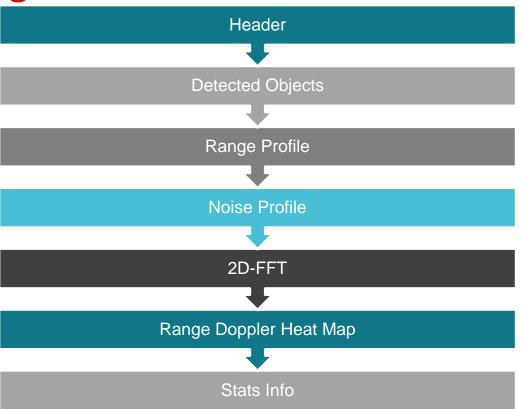
mmw Demo Data Structure v0.1

xWR14xx/xWR16xx SDK v1.0.x.x



mmW Demo Package Structure

- Data is output through the Data UART Port
 - Baud Rate = 921600
- Data is Little Endian
- Packet consists of a header and all of the enabled data fields
- Can be configured via CLI interface
- One packet is sent per frame
- Length is multiple of 32 bytes

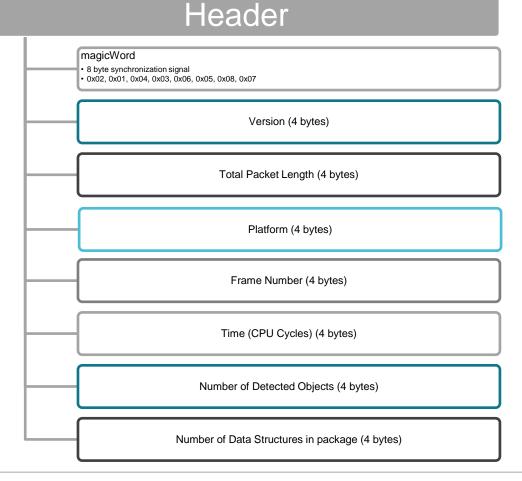


mmw Demo - Data Structure



Header

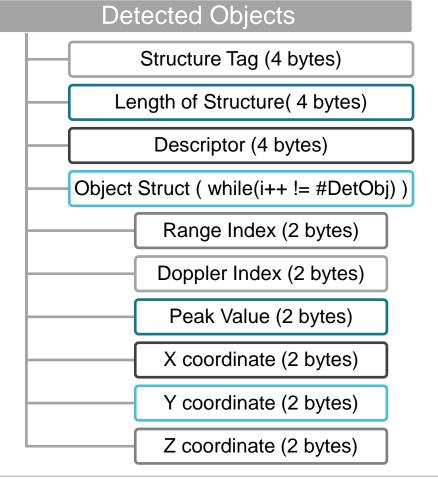
- Sent at the beginning of every transmission
- Always 36 bytes
- Contains information regarding the whole data packet
- Contains the magicWord used to signal the start of a packet



U Texas Instruments

Detected Objects

- Contains range, angle, and velocity information of objects seen by the mmWave device
- Size depends on number of objects detected
- X, Y, and Z coordinates are in the Q format specified in the Descriptor field



Detected Objects Descriptor

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

Descriptor

Detected Objects(4 bytes)

XYZ Q Format (4 bytes)

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

Range Profile

Structure Tag (4 bytes)

Length of Structure(4 bytes)

Log Mag Range Profile

Noise Profile

Noise Profile

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

Structure Tag(4 bytes)

Length of Structure(4 bytes)

Noise Profile

Range Azimuth Heat Map

Range Azimuth Heat Map

- Contains 2D antenna symbols from the radar cube matrix
- 2D-FFT symbols are sent for each range bin at 0 Doppler
- On PC, Azimuth FFT is applied to symbols for each range bin and a static heat map is constructed
- Size = #RangeBins * #VirtualAntennas * 4 bytes
- #VirtualAntennas = #RXantennas* #TXantennas
- Number of Rx and Tx antennas are set in the configuration file

Structure Tag(4 bytes)

Length of Structure(4 bytes)

Range Azimuth Heat map

Range Doppler Heat Map

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

Range Doppler Heat Map

Structure Tag(4 bytes)

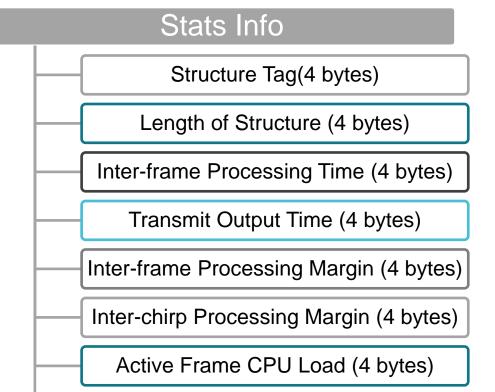
Length of Structure(4 bytes)

Range Azimuth Heat map

array

Stats Info

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



Interframe CPU Load (4 bytes)

mmw Demo – Data Structure

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Padding bytes

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

Padding

Padding bytes (0-31bytes)

mmw Demo – Data Structure



	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 4 4	ALWAYS	Contains information regarding the whole data packet
Detected Objects Tag & length Descriptor Payload (object array)	12+(# of objects*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	<u>0 – 31 bytes</u>	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