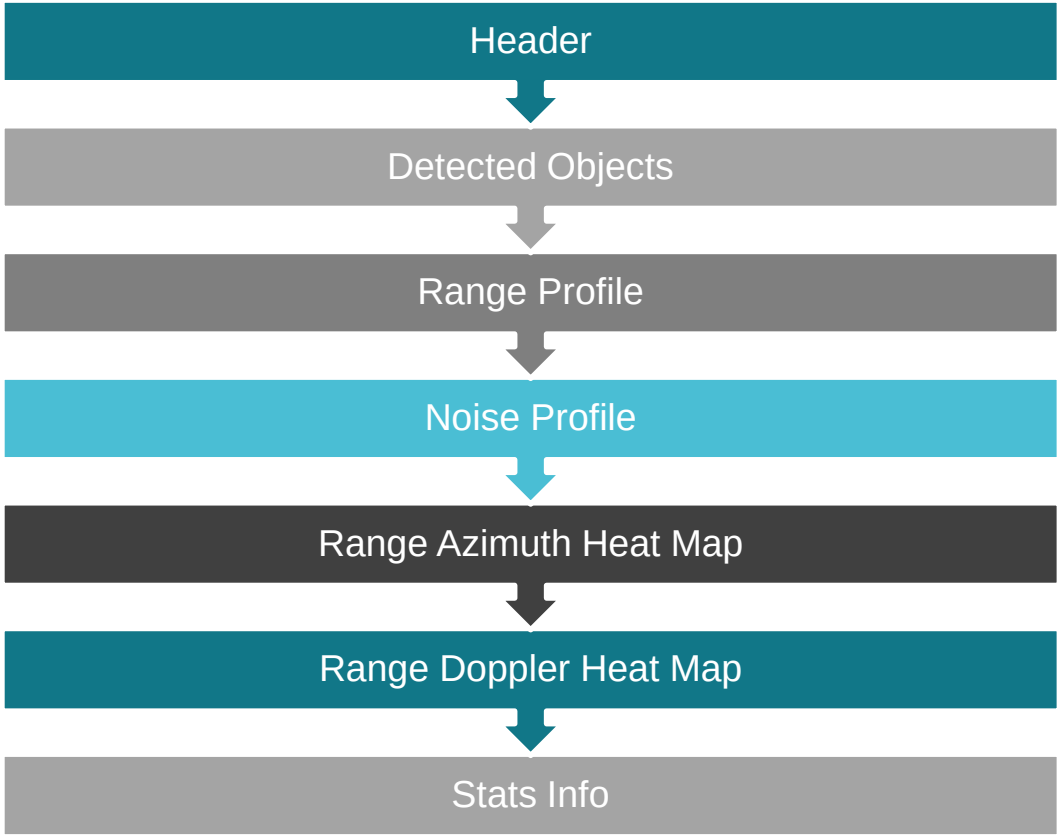
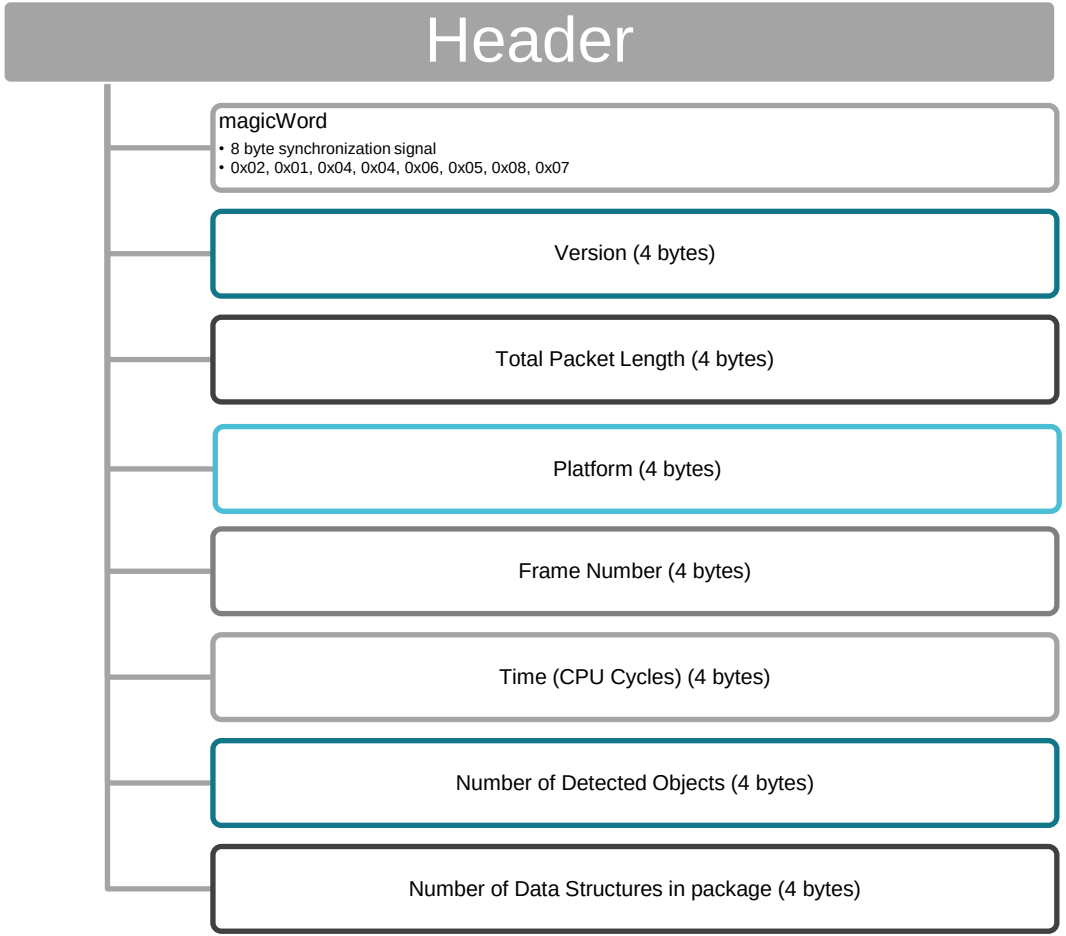
Out of Box Demo Package Structure

- Data is output through the Data UART Port
  - Baud Rate = 921600
- Data is Little Endian
- Up to 6 distinct data structures can be sent
  - Can be configured via CLI interface



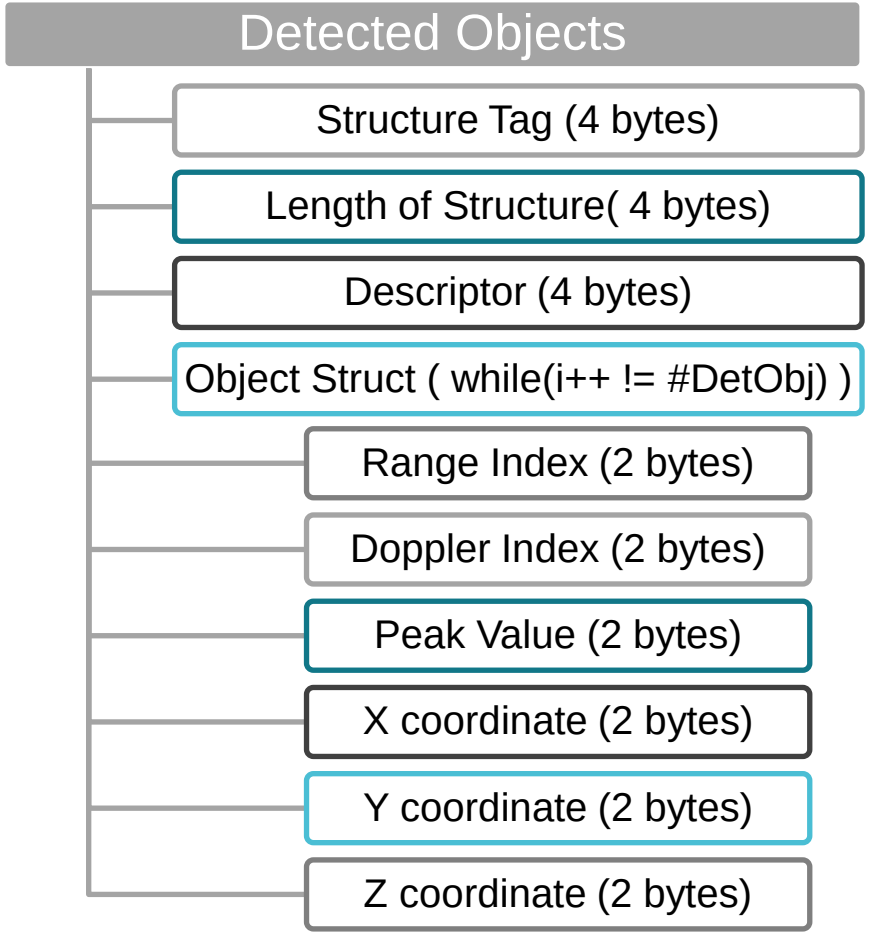
Header

- Sent at the beginning of every transmission
- Always 36 bytes
- Contains information regarding the whole data packet
- Contains the magicWord used to signal the start of a packet



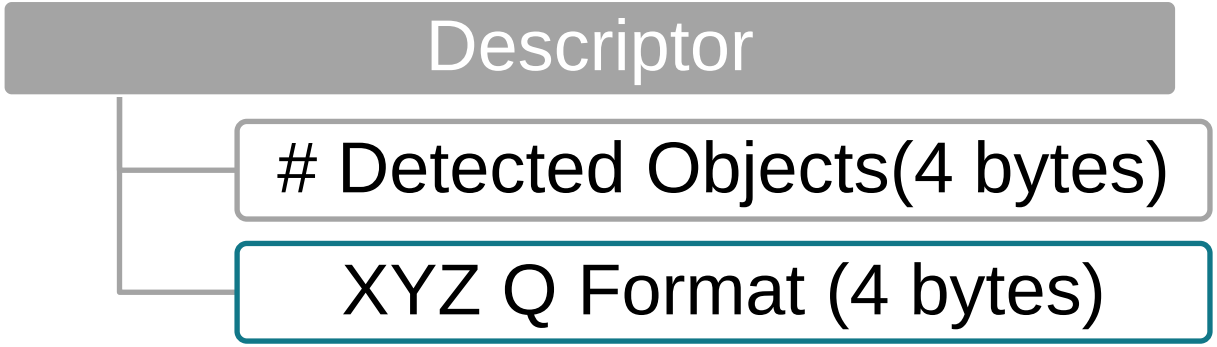
Detected Objects

- Contains range, angle, and velocity information of objects seen by the mmWave device
- Size depends on number of objects detected



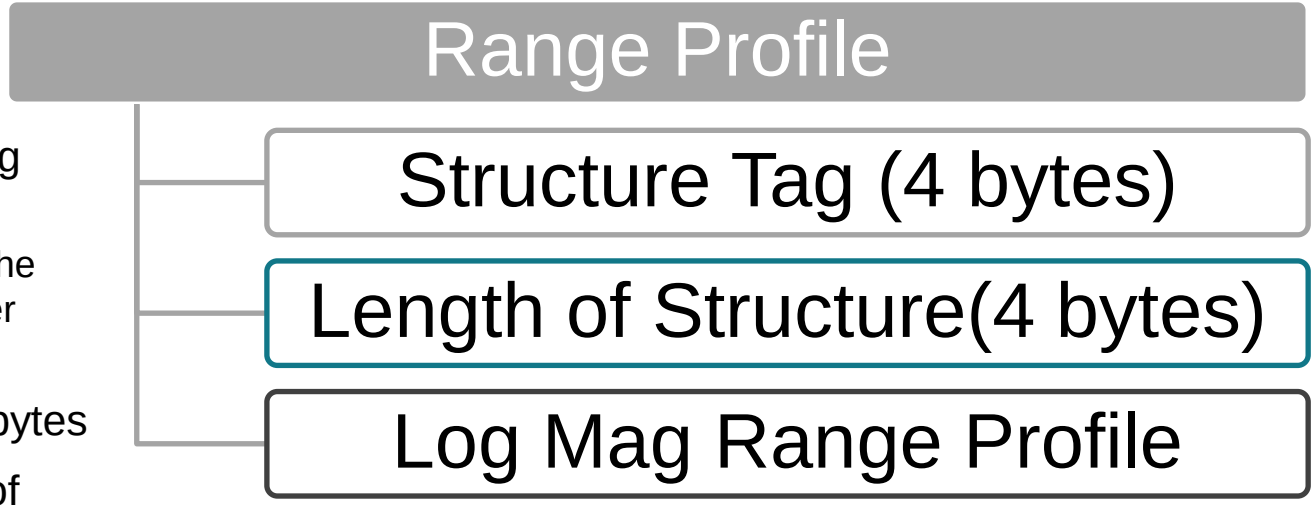
Detected Objects Descriptor

- Describes how many objects have been detected and the Q format the data is in



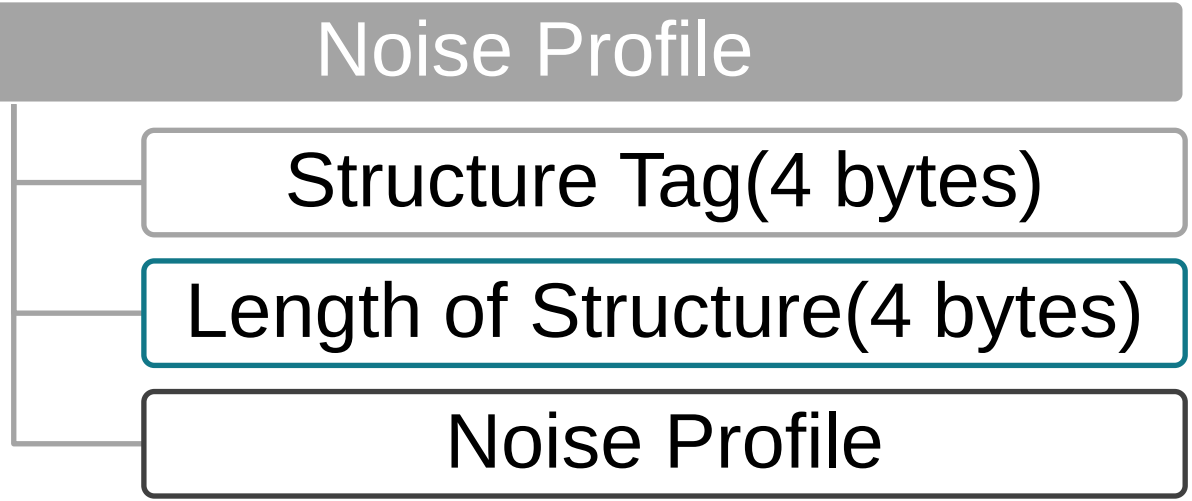
Range Profile

- Contains 1D array of Log Magnitude Range FFTs
  - i.e. The first column of the Log Mag Range-Doppler Matrix
- Size = #RangeBins * 4 bytes
- #RangeBins = number of ADC samples rounded up to the nearest power of 2
- #ADCsamples is set in the profileCfg line of the cfg file



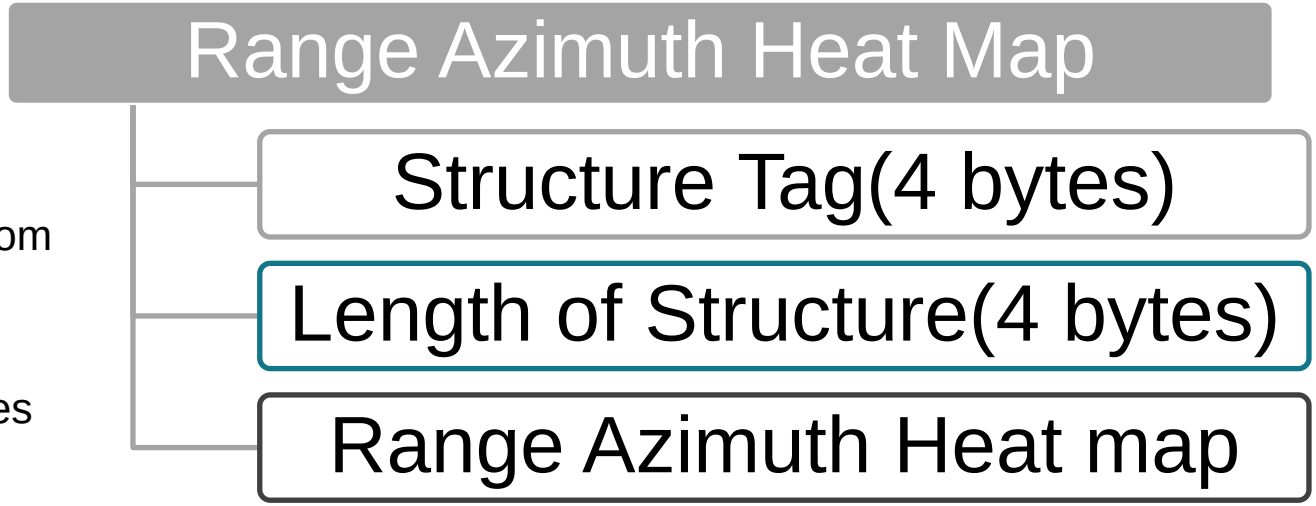
Noise Profile

- Contains 1D array of data considered “noise” by the mmWave demo
- Size = #RangeBins * 4 bytes



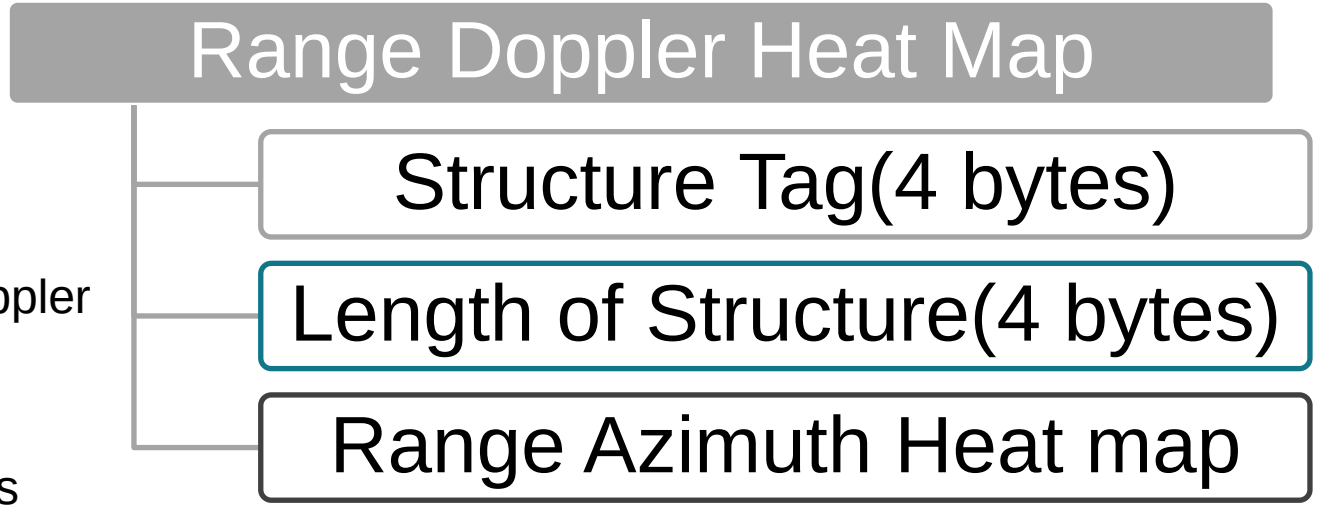
Range Azimuth Heat Map

- Contains azimuth data from the radar cube matrix
- Size = #RangeBins * #VirtualAntennas * 4 bytes
- #VirtualAntennas = #RXantennas * #TXantennas



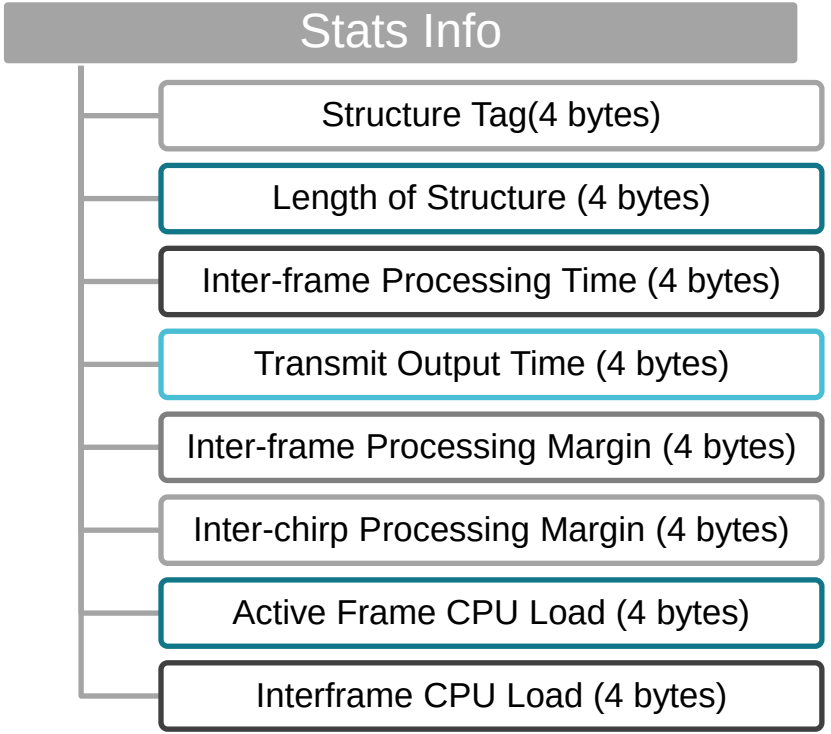
Range Doppler Heat Map

- Sends entire, 2D, Log Magnitude Range/Doppler array
- Size= #RangeBins * #DopplerBins * 4 bytes
- #DopplerBins = #ChirpsPerFrame / #TXantennas



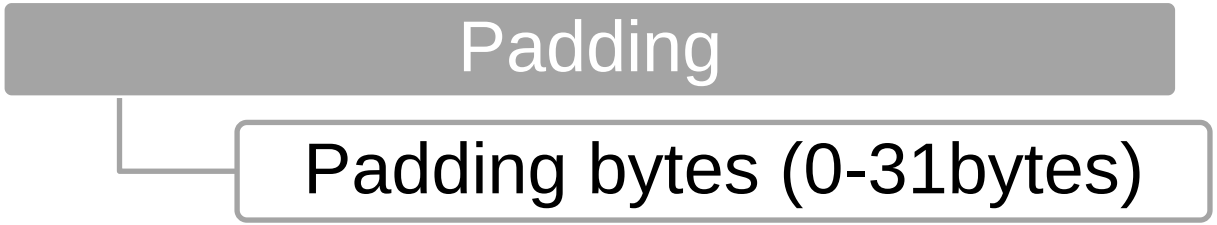
Stats Info

- Contains mmWave device performance statistical data
- Size = 32 bytes



Padding bytes

- Padding bytes are added to ensure that total packet length (including header) is a multiple of 32 bytes



	Size (Bytes)	When is it sent?**	Description
Header • Magic Word • Version • Total packet length • Platform • Frame number • Time (CPU Cycles) • Number detected objects • Number TLV's	36 (total) • 8 • 4 • 4 • 4 • 4 • 4 • 4 • 4	ALWAYS	Contains information regarding the whole data packet
Detected Objects • Tag & length • Descriptor • Payload (object array)	12+(# of objects*12) • 8 • 4 • # of detected obects * 12	If "detected objects" parameter is set to 1	Contains range, angle, and velocity information of objects detected by the mmWave device
Range Profile • Tag & length • Payload	8+(# of range bins*2) • 8 • # of range bins*2	If "range profile" parameter is set to 1	Contains 1D array of Log Magnitude Range FFTs
Noise Profile • Tag & Length • Payload	8+(# of range bins*2) • 8 • # of range bins*2	If "noise profile" parameter is set to 1	Contains 1D array of data considered "noise" by the mmWave demo
Azimuth Heat Map • Tag & Length • Payload	8+(# of range bins*# of virtual antennas *4) • 8 • # of range bins*# of virtual azimuth antennas*4	If "range azimuth heat map" parameter is set to 1	Contains azimuth data from the radar cube matrix
Range Doppler Heat Map • Tag & Length • Payload	8+(# of range bins*# of doppler bins*2) • 8 • # of range bins*# of doppler bins*2	If "range doppler heat map" parameter is set to 1	Sends entire, 2D, Log Magnitude Range/Doppler array
Statistics Profile • Tag & Length • Payload	32 • 8 • 24	If "statistics" parameter is set to 1	Contains mmWave device performance statistical data
Padding Bytes	0 – 31 bytes	If total packet length is not a multiple of 32	Bytes are added to ensure that total packet length (including header) is a multiple of 32