

*E**Memory Usage*

The System 824 has a memory size of 2 MB. This is generally more than adequate for measurements performed on a day-by-day basis. However, for applications such as noise monitoring where measurements are performed and stored automatically over a period of days or weeks, it is important to be able to calculate the rate at which memory will be consumed in order to download data before the memory capacity is reached. The information in this Appendix will be useful to accomplish this task. Memory usage for the LOG and SSA instruments will be presented separately. An example in the form of a Memory Usage Worksheet will be included for the LOG instrument.

LOG Memory Usage

Each of the 824's History Functions use space out of a common memory. The amount each record takes is based on the options selected. The following information is provided to assist in determining the amount of data that can be stored according to the option desired. The example will be show assuming that all of the memory is available for one measurement though many measurement files may be stored at one time.

Exceedance Records (Exceedance History Enabled)]

| Options — add bytes shown if enabled | Bytes |
|---|---|
| Basic Exceedance Record | 32 |
| Excd Time-Hist=[Yes] Ten sample prior to and up to ten following the event will be stored. | +21 plus number of samples based on length of event (129 bytes max) |
| Binary Accumulator and Count Enabled by "Store Complete Histogram" on "Daily" tab in 824 Utility | +16 |
| Wind/Tach = [Yes] | +3 |

Table E-1: LOG Memory Use: Exceedance Records

Interval Records (Intv History Enabled)

| Options — add bytes shown if enabled | Bytes |
|---|-------|
| Basic Interval Record | 34 |
| Intv Save Ln's=[Yes] | +18 |
| Intv Ln Table Enabled by "Store Complete Histogram" setting on "Interval" tab of 824 Utility | +384 |
| Wind/Tach = [Yes] | +5 |

Table E-2: LOG Memory Use: Interval Records

Daily Records (Daily History Enabled)

| Options — add bytes shown if enabled | Bytes |
|---|-------|
| Basic Daily Record | 175 |
| Save Daily Ln's=[Yes] | +18 |
| Daily Ln Table Enabled by "Store Complete Histogram" on "Daily" tab in 824 Utility | +440 |
| Wind/Tach = [Yes] | +19 |

Table E-3: LOG Memory Use: Daily Records

Time History Records (Time History Enabled)

| Options | | Bytes per record |
|-----------------|---------------------------|--|
| Hist Resolution | Other Level | |
| [1.0dB] | [No] | 1 |
| [0.1dB] | [No] | 2 |
| [1.0dB] | [Peak UwPk Max] | 2 |
| [0.1dB] | [Peak UwPk Max] | 4 |
| [1.0dB] | [AdvC] | 1 plus number of ✓ (enabled levels) |
| [0.1dB] | [AdvC] | 2 plus 2 times each ✓ (enabled levels) |
| [1.0dB] | [AdvC], Wind/Tach = [Yes] | 2 |
| [0.1dB] | [AdvC], Wind/Tach = [Yes] | 4 |

Table E-4: LOG Memory Use: Time History Records

Other Histories and Memory Usage

| Other Histories and Memory Usage | bytes |
|--|---------------------|
| Run Log History | 20 bytes per record |
| Calibration Log History | 17 bytes per record |
| LOG File (Store) with Wind/Tach = [No] | 7423 each |
| LOG File (Store) with Wind/Tach = [Yes] | 7481 each |

Table E-5: LOG Memory Use: Other Histories and Memory Usage

Estimating Memory Usage:

The easiest way to estimate the memory usage is to work on a time basis such as one day. Estimate how many Exceedances will occur in a normal day. Calculate the number of Interval, Time History, Daily, Run Log and Calibration Check records that will be performed in a day. Based on the options chosen calculate the number of bytes required for each record type and multiply by the number of records expected per day, sum these values and this is the number of bytes required per day. Divide this value into the amount of available memory in the 824 (see Tools | Memory display, generally about two million) and this is the number of days that can be gathered.

As an example, let's assume a job requires monitoring the noise made by trucks coming and going from a factory near a residential area. From an initial site survey it is discovered that all trucks are over 65dBA at the boundary of the road and residential property and that there seems to be a truck passing the site every 3 minutes. The occupants of the residential area want to know how many trucks are traveling this road and why they are disturbed by more than others. The Exceedance Function will be used to detect events over 65dBA and there are 20 events per hour expected or 240 per day (20 events/hour time 12 hours/day) assuming that the plant operations will be reduced during the night. Each event is expected to last 20 seconds and the Excd T.H rate is 1 sample per second. Statistics based on hourly intervals and a one minute time history are desired to identify disturbance patterns. The time history will give the A weight Leq normally and we will also get the A Lmax, C Leq and C Lmax. The following completed worksheet shows the calculations for this example:

| | | | |
|--|--|--------|--------------|
| Excd Time-Hist <small>1 = standard time of samples, 0.29 bytes in a/c</small> | 21+n <small>20sec/Excd</small> | ✓ | 41 |
| TOTAL Bytes / Excd | Add lines 1 & 2 | | 78 |
| Anticipated Excd / Day | Enter Number | | 240 |
| TOTAL Excd Bytes / Day | Multiply lines 3 & 4 - copy to line 25 | | 18,720 |
| Interval Memory Calculation | Bytes | ✓ Used | Bytes Needed |
| Basic Interval Record | 34 | ✓ | 34 |
| Intv Save Ln's | 18 | ✓ | 18 |
| Intv Save Ln Table | 384 | | 0 |
| TOTAL Bytes / Intv | Sum lines 6 to 8 | | 57 |
| Anticipated Intv / Day | Enter Number Calculated | | 24 |
| TOTAL Intv Bytes / Day | Multiply lines 10 & 11 - copy to line 26 | | 1,368 |
| Daily History Memory Calculation | Bytes | ✓ Used | Bytes Needed |
| Basic Daily Record | 175 | ✓ | 175 |
| Daily Save 6 Ln Values | 18 | ✓ | 18 |
| Daily Save Ln Table | 440 | | 0 |
| TOTAL Daily Bytes / Day | Sum lines 12 to 14 - copy to line 27 | | 312 |

| Time History Memory Calculation | | | | |
|---------------------------------|---|---------------------|--|--|
| Line | Resolution | Other Level | | Bytes per record / Used |
| 16 | [1.0dB] | [None] | | 1 |
| 17 | [0.1dB] | [None] | | 2 |
| 18 | [1.0dB] | [Pk-II] Pk-I Lmax] | | 2 |
| 19 | [0.1dB] | [Pk-II] Pk-I Lmax] | | 4 |
| 20 | [1.0dB] | [Advc] | 1 plus number of <input checked="" type="checkbox"/> (enabled levels) | Calculate |
| 21 | [0.1dB] | [Advc] | 2 plus 2 times each <input checked="" type="checkbox"/> (enabled levels) | Calculate <i>A Leg & Max, C 8 T</i> <i>Leg & Max</i> |
| 22 | TOTAL bytes / Hist Record | | Select the appropriate number of bytes from lines 16 to 21 above | <i>8</i> |
| 23 | Hist Records / Day <small>24 hours divided by Hist Period in hours</small> | | Enter Number Calculated i.e. 24/(60 sec/3600 sec per hour)= <u>1440</u> | <i>1,440</i> |
| 24 | TOTAL Hist Bytes / Day | | Multiply lines 22 & 23 – copy to line 28 | <i>11,520</i> |
| Memory Use per Day Calculation | | | Bytes | |
| 25 | Exceedance History bytes / day | | from line 5 <i>18,720</i> | |
| 26 | Interval History bytes / day | | from line 11 <i>1,368</i> | |
| 27 | Daily History bytes / day | | from line 22 <i>312</i> | |
| 28 | Time History bytes / day | | from line 29 <i>11,520</i> | |
| 29 | Run Log bytes / day <small>n = number of Run Log records / day</small> | | <u>2</u> x 20 = <small>n x 20 bytes/record</small> <i>40</i> | |
| 30 | Calibration Log bytes / day <small>n = number of Cal Log records / day</small> | | <u>1</u> x 17 = <small>n x 17 bytes/record</small> <i>17</i> | |
| 31 | Setup RAM Registers bytes used <small>n = number of registers stored</small> | | <u>0</u> x 506 = <small>n x 506 bytes/record</small> <i>0</i> | |
| 32 | TOTAL bytes used / day | | Sum lines 25 to 31 <i>31,977</i> | |
| 33 | 824's Memory Size ≈2,000,000 | | see TOOLS Memory Enter total memory shown <i>2,047,485</i> | |
| 34 | TOTAL Run Time in days until out of memory | | divide line 38 by line 37 <i>64 days</i> | |

Table E-6: Example LOG Memory Usage Calculation:

824-LOG Memory Usage Worksheet

| Line | Exceedance Memory Estimation | Bytes | Used | Bytes Needed |
|------|---|--|------|--------------|
| 1 | Basic Exceedance Record | 32 | | |
| 2 | Excd Time-Hist <small>n=estimated number of samples (129 bytes max)</small> | 21+n | | |
| 3 | Wind/Tach=[Yes] | 3 | | |
| 4 | TOTAL Bytes / Excd | Add lines 1 thru 2 | | |
| 5 | Anticipated Excd / Day | Enter Number | | |
| 6 | TOTAL Excd Bytes / Day | Multiply lines 4 & 5 – copy to line 30 | | |

| Line | Interval Memory Calculation | | Bytes | Used | Bytes Needed |
|---------------------------------|---|----------------------|--|-------------------------|--------------|
| 7 | Basic Interval Record | | 34 | | |
| 8 | Intv Save Ln's | | 18 | | |
| 9 | Intv Save Ln Table | | 384 | | |
| 10 | Wind/Tach=[Yes] | | 5 | | |
| 11 | TOTAL Bytes / Intv | | Sum lines 7to 10 | | |
| 12 | Anticipated Intv / Day | | Enter Number Calculated | | |
| 13 | TOTAL Intv Bytes / Day | | Multiply lines 11& 12- copy to line 31 | | |
| Line | Daily History Memory Calculation | | Bytes | Used | Bytes Needed |
| 14 | Basic Daily Record | | 175 | | |
| 15 | Daily Save 6 Ln Values | | 18 | | |
| 16 | Daily Save Ln Table | | 440 | | |
| 17 | Wind/Tach=[Yes] | | 19 | | |
| 18 | TOTAL Daily Bytes / Day | | Sum lines 14to 17- copy to line 32 | | |
| Time History Memory Calculation | | | | | |
| Line | Resolution | Other Level | | Bytes per record / Used | |
| 19 | [1.0dB] | [None] | | 1 | |
| 20 | [0.1dB] | [None] | | 2 | |
| 21 | [1.0dB] | [Pk-ll][Pk-I] Lmax] | | 2 | |
| 22 | [0.1dB] | [Pk-ll][Pk-I] Lmax] | | 4 | |
| 23 | [1.0dB] | [AdvC] | 1 plus number of ✓ (enabled levels) | Calculate | |
| 24 | [0.1dB] | [AdvC] | 2 plus 2 times each ✓ (enabled levels) | Calculate | |
| 25 | [1.0dB] | [AdvC] | Wind/Tach=[Yes] | 2 | |
| 26 | [0.1dB] | [AdvC] | Wind/Tach=[Yes] | 4 | |
| 27 | TOTAL bytes / Hist Record | | Select the appropriate number of bytes from lines 19to 26above | | |
| 28 | Hist Records / Day <small>24 hours divided by Hist Period in hours</small> | | Enter Number Calculated i.e. 24/(60 sec/3600 sec per hour)=1440 | | |
| 29 | TOTAL Hist Bytes / Day | | Multiply lines 27& 28- copy to line 33 | | |
| Line | Memory Use per Day Calculation | | | Bytes | |
| 30 | Exceedance History bytes / day | | from line 6 | | |
| 31 | Interval History bytes / day | | from line 13 | | |
| 32 | Daily History bytes / day | | from line 18 | | |
| 33 | Time History bytes / day | | from line 29 | | |
| 34 | Run Log bytes / day <small>n = number of Run Log records / day</small> | | ____ x 20 = <small>n x 20 bytes/record</small> | | |
| 35 | Calibration Log bytes / day <small>n = number of Cal Log records / day</small> | | ____ x 17 = <small>n x 17 bytes/record</small> | | |
| 36 | Setup RAM Registers bytes used <small>n = number of registers stored</small> | | ____ x 506 = <small>n x 506 bytes/record</small> | | |
| 37 | TOTAL bytes used / day | | Sum lines 30 to 36 | | |
| 38 | 824's Memory Size ≈2,000,000 | | see TOOLS Memory Enter total memory shown | | |
| 39 | TOTAL Run Time in days until out of memory | | divide line 38 by line 37 | | |

Table E-7: LOG Memory Usage Worksheet

824-SSA Memory Usage

Interval Records (Intv History Enabled)

| Options — add bytes shown if enabled | Bytes |
|---|-------|
| Basic Interval Record, includes Leg Spectrum | 100 |
| Intv Spectrum = [@Max] or [Mins] | +66 |
| Intv Save Ln's = [Yes] | +18 |
| Spectral Ln = [Interval] | +396 |
| Intv Ln Table Enabled by "Store Complete Histogram" setting on "Interval" tab of 824 Utility | +384 |
| Wind/Tach = [Yes] | +5 |

Table E-8: SSA Memory Usage: Interval Records

Time History Records (Time History Enabled)

| | | | | | | Bytes per record | |
|---|------|----------|----------|----------|--|--------------------|------------------|
| | | | | | | Resolution [0.1dB] | Resolution [1dB] |
| Basic Leq (selected by the Weighting setting) | | | | | | 2 | 1 |
| Leq | A | (option) | | | | 2 | 1 |
| Leq | C | (option) | | | | 2 | 1 |
| Leq | Flat | (option) | | | | 2 | 1 |
| Peak | A | (option) | | | | 2 | 1 |
| Peak | C | (option) | | | | 2 | 1 |
| Peak | Flat | (option) | | | | 2 | 1 |
| Lmax | Slow | A | (option) | | | 2 | 1 |
| Lmax | Slow | C | (option) | | | 2 | 1 |
| Lmax | Slow | Flat | (option) | | | 2 | 1 |
| Lmax | Fast | A | (option) | | | 2 | 1 |
| Lmax | Fast | C | (option) | | | 2 | 1 |
| Lmax | Fast | Flat | (option) | | | 2 | 1 |
| Lmax | Impl | A | (option) | | | 2 | 1 |
| Lmax | Impl | C | (option) | | | 2 | 1 |
| Lmax | Impl | Flat | (option) | | | 2 | 1 |
| Lmin | Slow | A | (option) | | | 2 | 1 |
| Lmin | Slow | C | (option) | | | 2 | 1 |
| Lmin | Slow | Flat | (option) | | | 2 | 1 |
| Lmin | Fast | A | (option) | | | 2 | 1 |
| Lmin | Fast | C | (option) | | | 2 | 1 |
| Lmin | Fast | Flat | (option) | | | 2 | 1 |
| Lmin | Impl | A | (option) | | | 2 | 1 |
| Lmin | Impl | C | (option) | | | 2 | 1 |
| Lmin | Impl | Flat | (option) | | | 2 | 1 |
| Live | SPL | Slow | A | (option) | | 2 | 1 |
| Live | SPL | Slow | C | (option) | | 2 | 1 |
| Live | SPL | Slow | Flat | (option) | | 2 | 1 |
| Live | SPL | Fast | A | (option) | | 2 | 1 |
| Live | SPL | Fast | C | (option) | | 2 | 1 |
| Live | SPL | Fast | Flat | (option) | | 2 | 1 |
| Live | SPL | Impl | A | (option) | | 2 | 1 |
| Live | SPL | Impl | C | (option) | | 2 | 1 |
| Live | SPL | Impl | Flat | (option) | | 2 | 1 |
| Leq Spectrum (option) | | | | | | 66 | 33 |
| Live Spectrum (option) | | | | | | 66 | 33 |
| Wind/Tach (option) | | | | | | 4 | 2 |
| Temperature (internal to instrument) (option) | | | | | | 2 | 1 |
| External Power Voltage (option) | | | | | | 2 | 1 |
| Battery Voltage (option) | | | | | | 2 | 1 |

Table E-9: SSA Memory Usage: Time History Records

| Other Histories and Memory Usage | bytes |
|--|---------------------|
| Run Log History | 20 bytes per record |
| Calibration Log History | 17 bytes per record |
| SSA File (Store) with 'Enable Ln' = [No] | 2503 each file |
| SSA File (Store) with 'Enable Ln' = [Yes] | 7623 each file |

Table E-10: SSA Memory Usage: Other Histories and Memory Usage

