

Analyzing Surveillance Data
msglist User's Guide

JVN Communications, Inc.
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Introduction

The FIRS surveillance and weather file formats are used by FIRS software and JVN Communications, Inc. drivers and software. Live recordings, extracted CDR data, and artificially generated (RSS) radar data are all stored in these formats. This is therefore the format used by FIRS software to simulate a radar (playback).

Most CD2 messages consist of four or seven 13 bit words. These messages are stored in the surveillance file format. These files usually have (but do not require) a .srv suffix.

ASR9 weather and SCIP control messages are stored in separate weather files with a similar binary format that allows larger messages. These messages consist of 32 and 10 words respectively. These files usually have but do not require a .wx suffix.

Invoking msglist

msglist is a command line utility requiring a Linux operating system. msglist is invoked in a terminal by typing *msglist* with the name of the file to analyze with any additional argument options. Since most surveillance files contain hundreds or thousands of messages, it is useful to control the output of msglist with a pager such as *more* or *less*. This is done in a terminal by piping the output of msglist to the input of the pager : *msglist er9.srv | less*. See the **Options** sections for more information.

Output Description

Both the surveillance and weather file formats can be decoded with the **msglist** utility. msglist displays the timestamp, channel, CD2 data words, and any errors that are associated with the message. See Figure 1. The timestamp precision is 1/100 of a second. The channel value usually ranges from 0 to 2 for the three channels of surveillance data in an ASR9 or ARSR radar. The ASR9 weather and SCIP control data usually has a channel value of 3 (fourth channel) and resides in the .wx file. The CD2 data words are displayed from left to right for each message and are in 16 bit hexadecimal format. The upper 4 bits are unused. The lower 12 bits are the CD2 word shifted right one bit to drop the parity bit. A parity error indication is displayed to the right of the CD2 words if it exists. Consult the appropriate radar ICD for the meaning of the bits in the CD2 words.

The CD2 message in figure 1 is an ASR9 beacon message. This can be verified by comparing the first word (6d0) to the message documentation for the ASR9. The second word (c4c) is the range of the target in 64^{ths} of a nautical mile. c4c hexadecimal converts to 3148 decimal. That is 3148/64 or 49.1875 nautical miles. The third word is the azimuth in ACPs. 5fe converts to 1534 ACPS. Since there are 4095 ACPs in 360 degrees, 1534 ACPs converts to 134.9 degrees (1534/4095 * 360). Word five is the beacon code. 534 hexadecimal converts to 2464 octal. The last word is altitude in hundreds of feet. a0 converts to 160 or 16,000 feet.

Time (HH:MM:SS)	Channel	CD2 words
19:00:07.80	(1)>	06d0 0c4c 05fe 0f4f 0534 0000 00a0

Figure 1. CD2 message output of msglist.

Options

To view the command line options offered by msglist, just invoke the command in a terminal with no arguments. The output should be similar to figure 2. Options can be specified in any order. Multiple options can be used together.

```
Usage: msglist srvfile [-X] [-s starttime] [-z msgsize] [-c chan] [-b[bcncode]] [-d] [-n] [-x] [-yimrwtupaf]
-X[output size] raw record mode
-b[bcncode] bcns
-d dynamic_mode
-n print msgno
-x print offset in file
-r rtqcs
-i siteid msgs
-y scip control msgs
-w wx msgs
-t strobe msgs
-u status msgs
-p primary (search) msgs
-m sector_marks
-a aims msgs
-f flags
-z msgsize override msgsize
-e plain english decoding for ASR
-E plain english decoding for ARSR
```

Figure 2. msglist options.

-e/-E Plain English decoding

msglist has a limited decoding function for displaying the fields of the CD2 words in a more readable format. The -e and -E command line options tell msglist to decode type, range, azimuth, Mode 3A (beacon code), and Mode C (altitude) fields to appropriate units. Use -e for short range (ASR9) files and -E for long range (ARSR) files.

-s start time

Specify a start time other than the beginning of the file. Format is (hh:mm:ss)

-d Dynamic Mode

Dynamic mode allows msglist to display the contents of a file that is actively being written. This is useful to view the progress of a live radar recording or CDR extraction.

-b[beacon code] Display only beacon messages

This option displays only beacon messages. If a beacon code is specified (e.g. -b1275), just messages with the specified code are displayed.

-p/-y/-w/-t/-u/-p/-m/-a Display other specific message types

These options display just the respective message types. These are useful to filter out undesirable messages.

-r[b/s] Display RTQCs (just beacon/just search)

This option displays just Real Time Quality Control (RTQC) messages. Specifying a **b** or **s** character (e.g. **-rb**) displays just beacon or search RTQC messages respectively. The RTQC option can be very useful for determining the scan time of a radar since a radar usually sends out one SRTQC and one BRTQC per scan. The difference in timestamp between two consecutive RTQC messages of the same type yields the scan time.

-f Display messages with flags

Only messages with flags (usually errors) are displayed with this option. See figure 3 for the meanings of different flags.

Flag	Meaning
IRQ	Trigger target to glass signal. Playback only.
MALF	One or more parity errors detected.
INV	Invalid header.
SYNC	Message framing error.

Figure 3. Flag definitions.