

Notes & Observations on M01a

History of M01 Group Stations

The M01 set of Morse stations have been active for a very long time & pre-date the original ENIGMA group that came into existence in 1993, & who were responsible for the classification of Number Stations we still use today.

The M01 group consists of M01, M01a & M01b. M01 & M01b use a very similar format & both have fixed schedules that have been in use since the inception of the ENIGMA group. There are however some differences between these two stations & these can be compared using the Active Stations List, available on the ENIGMA 2000 website. The stations are believed to be operated by the Russian Navy.

M01 Has a long-standing, rigid schedule of messages sent at 1800z & 2000z on Mondays / Thursdays, 1500z on Saturday & 0700z on Sundays. Frequencies & calls change every few months on a rotating schedule that repeats yearly.

M01b As with M01, has long-standing schedules on Mondays, Thursdays & Fridays. Also has a rotating schedule of frequency & call changes.

If we look at M01a, the subject of this article, we can see that it is very much the odd one out in that there are a number of different formats in use and, with the exception of the message formats, they all appear to be very different from those used by M01 or M01b. M01a uses both machine & hand-sent Morse.

Originally, ENIGMA had four sub-categories listed under the M01 definition - M01a, b, c & d. These definitions of the various sub-categories are taken from ENIGMA's Morse Station Profiles document - January 2005 Update.

M01A End of Month transmissions, the last Thursday and Saturday of each Month.

These transmissions are an entirely different format to the normal M01 but they can vary each time. Suggest listening to them to hear the format. Some of these have been logged at times other than the EOM and at the same time as M01 was transmitting. Sending was not the usual high quality of M01. (Possible operator practice sessions?)

These transmissions ceased to be at the end of the month from April 2002.

They have been heard but not at a regular time, day, or frequency. It is a matter of luck to find them.

M01B Hand sent. These are sent to individual IDs and the frequencies

M01C A common format of these is listed. Several other formats exist. If a message is sent it is nearly always 10 groups.

385 385 385 84297 84297 Repeated 8 times

30 Second pause

385 385 385 86652 86652 Repeated 8 times

Can be any number of these, usually machine sent, ending is hand sent.

385 385 385 000

These can be on at any time and do not use the normal M01 frequencies so are very difficult to find.

Logged on 14 July 1999 on 9143. A long transmission from 1045 to 1133, with 2 messages of 30 and 33 groups.

M01D A new variation heard on 29 September 1999 on 5730 at 0700

Also on 30 September 1999 on 5730 at 0600 0700 and 0800

Similar to M01C but all Auto sent

Call up was 331

Last group of message was random

Here is an example of the end of month transmissions. Between each line of the message there is a pause of anything from 5 to 170 Seconds. It appears that it is waiting for a reply from outstations in these pauses. None of these replies have ever been logged. The message, although there is not always one sent is unusual, in that the groups are only sent once. The call up usually uses the ID in use but has been known to start 333.

463 463 463 50481 50481 (This can be repeated up to 6 times)

111 51962 51962 (This can be repeated up to 6 times)

333 51028 51028

020 18 23

111 999

558 37 = 37x5f = 558 37

111 51179 53065 (Repeat of groups 15 and 25)

111 000

As can be seen from the above, the M01a definition referred specifically to regular scheduled transmissions that were heard on the last Thursday & Saturday of each month, but as we can also see, from April 2002 these regular transmissions ceased were said to be appearing more or less randomly, with time, day & frequency all variable.

This ending of the M01a scheduled transmissions combined with what also appeared to be similarly random transmissions from M01c & M01d presented a problem. With incoming reports, while it was easy enough to identify the M01 & M01b transmissions, the remaining logs proved to be difficult, if not impossible to fit with certainty into any one of the sub-categories. When comparing the contents of logs against the definitions it became clear that there was a good deal of overlap & that elements from several of the sub-definitions could be found in many of the logs.

With the cessation of the regular end of month transmissions there was no way of determining whether a report was an M01a transmission or one of the other sub-categories. Added to this was the fact that most reports were only partial logs, having been found in progress by monitors because of the random nature of the transmissions.

After some discussion, it was decided to revise the M01 group definitions. M01 & M01b would remain unchanged, but all other variants would in future be covered by the M01a sub-category. This was implemented in February 2016.

M01a - Content

As already stated M01a has very different content from that received from M01 or M01b & can present itself in a number of different formats. Here are a few examples that have been logged by members of the ENIGMA 2000 Group over the last two years;

9129	0542z	01 Mar	498 (x3) 524 82 (x2)			
3973	0632z		111 999 536 10 = 27873 29074 6 111 333 = 536 10 = 27873 29074 68842 56552 61299 32722 51821 96958 36067 27356 57356 = 536 10 111 000			
3352	1842z		342 (x3) 428 83 (2)			
4923	1253z	02 Mar	849 (x3) 840 03 (x2) 849 (x3) 786 73 (x2)			
3774	1911z		697 (x3) 483 59 (x2) 333 483 51 333 040 04 697 333 36 111 000			
3369	1708 - 1726z	28 Mar	156 (x3) 111 16 (x2) 156 (x3) 110 72 (x2) 156 (x3) 115 98 (x2) 050 156 (x3) 111 040 01 156 (x3) 333 114 07 (x2) 333 111 71 (x2) 111 000			
3187	1740 - 1744z		425 (x3) 644 40 (x2) 333 04 333 07 111 000	F5JBR		TUE
4729	0615z	28 Mar	893 (x3) 78504 (x2) 893 (x3) 78504 (x2) 333 78574 78574 333 78574 333 77778 77778 333 77778 77778 111 999 443 35 = 13266 26742 98373 46770 82605 95369 03039 27425 38589 32325 73694 94767 38756 49863 51636 72546 02233 24174 84618 18248 36639 01349 22441 34885 05203 17808 48660 12450 72749 37396 95033 10651 05262 33964 43478 = 443 35 000	CW	F5JBR	WED
5182	0906 (IP) - 0912z	11 Jul	781 333 00 111 333 03 111 333 10 111 000 (x4)			
5182	1051 (IP) - 1059z	11 Jul	781 (x3) 3180 1 3180 1 (Rx9) 781 (x3) 31603 31603 7 817 (x3) 81316 033 180 17 817 (x2) 81316 033 160 3 781 (x3) 31603 31603 (Rx2) (Monitored until 1230z. NRH) 111 000			
5347	1415 (IP) - 1426z	13 Jul	134 (x3) 20 160 (x2) 222 12 111 999 011 25 = 36557 96544 04541 12685 57669 45677 34464 97532 34876 04645 (Single grps) 45677 34464 87777 34876 04645 75432 12345 45087 45706 89750 34464 97532 12345 85674 36557 = 011 25 000			
5405	0539 - 0534z	15 Jul	111 999 325 50 = 40502 18033 56881 76486 48674 94823 70586 32757 00975 98547 49418 40161 45514 49497 87650 33196 16083 22730 29623 29902 41121 72360 03801 43537 13447 22398 86332 78392 58193 54207 37832 10972 90310 04761 35588 05080 98991 73664 80509 44796 78141 51909 69189 70835 96359 63535 63401 91473 59342 15520 = 325 50 111 000			

5209	0742z	28 Mar	260 (x3) 94930 (x2) 260 (x3) 94930 (x2) 260 (x3) 93552 (x2)
4683	1438z	04 Apr	333 07 333 11 333 15 333 19 333 25 111 000 111 000
4603	1442z	04 Apr	333 48928 333 46328 444 333 000 333 000 111 333 030 812
4830	1446z	04 Apr	111 = 80849 111 000
4803	1450z	04 Apr	104 (x3) 900 38 (x2) 111 111 333 999 /673229654324467334480 45580/31005000
2803	0420z	26 Sep	633 (x3) 728 26 (x2) 333 72682 040 01 333 111 020 27 30 111 000
3192	1803z	07 Sep	111 = 75320 81472 07034 111 000
3378	0453z	08 Sep	312 (x3) 111 000
3389	0523z	26 Sep	333 20 111 000
3768	1520z	08 Sep	133 (x3) 906 23 (x2) 111 000
4488	1144z	08 Sep	361 (x3) 361 (x3) 361 (x3) 875 36 (x2)
4517	0713z	26 Sep	378 34 = 64624 92788 50127 201532 45776 09000 17698 60381 84227 46537 46384 92275 28147 76943 73390 83913 38310 15342 54457 26530 39725 03412 19660 55329 03609 58052 42751 34452 18496 91830 18959 10228 43999 23835 = 378 34 111 000
3882	1553z	18 Mar	598 (x3) 79653(x2) 333 46 333 37 333 37 111 000
4905	1214 (IP) - 1216z	19 Mar	M01a Training 94013 24648 04613 54798 74052 49840 13498 65412 36870 46521 = 347 10 0 0 0 Groups, symbol, DK, GC; repeated twice. Sent slowly with bad timing, broken groups and mistakes.
4484	1836z	26 Mar	333 69107 333 69107 111 999 325 43 = 49451 00963 25529 44039 00395 97672 40428 66478 62480 80438 07934 80089 55262 84365 12929 33647 64385 58817 27796 80627 95925 66616 80730 43979 65248 56835 08630 07875 01360 36747 55655 78348 23428 60169 62075 45916 65275 28747 04096 67795 93110 93765 78085 = 325 43 000

As can be seen from these examples, the formats are quite formal. No operator 'chat', acknowledgements or 'Q' codes are used as usually seen on network traffic, & no call-up preamble used. While much remains a mystery, there are a number of clues that can tell us a little about the station.

The association with the M01 group is evident by the use of three zeros at the end of messages or traffic, (using the short zero for both this & in messages). The format of the messages also resemble those of M01 / M01b, but using only single groups & likewise a single Decode Key & Group Count at to both start & end messages.

One characteristic of the traffic are the pauses between each 'section' of text. These can range from a few seconds to a number of minutes. As stated in the above definition of M01d, 'it appears that it is waiting for a reply from outstations in these pauses. None of these replies have ever been logged.' This is very much the impression formed when listening to M01a for any length of time.

Repeated Groups

Looking through the logs will throw up examples where, having sent a message, the station will next repeat one or two of the groups from that message, seemingly in response to a request from an outstation. In this example below, we can see that groups 04 & 11 are repeated. The station then closes the transmission with 111 000.

```
5743      1435z          16 Jun    111 999
          111 999
          120 15 = 56754 34523 87967 75654 54323 98056 12354 78656 89709 12354
          78656 54223 87909 78676 23423 = 120 15
          111 = 75654 78656 =
          111 000
```

In this next example only a single group is repeated, in this case group 12;

```
5043      1219 (IP) - 1317z    18 Jul    281 30 = 28878 85570 12290 52500 42100 49662 60860 29022 40595 62210
          98656 39948 92650 52148 78421 64724 59011 89443 64859 85320
          93629 41419 63864 48365 64711 63043 14998 44682 14194 56537 =
          281 30 000

          111 333 39948
```

Finally, this example not only repeats part of the message, but also clearly states the group numbers of the repeated section as = 03 09 = before ending the transmission with 000.

```
5473      1051 (IP) - 1057z    20 Jul    111 999

          999

          999

          303 10 = 95021 33034 77079 18438 39358 83897 02907 39909 43897 95481 = 303 10 000

          111 020 = 03 09 = 77079 18438 39358 83897 02907 39909 43897 000
```

Call signs

The M01d definition also states that 'The call up usually uses the ID in use but has been known to start 333'. Here are some logs where the three-figure call signs are used showing examples of the different number sequences that are used. As you will see, one of the examples features a full message. Again, these are taken from logs submitted to ENIGMA 2000 over the last two years.

It is difficult to be sure of the function of these various sequences. As we have seen from the section above, there are situations where individual groups from a message are resent, so this is a possibility. It could also be that these five-figure groups represent a coded group in their own right or have some entirely different use. We simply don't have sufficient information to determine their purpose.

```
7692      0539 - 0549z          13 Mar    958 (x3) 47436 (x3) Rpt 5 min.
          958 (x3) 49337 (x3) Rpt 5 min.

9421      0620 - 0629z          13 Mar    135 (x3) 60479 (x3) Rpt 5 min

5182      1051 (IP) - 1059z        11 Jul    781 (x3) 3180 1 3180 1 (Rx9)

          781 (x3) 31603 31603 7

          817 (x3) 81316 033 180 17

          817 (x2) 81316 033 160 3

          781 (x3) 31603 31603 (Rx2) (Monitored until 1230z. NRH)

5080      0916 (IP) - 0925z        12 Jul    942 (x3) 629 40 (x2)

          942 (x3) 620 50 (x2) (Rx3)

          942 (x2) 5

          123456789

          111 000

5347      1415 (IP) - 1426z        13 Jul    134 (x3) 20 160 (x2)

          222 12

          111 999

          011 25 = 36557 96544 04541 12685 57669 45677 34464 97532 34876 04645 (Single grps)
          45677 34464 87777 34876 04645 75432 12345 45087 45706 89750
          34464 97532 12345 85674 36557 = 011 25 000
```

Triplet Codes

One very prominent feature of M01a output is the liberal use of three-figure codes throughout the transmission. While it is not possible to determine the meaning of the various codes, where & when they are used could suggest some possible meaning to one or two of the codes.

From observation the codes logged are;

111 111 000 111 333 111 999
222
333 333 000
444
999

111 can be either a stand-alone code or followed by traffic. E.G. 111 39906 31906 (Repeated several time)

111 333 can also be either as stand-alone sequence or with traffic. E.G. 111 333 39948 - Also frequently associated with two-figure codes. E.G. 333 20

111 999 is always seen as a stand-alone code.

333 is sent either as a stand-alone code or followed by traffic. E.G. 333 48928. It is also frequently followed by two-figure codes. E.G. 333 09 333 01 02

444 is always seen as a stand-alone code.

999 is always seen as a stand -alone code.

111 000 is the sequence used only at the end of a transmission. Although there have been instances of this being omitted, it is usually the sign-off of the station.

Schedule

M01a Schedule by Days of Week

Tuesday	Wednesday	Thursday	Friday
0530z 941kHz	0530z 9129kHz 9192kHz **	0530z 9129kHz 9192kHz **	0530z 941kHz
0620z 10233kHz 10235kHz **	0540z 7692kHz	0540z 7692kHz	0620z 10233kHz 10235kHz **
0630z 9447kHz	0620z 9421kHz *	0620z 9421kHz *	0630z 9447kHz
0710z 10651kHz	0630z 8111kHz	0630z 8111kHz	0710z 10651kHz
0720z 9151kHz	0710z 9175kHz	0710z 9175kHz	0720z 9151kHz

M01a Freqs vs Day/Time in UTC (With Known IDs)

Freq [kHz]	SUN	MON	TUE	WED	THU	FRI	SAT	Ident 01	Ident 02
7692				0540	0540			536	
8111				0630	0630			902	536
9129 9192 **				0530	0530			498	
9151			0720			0720		728	
9175				0710	0710			146	208
9411			0530			0530			751
9421				0620*	0620*				135
9447			0630			0630		143	796
10233 10235 **			0620			0620		354	458
10651			0710			0710		297	358

All monitoring of M01a using Twente SDR. All best received in Western Europe with the exception of 9421kHz

* Not audible in Western Europe, under Greek B/C station. Best copied in Eastern Europe.

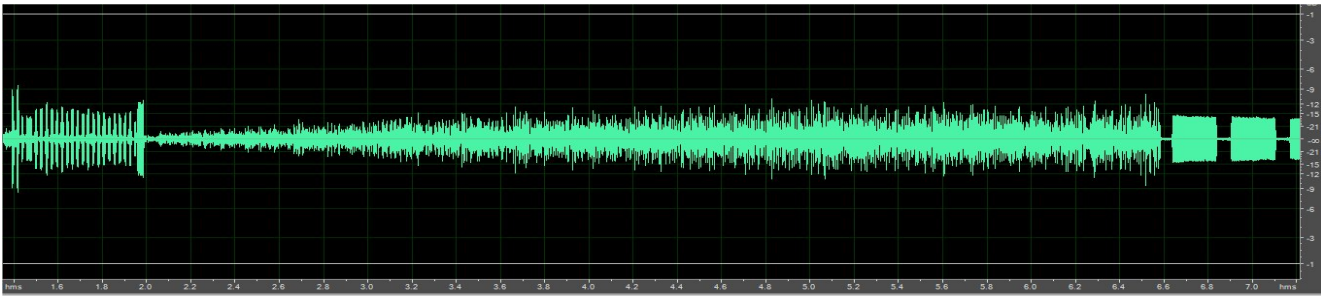
** Alternative frequencies shown in bold. One or the other Frequency is used at that time.

In addition to the schedule shown above, there are also several days each month given to what is believed to be M01a training. These sessions take place on frequencies between 3MHz & 6MHz

Data Bursts

Mixed in with the Morse transmissions are numerous short digital data bursts associated with M01a. These appear just before the beginning of a transmission & also before the continuation of a transmission following a pause or period of silence.

Here is an example showing the data burst followed by the commencement of the M01a transmission;



Examination of a number of these data bursts has shown that they are not identical & that there are variations in the length of some pulses as well as with the number of pulses sent.

Here are three examples that clearly show the differences & variations between data bursts;



If we look at the similarities between the various data bursts it can be seen they do seem to consist of the same basic elements, that is three short pulses, a long pulse, a number of short pulses & ending with a long pulse, (although that is absent from one of the samples obtained).

Differences can be seen in the length of the longer pulses & also the number of short pulses that make up the central part of the data burst. In the last example shown above it can be seen that there is also a long pulse at the start of the data burst, although this was not present on the remainder of the examples examined.

There are also variations in the time between the data burst being transmitted & the start of the M01a Morse with no two samples having the same time delay before the start of the Morse. However, it does seem that the data bursts are connected to the Morse transmissions as they consistently appear prior to the start of the Morse activity, whether that is the start of a transmission or following a pause in the Morse transmission.

The construction of the data bursts indicates that they carry no intelligent data & that is all we can say with certainty. The purpose of these is unknown & can only be surmised. However, the construction of the data bursts would seem to suggest some form of control codes, perhaps for remote switching purposes.

Is M01a an Automated System?

Although M01a does use some manual Morse, a large part of their output is automated consisting of repetitive sequences, often with long periods of silence between these active sessions. It has also been noted that these sequences can start or end part-way through a sequence & even part-way through a Morse character. Whoever these sequences are intended for could have an operator on continuous listening watch but given the nature of the sequences it is also possible that the system is automated to allow for unattended remote monitoring of the signals.

While this could be achieved today using computers, Russia is not known for being the most up to date with their equipment & will often utilise older systems & equipment, particularly where a low-tech solution will suffice.

Could these data bursts be used to remotely activate receive systems, perhaps using teleprinters or other recording equipment to log the output from the M01a sessions? Could the variations noted in the data bursts be used to selectively activate an individual remote station?

Although all the examples examined had a data burst prior to the Morse there was only one that had an equivalent burst at the end of the Morse transmission, so if used for remote switching, there only appears to be a command for switching the system on & not for deactivating it once the transmission has finished.

FSK

In addition to the Morse & data burst content, following a training Morse session an FSK, (Frequency Shift Keying), transmission was logged around five minutes after a training session had ended on 4920kHz. While this may be unrelated to the M01a operation it has been identified as encrypted 75bd with a 250Hz shift, which is a known standard used by the Russian military.

This article has been compiled by the ENIGMA 2000 Morse Team.

Thanks to those involved & particularly to Edd Smith for the huge effort he has put into monitoring, transcribing & analysing M01a transmissions & on whose work & recordings this article is based.

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