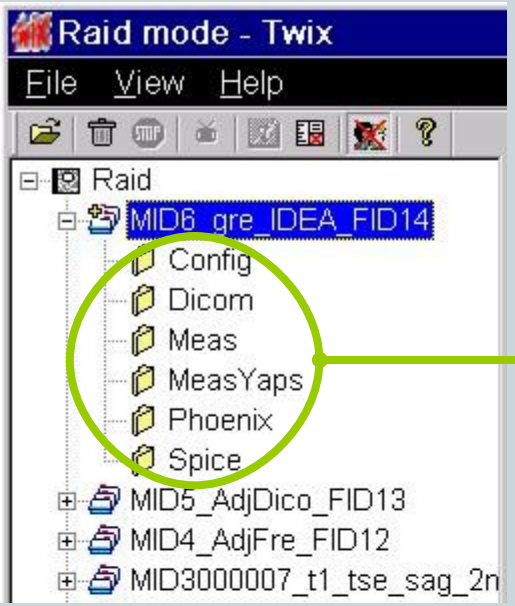
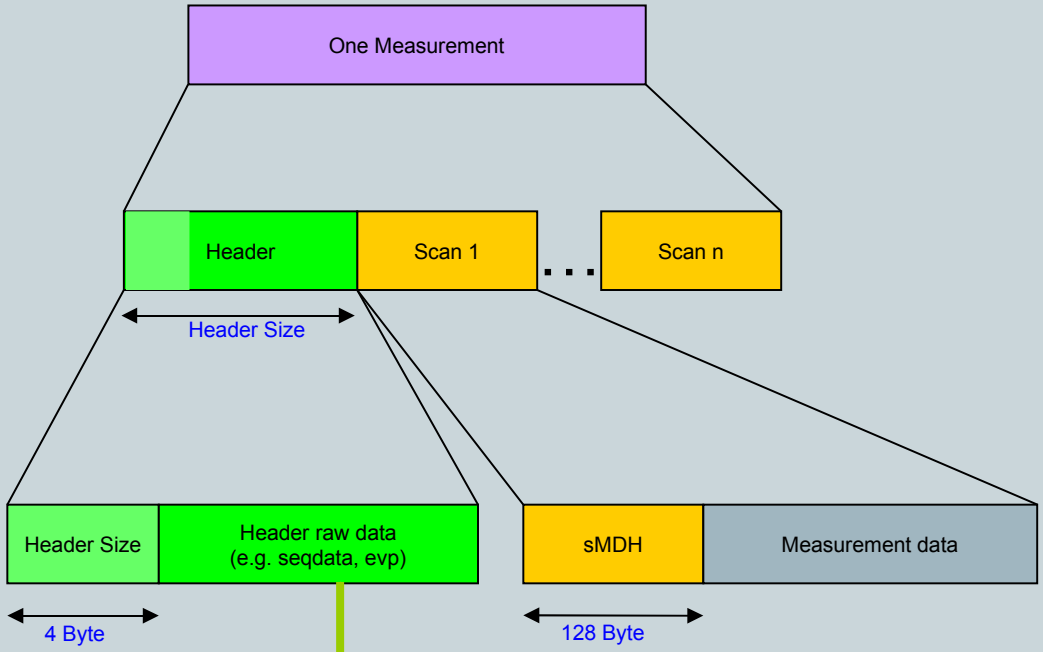
Up to now (≤ VB17A) – File Structure

- meas.dat

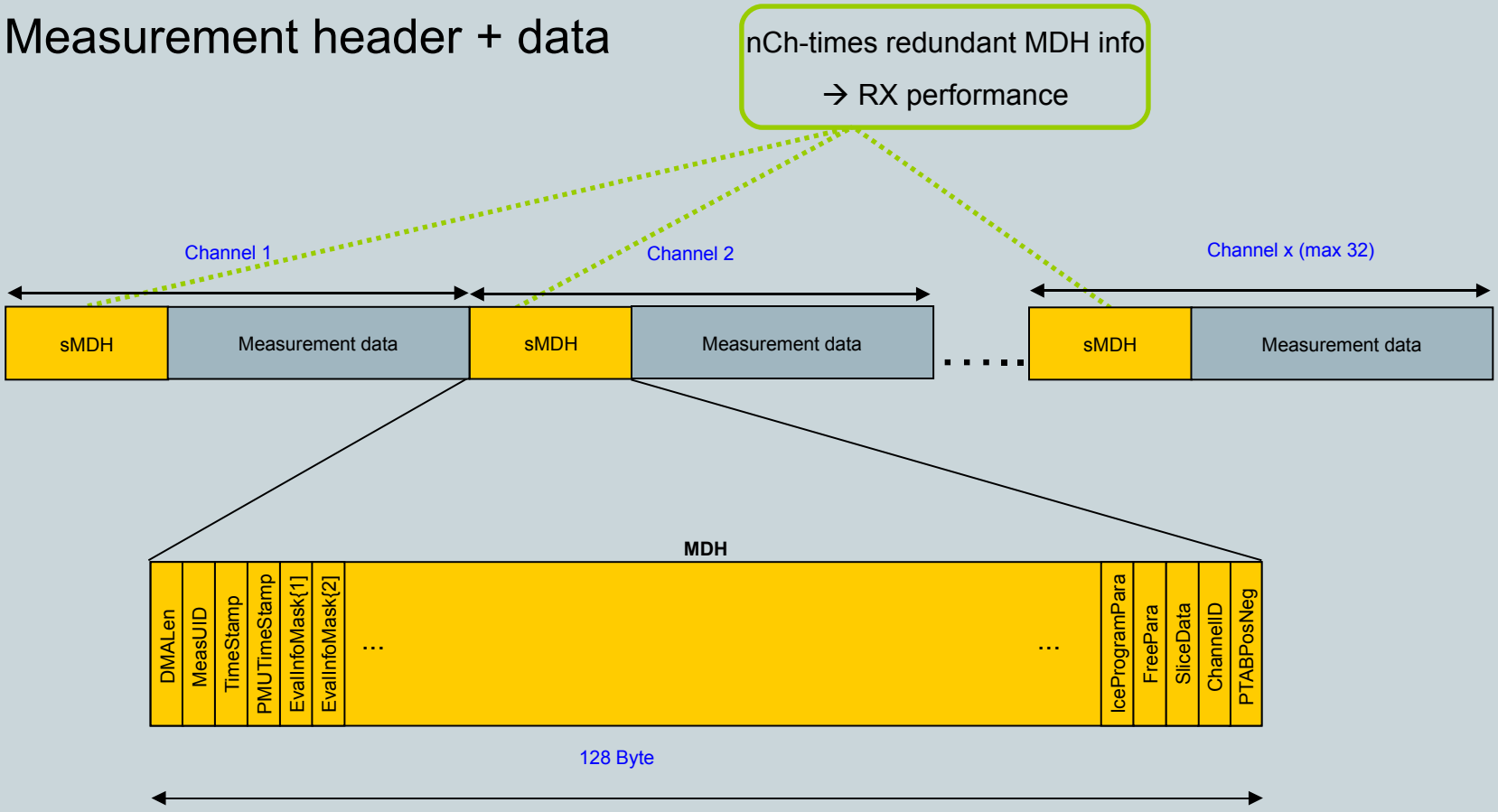




BufferHeader
(variable length)

Up to now (≤ VB17A) – One Scan

- Measurement header + data

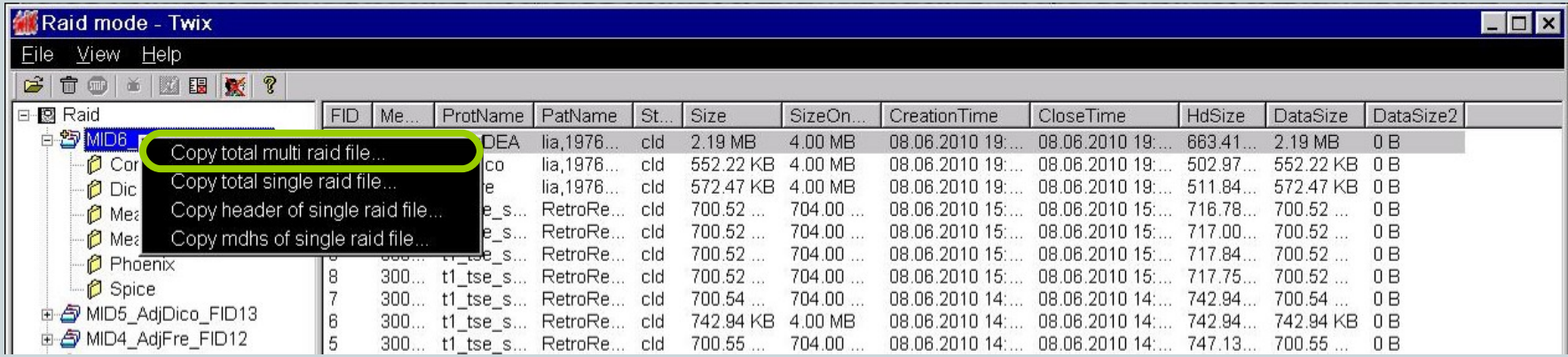


\n4\pkg\MrServers\MrMeasSrv\SeqIF\MDH\mdh.h

Motivation for Multi-RAID

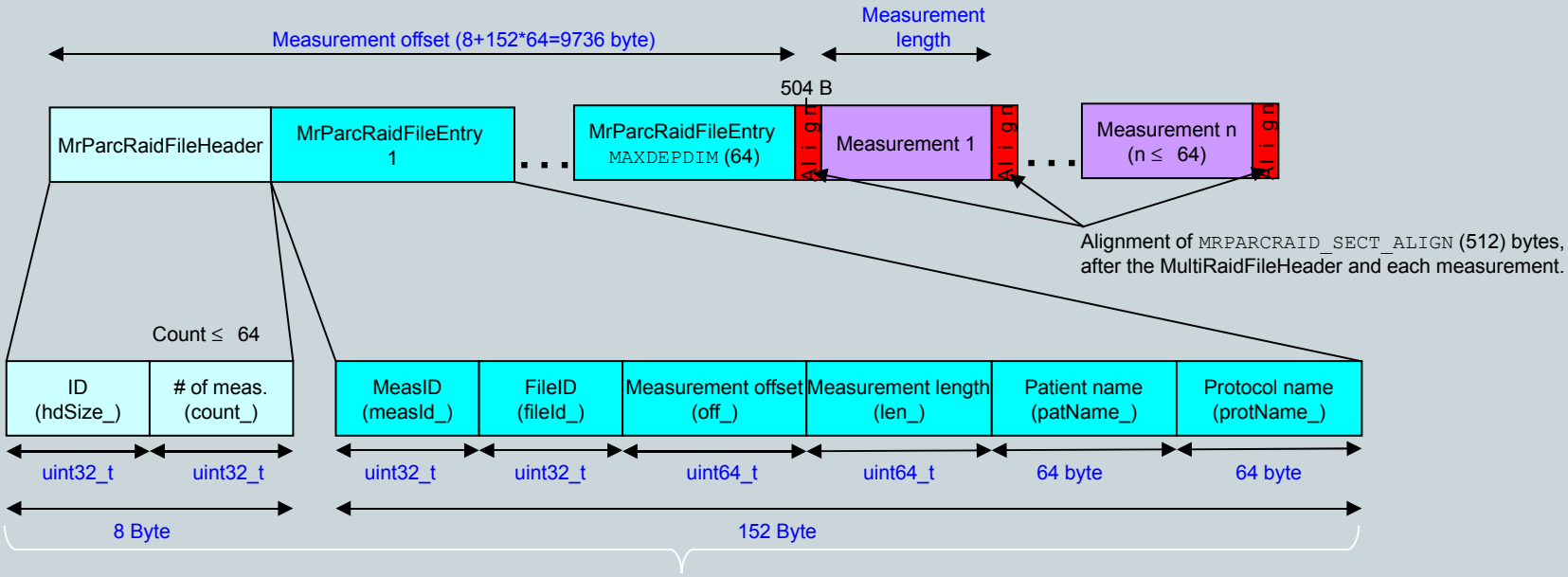
- Remove redundant MDH info (receiver performance)
- Extend MDH with additional application parameters

- Before VD11A only a single measurement data can be copied by TWIX
  - Problem: If PreScan-Normalize or NoiseDecorrelation is uesed also these pre-measurement data have to copied to run ICE simulation.
  - Solution: New Multi-RAID file in VD11A (selectable in TWIX) collects automatically all dependent measUIDs needed for ICE simulation.



Multi-RAID – file structure

- meas.dat (VD11A)

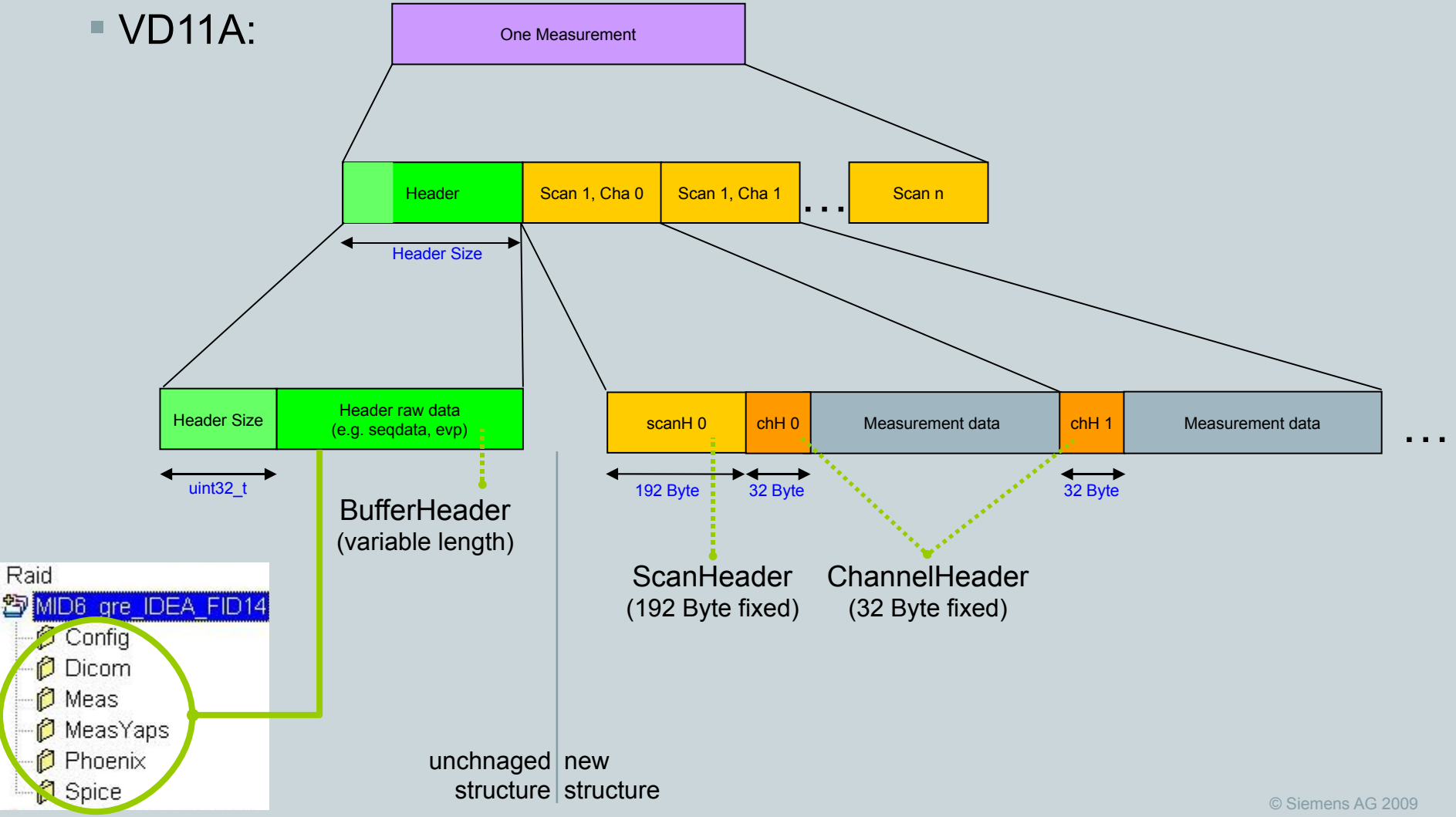


MultiRaidFileHeader
(fixed length of 160 B)

- The last measurement containts the „real“ image scan data, first one‘s are adjustments, pre-scans, noise-scans
- The last measurement depends on the preceeding measurements
- Use offset to determine the position of a measurement in file
- There are always 64 MrParcRaidFileEntry structs, indepenend of the actual number of measurements
- After the MultiRaidFileHeader and after every measurement there is a 512 byte alignment filled with „0“

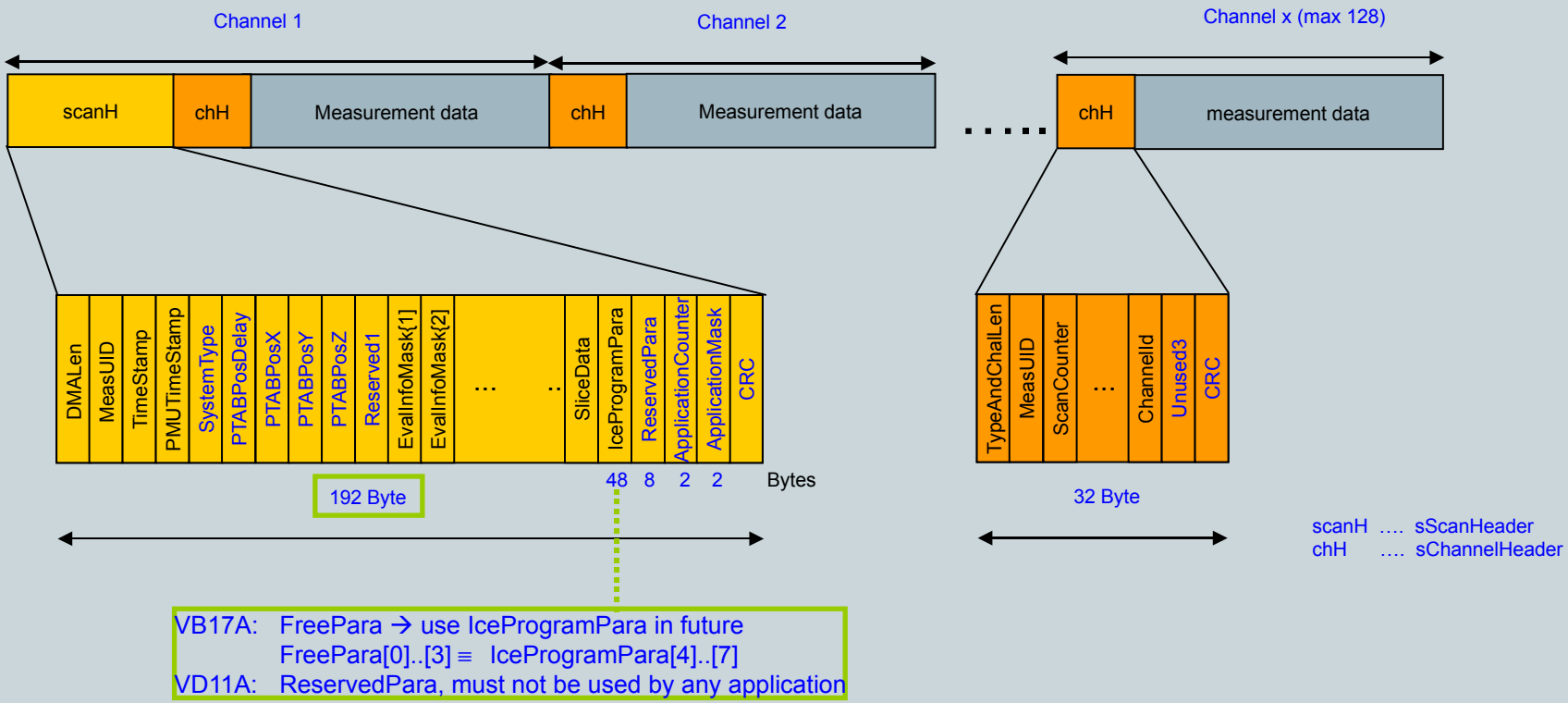
Multi-RAID – file sub structure

- VD11A:



Multi-RAID – One Scan

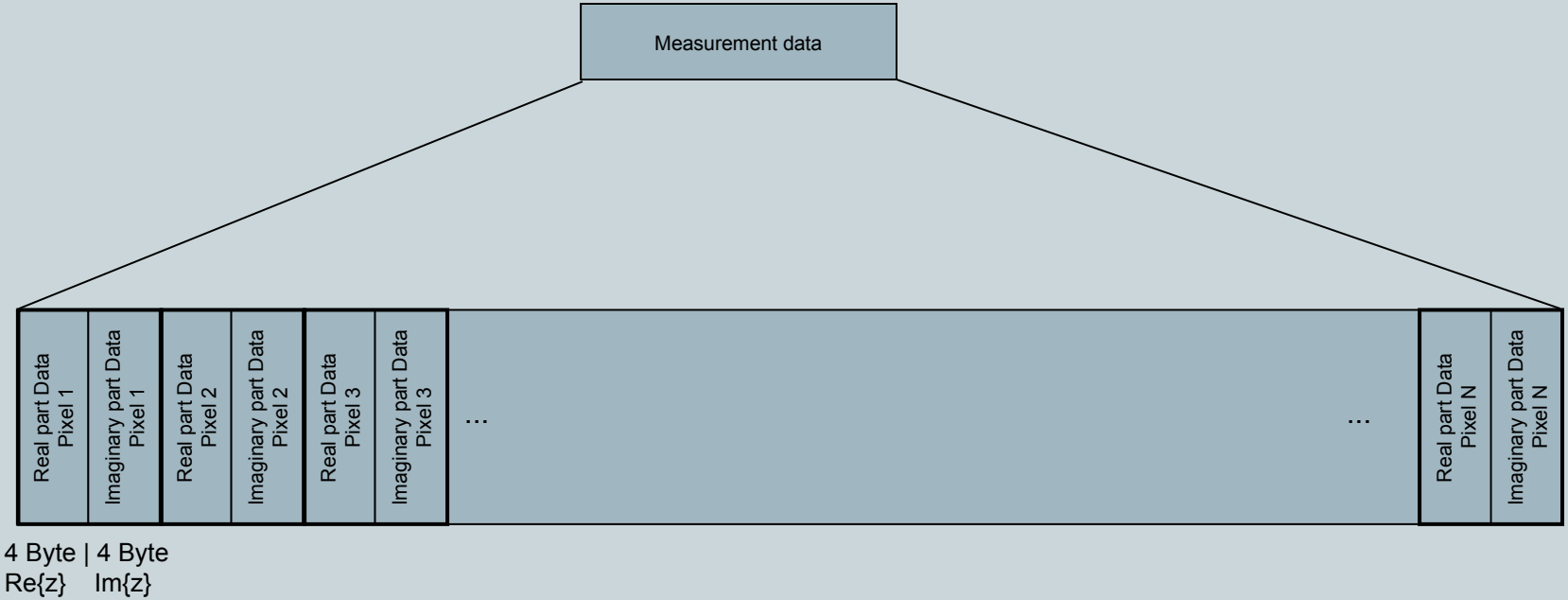
- VD11A: MDH = ScanHeader + ChannelHeader



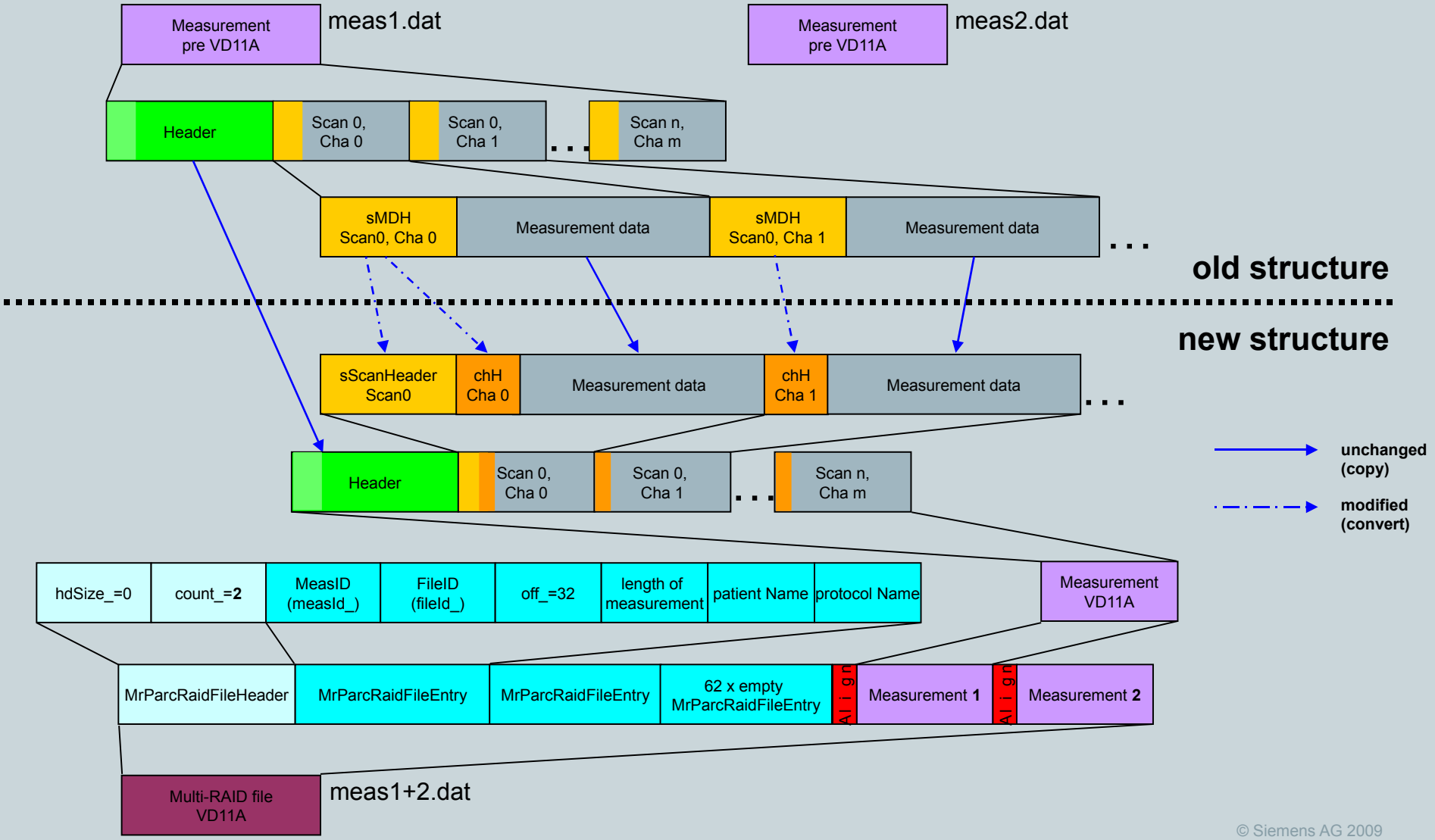
\n4\pkg\MrServers\MrMeasSrv\SeqIF\MDH\mdh.h

Multi-RAID – Pixel data

- VB17A ≡ VD11A:



RAID file – Summary: Old vs. New



Up to now (≤ VB17A) – MDH

\n4\pkg\MrServers\MrMeasSrv\SeqIF\MDH\mdh.h

DMALength	DMA length [bytes] (bit 0..24 of 4 Byte)
MeasUID	measurement user ID (4 Byte)
ScanCounter	scan counter [1...] (4 Byte)
TimeStamp	time stamp [2.5 ms ticks since 00:00] (4 Byte)
PMUTimeStam	PMU time stamp [2.5 ms ticks since last trigger] (4 Byte)
EvalInfoMask[1..2]	evaluation info mask field (2 · 4 Byte)
SamplesInScan	# of samples acquired in scan(2 Byte)
UsedChannel	# of channels used in scan(2 Byte)
sLoopCounter	loop counters [1..7] (28 Byte)
sCutOffData	cut-off values(4 Byte)
KSpaceCentreColumn	centre of echo(2 Byte)
CoilSelect	Coil select (2 Byte)
ReadOutOffcentre	ReadOut offcenter value (4 Byte)
TimeSinceLastRF	Sequence time stamp since last RF pulse (4 Byte)
KSpaceCentreLineNo	number of K-space centre line(2 Byte)
KSpaceCentrePartitionNo	number of K-space centre partition(2 Byte)
IceProgramPara	free parameter for IceProgram (8 Byte)
FreePara	free parameter (8 Byte)
SliceData	Slice Data (28 Byte)
ChannelId	channel Id (2 Byte)
PTABPosNeg	negative, absolute PTAB position in [0.1 mm] (2 Byte)

Σ = 128 Byte

VD11A – ScanHeader

\n4\pkg\MrServers\MrMeasSrv\SeqIF\MDH\mdh.h

DMALength		DMA length [bytes] (bit 0..24 of 4 Byte)
MeasUID		measurement user ID (4 Byte)
ScanCounter		scan counter [1...] (4 Byte)
TimeStamp		time stamp [2.5 ms ticks since 00:00] (4 Byte)
PMUTimeStam		PMU time stamp [2.5 ms ticks since last trigger] (4 Byte)
SystemType		System type (2 Byte)
PTABPosDelay		PTAB delay (2 Byte)
PTABPosX		absolute PTAB position in [0.1 mm] (4 Byte)
PTABPosY		absolute PTAB position in [0.1 mm] (4 Byte)
PTABPosZ		absolute PTAB position in [0.1 mm] (4 Byte)
Reserved1		reserved for future hardware signals (4 Byte)
EvalInfoMask[1..2]		evaluation info mask field (2 · 4 Byte)
…<like in VB17A>		…(50 Byte)
KSpaceCentrePartitionNo		number of K-space centre partition(2 Byte)
SliceData		Slice Data (28 Byte)
IceProgramPara	▶	free parameter for IceProgram (48 Byte)
ReservedPara		unused internal reserved parameter (8 Byte)
ApplicationCounter		(2 Byte)
ApplicationMask		(2 Byte)
CRC		CRC 32 checksum (4 Byte)

Σ = 192 Byte

VD11A – ChannelHeader

\n4\pkg\MrServers\MrMeasSrv\SeqIF\MDH\mdh.h

TypeAndChannelLength	DMA length [bytes] (bit 8..31 of 4 Byte)
MeasUID	measurement user ID (4 Byte)
ScanCounter	scan counter [1...] (4 Byte)
Reserved1	reserved (4 Byte)
SequenceTime	sequence readout starting time (4 Byte)
Unused2	unused (4 Byte)
ChannelId	channel Id (2 Byte)
Unused3	unused (2 Byte)
CRC	CRC 32 checksum of channel header (4 Byte)

Σ = 32 Byte

VD11A – MultiRaidFileHeader

\n4\pkg\MrServers\MrVista\include\Parc\MrParcRaid.h

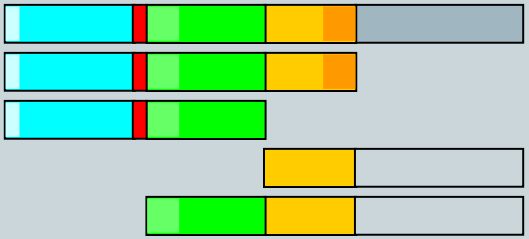
MrParcRaidFileHeader

HeaderSize Used for MDH file identification (4 Byte)

< 32: VD11A MDH file

≥ 32: Old pre VD11A MDH file

Values:



MR_PARC_RAID_ALLDATA	0	normal VD11A file (*.dat)	VD line
MR_PARC_RAID_MDHONLY	1	compact file (meas'data removed) (*.mdh)	
MR_PARC_RAID_HDONLY	2	file only with Multi-RAID and buffer header	
MR_PARC_RAID_LEGACY_THR	32	pre VD11A file without buffer header (no RAID)	VA line
> 32		pre VD11A file with buffer header	VB line

MeasCount Number of measurements in file (4 Byte)

Σ = 8 Byte

MrParcRaidFileEntry

Measurement UID Measurement UID (4 Byte)

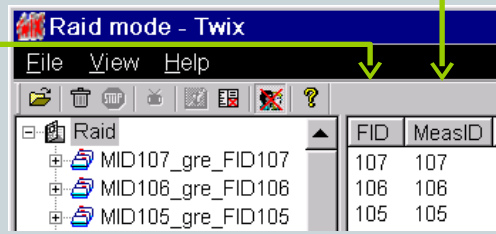
File ID File ID from RAID (4 Byte)

Offset Offset to measurement (and header) from start of file (8 Byte)

Length Length of measurement and header data (8 Byte)

PatName Patient name (64 Byte)

ProtName Protocol name (64 Byte)



Σ = 152 Byte