSI filter	nnn.n dB
R173,f	SSA, TAL	RTA filter - OVERALL Leq *f is ANSI filter	nnn.n dB
R174,f	SSA, LOG, RTA, AUD, TAL	RTA filter selected frequency *f is ANSI filter	cccccHz

R175	ALL	OverAll End Date and Time	ddmmmyy hh:mm:ss
R176	ALL	Current End Date and Time	ddmmmyy hh:mm:ss
R177	ALL	OverAll Reset/Began Text	“Reset” or “Began”
R178	ALL	Current Reset/Began Text	“Reset” or “Began”
R179	ALL	Total bytes of RAM installed in the SLM	nnnnnnn
R180	ALL	Current Instrument Type	ccc
R181	ALL	Number of Data File Records	nnn
R182	ALL	Data File History Record Size	nnnnnnn
R187	ALL	SLM Firmware Rev. Number & Revision Date	n.nnn ddmmmyyyy
R188	SSA	RTA Spectra at Lmax	nnn.n dB
R189	ALL	Logic Input State	‘On’ or ‘off”
R190	ALL	Noise Floor Indicators	c or cccc, flags
R191	AUD	Audiometric Test, Rise Time	nnnnn.nn
R192	AUD	Audiometric Test, Fall Time	nnnnn.nn
R193	AUD	Audiometric Test, On Time	nnnnn.nn
R194	AUD	Audiometric Test, Off Time	nnnnn.nn
R195	AUD	Audiometric Test, Plateau Time	nnnnn.nn
R196	AUD	Audiometric Test, Overshoot Level	nnn.n
R197	AUD	Audiometric Test, Level	nnn.n
R198	AUD	Audiometric Test, FFT Frequency	nnnnn.nn
R199	AUD	Audiometric Test, Carrier Frequency	nnnnn.nn
R200	AUD	Audiometric Test, Max Frequency	nnnnn.nn

R201	AUD	Audiometric Test, Min Frequency	nnnnn.nn
R202	AUD	Audiometric Test, Modulation Frequency	nnnnn.nn
R203,l	AUD	FFT Live Spectrum Level (, line_number) l=line#, 0 - 400	nnn.nn
R204,l	AUD	FFT Live Spectrum Frequency (,line_number) l=line#, 0 - 400	nnnnn
R205	FFT, AUD	FFT Live Broadband Level	nnn.n
R206,f	SSA	RTA Minimum Level per Spectrum Filter	nnn.n
R207,f	RTA	Live Spectrum (f=ANSI filter number or -1 for Flat)	nnn.n
R208	RTA	Live Spectrum's Duration	s.ssss
R209	RTA	Live Spectrum's Overload Status	'Ovld'
R210,f	RTA	Leq Spectrum (f=ANSI filter number or -1 for Flat)	nnn.n
R211	RTA	Leq Spectrum's Duration	hhhhh:mm | hh:mm:ss | mm:ss.ss | ss.ssss
R212	RTA	Leq Spectrum's Overload Status	'Ovld"
R213,f	RTA	Lmax Spectrum ,n (n=ANSI filter number or -1 for Flat)	nnn.n
R214,f	RTA	Lmin Spectrum (f=ANSI filter number or -1 for Flat)	nnn.n
R215	RTA	Trigger State	'Stop, Ready, Armed, Trigd, Ended'
R216	RTA	Pre-Trigger Samples	nnn
R217	RTA	Triggered ByTime Samples	
R218, n	RTA	Triggering String (,n) 1&2=ARM, 3&4=Trig, 5&6=End, 7=Repeat 21 character string, 0=all strings	character string

R219,f	RTA	Spatial Averaged Spectrum (f=ANSI filter number or -1 for Flat)	nnn.n
R220	RTA	Spatial Averaged sample count	nnnnnk
R221,f	RTA	Room Spectrum (f=ANSI filter number or -1 for Flat)	nnn.n
R222,f	RTA	Room Class Spectrum (f=ANSI filter number or -1 for Flat)	nnn.n
R223	RTA	Room Level, SIL or Lmf in dB	nnn.n
R224	RTA	Room Data, NCB or RC	nn
R225	RTA	Room Flags: Over/Under/Hiss/ Rumble/Vibra	ccccc
R226,n	ALL	Display the Last history record type 0 - Last record type string 1 - Date/Time of last record 2 - Duration/Runtime of last rec. 3 - Record Size (bytes) 4 - Instrument type of record	 ccccccccc ddmmmyyyy, hh:mm:ss hhhhh:mm, hh:mm:ss, mm:ss.ss nnnnnnn ccc
R227	TAL	Tonal Frequency in Hz	nnnnn
R228	TAL	Tonal delta Frequency in Hz	nnnnn
R229	TAL	Tonal Level	nnn.n
R230	TAL	Tonal Group Level	nnn.n
R231	TAL	Tonal Background Level	nnn.n
R232	TAL	A weight Impulse Leq, Overall	nnn.n
R233	TAL	Tonality Run Time	hh:mm:ss
R233	LOG	Excd Duration	mm:ss.ss
R234,f	SSA	Ln 1 Spectrum, dB (f=ANSI filter number)*	nnn.n

R235,f	SSA	Ln 2 Spectrum, dB (f=ANSI filter number)*	nnn.n
R236,f	SSA	Ln 3 Spectrum, dB (f=ANSI filter number)*	nnn.n
R237,f	SSA	Ln 4 Spectrum, dB (f=ANSI filter number)*	nnn.n
R238,f	SSA	Ln 5 Spectrum, dB (f=ANSI filter number)*	nnn.n
R239,f	SSA	Ln 6 Spectrum, dB (f=ANSI filter number)*	nnn.n
R240,n	SSA	Ln percentage stored with the spectra (n=the percentage number from 1 to 6)**	nn.nn
R241,n	AUD, FFT	Total harmonic distortion & frequency	see following commands
R241, 512	AUD, FFT	Extract harmonic distortion data from FFT Live	no output data
R241, 1024	AUD, FFT	Extract harmonic distortion data from FFT Snapshot	no output data
R241,0	AUD, FFT	Show precise frequency of fundamental	nnnnnn Hz
R241, 256	AUD, FFT	Show level of fundamental	nnn.n dB
R241,n	AUD, FFT	Show distortion of harmonic ‘n’, n=1 to 20	n.nn %
R241, n+256	AUD, FFT	Show harmonic levels minus fundamental level ‘n’, n=1 to 20	-nnn.n dB
R241, n+512	AUD, FFT	Show distortion of harmonic levels ‘n’ and above	n.nn %
R241, n+768	AUD, FFT	Show distortion of harmonic ‘n’, and above minus fundamental level, n=1 to 20	-nnn.n dB

R241, n+1024	AUD, FFT	Show noise floor influence indicator for harmonic ‘n’, n=1 to 20 (valleys have less than 10 dB from harmonic)	“ “ if no influence “*” if influence detected
R242	ISM, LOG, SSA, AUD, TAL	Live Leq detector sample (Weight setting applies)	nnn.n dB
R243	ISM, LOG, SSA, AUD, TAL	Live Lmax detector sample (Weight and Detector settings apply)	nnn.n dB

*If f=0 then all 33 filter levels will be output in a comma delimited string.

**If n=0 then all 6 percentages will be output in a comma

“ANY DATA” READ COMMANDS

The 824 measures SPL data with three frequency weightings and with three time weighting detectors simultaneously, as well as peak and integrated levels with three frequency weightings. To access this additional data use these Read Commands using the second operand indicated:

{SSA, ISM, LOG and ENV instruments only}				
R 4,x	SSA, ISM, LOG	Current SPL	(Any Wght/ Dect)	nnn.n dB
R 9,w	SSA, ISM, LOG	OVERALL TWA	(Any Wght)	nnn.n dB
R 11,w	SSA, ISM, LOG	CURRENT TWA	(Any Wght)	nnn.n dB
R 13,w	SSA, ISM, LOG	OVERALL SEL	(Any Wght)	nnn.n dB

R 14,w	SSA, ISM, LOG	CURRENT SEL	(Any Wght)	nnn.n dB
R 15,x	SSA, ISM, LOG	OverAll Minimum Level	(Any Wght/ Dect)	nnn.n dB
R 16,x	SSA, ISM, LOG	OverAll Lmin Date and Time	(Any Wght/ Dect)	ddmmmyy hh:mm:ss
R 17,x	SSA, ISM, LOG	Current Minimum Level	(Any Wght/ Dect)	nnn.n dB
R 18,x	SSA, ISM, LOG	Current Lmin Date and Time	(Any Wght/ Dect)	ddmmmyy hh:mm:ss
R 19,x	SSA, ISM, LOG	OverAll Maximum Level	(Any Wght/ Dect)	nnn.n dB
R 20,x	SSA, ISM, LOG	OverAll Lmax Date and Time	(Any Wght/ Dect)	ddmmmyy hh:mm:ss
R 21,x	SSA, ISM, LOG	Current Maximum Level	(Any Wght/ Dect)	nnn.n dB
R 22,x	SSA, ISM, LOG	Current Lmax Date and Time	(Any Wght/ Dect)	ddmmmyy hh:mm:ss
R 23,w	SSA, ISM, LOG	OverAll Pk Level	(Any Wght)	nnn.n dB
R 24,w	SSA, ISM, LOG	OverAll Lpk Date and Time	(Any Wght)	ddmmmyy hh:mm:ss
R 25,w	SSA, ISM, LOG	Current Pk Level	(Any Wght)	nnn.n dB
R 26,w	SSA, ISM, LOG	Current Lpk Date and Time	(Any Wght)	ddmmmyy hh:mm:ss
R163,x	SSA, ISM, LOG	TAKT 3	(Any Wght/ Dect)	nnn.n dB
R164,x	SSA, ISM, LOG	TAKT5	(Any Wght/ Dect)	nnn.n dB

Where “x” indicates a number to represent a combination of weighting and detector which has these values:

1	A weight, Slow detector
2	A weight, Fast detector
3	A weight, Impl detector
4	C weight, Slow detector
5	C weight, Fast detector
6	C weight, Impl detector
7	Flat weight, Slow detector
8	Flat weight, Fast detector
9	Flat weight, Impl detector

If “x” is not provided or it is zero then the value indicated by the Wght and Detc settings is given.

NOTE: Impulse detector is not applicable for Takt levels

Where “w” indicates a number to represent the weighting which has these values (Detector is not applicable for these measurements):

1	A weight
2	C weight
3	Flat weight

If “w” is not provided or it is zero then the value indicated by the Wght settings is given.

Other Read Commands

Other read commands are macro commands that send multiple “R” variables, so multiple data can be retrieved from the 824 with one command. Other commands O 1, O 2, and O 4 are preprogrammed macros while O 3 is a user-defined macro which is programmed by the Group command.

Code	Description	Response
O 1	Read SLM data	nnn.n, nnn.n, nnn.n, nnn.n<CR><LF> R 4 (SPL), R 11 (TWA), R 17, (Lmin), R 21 (Lmax)<CR><LF>)
O 2	Read Wind Data	nnn.n, ccc, nnn.n, nnn.n, ccc<CR><LF>
O 3	Read Group of “R” variables programmed by the group programming command G n,r	<as programmed>
O 4	Read 824’s LCD Display, bit mapped in a binary format	<SOH><HIGH_COUNT><LOW_COUNT><...data...><CHKSM><CR><LF> • There are 1024 bytes of screen data (8 lines of 128 bytes each) • Bits in each byte represent a vertical column of 8 pixels with the lsb on top
O 6	All History Records: R92 (Run Log), R93 (Excd), R94 (Intv), R95 (Time History), R96 (Daily), R97 (Cal. Log)	nnnnnn,nnnnnn,nnnnnn,nnnnnn,nnnnnn,nnnnnn

Code	Description	Response
O 8	AUD, FFT	Read THD data: Fund. Frequency, Fund Level, THD+n, 2nd, 3rd, 4th, 5th and above. nnnnnn, nnn.n, n.nn,n.nn,n.nn,n.nn
O 9	AUD, FFT	Read Fund. Frequency and Fund. Level nnnnnn, nnn.n

Group Read Programming

The group command permits the programming of a user-defined macro with up to eight (8) Read variables. The macro is executed with the G0 or O[ther] 3 commands which returns the list of defined read variables.

Use the following command syntax to program each desired read variable and its position in the macro.

Syntax	Response
G[roup]n, var_no	<cr><lf>
Example: G1, 4 <cr>	assigns the current SPL to the first group option
Example: G2, 15 <cr>	assigns Lmin to the second option
Example: G3, 19 <cr>	assigns Lmax to the third option
Example: G4, 0 <cr>	terminates group command programming

Where n is from 1 to 8, indicating the macro position and var_no is the number of the "R" variable associated with the position. Use a var_no of "0" to define the last position when less than eight are desired.

After programming this group read list, the response to G0 is 59.5, 38.6, 102.2; the SPL, L_{min} and L_{max}.

Setting Commands

The Settings select what functions are enabled and determine how the measurements are performed. Settings can be both set (S) and queried (Q). The setting numbers provided below in the "Setting List" section are for both the Set (S) and Query (Q) commands.

- Option e.g. [Sun|Mon|Tues…|Sat]
- Numeric e.g. (123.45)
- Character e.g. (Gas Flare, Test 1); can be up to 30 characters
- Template e.g. (hh:mm:ss)

Brackets [ ] indicate optional characters or operands.

<cr> = carriage return; <lf> = line feed; _ = space

Querying Settings

The current setting is retrieved with the Query (Q) command. The syntax for the query command is Q[uery]setting_number[,options] where setting_number is the number of the desired setting and options is a number to select the appearance of the response.

Brackets [ ] indicate optional characters or operands. <cr> = carriage return; <lf> = line feed; _ = space

Syntax	Response
Q[uery]item_number[,flag]	Depends on flag

Option flags elicit the following responses:

Flag	Response
none	Current setting
1	Setting name and current setting
2	Current setting (including spaces) in brackets or parentheses
3	Setting name and current setting (including spaces) in brackets or parentheses
32	Option number for option setting

Flag values may be added together for desired combinations:

Example:	Response
1.Q74	No
2.Q74, 1	Excd History Enable=No
3.Q74, 2	[_No]
4.Q74, 32	0
5.Q74, 3	Excd History Enable=[_No]

Responses are denoted by (x) if Yes/ No or (n) if numerical.

Ln Query Commands (SSA)

Commands	Instru-ment Type	Description	Comments
Q 63	SSA	Ln 1 Percent	nn.nn
Q 64	SSA	Ln 2 Percent	nn.nn
Q 65	SSA	Ln 3 Percent	nn.nn
Q 66	SSA	Ln 4 Percent	nn.nn
Q 67	SSA	Ln 5 Percent	nn.nn
Q 68	SSA	Ln 6 Percent	nn.nn
Q 139	SSA	Enable Lns	[No/Yes]
Q 224	SSA	Start Level	nn

Entering Settings

Option Settings

Settings are entered with the Set command. The syntax for the Set command is S[ET]setting_number, setting_value or S[ET]setting_number;option_text where setting_number is the setting number, setting_value is the desired setting, and option_text is the textual setting for the option settings (those that have one setting from a list of possible settings).

Option settings can be set in two ways: a. option number and b. actual option settings text.

a.Option Number

Syntax	Response
S[et]item_number,option_number	<cr><lf>
Example: S9, 3	sets setting 9:Baud Rate to option 3 which sets the baud rate to 9600
Example: S674, 1	sets Excd History Enable to Yes.
Example: S95, 0	sets Hist Period Units to _1/32s
Example: S95, 1	sets Hist Period Units to _1.0s

b.Option Setting Text

Querying an option with a flag of 2 will return the setting's value enclosed in brackets as needed when using the option text syntax.

Option settings texts is preceded by a semicolon and enclosed by brackets. Option settings text must include the same number of characters that are given when queried, including spaces, which are indicated below with "__".

Syntax	Response
S[et]item_number; [option_text]	<cr><lf>
Example: S9; [_9600]	sets Baud Rate to 9600.

Example: S74; [Yes]	sets Excd History Enable to Yes.
Example: S95; [_1/32s]	sets Hist Period Units to 1/32s
Example: S95; [_1.0s]	sets Hist Period Units to 1.0s

Numeric Settings

Syntax	Response
S[et]item_number, setting_value	<cr><lf>
Example: S62, 120	sets RMS Excd Level 2 to 120.

Character String Settings

To include leading spaces in a character string setting, precede the character string with a "`" (leading single quote or grave accent, ASCII 96 or hexadecimal 60).

Syntax	Response
S[et]item_number, character_string	<cr><lf>
Example: S2; ` ABC Acoustics	sets Name to ABC Acoustics.

Template Settings

For example, when entering a date, the month, day, and year are entered in that order; two numeric digits each and are separated by "/". The display shows date, month (abbreviated), and year in that order normally, or in year, month and date for ISO-8601 format (ddmmmyyyy or yyyymmmdd).

Syntax	Response
S[et]item_number; mm/dd/yy	<cr><lf>
S28, 05/23/89	sets Timer Run Date to 23May1989.

Times are entered in hour, minutes, and seconds order and are separated by ":". (24 hour clock time is used: i.e. hours 0 to 23.

Syntax	Response
S[et]item_number; hh:mm:ss	<cr><lf>
Example: S30, 09:25:00 Example: S6, 23:05:33	sets Timer Run Time 1 to 09:25:00. sets current time to 23:05:33 (11:05:33pm)

Setting List

Com-mand	Instrument Type	Description	Comment
S1,x	ALL	RESET-ALL	
S2,c	ALL	HEADING LINE #1	
S3,c	ALL	HEADING LINE #2	
S4,c	ALL	HEADING LINE #3	
S5,c	ALL	MEASUREMENT TITLE	
S6,t	ALL	CURRENT TIME	
S7,t	ALL	CURRENT DATE	
S8,x	ALL	DAY OF WEEK	
S9,x	ALL	Serial Communications Baud Rate	
S10,n	ALL	Serial Communications Address	
S11,x	ALL	Serial Communications Output Flow Control	
S12,x	ALL	Printer Serial Bit Rate	
S13,x	ALL	Printer Serial Output Flow Control	
S14,x	ALL	Logic-Output, Activation Mode	
S15,n	ALL	Logic-Output Line Timer	
S16,x	ALL	Logic-Output Line #2, Activation Mode {Heater control line}	
S17,n	ALL	Logic-Output Line #2 Timer	
S18,x	ALL	LOGIC-IN LINE MODE [None | Pause | Toggle | Level | Alarm]	

Where c = character, t = template, n = numeric, and x = option index.

S19	ALL	External Power Type [AC Pwr|Battery]	Protects External Battery
S20	ALL	External Power-Off Voltage	
S21	ALL	POWER SAVE OPTIONS [Blank LCD / Auto Off / Manual Off]	
S22	ALL	Standby Time (LCD Blank & Comm Off) (nn)	0 to 99 minutes
S23	ALL	Auto-Off Time (nn)	0 to 99 minutes
S24	ALL	Backlight Power Off Time (nn)	0 to 99 seconds
S25	ALL	Backlight On/Off	
S26	ALL	LCD Contrast 0 to 99% (nn)	
S27	SSA, LOG	TIMER MODE	
S28	SSA, LOG	TIMER RUN DATE	
S29	SSA, LOG	TIMER STOP DATE	
S30	SSA, LOG	TIMER RUN TIME1	
S31	SSA, LOG	TIMER STOP TIME 1	
S32	SSA, LOG	TIMER RUN TIME 2	
S33	SSA, LOG	TIMER STOP TIME 2	
S34	ALL	LOCK COMBINATION	
S35	ALL	LOCK R/S KEY	
S36	ALL	LOCK SETUP	
S37	ALL	LOCK FUNCTION	
S38	ALL	LOCK RESET	
S39	ALL	LOCK THE ‘ON’ KEY	

S40	ALL	LOCK I/O	
S41	ALL	CAL LEVEL	
S42	ALL	CALIBRATOR S/N	
S43	LOG	AUTO-CALIBRATION MODE	
S44	LOG	AUTO CAL TIME	
S45	SSA, ISM, LOG, AUD	DETECTOR	
S46	SSA, ISM, LOG, AUD	FREQUENCY WEIGHTING	
S48	ALL	AC/DC Output Control [AC-1 AC-2 | AC-1 DC | AC-2 DC | AC-2 AC-1]	
S49	SSA, ISM, LOG, AUD	Pk Detector Weighting [A | C | Flat]	
S50	SSA, ISM, LOG	RANGE [Normal | Low | High]	
S51	ALL	Transducer Type [Air Condenser| Electret | Direct}	
S52	SSA, ISM, LOG, AUD	Simple SLM Displayed Value	
S53	SSA, ISM, LOG	CURRENT EXCHANGE RATE	
S53	RTA	RTAf FILTER BANDWIDTH	[1/1, 1/3] OCTAVE
S54	SSA, ISM, LOG	CURRENT THRESHOLD	
S54	RTA	RTAf DETECTOR	[LIN, EXP] TIME WEIGHTING
S55	LOG	CURRENT CRITERION	
S55	RTA	LINEAR DETECTOR TIME	SS.SSS SECONDS
S56	LOG	OVERALL EXCHANGE RATE	

S56	RTA	RTAf EXPONENTIAL DETECTOR TIME	[1/64, 1/32, 1/16, 1/8, 1/4, 1/2, 1, 2, 4, 8, 16, 32, 64] SECONDS
S57	LOG	OVERALL THRESHOLD	
S57	RTA	RTAf EXPONENTIAL DETECTOR STORAGE RATE	[1/2, 1/8] SECONDS
S58	LOG	OVERALL CRITERION	
S58	RTA	RTAf RTAf AUTOMATIC RESET AT TRIGGER	[NO, YES]
S59	LOG	CRITERION TIME (HOURS)	
S59	RTA	RTAf AUTOMATICALLY STORE EVENT RECORDS	[YES, NO]
S60	LOG	LDL EXCHANGE RATE	
S60	RTA	RTAf ENABLE EVENT BYTIME HISTORY	[NO, YES]
S61	LOG	LDL THRESHOLD	
S61	RTA	RTAf EVENT BYTIME PRETRIG-GER SAMPLES	(NNN)
S62	LOG	LDL CRITERION	
S62	RTA	RTAf EVENT TRIGGERING ENABLE	[NO, YES]
S63	LOG	Lnn 1 PERCENT	
S63	RTA	RTAf TRIGGER SOURCE LEVEL	[12.5, 16.0 . . . 16.0K, 20.0K, FLAT] Hz.
S64	LOG	Lnn 2 PERCENT	
S64	RTA	RTAf ARM MODE	[NOW, L<, L=, L>, INPUT, TIME, COUNT]
S65	LOG	Lnn 3 PERCENT	
S65	RTA	RTAf ARM LEVEL	(NNN.N) dB

S66	LOG	Lnn 4 PERCENT	
S66	RTA	RTAf ARM TIME	(SS.SSSS) SECONDS (FOR LEVEL AND TIME ARM MODE CONDITIONS)
S67	LOG	Lnn 5 PERCENT	
S67	RTA	RTAf ARM SAMPLES	(NNNN)
S68	LOG	Lnn 6 PERCENT	
S68	RTA	RTAf ARM LOGIC INPUT TRUE LEVEL	[LOW, HIGH]
S69	SSA, ISM, LOG	SPL Exceedance Level 1	
S69	RTA	RTAf TRIGGER MODE	[NOW, L<, L=, L>, INPUT, TIME, COUNT]
S70	SSA, ISM, LOG	SPL Exceedance Level 2	
S70	RTA	RTAf TRIGGER LEVEL	(NNN.N) dB
S71	SSA, ISM, LOG	Peak-II Exceedance Level	
S71	RTA	RTAf TRIGGER TIME	(SS.SSSS) SECONDS
S72	SSA, ISM, LOG	Peak-I Exceedance Level	
S72	RTA	RTAf TRIGGER SAMPLES	(NNNN)
S73	SSA, ISM, LOG	EXCD HYSTERESIS	
S73	RTA	RTAf TRIGGER LOGIC INPUT TRUE LEVEL	[LOW, HIGH]
S74	LOG	ENABLE EXCD HISTORY	
S74	RTA	RTAF RUN MODE LOGIC INPUT TRUE LEVEL	[LOW, HIGH]

S75	LOG	EXCD EXCHANGE RATE	
S75	RTA	RTAf LOGIC OUTPUTS CONTROL SETTING	(BIT MAPPED WORD: 3 OUTPUTS BY 5 STATES)
S76	LOG	EXCD MINIMUM DURATION	
S76	RTA	RTAf END MODE	[NEVER, L<, L=, L>, INPUT, TIME, COUNT]
S77	LOG	EXCD TIME-HIST ENABLE	
S77	RTA	RTAf END LEVEL	(NNN.N) dB
S78	LOG	EXCD TIME-HIST PERIOD	
S78	RTA	RTAf END TIME	(SS.SSSS) SECONDS
S79	RTA	RTAf END SAMPLES	(NNNNN)
S80	LOG	EXCD Passby Trigger Mode	
S80	RTA	RTAf END LOGIC INPUT TRUE LEVEL	[LOW, HIGH]
S81	LOG	EXCD Occurrence Time [Start | Max]	
S81	RTA	RTAf END THEN, REPEAT MODE	[STOP, REPEAT, AVERAGE]
S82	LOG	TIMED EXCD PERIOD	MM:SS
S82	RTA	RTAf REPEAT COUNT	(NNN) O TO 255 TIMES
S83	SSA, LOG	ENABLE INTV HISTORY	
S83	RTA	RTAf AVERAGE COUNT	(N) 0 TO 9 TIMES
S84	SSA, LOG	INTV EXCHANGE RATE	
S84	RTA	RTAf ANNUNCIATOR	(CCCCCCCC) IF RIGHT DIGIT IS NUMERIC IT WILL AUTO-INCREMENT
S85	SSA, LOG	INTV THRESHOLD	

S85	RTA	RTAf RT-60 CALCULATION dB DOWN SETTING	[5, 10, 20, 30]
S86	SSA, LOG	INTV PERIOD	
S86	RTA	HORIZONTAL GRAPH SCALING	[1, 2, 3, 4, 6, 8, 11, 16, 23, 32, 45, 64, 90, 128, 181, 256, 362, 512, 724, 1024]
S87	SSA, LOG	INTV TIME SYNC	
S88	LOG	INTV SAVE Ln'S	
S90	SSA, LOG	INTV AUTO STOP	
S91	LOG	ENABLE TIME HIST	
S92	LOG	TIME HISTORY RESOLUTION	
S93	LOG	Other TIME HISTORY Level	
S94	LOG	TIME HISTORY PERIOD	
S95	LOG	TIME HISTORY PERIOD UNITS	
S96	LOG	HIST BASE	
S97	LOG	HIST BASE MODE	
S98	LOG	HISTOGRAM TABLE RESOLU-TION	
S99	LOG	ENABLE DAILY LDN HISTORY	
S100	LOG	SAVE 6 DAILY Ln VALUES	
S101	ALL	DATA REPORT	
S102	SSA, LOG	R/S AND CAL LOG	
S103	ALL	SETUP REPORT	

Histogram Reports

The RMS, Peak and UWPk histogram reports have been implemented with this revision. The unformatted reports have also been developed and the format is the level of the first bin followed by the number of samples in each bin (in hex, 0-9 & a–F). There are 1024 RMS bins and 128 Peak and UWPk bins, this corresponds to 1/8th dB resolution for RMS and 1dB resolution for the peak tables.

S104	LOG	SPL HISTOGRAM TABLE	(x)
S105	LOG	SPL HISTOGRAM TABLE LOW VALUE	(n)
S106	LOG	SPL HISTOGRAM TABLE HI VALUE	(n)
S107	LOG	SPL HISTOGRAM TABLE RESO-LUTION	(x)
S108	LOG	PEAK-II HISTOGRAM TABLE	(x)
S109	LOG	PEAK-II HISTOGRAM TABLE LOW VALUE	(n)
S110	LOG	PEAK-II HISTOGRAM TABLE HI VALUE	(n)
S111	LOG	PEAK-II HISTOGRAM TABLE RESOL	(x)
S112	LOG	PEAK-I HISTOGRAM TABLE	(x)
S113	LOG	PEAK-I HISTOGRAM TABLE LOW VALUE	(n)
S114	LOG	PEAK-I HISTOGRAM TABLE HI VALUE	(n)

S115	LOG	PEAK-I HISTOGRAM TABLE RESOL	(x)

Tailored Report

S116	RTA	EXCD REPORT	
S117	SSA, ISM, LOG	INTV REPORT	
S118	LOG	HIST REPORT	
S119	LOG	DAILY NOISE REPORT	
S120-142 Reserved settings			

Miscellaneous

S143	AUD	Audiometric Calibrator Mode [SLM/ RTA | FFT | Pulse/FM]	
S144	FFT	FFT Lines [100 | 200 | 400]	
S145	AUD, FFT	FFT Bandwidth [200 to 20KHz]	
S146	FFT	FFT Averaging Count (1 to 65535)	
S147	AUD, FFT	FFT Window Type [Rectangular | Hanning]	
S148	SSA, RTA, FFT, AUD, INT	RTA Gain (Range control for SLM/ RTA instruments) [-20 | -10 | +0 | +10 | +20 | +30 | +40 | +50]	
S149	SSA, AUD	RTA Detector Rate [Slow | Fast]	
S150	SSA, ISM, AUD	RTA BANDWIDTH [1/1 | 1/3]	
S151	ALL	Number of Allocated RAM Slots	
S152	ALL	ELECTROSTATIC ACTUATOR OFF/ON	

S153	ALL	HEATER LINE OFF/ON	
S154	ALL	MODEM MODE	
S155	ALL	MODEM DIAL OUT MODE	
S156	ALL	MODEM PHONE NUMBER	
S157	ALL	Monitor Number	
S158	ALL	MODEM INIT STRING	

Special Functions - Advanced use only. Remaining commands are not available on SETUP menu.

S159-166 Reserved settings			
S167	ALL	RELATIVE LEVEL REFERENCE	
S174	ALL	UNFORMATTED REPORTS	(x)
S175 Reserved setting			
S176	ALL	PRINTER TYPE	(x)
S177	ALL	DATA REPORT	(x)
S178	SSA, LOG	R/S AND CAL LOG	(x)
S179	ALL	SETUP REPORT	(x)
S180	LOG	RMS HISTOGRAM TABLE	(x)
S181	LOG	RMS HISTOGRAM TABLE LOWEST VALUE	(n)
S182	LOG	RMS HISTOGRAM TABLE HIGHEST VALUE	(n)
S183	LOG	RMS HISTOGRAM TABLE RESOLUTION	(x)
S184	LOG	PEAK-II HISTOGRAM TABLE	(x)

S185	LOG	PEAK-II HISTOGRAM TABLE LOWEST VALUE	(n)
S186	LOG	PEAK-II HISTOGRAM TABLE HIGHEST VALUE	(n)
S187	LOG	PEAK-II HISTOGRAM TABLE RESOL	(x)
S188	LOG	PEAK-I HISTOGRAM TABLE	(x)
S188	RTA	RTAf PRINT LIVE SUMMARY OR EVENT DATA	[NO, YES]
S189	LOG	PEAK-I HISTOGRAM TABLE LOW VALUE	(n)
S189	RTA	RTAf PRINT LEQ SUMMARY OR EVENT DATA	[NO, YES]
S190	LOG	PEAK-I HISTOGRAM TABLE HI VALUE	(n)
S190	RTA	RTAf PRINT MAX SUMMARY OR EVENT DATA	[NO, YES]
S191	LOG	PEAK-I HISTOGRAM TABLE RESOL	(x)
S191	RTA	RTAf PRINT MIN SUMMARY OR EVENT DATA	[NO, YES]
S192	LOG	EXCD REPORT	(x)
S192	RTA	EVENT WORKING REPORT ENABLE	[NO, SHORT, LONG]
S193	LOG, RTA	EXCD REPORT LOWEST RECORD	(n)
S194	LOG, RTA	EXCD REPORT HIGHEST RECORD	(n)
S195	SSA, ISM, LOG	INTV REPORT	(x)
S195	RTA	SPATIAL AVERAGE HISTORY REPORT ENABLE	[NO, YES]

S196	SSA, ISM, LOG	INTV REPORT LOWEST RECORD	(n)
S197	SSA, ISM, LOG	INTV REPORT HIGHEST RECORD	(n)
S198	LOG	HIST REPORT	(x)
S199	LOG	HIST REPORT LOWEST RECORD	(n)
S199	RTA	EVENT BYTIME REPORT LOWEST RECORD	[0 . . . 65535]
S200	LOG	HIST REPORT HIGHEST RECORD	(n)
S200	RTA	EVENT BYTIME REPORT HIGHEST RECORD	
S201	LOG	DAILY NOISE REPORT	(x)
S201	RTA	TEMPORARY NOTE FIELD FOR SPATIAL AVERAGE	[0 . . . 65535]
S202	ALL	CALIBRATION MODE [Off | Check | Change | Chk NF]	
S203	ALL	UNLOCK PASSWORD	
S204	ALL	SETUP FILENAME	
S205	ALL	ENABLE ERROR CHECKING I/O	

Error Checking I/O

The error checking I/O protocol verifies that commands and data are transferred without errors.

- To enable error checking the @ command or S205,1 command is used.
- To disable error checking two <CR> characters in a row may be sent (if not in the Modem Mode) or the S205, 0F command is sent.

The "F" is the check character for the S205, 0 command. A detailed description of the protocol is available from Larson•Davis and the latest revisions of software utilize the protocol.

S206 Reserved setting			
S207	ALL	NOISE FLOOR LEVEL	

This setting is set to the noise floor of the instrument so that it can properly indicate "Near Noise Floor" messages when within 10dB of the noise floor. It is also used with NF Compensate, Q208, which will place the System 824 in an extended Linearity Range Mode. The true noise floor of the entire system must be measured and entered in Q207. This will vary with the selected input weighting or microphone sensitivity. An equivalent microphone capacitance can be used after calibration to determine the noise floor. It may also be possible to remove the microphone bias to obtain this value. When properly set up the linearity range can be increased by 10dB.

NOTE: The mode is <u>always</u> turned off with a CAL Change.

S208	SSA, ISM, LOG	NOISE FLOOR COMP MODE	
S209 Reserved setting			
S210	ALL	AUX CONTROL REG	
S211	LOG	EXCD RECORD NUMBER	

S212	SSA, ISM, LOG, RTA	INTV RECORD NUMBER	
S213	LOG	HIST RECORD NUMBER	
S213	RTA	BYTIME HISTORY RECORD	(NNNNN)
S214	LOG	RUN-LOG RECORD NUMBER	
S215	LOG	DAILY RECORD NUMBER	
S216	LOG	CALIBRATION RECORD NUMBER	
S217	LOG	HISTOGRAM TABLE LEVEL	
S218	ALL	Data File Record Number	
S219	ALL	Graph Vertical Scale, dB per pixel	
S220	ALL	Graph Base Level (range from -99 to +999)	
S221	ALL	Request to send Output Control Mode	
S224	LOG, RTA	Start Level (nn) for Ln and ExTH	
S227	ALL	OVERALL CALIBRATION OFFSET (uses 225.48 lock)	
S230	ALL	BIAS OFFSET - For High Range Calibration (uses 225.48 lock)	
S231 Reserved setting			
S232	ALL	Temperature Calibration (Cal level must be 225.48)	
S233	ALL	SERIAL NUMBER Entry (secured setting)	
S234	ALL	Model Number Entry (secured setting)	
S235	ALL	Invalid Setting's data block	

S53	RTA	Filter Bandwidth [1/1 | 1/3]	
S54	RTA	Detector [Lin | Exp] Time Weighting	
S55	RTA	Linear Detector Time (ss.ssss) seconds	
S56	RTA	Exponential Detector Time [1/64 | 1/32 | 1/16 | ... 32 | 64]	
S57	RTA	Exponential Detector Sample Rate [1/2 | 1/8]	
S58	RTA	Auto-Store Records [No | Yes]	
S59	RTA	Event By-Time Pretrigger Samples (nnn)	
S60	RTA	Event Triggering Enable [No | Yes]	
S61	RTA	Trigger Source Level [12.5 | 16.0 |... | 16.0K | 20.0K | Flat] Hz	
S62	RTA	Store By-Time Samples of Event [No | Yes]	
S63	RTA	Arm Mode [... | L < | L = | Input | Time | Count]	
S64	RTA	Arm Level (nnn.n) dB	
S65	RTA	Arm Time (ss.ssss) Sec (for Level and Time Arm Mode Conditions)	
S66	RTA	Arm Samples (nnnnn)	
S67	RTA	Arm Logic Input TRUE Level [Low | High]	
S68	RTA	Trigger Mode [... | L < | L = | Input | Time | Count]	
S69	RTA	Trigger Level (nnn.n) dB	
S70	RTA	Trigger Time (ss.ssss) Sec	

S71	RTA	Trigger Samples (nnnnn)	
S72	RTA	Trigger Logic Input TRUE Level [Low | High]	
S73	RTA	Run via Logic Input [no, Yes]	
S74	RTA	Run Mode Logic Input TRUE Level [Low | High]	
S75	RTA	Logic Outputs Control Setting (bit mapped word: 3 outputs X 5 states)	
S76	RTA	End Mode [Never| L < | L = | Input | Time | Count]	
S77	RTA	End Level (nnn.n) dB	
S78	RTA	End Time (ss.ssss) Sec	
S79	RTA	End Samples (nnnnn)	
S80	RTA	End Logic Input TRUE Level [Low | High]	
S81	RTA	End Then, Repeat Mode [Stop | Repeat | Average]	
S82	RTA	Repeat Count (nnn) 0 to 255 times	
S83	RTA	Average Count (n) 0 to 9 times	
S84	RTA	Annunciator (cccccccc) if right digit is numeric it will auto-increment	
S85	RTA	RT-60 calculation dB down setting [5 | 10 | 20 | 30]	
S86	RTA	Horizontal Graph Scaling [1, 2, 3, 4 ... , 725, 1024]	
S188	RTA	Print Live Summary or Event Data [No | Yes]	
S189	RTA	Print Leq Summary or Event Data [No | Yes]	

S190	RTA	Print Max Summary or Event Data [No | Yes]	
S191	RTA	Print Min Summary or Event Data [No | Yes]	
S192	RTA	Event working report enable [No | Short | Long]	
S199	RTA	Event ByTime REPORT LOWEST RECORD	nnnnn
S200	RTA	Event ByTime REPORT HIGHEST RECORD	nnnnn
S213	RTA	ByTime History Record	(nnnnn)
S195	RTA	Spatial Average History Report Enable	
S201	RTA	Temporary Note Field for Spatial Average	
S139	RTA	FFT Repeat on Count complete [0 = No, 1 = Yes]	
S138	RTA	FFT Enable Overload Skipping [0 = No, 1 = Yes]	

History Records

Histories are records of stored data based on time or a particular event. One record is available at a time. The current record number is selected by using the Advance, Backup, and Find commands (see below) or the Setting S211 through S217.

The various histories of the System 824 are each accessed in a similar fashion. The Find command is the primary method of locating a history record for random (nonsequential) access. For example, to find the one hundred twenty-fifth Exceedance record you send the command F125,1 <cr> where the [,1] specifies that it is an Exceedance record to be found (as defined in the "history_number" column below). The Advance and Backup commands are generally used next. They extract data after the initial find command.

The Find command takes longer to execute as the record number increases in size, therefore, for sequential data extraction locate the first desired record with the Find command and then use the Advance command. The [,relative_rec] option can be used to retrieve data forward or backward from the current record number without changing that record number; it is a signed 8-bit value, i.e. 1 to 127 is positive 1 to 127 while 128 to 255 is -128 to -1 respectively. Refer to settings 211 through 217 to query the current record number. Setting these to a desired record

number is an alternate form of the Find command.

Brackets in the syntax indicate optional characters and operands.

<cr> = carriage return; <lf> = line feed

Types of History

Each history is assigned a number (history_number) so that it can be identified explicitly with the Advance, Backup, and Find commands and is shown below.

Denoted in syntax by history_number:
1=Exceedance (E)
2=Interval (I)
3=Daily (D)
4=Run Log (L)
5=Calibration (C)
6=Time (H)
7=Histogram Table (T)

Advance

Advance a number of records from present record number. If no num_record (number of records) is provided, 1 is assumed.

Syntax	Response
A[dvance][num_record][, history_number]	<cr><lf>
Example: A Example: A5 Example: A9,5	Advance current history 1 record Advance current history 5 records Advances calibration history by 9 records

Backup

Backup a number of records from present record number. If no num_record (number of records) is provided, 1 is assumed.

Syntax	Response
B[ackup][num_record][, history_number]	<cr><lf>
Example: B Example: B5 Example: B9,5	Backup current history by 1 record Backup current history by 5 records Backup the calibration history by 9 records from the current calibration history

Find

Find record number directly.

Syntax	Response
F[ind]num_record[, history_number]	<cr><lf>
Example: F9,5	Locates calibration history record 9

Generally you use the Find command to get to the first record (F1,2) and the Advance command (A) to move up through the records.

History Data Variables

Exceedance History Variables

Brackets in the syntax indicate optional characters and operands.

Syntax	Response
E[xceedance]var_no	Excd_var
Example: E9	__2 (Overload count from current record)

Commands	Instrument Type	Description	Commnet
E1	LOG RTA	Date and Time of Occurrence	ddmmmyy hh:mm:ss
E2	LOG, RTA	Duration	hh:mm:ss / mm:ss.ss
E3	LOG	TWA	nnn.n dB
E3,f	RTA	Leq Filter	
E4	LOG	SEL	nnn.n dB
E4,f	RTA	Max filter	
E5	LOG	Lmax	nnn.n dB
E5,f	RTA	Min Filter	
E6	LOG	Lpeak	nnn.n dB
E6	RTA	Overload	

Commands	Instrument Type	Description	Commnet
E7	LOG	UnWeighted Peak	nnn.n dB
E7	RTA	Pretrigger Samples	
E8	LOG	Peak Exceedance Count	nnn
E8	RTA	Trigger Samples	
E9	LOG	Overload Counts	nnn
E9	RTA	Total Samples	
E0	LOG	Illegal Indication	BEEP +"ILLEGAL"
E10	RTA	Pre/ Post Trigger indication	
E11,n	RTA	Sets ByTime Sample	If n<0, no change just report current sample
E12,f	RTA	By Time Sample Filter Level	
E13,n	RTA	ByTime Sample Time	
E14,n	RTA	By Time Sample Duration	
E15,n	RTA	By Time Overload	
E16	RTA	RT60 calculation at current filter. Filter set by E 3, E 4, E 5, or E 12.	
E17	LOG	Excd Time-Hist Samples	nnn
E17,n	RTA	Extracts ByTime History and returns nothing	
E18[n]	LOG	Excd Time-History	nnn.n dB
E18	RTA	RT60 delta time. *NOTE: Value is determined by prior E 16, or E 17.*	
E19<,n>	LOG	Excd T.H. Time	-sss.ss
E20<,n>	LOG	Excd T.H. Number	-nnn

Commands	Instrument Type	Description	Commnet
E21<,n>	LOG	Excd T.H. Bargraph	**********
E101	LOG	Excd Macro Variables 1-10, 25	Macro
E102	LOG	Excd Macro Time-Hist 17, 18...	Macro

Interval History Variables (“I” Commands)

The Interval History is a long-duration time history of statistical data. It is enabled by Setting 83, Interval Enable [No|Yes] (see Settings 83 through 90). The period of the interval is selectable from one second up to 99 hours, 59 minutes, and 59 seconds (99:59:59).

Brackets in the syntax indicate optional characters and operands.

Syntax	Response
I[nterval]var_no	Intv_var
Examples: I 1 I 1,-5 I1,5	 01Jan1997 01:25:00 01Jan1997 01:20:00 (from 5 previous) 01Jan1997 01:30:00 (from 5 after)

The time syncing feature can be used to synchronize the interval history records to the instruments real-time clock. If the Interval Period is set to the time shown in the first column below, the first interval of each new measurement will end at the real time indicated in the second column (the hh means any hour and the hh:m means any hour and tens of minutes). All subsequent intervals will now be synchronized to the real-time clock:

Intv Period	Sync On	Sync to nearest
01:00	hh:00	hour
00:30	hh:00, hh:30	half hour (30 minutes)
00:20	hh:00, hh:20, hh:40	one-third hour (20 minutes)
00:15	hh:00, hh:15, hh:30, hh:45	one-fourth hour (15 minutes)
00:10	hh:m0	one-sixth hour (10 minutes)
00:05	hh:m0, hh:m5	one-twelfth hour (5 minutes)
00:0x	hh:mm	minute

Commands	Instrument Type	Description	Comments
I0, I101	RTA	or variable greater that 4 will run macro by default.	
I1	SSA, LOG, RTA, FFT, TAL	Date and Time of Occurrence	ddmmmyy hh:mm:ss
I2	SSA, LOG, TAL	Duration	hh:mm:ss / mm:ss.ss

Commands	Instrument Type	Description	Comments
I2	RTA	Number of Samples Averaged	nnnn
I2	FFT	Count	nnn
I3	SSA, LOG	TWA	nnn.n dB
I3	RTA	Spectral or Flat Level (n=ANSI filter#)	nnn.n dB
I3	FFT	OVER LOAD	cccc
I3	TAL	Overload Counts	nnn
I4	SSA, LOG	SEL	nnn.n dB
I4	RTA	Note Field	cccccccc
I4	FFT	Overall Level	nnn.n
I4	TAL	Mode [SLM | RTA | Tonal]	
I5	SSA, LOG	Lmin	nnn.n dB
I5,n	FFT	FFT Line Level (n=0 to 400)	nnn.n
I5,n	RTA	RTA Live Spectrum Level	nnn.n dB
I6,n	RTA	RTA Leq Spectrum Level	nnn.n dB
I6	SSA, LOG	Lmax	nnn.n dB
I7	SSA, LOG	Lpeak	nnn.n dB
I8	SSA, LOG	UnWeighted Peak	nnn.n dB
I9	SSA, LOG	RMS Exceedance Count	nnn
I10	SSA, LOG	Peak Exceedance Count	nnn
I11	SSA, LOG	UnWeighted Peak Excd Count	nnn
I 12	SSA, LOG	Overload Counts	nnn
I13	LOG	Intv Ln 1 Percent	nn

Commands	Instrument Type	Description	Comments
I14	LOG	Intv Ln 1 Level (dB)	nnn.n
I15	LOG	Intv Ln 2 Percent	nn
I16	LOG	Intv Ln 2 Level (dB)	nnn.n
I17	LOG	Intv Ln 3 Percent	nn
I18	LOG	Intv Ln 3Level (dB)	nnn.n
I19	LOG	Intv Ln 4 Percent	nn
I20	LOG	Intv Ln 4 Level (dB)	nnn.n
I21	LOG	Intv Ln 5 Percent	nn
I22	LOG	Intv Ln 5 Level (dB)	nnn.n
I23	LOG	Intv Ln 6 Percent	nn
I24	LOG	Intv Ln 6 Level (dB)	nnn.n
I37,n	SSA	RTA Filter Leq (n = ANSI filter#)	nnn.n dB
I38,n	SSA	RTA Filter Leq (n = ANSI filter#)	nnn.n dB
I101	SSA, LOG	Intv Macro Variables	1-12, 37-38
I101	RTA	Macro 1 to 4	

"I" Commands for Basic SLM Mode:

Commands	Instrument Type	Description	Comments
I5,n	SSA, LOG	Any SPL; n=1 to 9	nnn.n
I6,n	SSA, LOG	Any Max; n=1 to 9	nnn.n
I7,n	SSA, LOG	Any Leq; n=1 to 9	nnn.n

Commands	Instrument Type	Description	Comments
I8	SSA, LOG	LAFTM5 (Takt5 A Fast)	nnn.n
I9	SSA, LOG	Intv Impulse A Leq (dB)	nnn.n
I10	SSA, LOG	Intv Ln 1 Percent	nn
I11	SSA, LOG	Intv Ln 1 Level (dB)	nnn.n
I12	SSA, LOG	Intv Ln 2 Percent	nn
I13	SSA, LOG	Intv Ln 2 Level (dB)	nnn.n
I14	SSA, LOG	Intv Ln 3 Percent	nn
I15	SSA, LOG	Intv Ln 3 Level (dB)	nnn.n
I16	SSA, LOG	Intv Ln 4 Percent	nn
I17	SSA, LOG	Intv Ln 4 Level (dB)	nnn.n
I18	SSA, LOG	Intv Ln 5 Percent	nn
I19	SSA, LOG	Intv Ln 5 Level (dB)	nnn.n
I20	SSA, LOG	Intv Ln 6 Percent	nn
I21	SSA, LOG	Intv Ln 6 Level (dB)	nnn.n
I22,n	SSA, LOG	Differences 0 to 2 [LAFTM5 - LAeq | LCeq - LAeq | LAIeq - LAeq]	

“I” Commands for Tonal Mode:

Commands	Instrument Type	Description	Comments
I5	TAL	Ftone	nnnnn Hz
I6	TAL	Dfc	nnnnn Hz
I7	TAL	Ltone	nnn.n dB

Commands	Instrument Type	Description	Comments
I8	TAL	Lgroup	nnn.n dB
I9	TAL	Ltone-Lgroup	nnn.n dB

Daily History Variables - (D1-D102)

Brackets in the syntax indicate optional characters and operands.

Syntax	Response
D[aily]var_no[,hour]	daily_var
Example: D5, 5	hourly noise level for hour 5 to 5:59:59 a.m.

D 1	LOG	Date	ddd ddmmmyyyy
D 2	LOG	Daily Leq	nnn.n dB
D 3	LOG	Daily LDN	nnn.n dB
D 4	LOG	Daily CNEL	nnn.n dB
D 5,hn	LOG	HNL (for hour 0-23)	nnn.n dB
D 6,hn	LOG	HNL partial hour indicator	c
D 7	LOG	Daily Lmin	nnn.n dB
D 8	LOG	Daily Lmax	nnn.n dB
D 9	LOG	Daily Lpeak	nnn.n dB
D 10	LOG	Daily Luwpk	nnn.n dB
D 11	LOG	Daily Run Time	hh:mm:ss | mm:ss.ss
D 19	LOG	Daily Ln Table in hexadecimal	hhhhhh, hhhhhh,...hhhhhh <ih>

D 20	LOG	Intv Ln 1 Percent	nn
D 21	LOG	Intv Ln 1 Level (dB)	nnn.n
D 22	LOG	Intv Ln 2 Percent	nn
D 23	LOG	Intv Ln 2 Level (dB)	nnn.n
D 24	LOG	Intv Ln 3 Percent	nn
D 25	LOG	Intv Ln 3Level (dB)	nnn.n
D 26	LOG	Intv Ln 4 Percent	nn
D 27	LOG	Intv Ln 4 Level (dB)	nnn.n
D 28	LOG	Intv Ln 5 Percent	nn
D 29	LOG	Intv Ln 5 Level (dB)	nnn.n
D 30	LOG	Intv Ln 6 Percent	nn
D 31	LOG	Intv Ln 6 Level (dB)	nnn.n
D 32,h	LOG	Intv Ln 1 Percent	nn
D 33,h	LOG	Hourly EXCD Leq (h=hour=0-23)	nnn.n dB
D 101	LOG	Hourly BkGd Leq (h=hour=0-23)	nnn.n dB
D 102	LOG	Daily HNLs 5(0-23),6(0-23)	Macro

Run Log Variables (SSA, ISM, LOG, TAL)

Brackets in the syntax indicate optional characters and operands.

Syntax	Response

L[og]var_nolog_var	
Example: L1	Run/Stop number

L 1	Run/Stop Number	nnnnn
L 2	Run/Stop Type	(RUN/STOP/CONT/PAUSE/MARK)
L 3	Cause	(TIMER/KEY/A:D-n/HALT/INTV/ BATT)
L 4	Day, Date and Time	ddd ddmmmyyyy hh:mm:ss
L 101	Run-Log Macro Variables L1-L5	Macro

Calibration History Variables (LOG)

Brackets in the syntax indicate optional characters.

Syntax	Response
C[alibration]var_no	cal_var
Example: C1	114.0 (checked level)

C 1	Checked Level	nnn.n
C 2	Day, Date and Time	ddd ddmmmyyyy hh:mm:ss
C 3	Calibration Mode	[Manual/Auto]
C 4	Cal Status	[OK/Bad]
C 101	Cal Variables 1-4	Macro

Brackets in the syntax indicate optional characters and operands.

H 1	SSA, LOG, TAL	Leq (RMS Level)	nnn.n dB
H 2	LOG	Other level (Pk-I, Pk-II, or Lmax)	nnn.n If Other Level is set to Advc then “ ” “—”
H 3	SSA, LOG, TAL	Run time of sample	hhhhh:mm/hh:mm:ss/mm:ss.ss
H 4	SSA, LOG, TAL	HISTORY BARGRAPH	==========-----
H 5, n	SSA, LOG, TAL	Return the advanced value where ‘n’ comes from a list of available levels	The optional parameter ‘n’ is available only when advanced time history is enabled. When ‘n’is omitted or 0, all enabled values are transmitted
H 6, n	SSA, LOG, TAL	Return descriptive text for the advanced level	‘n’ is an optional parameter, when it is omitted or equals 0, the descriptive text for all enabled levels is returned.
H 7, n	SSA	Return RTA Leq/Live data from an advanced time history.	‘n’ is the ANSI filter number for requesting a single filter level. When ‘n’ is omitted or equals 0, all filter levels are transmitted.
H 101	SSA, LOG, TAL	Same as doing an H 1 + H 5, 0	
H 102	SSA, LOG, TAL	Same as doing an H 1 and H 6, 0	

For the LOG instrument type H5 and H6 are for when “Other Level” setting is set to [Advc] to enable the advanced time history.

Time History Variables (SSA, LOG, TAL)

Brackets in the syntax indicate optional characters and operands.

Syntax	Response
H[istory]var_no	time_var
H2	123.4 (Peak level in current record)

H 1	Leq (RMS Level)	nnn.n dB ‘n’
H 2	Peak Level	nnn.n dB
H 3	Run Time of Sample (calc)	hhhhh:mm/hh:mm:ss/mm:ss.ss
H 4	HISTORY BARGRAPH	==========-----

Histogram Table Variables

Brackets in the syntax indicate optional characters and operands.

Table:

- 1=RMS,
- 2=Peak,
- 3=Unweighted Peak.

Default is last used table or RMS.

Syntax	Response

T[able]var_no[, table]	table_var
Example: T1,1	-75.0 (RMS current bin level)

T 1 [n[a]]	LOG	Level of current bin	nnn.n dB
T 2 [n]	LOG	Count of samples	nnnnnc (c= K or M for Kilo or Mega)
T 3 [n]	LOG	Percent of total	nnn.nn%
T 5 [n]	LOG	Prints the accumulated time for the current level/bin. The table number is optional.	hhhhh:mm:ss.s
T n+64	LOG	Shows total of bins less than this level	
T n+128	LOG	Shows total of bins greater than this level, plus resolution	

a. Where n equals the table number: 1-RMS, 2-Peak, & 3-UnWeighted Peak.

Print Command

Brackets in the syntax indicate optional characters.

<cr> = carriage return; <lf> = line feed

Syntax	Response
P[rint]print_no	<cr><lf>

Example: P1	Data Report is printed to computer.
P9 S177,1 S178,1 S192,1 P100	(1) sets all report enables in setup to [No] (2) sets the Data report, Run-log, and EXCD report enables (short) to [Yes] and (3) begins printing to the computer

Syn-tax	Instrument Type	Description
P 0	ISM, SSA, LOG, RTA	Tailored Report (Formatted from normal setup settings 89-113)
P 1	ISM, SSA, LOG, RTA	Data Report
P 2	SSA, LOG	Data & Histograms
P 3	SSA, LOG	Short Full Report (Histories with SHORT option)
P 4	SSA, LOG	Long Full Report (Histories with LONG option)
P 9	ISM, SSA, LOG, RTA	All Report Enables Turned OFF
P 10	SSA, LOG	Select All except Histograms in Unformatted Style
P 11	SSA, LOG	Select All including Histograms in Unformatted Style
P 100	ISM, SSA, LOG, RTA	Begin Printing through current I/O command channel (See X100 Command)
P 101	ISM, SSA, LOG, RTA	Begin Printing through channel selected by “Print Command”
P 999	ISM, SSA, LOG, RTA	Abort Printing

X 100	ALL	XMODEM Begin Printing (same as P100 except through the XMODEM communication protocol) Use with UnFormatted Reports to download a file to be viewed in a spreadsheet program. Also use this to download reports for printing on a computer's printer, rather than directly from the 824; this lets reports to be printed on a nice laser printer connected to a computer without having to disconnect it from the computer.
^X^X	ISM, SSA, LOG, RTA	CANcel transfer mode, 2 in a row (ASCII <CAN> or CHR$(24))

Error Messages and Warnings

The code listed is the number provided by R98.

All error messages begin with: CHR$(7), "ERROR - "

Error Code	Message
1	"COUNT OVERFLOW"
2	"EXPONENTIAL OVERFLOW"
3	"RTX TASK SELECT"
4	"BAD EXCHANGE RATE"
5	"UNKNOWN IRQ"
6	"WATCHDOG RESET"
7	"RAM BANK"
8	"OPCODE ERROR"

All warning messages begin with:
CHR$(7), “WARNING - ”

Warning Code	Message
128	“Out of Memory”
129	“Divide by Zero”
130	“Battery Low”
131	“POWER FAILURE”
132	“External Power Failure”
133	“Power Off”
134	“Time Not Set!”
135	“Timer Pending”
136	“Printer is Busy”
137	“DPC Format”
138	“Key No Effect”
139	“Stop Required”
140	“Setting Wrong”
141	“Overall Reset Required”
142	“OPEN #”
143	“Already Open”
144	“No History Yet”
145	“At End of History”
146	“At Start of History”
147	“History Format Bad”

148	“EEPROM Fault”
149	“Out of Memory”
150	“Memory was Lost”
151	“Unimplemented”
152	“System Locked”
153	“A:D Stack Full”
154	“A:D Over-Run”
155	“Serial Port Framing”
156	“Serial Port Line Noisy”
157	“Serial Port Over-Run”
158	“Unknown I/O Command”
159	“Operand 1 Range”
160	“Operand 2 Range”
161	“I/O Overflow”
162	“Can’t Calibrate”
163	“Calibration Invalid”
164	“Analog Calibration Bad”: often an indication of a faulty EPRM
165	“ID is Active”
166	“ID is in ROM’”
167	“ID is Read Only”
168	“ID is in a File”
169	“ID has Changed”
170	“ID Space Full”
171	“Purge Required”

172	“No Data”
173	“Not Available”
174	“Demo Mode”
175	“Setting Conflict”

Modem Control Mode (All Instruments)

The modem control mode enables the Model 824 to automatically dial out upon an exceedance or a low memory condition. This mode also enables the Model 824 to answer the phone so that instructions can be received. The modem must be Hayes (TM) compatible and set to respond to commands using numeric codes (non-verboses).

Modem Mode

If the Modem Mode is [Yes], the Model 824 will dial the Phone# on the events selected by the Dial Out Mode defined below.

Dial Out Mode

- None: The Model 824 will not dial a computer for any reason.
- Excd: The Model 824 will dial a computer to report when an illegal exceedance is logged into memory. An illegal exceedance is when Excd Lmax > RMS Excd Level 2. The phone will also be dialed if the memory is low.

- Phone#: The valid characters in Phone# are those recognized by the modem to which the Model 824 is attached and generally include:

W	will wait for another dial tone
P	selects pulse dialing
T	selects tone dialing
,	will pause dialing for 2 s
space or -	used to make the number more readable.
T9W 1-412-555-1212	indicates to use tone dialing, dial 9 for an outside line, wait until the dial tone is detected, and then dial the number.

Monitor Number

The monitor number is used to specifically address the monitor.

824 Phone Dialing Procedure

The Model 824 dialing process is as follows:

Example: `824 sends: ATDT 1-555-1234(Enter)`

Modem sends: 824A0123:001:2 (Enter)

Step 1 The Model 824 recognizes an exceedance or low memory condition.

Step 2 The Model 824 asks the modem to dial the phone number.

Step 3 The modem informs the Model 824 that a connection has been made. The Model 824 modifies its baud rate to that of the connected modem. If the connection is unsuccessful, the procedure is retried in 4 min.

Step 4 The Model 824 sends the following announcement: "*824: 824A0123:001:2*" (enter), where (0123) is the Model 824's serial number, (001) is

the monitor number entered, and (2) is a flag: 1-Alarm 2-Exceedance 4-Low Memory. More than one of these can be set at a time, in which case x is the sum of all set flags.

Computer sends: 824A0123:11111111

Step 5 The Model 824 awaits a response code, which should be: "824A0123:11111111" (enter), where (0123) is the Model 824's serial number and (11111111) is the Lock Combination (setting 28) which is required whether or not the Model 824 is currently locked. If the response is incorrect, the announcement is resent. Four chances are given to respond correctly. A "3 cr" sequence will cause the Model 824 to hang up.

824 sends: "Ready"

Step 6 When a correct response is received, the Model 824 indicates it is ready to send data when requested with "824:Ready"(enter).

Model 824 Answering Procedure

Modem sends: 2

Step 1 The modem informs the Model 824 that a connection has been requested; that is, the phone is ringing.

Step 2 The Model 824 answers the phone.

Modem sends: 824A0123:001:0

Step 3 The modem informs the Model 824 that a connection has been made. The Model 824 modifies its baud rate to that of the connected modem. If the connection is unsuccessful, the procedure is retried in 4 min.

Modem sends: 10 (enter)

Step 4 The Model 824 sends the following announcement: "824:824A0123:001:0" (enter), where (0123) is the Model 824's serial number, (001) is the monitor number entered, and (0) is a flag: 1-

Alarm 2-Exceedance 4-Low Memory. More than one of these can be set at a time, in which case x is the sum of all set flags.

Computer sends: 824A0123:11111111

Step 5 The Model 824 awaits a response code, which should be: “824A0123:11111111” (enter), where (0123) is the Model 824’s serial number and (11111111) is the Lock Combination (setting 28) which is required whether or not the Model 824 is currently locked. If the response is incorrect, the announcement is resent. Four chances are given to respond correctly. A “3 cr” sequence will cause the Model 824 to hang up.

824 sends: “Ready”

Step 6 When a correct response is received, the Model 824 indicates it is ready to send data when requested with “824: Ready” (enter).

Each line ends with a <CR> and line feed <LF>.

Unsupported Miscellaneous Commands

NOTE: Use of these commands is up to the discretion of the programmer, they are considered undocumented and unsupported. Larson Davis makes NO warranties for their proper operation and is unable to support them with further documentation or through customer support. They are used by proprietary Larson Davis software and are documented here on an as-is basis for those who may desire to explore, unaided, these advanced features.

The operation of these commands is subject to change without notice of any kind.

X 16x	XMODEM binary data dump, x = bit flags; Add 1 to 'x' to automatically reset histories at completion of transfer Add 2 to 'x' to inhibit the pause just before sending OverAll data (the pause provides for cohesive data) Add 4 to 'x' to begin where last download ended (always starts at the beginning of stored data if not set) Add 8 to 'x' to disable waiting for acknowledgment at the end of each block transfer (used with error checking modems, i.e. MNP 4 or V.42) Add 16 to enable the Xmodem download at 57.6 kilobaud (Comm. Port 1 ONLY). The resulting binary file structure is undocumented and unsupported. The advantages of the binary features can be obtained by utilizing Larson•Davis software (turnkey application, data translators or function library support is available).
^X^X	CANcel transfer mode, 2 in a row (ASCII <CAN> or CHR$(24)).
>a,b	Read 824's memory from address (a) and bank (b)

^	Read Excd T.H. Buffer. This command is used to create an SPL vs. Time plot that is time cohesive. Resolution is, by default, 1 dB with one byte/sample being sent. Each byte has 32 added to it to avoid confusion with ASCII control codes, subtract 32 to use. Only the samples taken since the last read are sent, up to the buffer size of 128 samples. The time of day is appended to the end of the string to permit time stamping of the SPL graph. A delimiter byte (ASCII 212 in decimal, which is the letter "T" with 128 added to it) precedes the time string. Full resolution including the fractional part of the level is sent if enabled by the M9,1 command. With full resolution, 2 bytes per level are sent. The first byte being the integer portion, which is the same as described above. The second byte is the fractional portion. it is converted by subtracting 32 from the byte and then dividing it by 128 to make it a fraction. The fractional part is then added to the integer part to form the level.
@	Enable IO Error Check Scheme. S205,0F or 2 <CR> in a row to disable.

Data File Commands

The &F I/O command reads out information about stored data or FILES and has facilities to store and recall files. These work in conjunction with Advance, Backup and Find to navigate through the File records of this history (just like Intervals).

&F1	FILE NAME	cccccccc
&F2	FILE EXTENSION (InstType)	ccc
&F3	FILE DESCRIPTION	ccccccccccccccccccccccccccccc
&F4	CURRENT START TIME	ddmmyy hh:mm:ss
&F5	CURRENT END TIME	ddmmyy hh:mm:ss
&F6	OVERALL START TIME	ddmmyy hh:mm:ss
&F7	OVERALL END TIME	ddmmyy hh:mm:ss
&F8	SIZE OF FILE	nnnnnnn

&F101	Read macro &F variables 1 through 8	
&F102	Recall a FILE into active memory	
&F103	Store the current data (in active memory) to a FILE	

Keyboard Simulation

The keys on the 824's keyboard may be simulated with the 'K' I/O command.

Each key is given an ASCII character as shown in the table below.

A space delimiter following the 'K' is required before non-numeric operands. (i.e. K ;6<)

The keyboard buffer will hold up to 8 keys. (K12345678 is acceptable).

ASCII Character:	Key that is simulated:
0	CHECK KEY
1	POWER KEY
2	RESET KEY
3	PAUSE KEY
4	RUN/STOP KEY
5	UP ARROW
6	DOWN ARROW

7	LEFT ARROW
8	RIGHT ARROW
9	FUNCTION KEY #1 (VIEW)
:	FUNCTION KEY #2 (DATA)
;	FUNCTION KEY #3 (SETUP)
<	FUNCTION KEY #4 (TOOLS)
=	FUNCTION KEY #5 (PRINT)

Operation Notes

When using the Logic Input line in the 'LEVEL' mode both I/O and keyboard Runs and Stops are inhibited. If the line is High the 824 takes data and if the line is Low no data is taken. The 'Pause' mode will pause the data taking process while the line is high; this may be triggered by high wind speed. In the 'Toggle' mode when the Logic Input line goes high the 824 toggles between RUN and STOP modes.