

## DAM High Level Design Document.

Upon powering on DAM controller (“DAM”) will always try to establish a TCP connection with server (“DPM”) before doing any other tasks. DAM takes IP of DPM from configuration file stored on CompactFlash card (CF). In case the config file is not present or it cannot be read, DAM will switch to Discover state. In this state DAM will try to obtain IP of DPM by broadcasting DISCOVER DDP request to port 15210 on the local network (LAN). DAM will wait for response for 5 seconds. If response didn’t come within 5 seconds DAM will periodically re-transmit DISCOVER requests. Interval between attempts depends on DAM load profile stored on CF. DAM will perform next attempt only after it processed all its 12 channels. If DAM has no load profile (for example CF is not present), DAM will try to re-transmit every 5 seconds.

Below is example of DISCOVER request from DAM to DPM:

```
DISCOVER 1:6:17:4:37:0 DDP/1.0
From:192.168.1.61:30165
Message-ID:1 DISCOVER
Content-Length:0
```

Highlighted in red is a serial number of a particular DAM which is also its MAC address. “From” header field specifies IP and port of DAM. DPM must send reply to this IP and port using UDP protocol. Below is example of reply message on DISCOVER request from DPM to DAM:

```
DDP/1.0 200 OK
To:192.168.1.62:15210
From:192.168.1.61:30165
Message-ID:1 DISCOVER
Content-Length:0
```

Highlighted in red is a new field added by DPM which contains DPM IP and port. DAM will use it to establish TCP connection with DPM.

After DAM discovered IP of DPM or if this info was available in the first place, DAM will try to establish TCP connection with DPM. If DAM failed to establish such connection, it will switch to Discover state.

After successfully establishing TCP connection with DPM DAM will switch to Register state. In this state DAM sends a REGISTER request and waits for response. DAM behavior in Register state is similar to its behavior in Discover state.

Below is example of REGISTER request from DAM to DPM:

```
REGISTER 1:6:17:4:37:0 DDP/1.0
To:192.168.1.62:15210
From:192.168.1.61:30165
Message-ID:1 REGISTER
Content-Length:0
```

As with DISCOVER request, with REGISTER request DAM also provides its serial number/MAC address (highlighted in red). DPM should use it for validation purposes.

Below is example of reply message on REGISTER request from DPM to DAM:

```
DDP/1.0 200 OK
Controller-ID:1209866489
Time-Stamp:1209866566
To:192.168.1.62:15210
From:192.168.1.61:30165
Message-ID:1 REGISTER
Content-Length:0
```

Highlighted in red are new fields added by DPM which contain new DAM unique number which will be used by DAM and DPM for all subsequent messages and timestamp which can be any string up to 40 bytes long.

To reset the timestamp DPM should send RESET message to DAM with new value for timestamp:

```
RESET 1209866489 DDP/1.0
From:192.168.1.62:15210
To:192.168.1.61:30165
Time-Stamp:1209866600
Message-ID:1 RESET
Content-Length:0
```

And below is an example of reply message on RESET request from DAM to DPM:

```
DDP/1.0 200 OK
Controller-ID:1209866489
Time-Stamp:1209866600
From:192.168.1.62:15210
To:192.168.1.61:30165
Message-ID:1 RESET
Content-Length:0
```

To modify DAM configuration and/or to modify channel parameters DPM must use UPDATE DDP request. DPM can send such requests at any time after DAM successfully registered with DPM. This is an example of UPDATE request from DPM to DAM in which DPM instructs DAM to update sampling rate and number of samples for channels 2 and 3:

```
UPDATE 1209866489 DDP/1.0
Content-Type:config
Message-ID:1 UPDATE
Content-Length:90
```

```
[CHANNEL-02]
SamplingRate=150
Samples=100
[CHANNEL-03]
SamplingRate=250
Samples=200
```

In this example DPM instructs DAM to update DAM IP and port:

```
UPDATE 1209866489 DDP/1.0
Content-Type:config
Message-ID:1 UPDATE
Content-Length:40
```

```
[DAM]
MyIP=192.168.1.61
MyPort=30165
```

Here is a full list of DAM parameters that can be modified by sending UPDATE request:  
For [DAM] section:

```
ServerIP=192.168.1.62
ServerPort=15210
MyMAC=01:06:17:05:48:39
MyIP=192.168.1.61
MyPort=30165
DHCP=enable
```

For [CHANNEL-XX] section:

```
SamplingRate=0
SamplingInterval=5
Samples=0
Tachometer1=disable
Tachometer2=disable
```

And here is example of DATA message from DAM to DPM which contains data collected from a particular channel:

```
DATA 1209866489 DDP/1.0
From:192.168.1.61:30165
To:192.168.1.62:15210
Time-Stamp:1209866600
Time-Offset:18148
CSeq:1
Message-ID:6
Sampling-Rate:100
Samples:200
Channel-ID:1
Content-Length:400
Content-Type:samples
Last-Message:true
```

<binary data of total of 400 bytes>

If total size of data collected by DAM is more than 8K, DAM will send such long message in several DATA messages. Below is example of long DATA message. In this case DAM is sending info for 10K samples. It requires three separate DATA messages to transmit such amount of data:

```
DATA 1209866489 DDP/1.0
Channel-ID:1
Content-Length:7000
Sampling-Rate:10000
From:192.168.1.61:30165
Time-Offset:11000
To:192.168.1.62:15210
Time-Stamp:1209866600
CSeq:1
Samples:10000
Message-ID:1
Content-Type:samples
Last-Message:false
```

<binary data of total of 7000 bytes>

```
DATA 1209866489 DDP/1.0
Channel-ID:1
Content-Length:7000
Sampling-Rate:10000
From:192.168.1.61:30165
Time-Offset:11050
To:192.168.1.62:15210
Time-Stamp:1209866600
CSeq:2
Samples:10000
Message-ID:1
Content-Type:samples
Last-Message:false
```

<binary data of total of 7000 bytes>

DATA 1209866489 DDP/1.0  
Channel-ID:1  
Content-Length:6000  
Sampling-Rate:10000  
From:192.168.1.61:30165  
Time-Offset:11067  
To:192.168.1.62:15210  
Time-Stamp:1209866600  
CSeq:3  
Samples:10000  
Message-ID:1  
Content-Type:samples  
Last-Message:true

<binary data of total of 6000 bytes>