

FLIR Boson Command Packet Generation

1 Boson Command Packet Creation

1.1 FLIR Serial Line Packet (FSLP)

1.1.1 Structure

Any FSLP contains:

1. Start Flag
2. Channel Number
3. Payload
4. Checksum
5. End Flag

1.1.2 Header

The header contains the Start Flag and Channel Number. For the purposes of this document, neither of these values will change, so the header shall always be the bytes 0x8E 0x00.

1.1.3 Payload

The payload for a command packet will be a Binary Protocol command. See Section 2 for details.

1.1.4 Footer

The footer contains the Checksum and End Flag.

Calculate the CRC16 following Appendix A of the FLIR_Binary_Protocol document (#102-9013-00).

1.1.5 Escaping aka Byte Stuffing

Any special characters that appear between the Start Flag and End Flag must be altered prevent a malformed FSLP. Escaping must be done after the CRC is calculated.

- A 0x8E byte is replaced by a 0x9E 0x81 pair.
- A 0x9E byte is replaced by a 0x9E 0x91 pair.
- A 0xAE byte is replaced by a 0x9E 0xA1 pair.

Take special care to ensure that the checksum bytes are escaped if necessary.

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1.2 FLIR Binary Protocol (FBP)

1.2.1 Structure

Any FBP command contains:

1. Sequence Number
2. Command ID aka Function ID
3. Command Status
4. Data Bytes

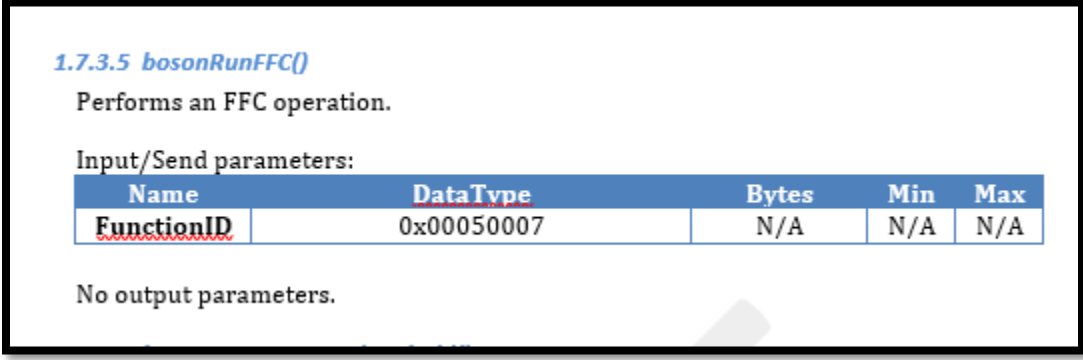
1.2.2 Sequence Number

This value is intended to be an ever increasing command counter, but can be any 4-byte value. When manually calculating CRCs, it is a good idea to just select a single value and stick to it.

1.2.3 Command ID

This value is a big-endian, unsigned, 32-bit integer. The documentation for a particular command will list this value.

Figure 1. Example command documentation:



1.7.3.5 bosonRunFFC()
Performs an FFC operation.

Input/Send parameters:

Name	DataType	Bytes	Min	Max
<u>FunctionID</u>	0x00050007	N/A	N/A	N/A

No output parameters.

1.2.4 Command Status

When you are sending a command, this must be 0xFF 0xFF 0xFF 0xFF. When the Boson responds to your command, it will replace this with a big-endian, unsigned, 32-bit integer. The value 0 is a “success” code, all others may be looked up in the documentation provided with the Boson.

1.2.5 Data Bytes

If the command you are sending to the Boson has input parameters, you must include them here. The command documentation will list the order, size, and range limits (if applicable) for parameters. All parameters with non-structure DataType will be sent in big-endian format.

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Figure 2. Example command with input parameters:

1.10.3.9 agcSetMaxGain()

Set the maximum transfer function gain. This gain limit is applied on a per bin basis such that locally the transfer function slope never exceeds the limit defined by the maxGain parameter.

Input/Send parameters:

Name	Data Type	Bytes	Min	Max
<u>FunctionID</u>	0x00090009	N/A	N/A	N/A
data	FLOAT	0:4	0.25	8

1.3 Example packets

1.3.1 bosonRunFFC() example

1. Start with an empty byte string and our fixed Header, the Start Flag and 0x00:
[8E 00]
2. Now begins the Payload section of the FSLP, Append the Sequence Number portion of the FBP, we'll use an arbitrary 32-bit integer (314638318):
[8E 00 12 C0 FF EE]
3. Next, we look up and append the Command ID for bosonRunFFC (see **Figure 1** above):
[8E 00 12 C0 FF EE 00 05 00 07]
4. The command status will be all 0xFF bytes:
[8E 00 12 C0 FF EE 00 05 00 07 FF FF FF FF]
5. bosonRunFFC does not require any inputs, so we skip to calculating and appending the CRC. Using the algorithm from the FSLP/FBP document, the CRC was calculated as 0x6C5E:
[8E 00 12 C0 FF EE 00 05 00 07 FF FF FF FF 6C 5E]
6. Next we check for any of the special characters that need to be escaped. In this example, there are none.
7. Finally, we end the FSLP with the End Flag:
[8E 00 12 C0 FF EE 00 05 00 07 FF FF FF FF 6C 5E AE]
8. This well-formed FSLP packet can now be sent to the camera.

1.3.2 agcSetMaxGain() example

9. Start with an empty byte string and our fixed Header, the Start Flag and 0x00:
[8E 00]
10. Now begins the Payload section of the FSLP, Append the Sequence Number portion of the FBP, we'll use an arbitrary 32-bit integer (1118716574):
[8E 00 42 AE 42 9E]
11. Next, we look up and append the Command ID for agcSetMaxGain (see **Figure 2** above):
[8E 00 42 AE 42 9E 00 09 00 09]

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12. The command status will be all 0xFF bytes:
[8E 00 42 AE 42 9E 00 09 00 09 FF FF FF FF]
13. agcSetMaxGain does requires a single float (32-bit) input. We'll use the value 1.25 for this example – this evaluates to 0x3FA00000:
[8E 00 42 AE 42 9E 00 09 00 09 FF FF FF FF 3F A0 00 00]
14. Next we calculate and append the CRC, in this case 0x7FFE:
[8E 00 42 AE 42 9E 00 09 00 09 FF FF FF FF 3F A0 00 00 7F FE]
15. Next we check for any of the special characters that need to be escaped. In this example, the both an End Flag and an Escape Byte show up in our packet. We replace them with the appropriate escaped pairs.
[8E 00 42 9E A1 42 9E 91 00 09 00 09 FF FF FF FF 3F A0 00 00 7F FE]
16. Finally, we end the FSLP with the End Flag:
[8E 00 42 9E A1 42 9E 91 00 09 00 09 FF FF FF FF 3F A0 00 00 7F FE AE]
17. This well-formed FSLP packet can now be sent to the camera.