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099-14950

JA-C FATP System

Engineering Requirements Specification

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Engineering Requirements Specification

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About This Document

This document describes the Depth Sensor (JA-C) sub-assembly and related assembly process and test metrics as part of the PP/PG system. The contents of this Engineering Requirements Specification, including any Apple-Vendor project-specific information, are Apple Confidential Information subject to the non-disclosure and use restrictions set forth in the Confidentiality Agreement between Vendor and Apple.

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If any request is made by a third party contrary to the above requirements, such request should be immediately escalated to the appropriate Apple DRI for review and resolution. For the purposes of this specification, Vendor is defined as the company supplying the part/ service specified by this document.

Audience

The people who benefit from this guide are:

- Engineers who are designing components of the JA-C module.
- Engineers who are designing electrical or mechanical parts interfacing to or related to the JA-C module.
- Engineers who are responsible for the IQC cosmetic inspection of the mechanical part.
- Engineers who are responsible for the testing and validation of the JA-C module.

Related Documents

Table 1: Related Documents

Specification	Description
Standard	I2C-bus specification and user manual. Rev. 03 — 19 June 2007
LPDP specification	Component Vendor Reference Documents
	JA-C-L Arming/Bricking scripts
NVM Content	JA-C-L_NVM_RegisterMap.X.Y.xlsx
ERS, CTS, Tester Requirements	APN 099-13228
ERS, CTS, Site Requirements	APN 099-13229
Cosmetics, Quality Criteria	APN 099-17891

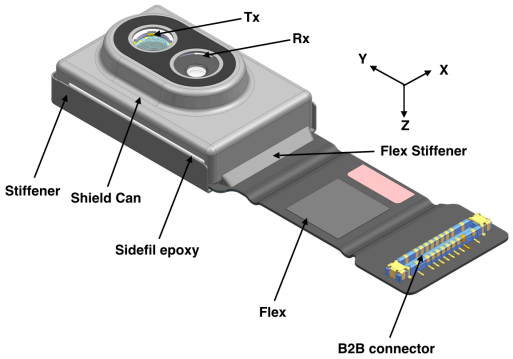
Related APN

Specification	Description
PP/PG APNs	JA-C MCO APN : 613-13465 JA-C Top level BOM APN : 673-00438 JA-C : 673-00438 (For use up to C1.9 - PVT) **JA-C : 673-00490 (C1.0 MP configs)**
	OH APN: 613-12079
	IN APN: 613-12080
	JOI Bracket APN: 806-23240
	JOI subassembly APN: 613-12345

Module Introduction

Module Layout

The following figure is shown for illustrative purposes only and should not be used for detailed mechanical design



Please refer to the detailed mechanical drawing package supplied by Apple Engineering for mechanical and assembly details and tolerances. The module will not operate as a standalone. Please refer to module schematic 951-xxxxx for further informations.

Normal Operating Conditions

All specifications must be met within the ratings below. Any exceptions shall be discussed with Apple Engineers

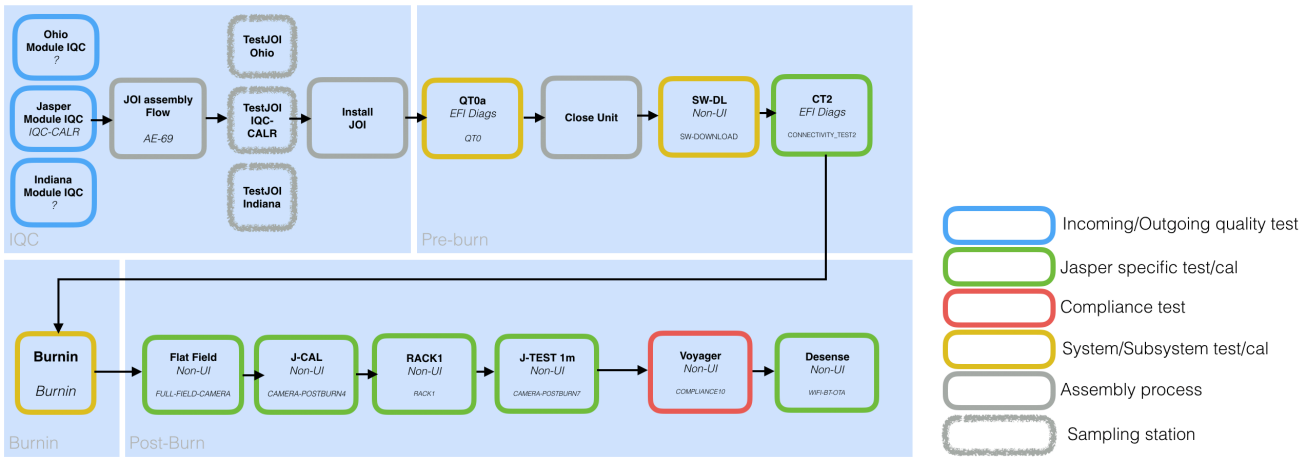
Parameter	Symbol	Min	Max	Unit	Notes
Operating temperature	Top	0	50	°C	Measured at the NTC
Storage temperature	Tstore	-20	65	°C	Ambient
Humidity (non condensing)	Humid_op	5	95	%	
Altitude	Alt_op	0	10,000	Ft.	
ESD Human Body Model (A114-A)	ESD_HBM		2	kV	
ESD CDM	ESD_CDM		500	V	

*The sensor design is expected to meet 1.2kV HBM, and 200V CDM ratings. The manufacturing line should never expose the device to greater than 1.2kV HBM, 200V CDM stress. ESD wrist straps and proper ESD grounding should be used at all handling stages. All handling stages/ processes shall be audited for ESD.

System Factory Assembly/Tests Specifications

Flow Diagram

The below flow char is an overview of JA-C related FATP assembly and test steps @ T0.



TDL updates Main line and REL line flow in the fowling radars:

PG Test Flow: <rdar://problem/46750904>

PP Test Flow: <rdar://problem/47371099>

List of Stations and Checks

Station Name	Device OS	POR	PP/PG Test Item/metrics
IQC-CALR	NA	MP*	Incoming quality check - CALR Station Correlation with module integrator
JOI-CALR	NA	ENG/ FA	After bracket assembly test - CALR Station Correlation with module integrator and IQC
QT0a	EFI Diags	MP	quick sanity check mostly focused on Riker & Will faults, and save impor-tant attributes to insight, such as JA-C SN.
SW-DL	EFI Diags	MP	DL factory UI Potentially check JA-C-RGB frame sync (AUX)
CT2	EFI Diags	MP	Push module S/N in EFI Connectivity check
Burnin	EFI Diags/Non UI	MP	Thermal test 1 (100%) Thermal stress 1 (100%) : JA-C alone Nice to have :Thermal stress 2 : JA-C + RCAM
Flat Field	Non-UI	MP	Persicope particles detect INL/DNL
DepthCAL	Non-UI	MP	MPC like station for Registration with RCAM (Ohio/Indiana) Intrinsics verification

Station Name	Device OS	POR	PP/PG Test Item/metrics
J-TEST 70cm	Non-UI	MP	Final test goals is to test assembly quality and calibrations results. JA-C Test will also be used in REL conditions
Voyager	Non-UI	MP	Angular distribution; separation between spots
OQC/CA/EQT	UI	FA	Not supported at P1
Desense	Non-UI	MP	JA-C as an aggressor Impact on antenna performance Agile clocking enabling
CoEx	Non-UI	Eng	CoEx with Arrow/Wifi JA-C as a victim Check CTS (tamper trace) and noise level in Periscope

Additionally, after inline tests there are some units put through reliability testing, starting from time zero (T0) and after each reliability read point, the module is re-tested on the FATP testers (or an Apple approved sub-set).

Insight/PDCA Key Mapping

See appendix A for the complete power-up sequence

At this stage the module unarmed arrives at the factory from the module integrators. There are 1 primary goals at IQC: Ensure that there are no test escapes from the module integrator or damage during shipping to protect against yield loss later in the supply chain.

In addition to functional testing at IQC, a detailed cosmetic inspection is performed as defined by the SQE team.

If IQC testing and cosmetics passes, you can be assured that the module is performing up to desired standard for FATP.

IQC / JOI Test : CALR

Test Name	IQC/JOI		Fields	ylabel
	LSL	USL		
PSQ_W98P_wide			4	
PSQ_W95P_wide			4	
PSQ_W90P_wide			4	
PSQ_W85P_wide			4	
PSQ_W80P_wide	0.4	0.96	4	
PSQ_W50P_wide			4	
PSQ_FW0_5M_wide			4	
PSQ_FW0_1M_wide			4	
PSQ_FW0_01M_wide			4	
PSQ_Bin1PercentOfPeak_wide	0	2	4	
PSQ_W98P_narrow			4	
PSQ_W95P_narrow			4	
PSQ_W90P_narrow			4	
PSQ_W85P_narrow			4	
PSQ_W80P_narrow	0.3	0.79	4	
PSQ_W50P_narrow			4	
PSQ_FW0_5M_narrow			4	
PSQ_FW0_1M_narrow			4	
PSQ_FW0_01M_narrow			4	
PSQ_Bin1PercentOfPeak_narrow	0	2	4	
ST_stray_photons_median_per_region			36	
ST_stray_photons_95th_per_region			36	
ST_stray_photons_95th_FOV			1	
ST_stray_photons_median_per_section			48	
ST_stray_photons_95th_per_section			48	
ST_stray_photons_5th_per_section			48	
SS_slice1_min	0		4	
SS_slice1_min_y			4	[px]
SS_slice1_min_x			4	[px]
SS_slice1_max			4	
SS_slice1_max_y			4	[px]
SS_slice1_max_x			4	[px]
SS_slice1_5th			4	

SS_slice1_5th_y			4	[px]
SS_slice1_5th_x			4	[px]
SS_slice1_median			4	
SS_slice3_min	0		4	
SS_slice3_min_y			4	[px]
SS_slice3_min_x			4	[px]
SS_slice3_max			4	
SS_slice3_max_y			4	[px]
SS_slice3_max_x			4	[px]
SS_slice3_5th			4	
SS_slice3_5th_y			4	[px]
SS_slice3_5th_x			4	[px]
SS_slice3_median			4	
SS_slice4_min	0		4	
SS_slice4_min_y			4	[px]
SS_slice4_min_x			4	[px]
SS_slice4_max			4	
SS_slice4_max_y			4	[px]
SS_slice4_max_x			4	[px]
SS_slice4_5th			4	
SS_slice4_5th_y			4	[px]
SS_slice4_5th_x			4	[px]
SS_slice4_median			4	
SS_cpp_min			4	
SS_cpp_min_y			4	[px]
SS_cpp_min_x			4	[px]
SS_cpp_max			4	
SS_cpp_max_y			4	[px]
SS_cpp_max_x			4	[px]
SS_cpp_98th		**0.727**	4	
SS_cpp_98th_y			4	[px]
SS_cpp_98th_x			4	[px]
SS_cpp_median			4	
SS_total_counts_min			4	
SS_total_counts_min_y			4	[px]
SS_total_counts_min_x			4	[px]

SS_total_counts_max			4	
SS_total_counts_max_y			4	[px]
SS_total_counts_max_x			4	[px]
SS_total_counts_98th			4	
SS_total_counts_98th_y			4	[px]
SS_total_counts_98th_x			4	[px]
SS_total_counts_median			4	
SS_slice1_pass			1	
SS_slice3_pass			1	
SS_slice4_pass			1	
SS_total_counts_pass			1	
SF_mean_temp_80cm	35	45	1	[degC]
SF_mean_vbd_80cm	1	1022	1	
SF_range_temp_80cm		4	1	[degC]
SF_range_vbd_80cm			1	
SF_Spots99pDistToNominal_80cm			1	
SF_numSpotsOutTol_80cm			1	
SF_missing_spots_80cm		10	1	
SF_Tz_mm_80cm			1	
SF_Rz_mrad_80cm			1	
SF_Txy_mm_80cm			2	
SQ_mean_temp_80cm	35	45	1	[degC]
SQ_mean_vbd_80cm	1	1022	1	
SQ_range_temp_80cm		4	1	[degC]
SQ_range_vbd_80cm			1	
SQ_p_Normal_A_4x4_median_per_region_80cm			36	
SQ_p_Normal_A_4x4_95th_per_region_80cm			36	
SQ_p_Normal_A_4x4_95th_FOV_80cm			1	
SQ_contrast_median_per_region_80cm	0.710	0.95	36	
SQ_contrast_95th_per_region_80cm			36	
SQ_contrast_95th_FOV_80cm	0.69	0.95	1	
SQ_countsPerSpotMult_median_per_region_80cm			36	
SQ_countsPerSpotMult_95th_per_region_80cm			36	
SQ_countsPerSpotMult_95th_FOV_80cm			1	
SQ_refNorm_surfaceFit_SSE_80cm		0.0015	1	
SQ_refNorm_surfaceFit_RMSE_80cm		0.0015	1	

SQ_refNorm_maskHist_promRatio_80cm		0.1	1	
SQ_refNorm_maskHist_pk1Width_80cm		0.06	1	
SQ_refNorm_maskHist_pk2Width_80cm		0.17	1	
SQ_refNorm_maskHist_pk1center_80cm	0.95	1.05	1	
SQ_refNorm_maskHist_pk2center_80cm	1.6	2.4	1	
SQ_refNorm_maskHist_bounds_80cm		0.005	1	
SQ_refNorm_performed_80cm			1	
DNL_RelErr1DNL_short			1	
DNL_MaxDnlVal_short	1	1.66	1	
DNL_MinDnlVal_short	0.71	1	1	
DNL_MeanHitPerPRI_short	0.08	1	1	
DNL_MaxHitPerPRI_short		1	1	
DNL_MinHitPerPRI_short	0.07		1	
DNL_NTdcSat_short			1	
DNL_TotalCounts_firstbins_short			1	
DNL_TotalCounts_lastbin_short			1	
DNL_InlMax_short	0	52	1	
DNL_Inl8res_Max_short	0	32	1	
DNL_LEDintensity_correctionFactor	0.6	3.6	1	
DNL_RelErr1DNL_ref_short			1	
DNL_MaxDnlVal_ref_short			1	
DNL_MinDnlVal_ref_short			1	
DNL_MeanHitPerPRI_ref_short			1	
DNL_MaxHitPerPRI_ref_short			1	
DNL_MinHitPerPRI_ref_short			1	
DNL_NTdcSat_ref_short			1	
DNL_TotalCounts_firstbins_ref_short			1	
DNL_TotalCounts_lastbin_ref_short			1	
DNL_InlMax_ref_short			1	
DNL_Inl8res_Max_ref_short			1	
DNL_RelErr1DNL_Normal_A_A			1	
DNL_MaxDnlVal_Normal_A_A	1	1.66	1	
DNL_MinDnlVal_Normal_A_A	0.71	1	1	
DNL_MeanHitPerPRI_Normal_A_A	0.08	0.5	1	
DNL_MaxHitPerPRI_Normal_A_A		0.5	1	
DNL_MinHitPerPRI_Normal_A_A	0.07		1	

DNL_NTdcSat_Normal_A_A			1	
DNL_TotalCounts_firstbins_Normal_A_A	380	386	1	
DNL_TotalCounts_lastbin_Normal_A_A	95	97	1	
DNL_InlMax_Normal_A_A	0	52	1	
DNL_Inl8res_Max_Normal_A_A	0	32	1	
DNL_RelErr1DNL_ref_Normal_A_A			1	
DNL_MaxDnlVal_ref_Normal_A_A			1	
DNL_MinDnlVal_ref_Normal_A_A			1	
DNL_MeanHitPerPRI_ref_Normal_A_A			1	
DNL_MaxHitPerPRI_ref_Normal_A_A			1	
DNL_MinHitPerPRI_ref_Normal_A_A			1	
DNL_NTdcSat_ref_Normal_A_A			1	
DNL_TotalCounts_firstbins_ref_Normal_A_A			1	
DNL_TotalCounts_lastbin_ref_Normal_A_A			1	
DNL_InlMax_ref_Normal_A_A			1	
DNL_Inl8res_Max_ref_Normal_A_A			1	
DNL_mean_temp	35	45	1	[degC]
DNL_mean_vbd	1	1022	1	
DNL_range_temp		4	1	[degC]
DNL_range_vbd			1	
FE_focus_quality_80cm	0.7		1	[unitless]
FE_image_SNR_80cm	35		1	[unitless]
FE_feature_accuracy_arcs_80cm		2	1	[mm]
FE_image_total_intensity_80cm	4E+08		1	[counts]
FE_num_features_found_80cm			1	
FE_num_features_missed_80cm			1	
FE_num_features_identified_80cm	5		1	
FE_num_features_not_identified_80cm			1	
FE_homography_precision_80cm		0.003	1	[mm]
FE_bad_pixels_80cm			1	
FE_origin_feature_found_80cm	0.5		1	
FE_mean_temp_80cm	35	45	1	[degC]
FE_mean_vbd_80cm	1	1022	1	
FE_range_temp_80cm		4	1	[degC]
FE_range_vbd_80cm			1	

DQ_RefIntensity_80cm_NPSRF	0.0047	0.405	8	[Qs]
DQ_mean_temp_80cm_NPSRF	35	45	1	[degC]
DQ_mean_vbd_80cm_NPSRF	1	1022	1	
DQ_range_temp_80cm_NPSRF		4	1	[degC]
DQ_range_vbd_80cm_NPSRF			1	
DQ_precision_median_per_region_80cm_NPSRF	0.02	1	36	[mm]
DQ_precision_95th_per_region_80cm_NPSRF			36	[mm]
DQ_precision_95th_FOV_80cm_NPSRF	0.1	1.4	1	[mm]
DQ_precision_worst_FOV_80cm_NPSRF			1	[mm]
DQ_CAL_noise_median_per_region_80cm_NPSRF			36	[mm]
DQ_CAL_noise_95th_per_region_80cm_NPSRF			36	[mm]
DQ_CAL_noise_95th_FOV_80cm_NPSRF			1	[mm]
DQ_absDepth_median_per_region_80cm_NPSRF			36	[mm]
DQ_absDepth_95th_per_region_80cm_NPSRF			36	[mm]
DQ_absDepth_95th_FOV_80cm_NPSRF			1	[mm]
DQ_regDepth_median_per_region_80cm_NPSRF	**-6**	**6**	36	[mm]
DQ_regDepth_95th_per_region_80cm_NPSRF			36	[mm]
DQ_regDepth_95th_FOV_80cm_NPSRF	0	**8**	1	[mm]
DQ_regDepth_worst_FOV_80cm_NPSRF	0	**12**	1	[mm]
DQ_relDepth_median_per_region_80cm_NPSRF	0	**5**	36	[mm]
DQ_relDepth_95th_per_region_80cm_NPSRF			36	[mm]
DQ_relDepth_95th_FOV_80cm_NPSRF	0	**7**	1	[mm]
DQ_relDepth_worst_FOV_80cm_NPSRF	0	**11**	1	[mm]
DQ_PD_median_per_region_80cm_NPSRF	0.99	1	36	
DQ_PD_95th_per_region_80cm_NPSRF	0.99	1	36	
DQ_PD_95th_FOV_80cm_NPSRF	0.99	1	1	
DQ_RefIntensity_80cm_WPSG	0.0047	0.605	8	[Qs]
DQ_mean_temp_80cm_WPSG	35	45	1	[degC]
DQ_mean_vbd_80cm_WPSG	1	1022	1	
DQ_range_temp_80cm_WPSG		4	1	[degC]
DQ_range_vbd_80cm_WPSG			1	
DQ_precision_median_per_region_80cm_WPSG	0.1	1.1	36	[mm]
DQ_precision_95th_per_region_80cm_WPSG			36	[mm]
DQ_precision_95th_FOV_80cm_WPSG	0.1	1.3	1	[mm]
DQ_precision_worst_FOV_80cm_WPSG			1	[mm]
DQ_CAL_noise_median_per_region_80cm_WPSG			36	[mm]

DQ_CAL_noise_95th_per_region_80cm_WPSG			36	[mm]
DQ_CAL_noise_95th_FOV_80cm_WPSG			1	[mm]
DQ_absDepth_median_per_region_80cm_WPSG			36	[mm]
DQ_absDepth_95th_per_region_80cm_WPSG			36	[mm]
DQ_absDepth_95th_FOV_80cm_WPSG			1	[mm]
DQ_regDepth_median_per_region_80cm_WPSG	**-8**	**8**	36	[mm]
DQ_regDepth_95th_per_region_80cm_WPSG			36	[mm]
DQ_regDepth_95th_FOV_80cm_WPSG	0	**10**	1	[mm]
DQ_regDepth_worst_FOV_80cm_WPSG	0	**14**	1	[mm]
DQ_relDepth_median_per_region_80cm_WPSG	0	**7**	36	[mm]
DQ_relDepth_95th_per_region_80cm_WPSG			36	[mm]
DQ_relDepth_95th_FOV_80cm_WPSG	0	**9**	1	[mm]
DQ_relDepth_worst_FOV_80cm_WPSG	0	**13**	1	[mm]
DQ_PD_median_per_region_80cm_WPSG	0.99	1	36	
DQ_PD_95th_per_region_80cm_WPSG	0.99	1	36	
DQ_PD_95th_FOV_80cm_WPSG	0.99	1	1	
CQ_95P_corners_80cm			1	[mm]
CQ_Npairs_corners_80cm			1	
CQ_95P_interior_80cm			1	[mm]
CQ_Npairs_interior_80cm			1	
CQ_NN_95P_radial_zone_1_80cm			1	[mm]
CQ_NN_Npairs_radial_zone_1_80cm			1	
CQ_NN_95P_radial_zone_2_80cm			1	[mm]
CQ_NN_Npairs_radial_zone_2_80cm			1	
CQ_NN_95P_radial_zone_3_80cm			1	[mm]
CQ_NN_Npairs_radial_zone_3_80cm			1	
CQ_95P_dist_zone_1_80cm			1	[mm]
CQ_Npairs_dist_zone_1_80cm			1	
CQ_95P_dist_zone_2_80cm			1	[mm]
CQ_Npairs_dist_zone_2_80cm			1	
CQ_95P_dist_zone_3_80cm			1	[mm]
CQ_Npairs_dist_zone_3_80cm			1	
CQ_Delta_slope_80cm	-0.005	0.005	1	
CQ_Delta_intercept_80cm	-0.250	0.250	1	
CQ_sigma_1_80cm			1	
CQ_sigma_2_80cm		1.500	1	

PS_wide_tail_param_amp1_per_bank			4	
PS_wide_tail_param_decay1_per_bank			4	
PS_wide_tail_param_amp2_per_bank			4	
PS_wide_tail_param_decay2_per_bank			4	
PS_wide_tail_param_RMSE_log_per_bank			4	
PS_wide_tail_param_RMSE_per_bank			4	
PS_narrow_tail_param_amp1_per_bank			4	
PS_narrow_tail_param_decay1_per_bank			4	
PS_narrow_tail_param_amp2_per_bank			4	
PS_narrow_tail_param_decay2_per_bank			4	
PS_narrow_tail_param_RMSE_log_per_bank			4	
PS_narrow_tail_param_RMSE_per_bank			4	
SPS_spot_shift_median_per_bank		0.5	4	[pixel]
SPS_spot_shift_95th_per_bank		0.8	4	[pixel]
SPS_homography_stretch_x			1	
SPS_homography_stretch_y			1	
SPS_homography_rotation			1	
SPS_homography_translation			1	
PE_reg_plain_Normal_A_1			1	
PE_reg_plain_Normal_A_2			1	
PE_reg_plain_Normal_A_3			1	
PE_reg_plain_distance	-810	-790	1	[mm]
LI_laser_intensity_1	50	250	1	
LI_laser_intensity_2	50	250	1	
LI_laser_intensity_3	50	250	1	
LI_laser_intensity_4	50	250	1	
CALR_Riker_FaultStatus0Reg	-0.5	0.5	1	
CALR_Riker_FaultStatus1Reg	-0.5	0.5	1	
CALR_Riker_FaultStatus2Reg	-0.5	0.5	1	
CALR_Riker_MisControl2Reg	4.5	5.5	1	
CALR_VBDVersion	0.5	1.5	1	
CALR_RDF_MEAN	45500	95500	1	[Ohm]
NVM_VSR	0.5	1.5		
NVM_SN	0.5	1.5		
Riker_0x43_MASK	-0.5	0.5		
Riker_0x44	-0.5	0.5		

Riker_0x45	-0.5	0.5		
Riker_0x46	-0.5	0.5		
VSR_CS	0.5	1.5		
NVM_CS	0.5	1.5		
EOL_CS	0.5	1.5		
COMP_CS	0.5	1.5		
PNV_CS	0.5	1.5		
CALU_CS	0.5	1.5		

(*) GRR FOMs

QT0A

This station will run a quick sanity check mostly focused on Riker & Will faults and RDF value, while it will also save important attributes to insight, such as JA-C SN.

Sanity Tests

Test Type	Test Items	Abbreviation	T0		Unit	Notes
			Min	Max		
Arming bit	RDF arm status(end)		1	1	N/A	If 0 report failure “JA-C UNARMED”
	RDF arm status(end)		1	1	N/A	If 0 report failure “JA-C UNARMED”
RDF Value mean	RDF resistance(start)		45500	95500	Ohm	Measure RDF Resistance
	RDF resistance(end)		45500	95500	Ohm	
RDF Value STD	Riker RDF Std		-5	5	%	Compare to NVM RDF Value in 0x0031 and 0x0032 Report Error +/- >5% (RDF_NVM_Mismatch)
Riker Faults	Riker fault registers 0x43		0	0		
	Riker fault registers 0x44		0	0		
	Riker fault registers 0x45		0	0		
	Riker fault registers 0x46		0	0		
Will Faults	Will fault registers 0x43		0	0		
	Will fault registers 0x44		0	0		
	Will fault registers 0x45		0	0		
Adams LD01	Will VDD(idle)		NA	NA	V	
	Will VDD(firing)		NA	NA	V	
Adams LD02	Periscope VDD(idle)		NA	NA	V	

Test Type	Test Items	Abbre-viation	T0		Unit	Notes
			Min	Max		
Adams LD02	Periscope VDD(firing)		NA	NA	V	
Adams LD04	Riker VDD(idle)		NA	NA	V	
	Riker VDD(firing)		NA	NA	V	
Validate Config	JA-C firing XX validateconfig results		1	1		5 samples, 1x every 5s
	JA-C firing XX validateconfig error code		0	0		5 samples, 1x every 5s
	JA-C streaming validateconfig results		1	1		
	JA-C streaming validateconfig error code		0	0		
CTS test	Vf max delta			0.52	V	
	Imon max delta			0.004	A	
	Vdd laser Vf min		1.2	1.8	V	
Riker Trim *	Trim0Reg - 0x08		0x01			OVP brick enabled
	Trim1Reg - 0x09		0x00			OVP brick enabled

***Exceptions : C2000, C2032, C2033 have wrong Riker Trim and can skip the "Riker Trim" test.**

Saving Attributes in INSIGHT in QT0 station

Attributes	Address		Notes
JA-C S/N	(0x51) - 0x0013 -> 0x001D		[31;0] See S/N definition in section above
JA-C Con-fig	(0x51) - 0x0004 -> 0x0005		Present config this way : C "camera Build" "config num-ber" : Example : **C3008**
Riker De-vice ID	(0x33) - DeviceID0Reg 0x00		Upper 8 bits of the 16th-bit device ID
	(0x33) - DeviceID1Reg 0x01		Lower 8 bits of the 16th-bit device ID
Riker Trace ID	(0x33) - TraceID0Reg 0x04		Byte 0 of trace ID
	(0x33) - TraceID1Reg 0x05		Byte 1 of trace ID
	(0x33) - TraceID2Reg 0x06		Byte 2 of trace ID
	(0x33) - TraceID3Reg 0x07		Byte 3 of trace ID

CT2 (Connectivity Test)

This station will do a thorough check of the module NVM making sure we log and review traceability for most of the components.

JA-C will be in Idle mode, with Rx only active at 30 FPS.

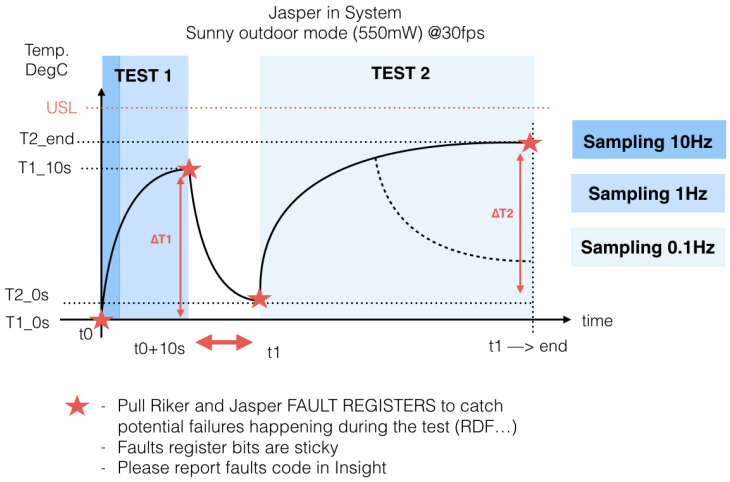
Power cycle : Sleep/reboot min. 100x **(?)**

Test Type	Test Items	Abbre-viation	Production Limit*		Unit	Notes
			Min	Max		
JA-C NVM In-tegrity	Integrity Check					Check NVM integrity check section

Burnin (Thermal Tests) <rdar://problem/51922977>

Two tests will be performed in series:

- Test 1 : Short term test (10s), to make sure to catch assembly issues;
- Test 2 : Long term test (15min), thermal characterization, up to JA-C steady state;
- The delay between the two tests above is fixed to T_cool = 10s



These 2 tests are designed to :

- **guaranty the mechanical integration is done properly**
- **catch JA-C infant failures**
- **make sure no frame is dropped during the JA-C streaming, that could indicate a catastrophic failure.**

At this stage of JA-C development (DVT), frames can potentially be dropped during an Agile Clocking event, that can trigger JA-C to switch PLL and drop frame (FW team is working on a fix).

Agile Clocking needs to be disabled during the Burnin JA-C tests to ensure JA-C sanity and make sure to not trigger false failure (frames dropped due to Agile Clocking).

Test Type	Test Items	Abbre-viation	Production Limit*		Unit	Notes
			Min	Max		
10s Thermal Test	JA-CTherm KirkActive_Sample_1		NA	NA	ºC	Time: 0s
	JA-CTherm KirkActive_Sample_2		NA	NA	ºC	Time: 0.1s
	JA-CTherm KirkActive_Sample_3		NA	NA	ºC	Time: 0.2s
	JA-CTherm KirkActive_Sample_4		NA	NA	ºC	Time: 0.3s
	JA-CTherm KirkActive_Sample_5		NA	NA	ºC	Time: 0.4s
	JA-CTherm KirkActive_Sample_6		NA	NA	ºC	Time: 0.5s
	JA-CTherm KirkActive_Sample_7		NA	NA	ºC	Time: 0.6s
	JA-CTherm KirkActive_Sample_8		NA	NA	ºC	Time: 0.7s
	JA-CTherm KirkActive_Sample_9		NA	NA	ºC	Time: 0.8s
	JA-CTherm KirkActive_Sample_10		NA	NA	ºC	Time: 0.9s
	JA-CTherm KirkActive_Sample_11		NA	NA	ºC	Time: 1.0s
	JA-CTherm KirkActive_Sample_12		NA	NA	ºC	Time: 2.0s
	JA-CTherm KirkActive_Sample_13		NA	NA	ºC	Time: 3.0s
	JA-CTherm KirkActive_Sample_14		NA	NA	ºC	Time: 4.0s
	JA-CTherm KirkActive_Sample_15		NA	NA	ºC	Time: 5.0s
	JA-CTherm KirkActive_Sample_16		NA	NA	ºC	Time: 6.0s
	JA-CTherm KirkActive_Sample_17		NA	NA	ºC	Time: 7.0s
	JA-CTherm KirkActive_Sample_18		NA	NA	ºC	Time: 8.0s
	JA-CTherm KirkActive_Sample_19		NA	NA	ºC	Time: 9.0s
	JA-CTherm KirkActive_Sample_20		NA	NA	ºC	Time: 10.0s
	JA-CTherm KirkActive_Delta	TDelta	4	10	ºC	
	JA-CTherm KirkActive_Max	TMax	NA	69	ºC	
15 min Thermal Test	JA-CBurn KirkActive_Sample_[1,61]		NA	NA	ºC	1x sample every ~15s
	JA-CBurn KirkActive_Delta	TDelta	10	21	ºC	
	JA-CBurn KirkActive_Max	TMax	NA	69	ºC	
	JA-CBurn RDF_RDF_Sample_[1,61]		45.5	95.5	KOhm	1x sample every ~15s
	RIKERFAULTSTATUS		0	0	NA	4x samples
	WILLFAULTSTATUS		0	0	NA	4x samples

Test 1 : Running Conditions

JA-C Tx, Rx fully active, 550mW, POR mode, 116fps iOS

This first test has to check if JA-C is Armed and report a failure if it is not the case

Parameter	LSL	USL	Unit	Notes
Initial		40	C	Key metric on insight Kirl_Therm_Initial If initial temp >40DegC, don't start the test : Report FAILURE "Initial_Kirk_Temp_TooHigh" Should always be reported in Insight
Sampling (@116fps)	N/A	N/A		Save NTC readings every 2 frames for [0;1s] Save NTC readings every 58 frames between [1;5s] Save NTC readings every 116 frames between [5;10s[
Test Duration	900		S	Generate a metric "StreamDuration" : Tfinal - Tstart Should always be reported in Insight

Test 2 : Running Conditions

JA-C Tx, Rx fully active, 550mW, POR mode, 116fps iOS

Parameter	LSL	USL	Unit	Notes
Cool down time	10s			
Initial		40	C	Key metric on insight Kirl_Burn_Initial If initial temp >40DegC, don't start the test : Report FAILURE "Initial_Kirk_Temp_TooHigh" Should always be reported in Insight
Sampling (@116fps)	N/A	N/A		Save NTC readings every 348 frames for [0; end]
Test Duration	10		S	Generate a metric "StreamDuration" : Tfinal - Tstart Should always be reported in Insight

Pending coverage: Add a test that pulls down the interrupt pin to make sure it's working on all the ICs.

Please note: Starting EVT OP will not apply IRPF prior to burnin test on JA-C area.

Flat Field - ERS rdar://problem/55451710

Test	ylabel	Inline		Notes
		LSL	USL	
RelErr1DNL_short		0	0.06	
MaxDnlVal_short		1	1.66	
MinDnlVal_short		0.71	1	
MeanHitPerPRI_short		0.2	1	
MaxHitPerPRI_short		0.2	1	
MinHitPerPRI_short		0.15	1	
NTdcSat_short				
TotalCounts_lastbin_short				
TotalCounts_firstbins_short				
InlMax_short		0	52	
Inl8res_Max_short		0	32	
DNL_LEDIntensity_correction-Factor		0.6	1.8	
RelErr1DNL_Normal_A		0	0.06	
MaxDnlVal_Normal_A		1	1.66	
MinDnlVal_Normal_A		0.71	1	
MeanHitPerPRI_Normal_A (*)		0.2	0.5	
MaxHitPerPRI_Normal_A (*)		0.2	0.5	
MinHitPerPRI_Normal_A (*)		0.15	0.5	
NTdcSat_Normal_A		0	0	
TotalCounts_lastbin_Normal_A		95	97	96+-1%
TotalCounts_firstbins_Normal_A		380	386	383+-1%
InlMax_Normal_A		0	52	
Inl8res_Max_Normal_A		0	32	
DNL_mean_temp		20	48	
DNL_mean_vbd		1	1022	
DNL_range_temp		0	8	
RelErr1DNL_ref_short				
MaxDnlVal_ref_short				
MinDnlVal_ref_short				
MeanHitPerPRI_ref_short				
MaxHitPerPRI_ref_short				
MinHitPerPRI_ref_short				
NTdcSat_ref_short		0	0	

Test	ylabel	Inline		Notes
		LSL	USL	
TotalCounts_lastbin_ref_short				
TotalCounts_first-bins_ref_short				
InlMax_ref_short				
Inl8res_Max_ref_short				
RelErr1DNL_ref_short				
RelErr1DNL_ref_Normal_A				
MaxDnlVal_ref_Normal_A				
MinDnlVal_ref_Normal_A				
MeanHitPerPRI_ref_Normal_A				
MaxHitPerPRI_ref_Normal_A				
MinHitPerPRI_ref_Normal_A				
NTdcSat_ref_Normal_A				
TotalCounts_lastbin_ref_Normal_A				
TotalCounts_firstbins_ref_Normal_A				
InlMax_ref_Normal_A				
Inl8res_Max_ref_Normal_A				
LEDintensity_correctionFactor				

Depth-Cal ERS rdar://problem/55451745

There are 2 primary goals at System Test level:

- RGB Registration with Ohio/Indiana
- Validate that there are no issues with the modules interacting with the system MLB, BG, etc… and if so address any issues before those modules reach FATP to avoid line down situations

name	T0		REL		units
	LSL	USL	LSL	USL	
JCal_JA-C_intr_efl_nvm					mm
JCal_JA-C_intr_distortion_30					%
JCal_JA-C_intr_distortion_50					%
JCal_JA-C_intr_distortion_80					%
JCal_JA-C_intr_erepr_rmse		1		1	px
JCal_JA-C_mean_temp_Ndeg_ON					degC
JCal_JA-C_mean_temp_P00_ON	20	48	20	48	degC
JCal_JA-C_mean_temp_Pdeg_ON					degC
JCal_JA-C_range_temp_Ndeg_ON					degC
JCal_JA-C_range_temp_P00_ON					degC
JCal_JA-C_range_temp_Pdeg_ON					degC
JCal_JA-C_mean_vbd_Ndeg_ON					N/A
JCal_JA-C_mean_vbd_P00_ON					N/A
JCal_JA-C_mean_vbd_Pdeg_ON					N/A
JCal_JA-C_range_vbd_Ndeg_ON					N/A
JCal_JA-C_range_vbd_P00_ON					N/A
JCal_JA-C_range_vbd_Pdeg_ON					N/A
JCal_JA-C_intr_principlePoint_x_nvm					mm
JCal_JA-C_intr_principlePoint_y_nvm					mm

name	T0		REL		units
	LSL	USL	LSL	USL	
JCal_JA-C_undistort-LUT_nvm_1					mm
JCal_JA-C_undistort-LUT_nvm_2					mm
JCal_JA-C_undistort-LUT_nvm_3					mm
JCal_JA-C_undistort-LUT_nvm_4					mm
JCal_JA-C_undistort-LUT_nvm_5					mm
JCal_JA-C_undistort-LUT_nvm_6					mm
JCal_JA-C_undistort-LUT_nvm_7					mm
JCal_JA-C_undistort-LUT_nvm_8					mm
JCal_JA-C_distortLUT_n-vm_1					mm
JCal_JA-C_distortLUT_n-vm_2					mm
JCal_JA-C_distortLUT_n-vm_3					mm
JCal_JA-C_distortLUT_n-vm_4					mm
JCal_JA-C_distortLUT_n-vm_5					mm
JCal_JA-C_distortLUT_n-vm_6					mm
JCal_JA-C_distortLUT_n-vm_7					mm
JCal_JA-C_distortLUT_n-vm_8					mm
JCal_JA-C_intr_dcx_nvm					a.u
JCal_JA-C_intr_dcy_nvm					a.u
JCal_JA-C_tempSub-strate_nvm					degC
JCal_JA-C_tempKirk_nvm					degC
JCal_JA-C_temp-Periscope_nvm					degC
JCal_JA-C_fp_x					mm
JCal_JA-C_fp_y					mm
JCal_JA-C_fp_z					mm
JCal_JA-C_intr_erepr_50th		1		1	pix

name	T0		REL		units
	LSL	USL	LSL	USL	
JCal_JA-C_intr_erepr_68th					pix
JCal_JA-C_intr_erepr_95th		1.5		1.5	pix
JCal_JA-C_intr_erepr_97th					pix
JCal_JA-C_planes_d_Ndeg	395	435	395	435	mm
JCal_JA-C_planes_d_P00	380	420	380	420	mm
JCal_JA-C_planes_d_Pdeg	355	395	355	395	mm
JCal_JA-C_int_-plane_rot_Ndeg_x¬† ¬† ¬†	-100	100	-100	100	mrad
JCal_JA-C_int_-plane_rot_Ndeg_y	-360	-160	-360	-160	mrad
JCal_JA-C_int_-plane_rot_Ndeg_z	-100	100	-100	100	mrad
JCal_JA-C_int_-plane_rot_P00_x	-100	100	-100	100	mrad
JCal_JA-C_int_-plane_rot_P00_y	-100	100	-100	100	mrad
JCal_JA-C_int_-plane_rot_P00_z	-100	100	-100	100	mrad
JCal_JA-C_int_-plane_rot_Pdeg_x	-100	100	-100	100	mrad
JCal_JA-C_int_-plane_rot_Pdeg_y	160	360	160	360	mrad
JCal_JA-C_int_-plane_rot_Pdeg_z	-100	100	-100	100	mrad
JCal_JA-C_int_plane_-tran_Ndeg_x¬† ¬† ¬†					mm
JCal_JA-C_int_plane_-tran_Ndeg_y					mm
JCal_JA-C_int_plane_-tran_Ndeg_z					mm
JCal_JA-C_int_plane_-tran_P00_x					mm
JCal_JA-C_int_plane_-tran_P00_y					mm
JCal_JA-C_int_plane_-tran_P00_z					mm
JCal_JA-C_int_plane_-tran_Pdeg_x					mm
JCal_JA-C_int_plane_-tran_Pdeg_y					mm
JCal_JA-C_int_plane_-tran_Pdeg_z					mm
JCal_JA-C_refWallDist	380	420	380	420	mm

name	T0		REL		units
	LSL	USL	LSL	USL	
JCal_JA-C_refWallIdx					N/A
JCal_JA-C_refWallNormal_1					a.u.
JCal_JA-C_refWallNormal_2					a.u.
JCal_JA-C_refWallNormal_3					a.u.
JCal_JA-C_num_features_found_0deg	820	930	820	930	a.u
JCal_JA-C_intr_principlePoint_x_reCal			0.6673	0.7439	mm
JCal_JA-C_intr_principlePoint_y_reCal			0.8689	0.9455	mm
JCal_JA-C_intr_efl_reCal			1.4939	1.57	mm
JCal_JA-C_intr_dcx_reCal					a.u
JCal_JA-C_intr_dcy_reCal					a.u
JCal_JA-C_undistortLUT_reCal_1					mm
JCal_JA-C_undistortLUT_reCal_2					mm
JCal_JA-C_undistortLUT_reCal_3					mm
JCal_JA-C_undistortLUT_reCal_4					mm
JCal_JA-C_undistortLUT_reCal_5					mm
JCal_JA-C_undistortLUT_reCal_6					mm
JCal_JA-C_undistortLUT_reCal_7					mm
JCal_JA-C_undistortLUT_reCal_8					mm
JCal_JA-C_distortLUT_reCal_1					mm
JCal_JA-C_distortLUT_reCal_2					mm
JCal_JA-C_distortLUT_reCal_3					mm
JCal_JA-C_distortLUT_reCal_4					mm
JCal_JA-C_distortLUT_reCal_5					mm

name	T0		REL		units
	LSL	USL	LSL	USL	
JCal_JA-C_distortLUT_re-Cal_6					mm
JCal_JA-C_distortLUT_re-Cal_7					mm
JCal_JA-C_distortLUT_re-Cal_8					mm
JCal_JSW_rotAng_x	-100	100	-100	100	mrad
JCal_JSW_rotAng_y	-100	100	-100	100	mrad
JCal_JSW_rotAng_z	1470	1670	1470	1670	mrad
JCal_JSW_fp_x					mm
JCal_JSW_fp_y					mm
JCal_JSW_fp_z					mm
JCal_SW_intr_efl	1.2	1.4	1.2	1.4	mm
JCal_SW_intr_principle-Point_x	1.77	1.97	1.77	1.97	mm
JCal_SW_intr_principle-Point_y	1.16	1.36	1.16	1.36	mm
JCal_SW_undistortLUT_1					N/A
JCal_SW_undistortLUT_2					N/A
JCal_SW_undistortLUT_3					N/A
JCal_SW_undistortLUT_4					N/A
JCal_SW_undistortLUT_5					N/A
JCal_SW_undistortLUT_6					N/A
JCal_SW_undistortLUT_7					N/A
JCal_SW_undistortLUT_8					N/A
JCal_SW_distortLUT_1					N/A
JCal_SW_distortLUT_2					N/A
JCal_SW_distortLUT_3					N/A
JCal_SW_distortLUT_4					N/A
JCal_SW_distortLUT_5					N/A
JCal_SW_distortLUT_6					N/A
JCal_SW_distortLUT_7					N/A
JCal_SW_distortLUT_8					N/A
JCal_SW_intr_dcx					N/A

name	T0		REL		units
	LSL	USL	LSL	USL	
JCal_SW_intr_dcy					N/A
JCal_SW_intr_erepr_rmse	0	2	0	2	pix
JCal_SW_intr_erepr_50th	0	2	0	2	pix
JCal_SW_intr_erepr_68th					pix
JCal_SW_intr_erepr_95th	0	4	0	4	pix
JCal_SW_intr_erepr_97th					pix
JCal_SW_planes_d_Ndeg	395	435	395	435	mm
JCal_SW_planes_d_P00	375	415	375	415	mm
JCal_SW_planes_d_Pdeg	350	390	350	390	mm
JCal_SW_int_plane_rot_N-deg_x¬† ¬† ¬†	-100	100	-100	100	mrad
JCal_SW_int_plane_rot_N-deg_y	-360	-160	-360	-160	mrad
JCal_SW_int_plane_rot_N-deg_z	-1670	-1470	-1670	-1470	mrad
JCal_SW_int_-plane_rot_P00_x	-100	100	-100	100	mrad
JCal_SW_int_-plane_rot_P00_y	-100	100	-100	100	mrad
JCal_SW_int_-plane_rot_P00_z	-1670	-1470	-1670	-1470	mrad
JCal_SW_int_-plane_rot_Pdeg_x	-100	100	-100	100	mrad
JCal_SW_int_-plane_rot_Pdeg_y	160	360	160	360	mrad
JCal_SW_int_-plane_rot_Pdeg_z	-1670	-1470	-1670	-1470	mrad
JCal_SW_int_plane_-tran_Ndeg_x¬† ¬† ¬†					mm
JCal_SW_int_plane_-tran_Ndeg_y					mm
JCal_SW_int_plane_-tran_Ndeg_z					mm
JCal_SW_int_plane_-tran_P00_x					mm
JCal_SW_int_plane_-tran_P00_y					mm
JCal_SW_int_plane_-tran_P00_z					mm
JCal_SW_int_plane_-tran_Pdeg_x					mm
JCal_SW_int_plane_-tran_Pdeg_y					mm

name	T0		REL		units
	LSL	USL	LSL	USL	
JCal_SW_int_plane_-tran_Pdeg_z					mm
JCal_SW_refWallDist	380	420	380	420	mm
JCal_SW_refWallIdx					N/A
JCal_SW_refWallNormal_1					a.u.
JCal_SW_refWallNormal_2					a.u.
JCal_SW_refWallNormal_3					a.u.
JCal_SW_num_features_-found_0deg	1450	1630	1450	1630	N/A
JCal_SW_intr_distortion_30					%
JCal_SW_intr_distortion_50					%
JCal_SW_intr_distortion_80					%

J-TEST 70cm - ERS rdar://problem/55451779

name	Nbr entity	T0		REL		units
		LSL	USL	LSL	USL	
GP_laserIntensity	4	50	250	50	250	N/A
PSQ_W98P_wide	4					N/A
PSQ_W95P_wide_1	4					N/A
PSQ_W90P_wide_1	4					N/A
PSQ_W85P_wide_1	4					N/A
PSQ_W80P_wide_4	4	0.4	0.97	0.4	0.97	N/A
PSQ_W50P_wide_4	4					N/A
PSQ_FW0_5M_wide_4	4					N/A
PSQ_FW0_1M_wide_4	4					N/A
PSQ_FW0_01M_wide_4	4					N/A
PSQ_Bin1PercentOfPeak_wide_4	4					N/A
PSQ_W98P_narrow_4	4					N/A
PSQ_W95P_narrow_4	4					N/A
PSQ_W90P_narrow_4	4					N/A
PSQ_W85P_narrow_4	4					N/A
PSQ_W80P_narrow_4	4	0.3	0.8	0.3	0.8	N/A
PSQ_W50P_narrow_4	4					N/A
PSQ_FW0_5M_narrow_4	4					N/A
PSQ_FW0_1M_narrow_4	4					N/A
PSQ_FW0_01M_narrow_4	4					N/A
PSQ_Bin1PercentOfPeak_narrow_4	4	0	3	0	3	N/A
ST_stray_photons_median_per_region_36	36					N/A
ST_stray_photons_95th_per_region_36	36					N/A
ST_stray_photons_95th_FOV	1					N/A
ST_stray_photons_median_per_section_48	48					N/A
ST_stray_photons_95th_per_section_48	48					N/A
ST_stray_photons_5th_per_section_48	48					N/A
SS_slice1_min_4	4	0		0		N/A
SS_slice1_min_y_4	4					px

SS_slice1_min_x_4	4					px
SS_slice1_max_4	4					N/A
SS_slice1_max_y_4	4					px
SS_slice1_max_x_4	4					px
SS_slice1_5th_4	4					N/A
SS_slice1_5th_y_4	4					px
SS_slice1_5th_x_4	4					px
SS_slice1_median_4	4					N/A
SS_slice3_min_4	4	0		0		N/A
SS_slice3_min_y_4	4					px
SS_slice3_min_x_4	4					px
SS_slice3_max_4	4					N/A
SS_slice3_max_y_4	4					px
SS_slice3_max_x_4	4					px
SS_slice3_5th_4	4					N/A
SS_slice3_5th_y_4	4					px
SS_slice3_5th_x_4	4					px
SS_slice3_median_4	4					N/A
SS_slice4_min_4	4	0		0		N/A
SS_slice4_min_y_4	4					px
SS_slice4_min_x_4	4					px
SS_slice4_max_4	4					N/A
SS_slice4_max_y_4	4					px
SS_slice4_max_x_4	4					px
SS_slice4_5th_4	4					N/A
SS_slice4_5th_y_4	4					px
SS_slice4_5th_x_4	4					px
SS_slice4_median_4	4					N/A
SS_cpp_min_4	4					N/A
SS_cpp_min_y_4	4					px
SS_cpp_min_x_4	4					px
SS_cpp_max_4	4					N/A

SS_cpp_max_y_4	4					px
SS_cpp_max_x_4	4					px
SS_cpp_98th_4	4		0.902	0	0.902	N/A
SS_cpp_98th_y_4	4					px
SS_cpp_98th_x_4	4					px
SS_cpp_median_4	4					N/A
SS_total_counts_min_4	4					N/A
SS_total_counts_min_y_4	4					px
SS_total_counts_min_x_4	4					px
SS_total_counts_max_4	4					N/A
SS_total_counts_max_y_4	4					px
SS_total_counts_max_x_4	4					px
SS_total_counts_98th_4	4					N/A
SS_total_counts_98th_y_4	4					px
SS_total_counts_98th_x_4	4					px
SS_total_counts_median_4	4					N/A
SS_slice4_pass	1					N/A
SS_total_counts_pass	1					N/A
SF_Spots99pDistToNominal	1					N/A
SF_numSpotsOutTol	1					N/A
SF_missing_spots_4	4		10		10	N/A
SF_Tz_mm	1					mm
SF_Rz_mrad	1					mrad
SF_Tx_mm	1					mm
SF_Ty_mm	1					mm
SQ_mean_temp_70cm	1	20	48	20	48	degC
SQ_mean_vbd_70cm	1	1	1022	1	1022	N/A
SQ_range_temp_70cm	1		8	0	8	degC
SQ_range_vbd_70cm	1					N/A
SQ_p_normal_4x4_median_per_region_70cm_36	36	0.175	1	0.175	1	N/A
SQ_p_normal_4x4_95th_per_region_70cm_36	36					N/A
SQ_p_normal_4x4_95th_FOV_70cm	1	0.165	1	0.165	1	N/A

SQ_contrast_median_per_region_70cm_36	36	0.705	0.95	0.685	0.95	N/A
SQ_contrast_95th_per_region_70cm_36	36					N/A
SQ_contrast_95th_FOV_70cm	1	0.685	0.95	0.665	0.95	N/A
SQ_countsPerSpotMult_median_per_region_70cm_36	36					N/A
SQ_countsPerSpotMult_95th_per_region_70cm_36	36					N/A
SQ_countsPerSpotMult_95th_FOV_70cm	1					N/A
SQ_refNorm_surfaceFit_SSE_70cm	1		0.0015		0.0015	N/A
SQ_refNorm_surfaceFit_RMSE_70cm	1		0.0015		0.0015	N/A
SQ_refNorm_maskHist_promRatio_70cm	1		0.12		0.12	N/A
SQ_refNorm_maskHist_pk1Width_70cm	1		0.08		0.08	N/A
SQ_refNorm_maskHist_pk2Width_70cm	1		0.19		0.19	N/A
SQ_refNorm_maskHist_pk1center_70cm	1	0.95	1.05	0.95	1.05	N/A
SQ_refNorm_maskHist_pk2center_70cm	1	1.6	2.4	1.6	2.4	N/A
SQ_refNorm_maskHist_bounds_70cm	1		**0.0075**		**0.0075**	N/A
SQ_refNorm_performed_70cm	1					N/A
SQ_refNorm_reflectivity_ratio_70cm	1					N/A
DQ_RefIntensity_70cm_NPSRF	1	0.0045	0.6	0.0045	0.6	Qs
DQ_mean_vbd_70cm_NPSRF	1	1	1022	1	1022	N/A
DQ_mean_temp_70cm_NPSRF	1	20	48	20	48	degC
DQ_range_temp_70cm_NPSRF	1	0	8	0	8	degC
DQ_range_vbd_70cm_NPSRF	1					N/A
DQ_precision_median_per_region_70cm_NPSRF_36	36	0.1	1	0.1	1	mm
DQ_precision_95th_per_region_70cm_NPSRF_36	36					mm
DQ_precision_95th_FOV_70cm_NPSRF	1	0.1	1.1	0.1	1.1	mm
DQ_precision_worst_FOV_70cm_NPSRF	1					mm
DQ_precision_worst_FOV_NoCorners_70cm_NPSRF	1					mm
DQ_CAL_noise_median_per_region_70cm_NPSRF_36	36					mm
DQ_CAL_noise_95th_per_region_70cm_NPSRF_36	36					mm
DQ_CAL_noise_95th_FOV_70cm_NPSRF	1					mm
DQ_absDepth_median_per_region_70cm_NPSRF_36	36					mm
DQ_absDepth_95th_per_region_70cm_NPSRF_36	36					mm
DQ_absDepth_95th_FOV_70cm_NPSRF	1					mm

DQ_regDepth_median_per_region_70cm_NPSRF_36	36	-8	8	-12	12	mm
DQ_regDepth_median_FOV_70cm_NPSRF	1	-8	8	-12	12	mm
DQ_regDepth_95th_per_region_70cm_NPSRF_36	36					mm
DQ_regDepth_95th_FOV_70cm_NPSRF	1	0	9	0	14	mm
DQ_regDepth_worst_FOV_70cm_NPSRF	1					mm
DQ_regDepth_worst_FOV_NoCorners_70cm_NPSRF	1	0.1	16	0.1	19	mm
DQ_relDepth_median_per_region_70cm_NPSRF_36	36	0	6	0	12	mm
DQ_relDepth_95th_per_region_70cm_NPSRF_36	36					mm
DQ_relDepth_95th_FOV_70cm_NPSRF	1	0	10	0	14	mm
DQ_relDepth_worst_FOV_70cm_NPSRF	1					mm
DQ_relDepth_worst_FOV_NoCorners_70cm_NPSRF	1	0	16	0	19	mm
DQ_PD_median_per_region_70cm_NPSRF_36	36	0.99	1	0.99	1	N/A
DQ_PD_95th_per_region_70cm_NPSRF_36	36					N/A
DQ_PD_95th_FOV_70cm_NPSRF	1	0.99	1	0.99	1	N/A
DQ_RefIntensity_70cm_WPSG	1	0.0045	0.8	0.0045	0.8	N/A
DQ_mean_temp_70cm_WPSG	1	20	48	20	48	degC
DQ_mean_vbd_70cm_WPSG	1	1	1022	1	1022	N/A
DQ_range_temp_70cm_WPSG	1	0	8	0	8	degC
DQ_range_vbd_70cm_WPSG	1					N/A
DQ_precision_median_per_region_70cm_WPSG_36	36	0.1	1	0.1	1	mm
DQ_precision_95th_per_region_70cm_WPSG_36	36					mm
DQ_precision_95th_FOV_70cm_WPSG	1	0.1	1.1	0.1	1.1	mm
DQ_precision_worst_FOV_70cm_WPSG	1					mm
DQ_precision_worst_FOV_NoCorners_70cm_WPSG	1					mm
DQ_CAL_noise_median_per_region_70cm_WPSG_36	36					mm
DQ_CAL_noise_95th_per_region_70cm_WPSG_36	36					mm
DQ_CAL_noise_95th_FOV_70cm_WPSG	1					mm
DQ_absDepth_median_per_region_70cm_WPSG_36	36					mm
DQ_absDepth_95th_per_region_70cm_WPSG_36	36					mm
DQ_absDepth_95th_FOV_70cm_WPSG	1					mm
DQ_regDepth_median_per_region_70cm_WPSG_36	36	-10	10	-14	14	mm
DQ_regDepth_median_FOV_70cm_WPSG	1	-10	10	-14	14	mm

DQ_regDepth_95th_per_region_70cm_WPSG_36	36					mm
DQ_regDepth_95th_FOV_70cm_WPSG	1	0	11	0	16	mm
DQ_regDepth_worst_FOV_70cm_WPSG	1					mm
DQ_regDepth_worst_FOV_NoCorners_70cm_WPSG	1	0.1	16	0.1	21	mm
DQ_relDepth_median_per_region_70cm_WPSG_36	36	0	8	0	14	mm
DQ_relDepth_95th_per_region_70cm_WPSG_36	36					mm
DQ_relDepth_95th_FOV_70cm_WPSG	1	0	10	0	16	mm
DQ_relDepth_worst_FOV_70cm_WPSG	1					mm
DQ_relDepth_worst_FOV_NoCorners_70cm_WPSG	1	0.1	16	0.1	21	mm
DQ_PD_median_per_region_70cm_WPSG_36	36	0.99	1	0.99	1	N/A
DQ_PD_95th_per_region_70cm_WPSG_36	36					N/A
DQ_PD_95th_FOV_70cm_WPSG	1	0.99	1	0.99	1	N/A
PS_stray_1_percent_min_tof_per_bank_4	4					psec
PS_wide_tail_param_amp1_per_bank_4	4					N/A
PS_wide_tail_param_decay1_per_bank_4	4					N/A
PS_wide_tail_param_amp2_per_bank_4	4					N/A
PS_wide_tail_param_decay2_per_bank_4	4					N/A
PS_wide_tail_param_RMSE_log_per_bank_4	4					N/A
PS_wide_tail_param_RMSE_per_bank_4	4					N/A
PS_narrow_tail_param_amp1_per_bank_4	4					N/A
PS_narrow_tail_param_decay1_per_bank_4	4					N/A
PS_narrow_tail_param_amp2_per_bank_4	4					N/A
PS_narrow_tail_param_decay2_per_bank_4	4					N/A
PS_narrow_tail_param_RMSE_log_per_bank_4	4					N/A
PS_narrow_tail_param_RMSE_per_bank_4	4					N/A
SPS_spot_shift_median_per_bank_4	4		0.7		2.3	N/A
SPS_spot_shift_95th_per_bank_4	4		1		2.6	N/A
SPS_homography_stretch_x	1					N/A
SPS_homography_stretch_y	1					N/A
SPS_homography_rotation	1					N/A
SPS_homography_translation	1					N/A
RQ_absDepth_95th_FOV	1					N/A

RQ_absDepth_95th_per_region_36	36					N/A
RQ_absDepth_median_per_region_36	36					N/A
RQ_absDepth_worst_FOV	1					N/A
RQ_absDepth_worst_FOV_NoCorners	1					N/A
RQ_JA-CWallParams_dist	1	695	709	692	712	mm
RQ_JA-CWallParams_normal_1	1					N/A
RQ_JA-CWallParams_normal_2	1					N/A
RQ_JA-CWallParams_normal_3	1					N/A
RQ_JasTargetNormalsRotAngle_1	1					N/A
RQ_JasTargetNormalsRotAngle_2	1					N/A
RQ_JasTargetNormalsRotAngle_3	1					N/A
RQ_JTestNFeatures	1					N/A
RQ_medianErrJSW	1	0.01	5	0.01	20	N/A
RQ_medianErrJW	1	0.01	12	0.01	25	N/A
RQ_perc95ErrJSW	1	0.01	7	0.01	22	N/A
RQ_perc95ErrJW	1	0.01	18	0.01	27	N/A
RQ_SWJasNormalsRotAngle_1	1	-50	50	-65	65	N/A
RQ_SWJasNormalsRotAngle_2	1	-50	50	-65	65	N/A
RQ_SWJasNormalsRotAngle_3	1	1560	1580	1560	1580	N/A
RQ_SWWallParams_dist	1					N/A
RQ_SWWallParams_normal_1	1					N/A
RQ_SWWallParams_normal_2	1					N/A
RQ_SWWallParams_normal_3	1					N/A
RQ_TLxFeature	1					N/A
RQ_TLyFeature	1					N/A
RQ_DevicePosLeft	1					N/A
RQ_DevicePosRight	1					N/A
SPS_spot_shift_median_per_bank_4	4					N/A
DR_spot12_sumIntensity	12					N/A
DR_spot12_NPixels	12					N/A
DR_spot12_bankid	12					N/A
DR_spot12_centPosX	12					N/A

DR_spot12_centPosY	12					N/A
DR_Nspots_bank4	4					N/A
DR_meanStrayExcludingDRSpots_bank4	4					N/A
DR_totalNspots	1					N/A
DR_generalStrayZone_bank4	4					N/A
DR_spot12_intensityPeakVal	1					N/A
DR_spot12_dist2nearestSpot	1					N/A

Voyager (Compliance)

<rdar://problem/40737778> JA-C- OK2Book Approval for Compliance: FMEA, System Envelope and CTS Master List

Parameter	LSL	USL	Unit	Notes
temperature_tec	25.5	24.5	degC	
JA-C_FaultStatus	0.5	0	NA	
JA-C_MaxBinary	3500	400	cts	
JA-C_alpha	7.6	3.8	mRad	
JA-C_q	0.95	0.75	NA	
IQCAudit_RLSCount	5	2	NA	
ActiveAlignment_JA-C_XOffset	0.1	-0.1	mm	
ActiveAlignment_JA-C_YOffset	0.1	-0.1	mm	
ActiveAlignment_JA-C_PatternScore			NA	
AuditTimeRemaining	2592000	0	s	
JA-C_CameraSensorDeltaTemperature	27	-10	degC	
MaxBinary	3400	500	NA	
BoundaryArea	2420	2210	deg2	
maxMaxPixelValue	3500	600	NA	
minMaxPixelValue	3500	600	NA	
delta_cy_mm	0.5	-0.5	mm	
delta_cx_mm	0.5	-0.5	mm	
AA_alpha_height	155	135	NA	
AA_alpha_width	80	60	NA	
AA_alpha_correct_order_power_norm	1	0.7	NA	
BeckHoff_axis_1_x_diff_mm	0.1	-0.1	mm	
BeckHoff_axis_2_z_diff_mm	0.1	-0.1	mm	
BeckHoff_axis_3_phi_diff_deg	0.1	-0.1	deg	

Parameter	LSL	USL	Unit	Notes
BeckHoff_correction_phi_deg	0.4	-0.4	deg	
max_error_angle	0.25	-0.25	deg	
TriggerMeasuredPeriod	17100	16900	us	
maxAlpha	7.6	3.8	mRad	
minSpotPower_ZeroOrder_mW	0.208	0.01	mW	
minSpotPower_NonZeroOrder_mW	0.17388	0.01	mW	
maxSpotPower_ZeroOrder_mW_dustCorrected	0.208		mW	
maxSpotPower_NonZeroOrder_mW_dustCorrected	0.17388		mW	
minQ	0.95	0.65	NA	
MatlabExposureTime_ms	5.001	4.999	NA	
alpha_total_spots	16	16	NA	
JA-C_Vf_Vf_max_delta_bank2bank	0.52	0.00001	V	
JA-C_Vf_Vdd_laser - Vf_min	1.8	1.2	V	
JA-C_Vf_I_mon_max_delta_bank2bank	0.004	0.00001	A	
RLS_maxI			NA	
RLS_minI	1	0.85	NA	
minNER	1	0.85	NA	

Desense online

Tester name : WIFI BT OTA LAT

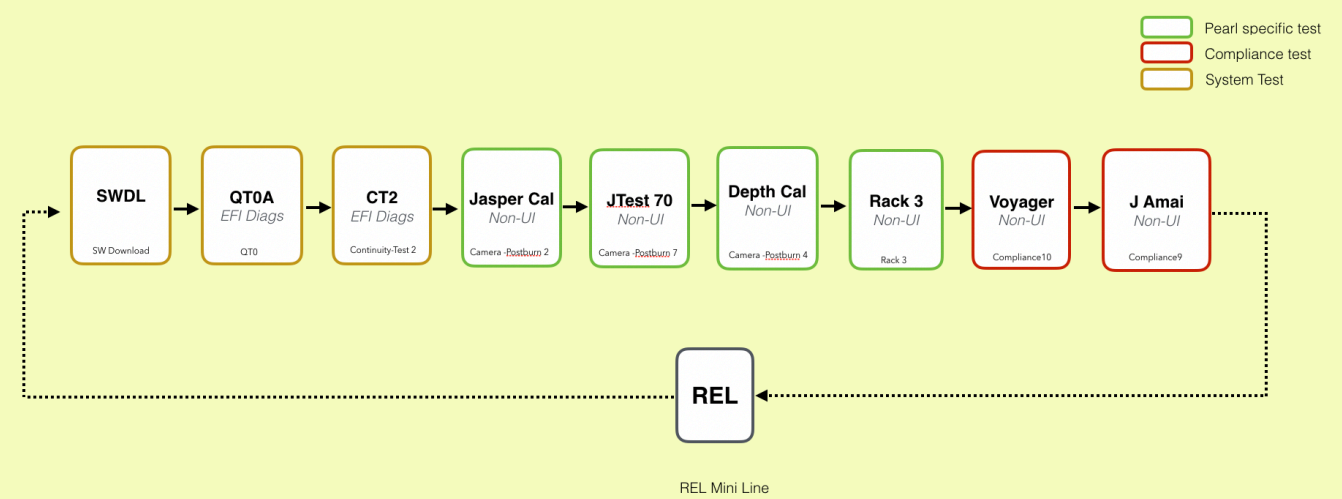
Online tester on Wifi 5GHz antennas - **PP/PG Only**

Parameter	LSL	USL	Unit	Notes
tcRxSingle tWLAN:stcPER condJSP:tp1:sp2:ant6:f5600:pwr17:bw20:rMCS7:dl-65		-65	dBm	Cell SKU (PG)
tcRxSingle tWLAN:stcPER condJSP:tp1:sp2:ant6:f5825:pwr18:bw20:rMCS7:dl-65		-65	dBm	Wifi SKU (PG)
tcRxSingle tWLAN:stcPER condJSP:tp1:sp2:ant6:f5600:pwr17:bw20:rMCS7:dl-70		-70	dBm	Cell SKU (PP)
tcRxSingle tWLAN:stcPER condJSP:tp1:sp2:ant6:f5600:pwr18:bw20:rMCS7:dl-71		-71	dBm	Wifi SKU (PP)

FATP Reliability Test Coverage

Reliability Test Flow

The test flow used in reliability has some differences compared to the main FATP one. You can find the latest flow in the image below.

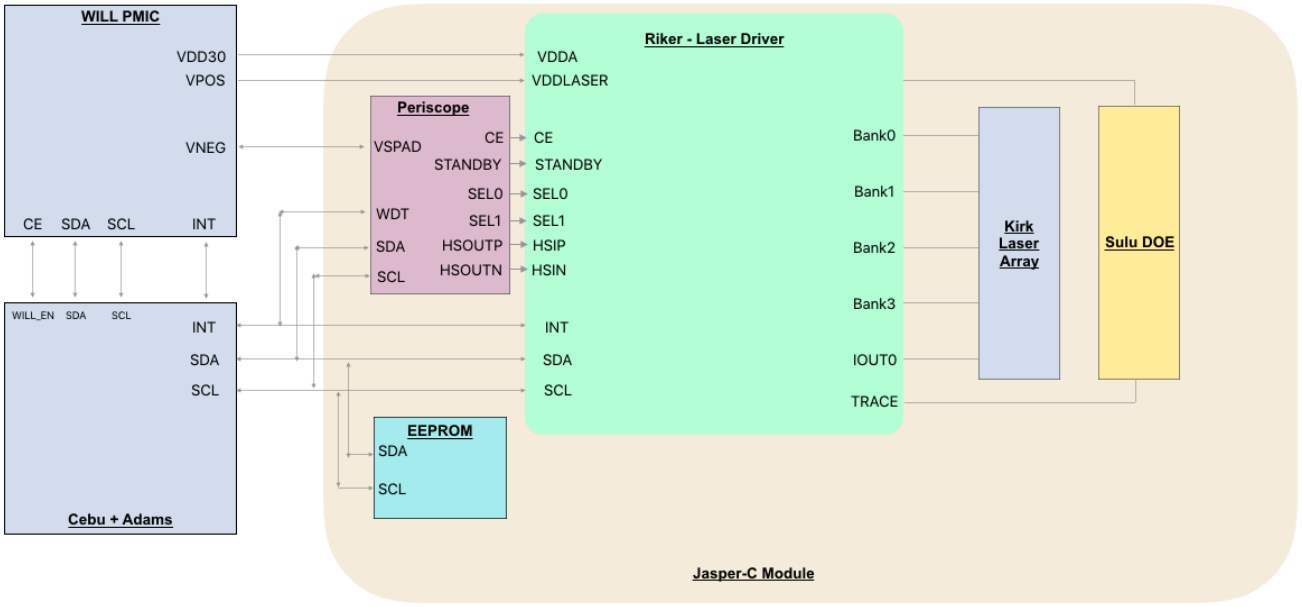


REL Mini Line

Electrical Requirements

JA-C Electrical sub-system

Electrical connection between subcomponents is shown below:



JA-C Flex B2B

The module is using a B2B connector with pinout location identified below.

Module Pinout B2B MCO + Pinout location

Module NVM Requirements

JA-C Module NVM Mapping

The JA-C module contains electrically erasable programable read-only memory (EEPROM), which will be referred to as non-volatile memory (NVM) in this document, that must be programmed. This memory may be any form of non volatile memory including one time programmable memory. The parameters in the table below must be programmed on every module. Every write to EEPROM should be read back for verification.The table below describes the EEPROM registers that should be programmed. Please refer to data sheet CAS24LS128 for details on how to program and read back the EEPROM.

The NVM content is accessible on a separate spreadsheet, JA-C-L_NVM_RegisterMap.X.Y (X.Y being the last version available) available on radar : <rdar://problem/42406456>.

Table 1-6

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
0	0	0x0000	NVM Version [7:4]				NVM Revision [3:0]				HEX	No	0xE0	EOL
0	1	0x0001	Camera Project [7:0]											
0	2	0x0002	Project Version [7:0]											
0	3	0x0003	Integrator [7:3]					Plant [2:0]						
0	4	0x0004	Camera Build [7:0]											
0	5	0x0005	Config Number [7:0]											
0	6	0x0006	Substrate Vendor [7:5]			Revision [4:2]			Variant [1:0]					
0	7	0x0007	Driver Vendor [7:5]			Revision [4:2]			Variant [1:0]					
0	8	0x0008	Kirk Vendor [7:5]			Revision [4:2]			Variant [1:0]					
0	9	0x0009	Periscope Vendor [7:5]			Revision [4:2]			Variant [1:0]					
0	10	0x000A	IR Filter Vendor [7:5]			Revision [4:2]			Variant [1:0]					
0	11	0x000B	Lens Vendor1 [7:5]			Revision [4:2]			Variant [1:0]					
0	12	0x000C	Lens Vendor2 [7:5]			Revision [4:2]			Variant [1:0]					
0	13	0x000D	Sulu Vendor [7:5]			Revision [4:2]			Variant [1:0]					
0	14	0x000E	Lens Holder Vendor [7:3]					Revision [2:0]						
0	15	0x000F	Shield Can Vendor [7:3]					Revision [2:0]						
0	16	0x0010	Flex Vendor [7:3]					Revision [2:0]						
0	17	0x0011	Stiffener Vendor [7:3]					Revision [2:0]						
0	18	0x0012	RSVD											
0	19	0x0013	SN_PPPYWW [31:24]											
0	20	0x0014	SN_PPPYWW [23:16]											
0	21	0x0015	SN_PPPYWW [15:8]											

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
0	22	0x0016	SN_PPPYWW [7:0]											
0	23	0x0017	SN_DSSSS [23:16]											
0	24	0x0018	SN_DSSSS [15:8]											
0	25	0x0019	SN_DSSSS [0:7]											
0	26	0x001A	SN_EEEERX [31:24]											
0	27	0x001B	SN_EEEERX [23:16]											
0	28	0x001C	SN_EEEERX [15:8]											
0	29	0x001D	SN_EEEERX [7:0]											
0	30	0x001E	Liner Vendor [7:3]					Revision [2:0]						
0	31	0x001F	FOL_SN_PPPYWW [31:24]											Tx AA
0	32	0x0020	FOL_SN_PPPYWW [23:16]											
0	33	0x0021	FOL_SN_PPPYWW [15:8]											
0	34	0x0022	FOL_SN_PPPYWW [7:0]											
0	35	0x0023	FOL_SN_DSSSS [23:16]											
0	36	0x0024	FOL_SN_DSSSS [15:8]											
0	37	0x0025	FOL_SN_DSSSS [7:0]											
0	38	0x0026	FOL_SN_EEEERX [31:24]											
0	39	0x0027	FOL_SN_EEEERX [23:16]											
0	40	0x0028	FOL_SN_EEEERX [15:8]											
0	41	0x0029	FOL_SN_EEEERX [7:0]											
0	42	0x002A	RSVD											
0	43	0x002B	Sulu Wafer ID 1 [7:0]											Tx AA
0	44	0x002C	Sulu Wafer ID 2 [7:0]											
0	45	0x002D	Sulu Wafer ID 3 [7:0]											
0	46	0x002E	Sulu Wafer ID 4 [7:0]											
0	47	0x002F	Sulu ID X [3:0]				Sulu ID x [3:0]							
0	48	0x0030	Sulu ID Y [3:0]				Sulu ID y [3:0]							
0	49	0x0031	Sulu RDF 1 [15:8]											
0	50	0x0032	Sulu RDF 2 [7:0]											
0	51	0x0033	McCoy Site [7:0]											
0	52	0x0034	McCoy Machine ID [7:0]											
0	53	0x0035	McCoy Mfg Date 1 [31:24]											
0	54	0x0036	McCoy Mfg Date 2 [23:16]											
0	55	0x0037	McCoy Mfg Date 3 [15:8]											
0	56	0x0038	McCoy Mfg Date 4 [7:0]											
0	57	0x0039	McCoy H Value [7:0]											
0	58	0x003A	RSVD											
0	59	0x003B	RSVD											

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
0	60	0x003C	RSVD											
0	61	0x003D	RSVD											
0	62	0x003E	RSVD											
0	63	0x003F	Integrator VSR Checksum [7:0]											EOL
1	64	0x0040	Spock Site [7:0]											Rx AA
1	65	0x0041	Spock Machine ID [7:0]											
1	66	0x0042	Spock Mfg Date 1 [31:24]											
1	67	0x0043	Spock Mfg Date 2 [23:16]											
1	68	0x0044	Spock Mfg Date 3 [15:8]											
1	69	0x0045	Spock Mfg Date 4 [7:0]											
1	70	0x0046	Spock H Value [7:0]											
1	71	0x0047	RSVD											
1	72	0x0048	Kirk PF [7:6]		Kirk V-Code [5:4]			Kirk R-Code [3:0]						Tx AA
1	73	0x0049	Kirk MYR [7:6]		Kirk MWK [5:0]									
1	74	0x004A	Kirk L-Code [11:4]											
1	75	0x004B	Kirk L-Code [3:0]				Kirk W-Code [3:0]							
1	76	0x004C	Kirk X-Code [7:0]											
1	77	0x004D	Kirk Y-Code [7:0]											
1	78	0x004E	RSVD											
1	79	0x004F	RSVD											
1	80	0x0050	Flex_SN_PPPYWW [31:24]											EOL Test
1	81	0x0051	Flex_SN_PPPYWW [23:16]											
1	82	0x0052	Flex_SN_PPPYWW [15:8]											
1	83	0x0053	Flex_SN_PPPYWW [7:0]											
1	84	0x0054	Flex_SN_DSSSS [23:16]											
1	85	0x0055	Flex_SN_DSSSS [15:8]											
1	86	0x0056	Flex_SN_DSSSS [7:0]											
1	87	0x0057	Flex_SN_EEEERX [31:24]											
1	88	0x0058	Flex_SN_EEEERX [23:16]											
1	89	0x0059	Flex_SN_EEEERX [15:8]											
1	90	0x005A	Flex_SN_EEEERX [7:0]											
1	91	0x005B	RSVD											
1	92	0x005C	Borg_SN_P Code [7:0]											Tx AA
1	93	0x005D	Borg_SN_Y Code [7:3]					Borg_SN_D Code [2:0]						
1	94	0x005E	Borg_SN_WW Code [7:0]											
1	95	0x005F	Borg_SN_SSSS Code [31:24]											
1	96	0x0060	Borg_SN_SSSS Code [23:16]											

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
1	97	0x0061	Borg_SN_SSSS Code [15:8]											
1	98	0x0062	Borg_SN_SSSS Code [7:0]											
1	99	0x0063	Borg_SN_Program Code [7:0]											
1	100	0x0064	Borg_SN_T Code [7:3]					Borg_SN_C_Code [2:0]						
1	101	0x0065	RSVD											
1	102	0x0066	OPS - SMT Line No.											EOL Test
1	103	0x0067	OPS - Die Attach Inline No.											
1	104	0x0068	OPS - Wire Bonder No.											
1	105	0x0069	OPS - Sulu Attach Machine No.											
1	106	0x006A	OPS - Sulu Sealing Machine No.											
1	107	0x006B	OPS - Tx Lens Attach Machine No.											
1	108	0x006C	OPS - Tx AA Machine No.											
1	109	0x006D	OPS - Rx AA Machine No.											
1	110	0x006E	OPS - Rx Sealing Machine No.											
1	111	0x006F	OPS - Shield Can Attach Machine No.											
1	112	0x0070	OPS - Terminal Connect Machine No.											
1	113	0x0071	OPS - ACF Attach Machine No.											
1	114	0x0072	OPS - Stiffener Attach Machine No.											
1	115	0x0073	OPS - Stiffener Side Fill Machine No.											
1	116	0x0074	OPS - Flex Reinforcement Machine No.											
1	117	0x0075	OPS - Liner Attach Machine No.											
1	118	0x0076	OPS - Flex Bending Machine No.											Compliance Test
1	119	0x0077	OPS - FOL Tester ID											FOL Test
1	120	0x0078	OPS - EOL Tester ID											EOL Test
1	121	0x0079	OPS - CALU Tester ID											CALU
1	122	0x007A	OPS - Compliance Tester ID											Compliance Test
1	123	0x007B	OPS Test CB FOL - Socket ID [7:3]					Cycles [2:1]		Result[0]				FOL Test
1	124	0x007C	OPS Test CB EOL - Socket ID [7:3]					Cycles [2:1]		Result[0]				EOL Test
1	125	0x007D	OPS Test CB CALU - Socket ID [7:3]					Cycles [2:1]		Result[0]				CALU
1	126	0x007E	OPS Test CB Compliance - Socket ID [7:3]					Cycles [2:1]		Result[0]				COMP
1	127	0x007F	Integrator NVM Checksum [7:0]											COMP
2	128	0x0080	OPS - RSVD											TBD

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
2	129	0x0081	OPS - RSVD											
2	130	0x0082	OPS - RSVD											
2	131	0x0083	OPS - RSVD											
2	132	0x0084	OPS - RSVD											
2	133	0x0085	OPS - RSVD											
2	134	0x0086	OPS - RSVD											
2	135	0x0087	OPS - RSVD											
2	136	0x0088	OPS - RSVD											
2	137	0x0089	OPS - RSVD											
2	138	0x008A	OPS - RSVD											
2	139	0x008B	OPS - RSVD											
2	140	0x008C	OPS - RSVD											
2	141	0x008D	OPS - RSVD											
2	142	0x008E	OPS - RSVD											
2	143	0x008F	OPS - RSVD											
2	144	0x0090	OPS - RSVD											

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
2	145	0x0091	OPS - RSVD											
2	146	0x0092	OPS - RSVD											
2	147	0x0093	OPS - RSVD											
2	148	0x0094	OPS - RSVD											
2	149	0x0095	OPS - RSVD											
2	150	0x0096	OPS - RSVD											
2	151	0x0097	OPS - RSVD											
2	152	0x0098	OPS - RSVD											
2	153	0x0099	OPS - RSVD											
2	154	0x009A	OPS - RSVD											
2	155	0x009B	OPS - RSVD											
2	156	0x009C	OPS - RSVD											
2	157	0x009D	OPS - RSVD											
2	158	0x009E	OPS - RSVD											
2	159	0x009F	OPS - RSVD											
2	160	0x00A0	OPS - RSVD											

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
2	161	0x00A1	OPS - RSVD											
2	162	0x00A2	OPS - RSVD											
2	163	0x00A3	OPS - RSVD											
2	164	0x00A4	OPS - RSVD											
2	165	0x00A5	OPS - RSVD											
2	166	0x00A6	OPS - RSVD											
2	167	0x00A7	OPS - RSVD											
2	168	0x00A8	OPS - RSVD											
2	169	0x00A9	OPS - RSVD											
2	170	0x00AA	OPS - RSVD											
2	171	0x00AB	OPS - RSVD											
2	172	0x00AC	OPS - RSVD											
2	173	0x00AD	OPS - RSVD											
2	174	0x00AE	OPS - RSVD											
2	175	0x00AF	OPS - RSVD											
2	176	0x00B0	OPS - RSVD											

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
2	177	0x00B1	OPS - RSVD											
2	178	0x00B2	OPS - RSVD											
2	179	0x00B3	OPS - RSVD											
2	180	0x00B4	OPS - RSVD											
2	181	0x00B5	OPS - RSVD											
2	182	0x00B6	OPS - RSVD											
2	183	0x00B7	OPS - RSVD											
2	184	0x00B8	OPS - RSVD											
2	185	0x00B9	OPS - RSVD											
2	186	0x00BA	OPS - RSVD											
2	187	0x00BB	OPS - RSVD											
2	188	0x00BC	OPS - RSVD											
2	189	0x00BD	OPS - RSVD											
2	190	0x00BE	OPS - RSVD											
2	191	0x00BF	OPS - RSVD											
3	192	0x00C0	EOL_NVM_VERSION[7:0]								Hex		0x01	EOL
3	193	0x00C1	NTC_RIKER_B1_H [9:8]								ADC Value			

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
3	194	0x00C2	NTC_RIKER_B1_H [7:0]								ADC Value			
3	195	0x00C3	NTC_RIKER_B2_H [9:8]								ADC Value			
3	196	0x00C4	NTC_RIKER_B2_H [7:0]								ADC Value			
3	197	0x00C5	NTC_RIKER_B3_H [9:8]								ADC Value			
3	198	0x00C6	NTC_RIKER_B3_H [7:0]								ADC Value			
3	199	0x00C7	NTC_RIKER_B4_H [9:8]								ADC Value			
3	200	0x00C8	NTC_RIKER_B4_H [7:0]								ADC Value			
3	201	0x00C9	IMON_RIKER_B1_H [9:8]								ADC Value			
3	202	0x00CA	IMON_RIKER_B1_H [7:0]								ADC Value			
3	203	0x00CB	IMON_RIKER_B2_H [9:8]								ADC Value			
3	204	0x00CC	IMON_RIKER_B2_H [7:0]								ADC Value			
3	205	0x00CD	IMON_RIKER_B3_H [9:8]								ADC Value			
3	206	0x00CE	IMON_RIKER_B3_H [7:0]								ADC Value			
3	207	0x00CF	IMON_RIKER_B4_H [9:8]								ADC Value			
3	208	0x00D0	IMON_RIKER_B4_H [7:0]								ADC Value			
3	209	0x00D1	VF_RIKER_B1_H [9:0]								ADC Value			
3	210	0x00D2	VF_RIKER_B1_H [7:0]								ADC Value			
3	211	0x00D3	VF_RIKER_B2_H [9:0]								ADC Value			
3	212	0x00D4	VF_RIKER_B2_H [7:0]								ADC Value			
3	213	0x00D5	VF_RIKER_B3_H [9:0]								ADC Value			
3	214	0x00D6	VF_RIKER_B3_H [7:0]								ADC Value			
3	215	0x00D7	VF_RIKER_B4_H [9:0]								ADC Value			
3	216	0x00D8	VF_RIKER_B4_H [7:0]								ADC Value			
3	217	0x00D9	TX_RIKER_VDD_LASER [7:0]								Will Encoding		4.75 + 0.05*REG	
3	218	0x00DA	B1 [2:0]			B2 [2:0]			B3 [2:1]		Hex Value	3 bits per bank	TX_BK1234_RIKER_CURRENT_SETTING	

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
3	219	0x00DB	B3 [0]	B4 [2:0]			0	0	0	0	Hex Value		TX_BK1234_RIKER_CURRENT_SETTING [3:0]	
3	220	0x00DC												
3	221	0x00DD												
3	222	0x00DE												
3	223	0x00DF												
3	224	0x00E0												
3	225	0x00E1												
3	226	0x00E2												
3	227	0x00E3												
3	228	0x00E4												
3	229	0x00E5												
3	230	0x00E6												
3	231	0x00E7												
3	232	0x00E8												
3	233	0x00E9												
3	234	0x00EA												
3	235	0x00EB												
3	236	0x00EC												
3	237	0x00ED												
3	238	0x00EE												
3	239	0x00EF												
3	240	0x00F0												
3	241	0x00F1												
3	242	0x00F2												
3	243	0x00F3												
3	244	0x00F4												
3	245	0x00F5												
3	246	0x00F6												
3	247	0x00F7												
3	248	0x00F8												
3	249	0x00F9												
3	250	0x00FA												
3	251	0x00FB												
3	252	0x00FC												
3	253	0x00FD												
3	254	0x00FE												

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
3	255	0x00FF	EOL_Checksum [7:0]											
4	256	0x0100	COMP_NVM_VERSION[7:0]								Hex		0x01	COMP
4	257	0x0101	NTC_RIKER_B1_C [9:8]								ADC Value			
4	258	0x0102	NTC_RIKER_B1_C [7:0]								ADC Value			
4	259	0x0103	NTC_RIKER_B2_C [9:8]								ADC Value			
4	260	0x0104	NTC_RIKER_B2_C [7:0]								ADC Value			
4	261	0x0105	NTC_RIKER_B3_C [9:8]								ADC Value			
4	262	0x0106	NTC_RIKER_B3_C [7:0]								ADC Value			
4	263	0x0107	NTC_RIKER_B4_C [9:8]								ADC Value			
4	264	0x0108	NTC_RIKER_B4_C [7:0]								ADC Value			
4	265	0x0109	IMON_RIKER_B1_C [9:8]								ADC Value			
4	266	0x010A	IMON_RIKER_B1_C [7:0]								ADC Value			
4	267	0x010B	IMON_RIKER_B2_C [9:8]								ADC Value			
4	268	0x010C	IMON_RIKER_B2_C [7:0]								ADC Value			
4	269	0x010D	IMON_RIKER_B3_C [9:8]								ADC Value			
4	270	0x010E	IMON_RIKER_B3_C [7:0]								ADC Value			
4	271	0x010F	IMON_RIKER_B4_C [9:8]								ADC Value			
4	272	0x0110	IMON_RIKER_B4_C [7:0]								ADC Value			
4	273	0x0111	VF_RIKER_B1_C [9:0]								ADC Value			
4	274	0x0112	VF_RIKER_B1_C [7:0]								ADC Value			
4	275	0x0113	VF_RIKER_B2_C [9:0]								ADC Value			
4	276	0x0114	VF_RIKER_B2_C [7:0]								ADC Value			
4	277	0x0115	VF_RIKER_B3_C [9:0]								ADC Value			
4	278	0x0116	VF_RIKER_B3_C [7:0]								ADC Value			
4	279	0x0117	VF_RIKER_B4_C [9:0]								ADC Value			
4	280	0x0118	VF_RIKER_B4_C [7:0]								ADC Value			
4	281	0x0119	VDDLAS_RIKER_B1_H [9:8]								ADC Value			

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
4	282	0x011A	VDDLAS_RIKER_B1_H [7:0]								Value			
4	283	0x011B	VDDLAS_RIKER_B1_C [9:8]								ADC Value			
4	284	0x011C	VDDLAS_RIKER_B1_C [7:0]								ADC Value			
4	285	0x011D	RDF_AVG_C [7:0]								float32			
4	286	0x011E	RDF_AVG_C [15:8]											
4	287	0x011F	RDF_AVG_C [23:16]											
4	288	0x0120	RDF_AVG_C [31:24]											
4	289	0x0121												
4	290	0x0122												
4	291	0x0123												
4	292	0x0124												
4	293	0x0125												
4	294	0x0126												
4	295	0x0127												
4	296	0x0128												
4	297	0x0129												
4	298	0x012A												
4	299	0x012B												
4	300	0x012C												
4	301	0x012D												
4	302	0x012E												
4	303	0x012F												
4	304	0x0130												
4	305	0x0131												
4	306	0x0132												
4	307	0x0133												
4	308	0x0134												
4	309	0x0135												
4	310	0x0136												
4	311	0x0137												
4	312	0x0138												
4	313	0x0139												
4	314	0x013A												
4	315	0x013B												
4	316	0x013C												
4	317	0x013D	Process_DOE_code [7:0]								Hex			
4	318	0x013E	Waiver [7:0]								Hex			

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
4	319	0x013F	COMP_Checksum [7:0]											
5	320	0x0140	PNV_NVM_VERSION[7:0]								Hex		0x01	Tx AA
5	321	0x0141	Nominal PDE - μ [7:0]								float32			
5	322	0x0142	Nominal PDE - μ [15:8]											
5	323	0x0143	Nominal PDE - μ [23:16]											
5	324	0x0144	Nominal PDE - μ [31:24]											
5	325	0x0145	Nominal PDE - σ [7:0]								float32			
5	326	0x0146	Nominal PDE - σ [15:8]											
5	327	0x0147	Nominal PDE - σ [23:16]											
5	328	0x0148	Nominal PDE - σ [31:24]											
5	329	0x0149	High temperature VBD model coefficient 0 [7:0] - polynomial p0								float32			
5	330	0x014A	High temperature VBD model coefficient 0 [15:8] - polynomial p0											
5	331	0x014B	High temperature VBD model coefficient 0 [23:16] - polynomial p0											
5	332	0x014C	High temperature VBD model coefficient 0 [31:24] - polynomial p0											
5	333	0x014D	High temperature VBD model coefficient 1 [7:0] - polynomial p1								float32			
5	334	0x014E	High temperature VBD model coefficient 1 [15:8] - polynomial p1											
5	335	0x014F	High temperature VBD model coefficient 1 [23:16] - polynomial p1											
5	336	0x0150	High temperature VBD model coefficient 1 [31:24] - polynomial p1											
5	337	0x0151	High temperature VBD model coefficient 2 [7:0] - polynomial p2								float32			
5	338	0x0152	High temperature VBD model coefficient 2 [15:8] - polynomial p2											
5	339	0x0153	High temperature VBD model coefficient 2 [23:16] - polynomial p2											
5	340	0x0154	High temperature VBD model coefficient 2 [31:24] - polynomial p2											
5	341	0x0155	VBD model low-to-high transition temperature								uint8			
5	342	0x0156	Low temperature VBD model coefficient 0 [7:0] - polynomial p0								float32			
5	343	0x0157	Low temperature VBD model coefficient 0 [15:8] - polynomial p0											
5	344	0x0158	Low temperature VBD model coefficient 0 [23:16] - polynomial p0											
5	345	0x0159	Low temperature VBD model coefficient 0 [31:24] - polynomial p0											
5	346	0x015A	Low temperature VBD model coefficient 1 [7:0] - polynomial p1								float32			
5	347	0x015B	Low temperature VBD model coefficient 1 [15:8] - polynomial p1											
5	348	0x015C	Low temperature VBD model coefficient 1 [23:16] - polynomial p1											

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
5	349	0x015D	Low temperature VBD model coefficient 1 [31:24] - polynomial p1											
5	350	0x015E	Low temperature VBD model coefficient 2 [7:0] - polynomial p2								float32			
5	351	0x015F	Low temperature VBD model coefficient 2 [15:8] - polynomial p2											
5	352	0x0160	Low temperature VBD model coefficient 2 [23:16] - polynomial p2											
5	353	0x0161	Low temperature VBD model coefficient 2 [31:24] - polynomial p2											
5	354	0x0162	MONITOR_VBD_BITMASK_0								uint8			
5	355	0x0163	MONITOR_VBD_BITMASK_1								uint8			
5	356	0x0164	MONITOR_VBD_ADDRESS_0								uint8			
5	357	0x0165	MONITOR_VBD_ADDRESS_1								uint8			
5	358	0x0166	MONITOR_VBD_ADDRESS_2								uint8			
5	359	0x0167	MONITOR_VBD_ADDRESS_3								uint8			
5	360	0x0168	MONITOR_VBD_ADDRESS_4								uint8			
5	361	0x0169	MONITOR_VBD_ADDRESS_5								uint8			
5	362	0x016A	MONITOR_VBD_ADDRESS_6								uint8			
5	363	0x016B	MONITOR_VBD_ADDRESS_7								uint8			
5	364	0x016C	MONITOR_VBD_ADDRESS_8								uint8			
5	365	0x016D	MONITOR_VBD_ADDRESS_9								uint8			
5	366	0x016E	MONITOR_VBD_ADDRESS_10								uint8			
5	367	0x016F	MONITOR_VBD_ADDRESS_11								uint8			
5	368	0x0170	MONITOR_VBD_ADDRESS_12								uint8			
5	369	0x0171	MONITOR_VBD_ADDRESS_13								uint8			
5	370	0x0172	MONITOR_VBD_ADDRESS_14								uint8			
5	371	0x0173	MONITOR_VBD_ADDRESS_15								uint8			
5	372	0x0174												
5	373	0x0175												
5	374	0x0176												
5	375	0x0177												
5	376	0x0178												
5	377	0x0179												
5	378	0x017A												
5	379	0x017B												
5	380	0x017C												
5	381	0x017D												
5	382	0x017E	VBD software version								uint8			
5	383	0x017F	PNV_Checksum [7:0]											
6	384	0x0180	CALU_NVM_VERSION[7:0]								uint8			CALU

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
6	385	0x0181	CALU_SW_VERSION[7:0]								uint8			
6	386	0x0182	ZEFRAM_SW_VERSION: version [7:4], revision [3:0]								uint8			
6	387	0x0183	JLPS_VERSION[7:0]								uint8			
6	388	0x0184	pulseShape_wide, bank1, bin1 [7:0]								uint16			
6	389	0x0185	pulseShape_wide, bank1, bin1 [15:8]											
6	390	0x0186	pulseShape_wide, bank1, bin2 [7:0]								uint16			
6	391	0x0187	pulseShape_wide, bank1, bin2 [15:8]											
			…											
8	514	0x0202	pulseShape_wide, bank1, bin64 [7:0]								uint16			
8	515	0x0203	pulseShape_wide, bank1, bin64 [15:8]											
8	516	0x0204	pulseShape_wide, bank2, bin1 [7:0]								uint16			
8	517	0x0205	pulseShape_wide, bank2, bin1 [15:8]											
0			…											
10	642	0x0282	pulseShape_wide, bank2, bin64 [7:0]								uint16			
10	643	0x0283	pulseShape_wide, bank2, bin64 [15:8]											
10	644	0x0284	pulseShape_wide, bank3, bin1 [7:0]								uint16			
10	645	0x0285	pulseShape_wide, bank3, bin1 [15:8]											
0			…											
12	770	0x0302	pulseShape_wide, bank3, bin64 [7:0]								uint16			
12	771	0x0303	pulseShape_wide, bank3, bin64 [15:8]											
12	772	0x0304	pulseShape_wide, bank4, bin1 [7:0]								uint16			
12	773	0x0305	pulseShape_wide, bank4, bin1 [15:8]											
0			…											
14	898	0x0382	pulseShape_wide, bank4, bin64 [7:0]								uint16			
14	899	0x0383	pulseShape_wide, bank4, bin64 [15:8]											
14	900	0x0384	tailParams_wide_amp_A, bank1 [7:0]								uint16			
14	901	0x0385	tailParams_wide_amp_A, bank1 [15:8]											
14	902	0x0386	tailParams_wide_amp_A, bank2 [7:0]								uint16			
14	903	0x0387	tailParams_wide_amp_A, bank2 [15:8]											
14	904	0x0388	tailParams_wide_amp_A, bank3 [7:0]								uint16			
14	905	0x0389	tailParams_wide_amp_A, bank3 [15:8]											
14	906	0x038A	tailParams_wide_amp_A, bank4 [7:0]								uint16			
14	907	0x038B	tailParams_wide_amp_A, bank4 [15:8]											
14	908	0x038C	tailParams_wide_decay_B bank1 [7:0]								uint16			
14	909	0x038D	tailParams_wide_decay_B, bank1 [15:8]											
14	910	0x038E	tailParams_wide_decay_B, bank2 [7:0]								uint16			
14	911	0x038F	tailParams_wide_decay_B, bank2 [15:8]											
14	912	0x0390	tailParams_wide_decay_B, bank3 [7:0]								uint16			

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14	913	0x0391	tailParams_wide_decay_B, bank3 [15:8]											
14	914	0x0392	tailParams_wide_decay_B, bank4 [7:0]								uint16			
14	915	0x0393	tailParams_wide_decay_B bank4 [15:8]											
14	916	0x0394	tailParams_wide_amp_C, bank1 [7:0]								uint16			
14	917	0x0395	tailParams_wide_amp_C, bank1 [15:8]											
14	918	0x0396	tailParams_wide_amp_C, bank2 [7:0]								uint16			
14	919	0x0397	tailParams_wide_amp_C, bank2 [15:8]											
14	920	0x0398	tailParams_wide_amp_C, bank3 [7:0]								uint16			
14	921	0x0399	tailParams_wide_amp_C, bank3 [15:8]											
14	922	0x039A	tailParams_wide_amp_C, bank4 [7:0]								uint16			
14	923	0x039B	tailParams_wide_amp_C, bank4 [15:8]											
14	924	0x039C	tailParams_wide_decay_D bank1 [7:0]								uint16			
14	925	0x039D	tailParams_wide_decay_D, bank1 [15:8]											
14	926	0x039E	tailParams_wide_decay_D, bank2 [7:0]								uint16			
14	927	0x039F	tailParams_wide_decay_D, bank2 [15:8]											
14	928	0x03A0	tailParams_wide_decay_D, bank3 [7:0]								uint16			
14	929	0x03A1	tailParams_wide_decay_D, bank3 [15:8]											
14	930	0x03A2	tailParams_wide_decay_D, bank4 [7:0]								uint16			
14	931	0x03A3	tailParams_wide_decay_D bank4 [15:8]											
14	932	0x03A4	pulseShape_narrow, bank1, bin1 [7:0]								uint16			
14	933	0x03A5	pulseShape_narrow, bank1, bin1 [15:8]											
14	934	0x03A6	pulseShape_narrow, bank1, bin2 [7:0]								uint16			
14	935	0x03A7	pulseShape_narrow, bank1, bin2 [15:8]											
			…											
16	1058	0x0422	pulseShape_narrow, bank1, bin64 [7:0]								uint16			
16	1059	0x0423	pulseShape_narrow, bank1, bin64 [15:8]											
16	1060	0x0424	pulseShape_narrow, bank2, bin1 [7:0]								uint16			
16	1061	0x0425	pulseShape_narrow, bank2, bin1 [15:8]											
0			…											
18	1186	0x04A2	pulseShape_narrow, bank2, bin64 [7:0]								uint16			
18	1187	0x04A3	pulseShape_narrow, bank2, bin64 [15:8]											
18	1188	0x04A4	pulseShape_narrow, bank3, bin1 [7:0]								uint16			
18	1189	0x04A5	pulseShape_narrow, bank3, bin1 [15:8]											
0			…											
20	1314	0x0522	pulseShape_narrow, bank3, bin64 [7:0]								uint16			
20	1315	0x0523	pulseShape_narrow, bank3, bin64 [15:8]											
20	1316	0x0524	pulseShape_narrow, bank4, bin1 [7:0]								uint16			
20	1317	0x0525	pulseShape_narrow, bank4, bin1 [15:8]											

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0			…											
22	1442	0x05A2	pulseShape_narrow, bank4, bin64 [7:0]								uint16			
22	1443	0x05A3	pulseShape_narrow, bank4, bin64 [15:8]										Mm	
22	1444	0x05A4	tailParams_narrow_amp_A, bank1 [7:0]								uint16		mm	
22	1445	0x05A5	tailParams_narrow_amp_A, bank1 [15:8]											
22	1446	0x05A6	tailParams_narrow_amp_A, bank2 [7:0]								uint16			
22	1447	0x05A7	tailParams_narrow_amp_A, bank2 [15:8]											
22	1448	0x05A8	tailParams_narrow_amp_A, bank3 [7:0]								uint16			
22	1449	0x05A9	tailParams_narrow_amp_A, bank3 [15:8]											
22	1450	0x05AA	tailParams_narrow_amp_A, bank4 [7:0]								uint16			
22	1451	0x05AB	tailParams_narrow_amp_A, bank4 [15:8]											
22	1452	0x05AC	tailParams_narrow_decay_B bank1 [7:0]								uint16			
22	1453	0x05AD	tailParams_narrow_decay_B, bank1 [15:8]											
22	1454	0x05AE	tailParams_narrow_decay_B, bank2 [7:0]								uint16			
22	1455	0x05AF	tailParams_narrow_decay_B, bank2 [15:8]											
22	1456	0x05B0	tailParams_narrow_decay_B, bank3 [7:0]								uint16			
22	1457	0x05B1	tailParams_narrow_decay_B, bank3 [15:8]											
22	1458	0x05B2	tailParams_narrow_decay_B, bank4 [7:0]								uint16			
22	1459	0x05B3	tailParams_narrow_decay_B bank4 [15:8]											
22	1460	0x05B4	tailParams_narrow_amp_C, bank1 [7:0]								uint16			
22	1461	0x05B5	tailParams_narrow_amp_C, bank1 [15:8]											
22	1462	0x05B6	tailParams_narrow_amp_C, bank2 [7:0]								uint16			
22	1463	0x05B7	tailParams_narrow_amp_C, bank2 [15:8]											
22	1464	0x05B8	tailParams_narrow_amp_C, bank3 [7:0]								uint16			
22	1465	0x05B9	tailParams_narrow_amp_C, bank3 [15:8]											
22	1466	0x05BA	tailParams_narrow_amp_C, bank4 [7:0]								uint16			
22	1467	0x05BB	tailParams_narrow_amp_C, bank4 [15:8]											
22	1468	0x05BC	tailParams_narrow_decay_D bank1 [7:0]								uint16			
22	1469	0x05BD	tailParams_narrow_decay_D, bank1 [15:8]											
22	1470	0x05BE	tailParams_narrow_decay_D, bank2 [7:0]								uint16			
22	1471	0x05BF	tailParams_narrow_decay_D, bank2 [15:8]											
23	1472	0x05C0	tailParams_narrow_decay_D, bank3 [7:0]								uint16			
23	1473	0x05C1	tailParams_narrow_decay_D, bank3 [15:8]											
23	1474	0x05C2	tailParams_narrow_decay_D, bank4 [7:0]								uint16			
23	1475	0x05C3	tailParams_narrow_decay_D bank4 [15:8]											
23	1476	0x05C4	JLNM_VERSION[7:0]								uint8			
23	1477	0x05C5	SpotCalibDistance[7:0]								uint16			
23	1478	0x05C6	SpotCalibDistance[15:8]											

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23	**1479**	**0x05C7**	SPX000 - Bank 1[12:4]								Packed 12 - 8.4 fixed-point			
23	**1480**	**0x05C8**	SPY000 - Bank 1[3:0]				SPX000 - Bank 1[3:0]							
23	**1481**	**0x05C9**	SPY000 - Bank 1[12:4]											
23	**1482**	**0x05CA**	SPX001 - Bank 1[12:4]											
23	**1483**	**0x05CB**	SPY001 - Bank 1[3:0]				SPX001 - Bank 1[3:0]							
23	**1484**	**0x05CC**	SPY001 - Bank 1[12:4]											
			…											
29	**1908**	**0x0774**	SPX143 - Bank 1[12:4]											
29	**1909**	**0x0775**	SPY143 - Bank 1[3:0]				SPX143 - Bank 1[3:0]							
29	**1910**	**0x0776**	SPY143 - Bank 1[12:4]											
29	**1911**	**0x0777**	SPX000 - Bank 2[12:4]											
29	**1912**	**0x0778**	SPY000 - Bank 2[3:0]				SPX000 - Bank 2[3:0]							
29	**1913**	**0x0779**	SPY000 - Bank 2[12:4]											
29	**1914**	**0x077A**	SPX001 - Bank 2[12:4]											
29	**1915**	**0x077B**	SPY001 - Bank 2[3:0]				SPX001 - Bank 2[3:0]							
29	**1916**	**0x077C**	SPY001 - Bank 2[12:4]											
			…											
36	**2340**	**0x0924**	SPX143 - Bank 2[12:4]											
36	**2341**	**0x0925**	SPY143 - Bank 2[3:0]				SPX143 - Bank 2[3:0]							
36	**2342**	**0x0926**	SPY143 - Bank 2[12:4]											
36	**2343**	**0x0927**	SPX000 - Bank 3[12:4]											
36	**2344**	**0x0928**	SPY000 - Bank 3[3:0]				SPX000 - Bank 3[3:0]							
36	**2345**	**0x0929**	SPY000 - Bank 3[12:4]											
36	**2346**	**0x092A**	SPX001 - Bank 3[12:4]											
36	**2347**	**0x092B**	SPY001 - Bank 3[3:0]				SPX001 - Bank 3[3:0]							
36	**2348**	**0x092C**	SPY001 - Bank 3[12:4]											
			…											
43	**2772**	**0x0AD4**	SPX143 - Bank 3[12:4]											
43	**2773**	**0x0AD5**	SPY143 - Bank 3[3:0]				SPX143 - Bank 3[3:0]							
43	**2774**	**0x0AD6**	SPY143 - Bank 3[12:4]											
43	**2775**	**0x0AD7**	SPX000 - Bank 4[12:4]											
43	**2776**	**0x0AD8**	SPY000 - Bank 4[3:0]				SPX000 - Bank 4[3:0]							
43	**2777**	**0x0AD9**	SPY000 - Bank 4[12:4]											
43	**2778**	**0x0ADA**	SPX001 - Bank 4[12:4]											
43	**2779**	**0x0ADB**	SPY001 - Bank 4[3:0]				SPX001 - Bank 4[3:0]							
43	**2780**	**0x0ADC**	SPY001 - Bank 4[12:4]											
			…											
50	**3204**	**0x0C84**	SPX143 - Bank 4[12:4]											

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50	3205	0x0C85	SPY143 - Bank 4[3:0]				SPX143 - Bank 4[3:0]							
50	3206	0x0C86	SPY143 - Bank 4[12:4]											
50	3207	0x0C87	RSPX0, Wide Pulse - Bank1								uint8			
50	3208	0x0C88	RSPX1, Wide Pulse - Bank1								uint8			
50	3209	0x0C89	RSPX0, Wide Pulse - Bank2								uint8			
50	3210	0x0C8A	RSPX1, Wide Pulse - Bank2								uint8			
50	3211	0x0C8B	RSPX0, Wide Pulse - Bank3								uint8			
50	3212	0x0C8C	RSPX1, Wide Pulse - Bank3								uint8			
50	3213	0x0C8D	RSPX0, Wide Pulse - Bank4								uint8			
50	3214	0x0C8E	RSPX1, Wide Pulse - Bank4								uint8			
50	3215	0x0C8F	TRGOUTDLY_wide, bank1								int8			
50	3216	0x0C90	TRGOUTDLY_wide, bank2								int8			
50	3217	0x0C91	TRGOUTDLY_wide, bank3								int8			
50	3218	0x0C92	TRGOUTDLY_wide, bank4								int8			
50	3219	0x0C93	TDCTR1C_wide, bank1 [7:0]								uint16			
50	3220	0x0C94	TDCTR1C_wide, bank1 [15:8]											
50	3221	0x0C95	TDCTR1C_wide, bank2 [7:0]								uint16			
50	3222	0x0C96	TDCTR1C_wide, bank2 [15:8]											
50	3223	0x0C97	TDCTR1C_wide, bank3 [7:0]								uint16			
50	3224	0x0C98	TDCTR1C_wide, bank3 [15:8]											
50	3225	0x0C99	TDCTR1C_wide, bank4 [7:0]								uint16			
50	3226	0x0C9A	TDCTR1C_wide, bank4 [15:8]											
50	3227	0x0C9B	TMINTOF_WPSG, bank1								int8			
50	3228	0x0C9C	TMINTOF_WPSG, bank2								int8			
50	3229	0x0C9D	TMINTOF_WPSG, bank3								int8			
50	3230	0x0C9E	TMINTOF_WPSG, bank4								int8			
50	3231	0x0C9F	SETPLSCG_WPSG, bank1								int8			
50	3232	0x0CA0	SETPLSCG_WPSG, bank2								int8			
50	3233	0x0CA1	SETPLSCG_WPSG, bank3								int8			
50	3234	0x0CA2	SETPLSCG_WPSG, bank4								int8			
50	3235	0x0CA3	TGDDLY_WPSG, bank1								int8			
50	3236	0x0CA4	TGDDLY_WPSG, bank2								int8			
50	3237	0x0CA5	TGDDLY_WPSG, bank3								int8			
50	3238	0x0CA6	TGDDLY_WPSG, bank4								int8			
50	3239	0x0CA7	TDCTR1C_WPSG, bank1								int8			
50	3240	0x0CA8	TDCTR1C_WPSG, bank2								int8			
50	3241	0x0CA9	TDCTR1C_WPSG, bank3								int8			
50	3242	0x0CAA	TDCTR1C_WPSG, bank4								int8			

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50	3243	0x0CAB	gateDelay, bank1 [7:0]								uint16			
50	3244	0x0CAC	gateDelay, bank1 [15:8]											
50	3245	0x0CAD	gateDelay, bank2 [7:0]								uint16			
50	3246	0x0CAE	gateDelay, bank2 [15:8]											
50	3247	0x0CAF	gateDelay, bank3 [7:0]								uint16			
50	3248	0x0CB0	gateDelay, bank3 [15:8]											
50	3249	0x0CB1	gateDelay, bank4 [7:0]								uint16			
50	3250	0x0CB2	gateDelay, bank4 [15:8]											
50	3251	0x0CB3	REF_STRAY_DELAY, bank1 [7:0]								uint16			
50	3252	0x0CB4	REF_STRAY_DELAY, bank1 [15:8]											
50	3253	0x0CB5	REF_STRAY_DELAY, bank2 [7:0]								uint16			
50	3254	0x0CB6	REF_STRAY_DELAY, bank2 [15:8]											
50	3255	0x0CB7	REF_STRAY_DELAY, bank3 [7:0]								uint16			
50	3256	0x0CB8	REF_STRAY_DELAY, bank3 [15:8]											
50	3257	0x0CB9	REF_STRAY_DELAY, bank4 [7:0]								uint16			
50	3258	0x0CBA	REF_STRAY_DELAY, bank4 [15:8]											
50	3259	0x0CBB	IMG_STRAY_DELAY, bank1 [7:0]								uint16			
50	3260	0x0CBC	IMG_STRAY_DELAY, bank1 [15:8]											
50	3261	0x0CBD	IMG_STRAY_DELAY, bank2 [7:0]								uint16			
50	3262	0x0CBE	IMG_STRAY_DELAY, bank2 [15:8]											
50	3263	0x0CBF	IMG_STRAY_DELAY, bank3 [7:0]								uint16			
51	3264	0x0CC0	IMG_STRAY_DELAY, bank3 [15:8]											
51	3265	0x0CC1	IMG_STRAY_DELAY, bank4 [7:0]								uint16			
51	3266	0x0CC2	IMG_STRAY_DELAY, bank4 [15:8]											
51	3267	0x0CC3	JLSK_VERSION[7:0]								uint8			
51	3268	0x0CC4	spot_skew_offset_wide [7:0]								uint16			
51	3269	0x0CC5	spot_skew_offset_wide [15:8]											
51	3270	0x0CC6	Spot 000 skew_wide - bank 1 [9:2]								Packed 10			
51	3271	0x0CC7	Spot 001 skew_wide - bank 1 [9:2]											
51	3272	0x0CC8	Spot 002 skew_wide - bank 1 [9:2]											
51	3273	0x0CC9	Spot 003 skew_wide - bank 1 [9:2]											
51	3274	0x0CCA	Spot 003 skew_wide - bank 1 [1:0]				Spot 002 skew_wide - bank 1 [1:0]							
							Spot 001 skew_wide - bank 1 [1:0]							
									Spot 000 skew_wide - bank 1 [1:0]					
0			…											
53	3445	0x0D75	Spot 140 skew_wide - bank 1 [9:2]											
53	3446	0x0D76	Spot 141 skew_wide - bank 1 [9:2]											
53	3447	0x0D77	Spot 142 skew_wide - bank 1 [9:2]											
53	3448	0x0D78	Spot 143 skew_wide - bank 1 [9:2]											

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53	3449	0x0D79	Spot 143 skew_wide - bank 1 [1:0]		Spot 142 skew_wide - bank 1 [1:0]		Spot 141 skew_wide - bank 1 [1:0]		Spot 140 skew_wide - bank 1 [1:0]					
53	3450	0x0D7A	Spot 000 skew_wide - bank 2 [9:2]											
53	3451	0x0D7B	Spot 001 skew_wide - bank 2 [9:2]											
53	3452	0x0D7C	Spot 002 skew_wide - bank 2 [9:2]											
53	3453	0x0D7D	Spot 003 skew_wide - bank 2 [9:2]											
53	3454	0x0D7E	Spot 003 skew_wide - bank 2 [1:0]		Spot 002 skew_wide - bank 2 [1:0]		Spot 001 skew_wide - bank 2 [1:0]		Spot 000 skew_wide - bank 2 [1:0]					
0			…											
56	3625	0x0E29	Spot 140 skew_wide - bank 2 [9:2]											
56	3626	0x0E2A	Spot 141 skew_wide - bank 2 [9:2]											
56	3627	0x0E2B	Spot 142 skew_wide - bank 2 [9:2]											
56	3628	0x0E2C	Spot 143 skew_wide - bank 2 [9:2]											
56	3629	0x0E2D	Spot 143 skew_wide - bank 2 [1:0]		Spot 142 skew_wide - bank 2 [1:0]		Spot 141 skew_wide - bank 2 [1:0]		Spot 140 skew_wide - bank 2 [1:0]					
56	3630	0x0E2E	Spot 000 skew_wide - bank 3 [9:2]											
56	3631	0x0E2F	Spot 001 skew_wide - bank 3 [9:2]											
56	3632	0x0E30	Spot 002 skew_wide - bank 3 [9:2]											
56	3633	0x0E31	Spot 003 skew_wide - bank 3 [9:2]											
56	3634	0x0E32	Spot 003 skew_wide - bank 3 [1:0]		Spot 002 skew_wide - bank 3 [1:0]		Spot 001 skew_wide - bank 3 [1:0]		Spot 000 skew_wide - bank 3 [1:0]					
0			…											
59	3805	0x0EDD	Spot 140 skew_wide - bank 3 [9:2]											
59	3806	0x0EDE	Spot 141 skew_wide - bank 3 [9:2]											
59	3807	0x0EDF	Spot 142 skew_wide - bank 3 [9:2]											
59	3808	0x0EE0	Spot 143 skew_wide - bank 3 [9:2]											
59	3809	0x0EE1	Spot 143 skew_wide - bank 3 [1:0]		Spot 142 skew_wide - bank 3 [1:0]		Spot 141 skew_wide - bank 3 [1:0]		Spot 140 skew_wide - bank 3 [1:0]					
59	3810	0x0EE2	Spot 000 skew_wide - bank 4 [9:2]											
59	3811	0x0EE3	Spot 001 skew_wide - bank 4 [9:2]											
59	3812	0x0EE4	Spot 002 skew_wide - bank 4 [9:2]											
59	3813	0x0EE5	Spot 003 skew_wide - bank 4 [9:2]											
59	3814	0x0EE6	Spot 003 skew_wide - bank 4 [1:0]		Spot 002 skew_wide - bank 4 [1:0]		Spot 001 skew_wide - bank 4 [1:0]		Spot 000 skew_wide - bank 4 [1:0]					
0			…											
62	3985	0x0F91	Spot 140 skew_wide - bank 4 [9:2]											

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
62	3986	0x0F92	Spot 141 skew_wide - bank 4 [9:2]											
62	3987	0x0F93	Spot 142 skew_wide - bank 4 [9:2]											
62	3988	0x0F94	Spot 143 skew_wide - bank 4 [9:2]											
62	3989	0x0F95	Spot 143 skew_wide - bank 4 [1:0]		Spot 142 skew_wide - bank 4 [1:0]		Spot 141 skew_wide - bank 4 [1:0]		Spot 140 skew_wide - bank 4 [1:0]					
62	3990	0x0F96	abs_skew_ref1_minus_ref0_wide, bank1								int8			
62	3991	0x0F97	abs_skew_ref1_minus_ref0_wide, bank2								int8			
62	3992	0x0F98	abs_skew_ref1_minus_ref0_wide, bank3								int8			
62	3993	0x0F99	abs_skew_ref1_minus_ref0_wide, bank4								int8			
62	3994	0x0F9A	abs_skew_stray_minus_ref0_plus_offset_wide, bank1								int8			
62	3995	0x0F9B	abs_skew_stray_minus_ref0_plus_offset_wide, bank2								int8			
62	3996	0x0F9C	abs_skew_stray_minus_ref0_plus_offset_wide, bank3								int8			
62	3997	0x0F9D	abs_skew_stray_minus_ref0_plus_offset_wide, bank4								int8			
62	3998	0x0F9E	spot_skew_offset_narrow [7:0]								uint16			
62	3999	0x0F9F	spot_skew_offset_narrow [15:8]											
62	4000	0x0FA0	Spot 000 skew_narrow - bank 1 [9:2]								Packed 10			
62	4001	0x0FA1	Spot 001 skew_narrow - bank 1 [9:2]											
62	4002	0x0FA2	Spot 002 skew_narrow - bank 1 [9:2]											
62	4003	0x0FA3	Spot 003 skew_narrow - bank 1 [9:2]											
62	4004	0x0FA4	Spot 003 skew_narrow - bank 1 [1:0]		Spot 002 skew_narrow - bank 1 [1:0]		Spot 001 skew_narrow - bank 1 [1:0]		Spot 000 skew_narrow - bank 1 [1:0]					
0			…											
65	4175	0x104F	Spot 140 skew_narrow - bank 1 [9:2]											
65	4176	0x1050	Spot 141 skew_narrow - bank 1 [9:2]											
65	4177	0x1051	Spot 142 skew_narrow - bank 1 [9:2]											
65	4178	0x1052	Spot 143 skew_narrow - bank 1 [9:2]											
65	4179	0x1053	Spot 143 skew_narrow - bank 1 [1:0]		Spot 142 skew_narrow - bank 1 [1:0]		Spot 141 skew_narrow - bank 1 [1:0]		Spot 140 skew_narrow - bank 1 [1:0]					
65	4180	0x1054	Spot 000 skew_narrow - bank 2 [9:2]											
65	4181	0x1055	Spot 001 skew_narrow - bank 2 [9:2]											
65	4182	0x1056	Spot 002 skew_narrow - bank 2 [9:2]											
65	4183	0x1057	Spot 003 skew_narrow - bank 2 [9:2]											
65	4184	0x1058	Spot 003 skew_narrow - bank 2 [1:0]		Spot 002 skew_narrow - bank 2 [1:0]		Spot 001 skew_narrow - bank 2 [1:0]		Spot 000 skew_narrow - bank 2 [1:0]					
0			…											
68	4355	0x1103	Spot 140 skew_narrow - bank 2 [9:2]											
68	4356	0x1104	Spot 141 skew_narrow - bank 2 [9:2]											

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
68	4357	0x1105	Spot 142 skew_narrow - bank 2 [9:2]											
68	4358	0x1106	Spot 143 skew_narrow - bank 2 [9:2]											
68	4359	0x1107	Spot 143 skew_narrow - bank 2 [1:0]		Spot 142 skew_narrow - bank 2 [1:0]		Spot 141 skew_narrow - bank 2 [1:0]		Spot 140 skew_narrow - bank 2 [1:0]					
68	4360	0x1108	Spot 000 skew_narrow - bank 3 [9:2]											
68	4361	0x1109	Spot 001 skew_narrow - bank 3 [9:2]											
68	4362	0x110A	Spot 002 skew_narrow - bank 3 [9:2]											
68	4363	0x110B	Spot 003 skew_narrow - bank 3 [9:2]											
68	4364	0x110C	Spot 003 skew_narrow - bank 3 [1:0]		Spot 002 skew_narrow - bank 3 [1:0]		Spot 001 skew_narrow - bank 3 [1:0]		Spot 000 skew_narrow - bank 3 [1:0]					
0			…											
70	4535	0x11B7	Spot 140 skew_narrow - bank 3 [9:2]											
70	4536	0x11B8	Spot 141 skew_narrow - bank 3 [9:2]											
70	4537	0x11B9	Spot 142 skew_narrow - bank 3 [9:2]											
70	4538	0x11BA	Spot 143 skew_narrow - bank 3 [9:2]											
70	4539	0x11BB	Spot 143 skew_narrow - bank 3 [1:0]		Spot 142 skew_narrow - bank 3 [1:0]		Spot 141 skew_narrow - bank 3 [1:0]		Spot 140 skew_narrow - bank 3 [1:0]					
70	4540	0x11BC	Spot 000 skew_narrow - bank 4 [9:2]											
70	4541	0x11BD	Spot 001 skew_narrow - bank 4 [9:2]											
70	4542	0x11BE	Spot 002 skew_narrow - bank 4 [9:2]											
70	4543	0x11BF	Spot 003 skew_narrow - bank 4 [9:2]											
71	4544	0x11C0	Spot 003 skew_narrow - bank 4 [1:0]		Spot 002 skew_narrow - bank 4 [1:0]		Spot 001 skew_narrow - bank 4 [1:0]		Spot 000 skew_narrow - bank 4 [1:0]					
0			…											
73	4715	0x126B	Spot 140 skew_narrow - bank 4 [9:2]											
73	4716	0x126C	Spot 141 skew_narrow - bank 4 [9:2]											
73	4717	0x126D	Spot 142 skew_narrow - bank 4 [9:2]											
73	4718	0x126E	Spot 143 skew_narrow - bank 4 [9:2]											
73	4719	0x126F	Spot 143 skew_narrow - bank 4 [1:0]		Spot 142 skew_narrow - bank 4 [1:0]		Spot 141 skew_narrow - bank 4 [1:0]		Spot 140 skew_narrow - bank 4 [1:0]					
	4720	0x1270	abs_skew_ref1_minus_ref0_narrow, bank1								int8			
73	4721	0x1271	abs_skew_ref1_minus_ref0_narrow, bank2								int8			
73	4722	0x1272	abs_skew_ref1_minus_ref0_narrow, bank3								int8			
73	4723	0x1273	abs_skew_ref1_minus_ref0_narrow, bank4								int8			
73	4724	0x1274	abs_skew_stray_minus_ref0_plus_offset_narrow, bank1								int8			
73	4725	0x1275	abs_skew_stray_minus_ref0_plus_offset_narrow, bank2								int8			

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
73	4726	0x1276	abs_skew_stray_minus_ref0_plus_offset_narrow, bank3								int8			
73	4727	0x1277	abs_skew_stray_minus_ref0_plus_offset_narrow, bank4								int8			
73	4728	0x1278	JLIN_VERSION[7:0]								uint8			
73	4729	0x1279	EFL[7:0]								float32			
73	4730	0x127A	EFL[15:8]											
73	4731	0x127B	EFL[23:16]											
73	4732	0x127C	EFL[31:24]											
73	4733	0x127D	PPX [7:0]								float32			
73	4734	0x127E	PPX [15:8]											
73	4735	0x127F	PPX [23:16]											
74	4736	0x1280	PPX [31:24]											
74	4737	0x1281	PPY [7:0]								float32			
74	4738	0x1282	PPY [15:8]											
74	4739	0x1283	PPY [23:16]											
74	4740	0x1284	PPY [31:24]											
74	4741	0x1285	coeffData p0 [7:0]								float32			
74	4742	0x1286	coeffData p0 [15:8]											
74	4743	0x1287	coeffData p0 [23:16]											
74	4744	0x1288	coeffData p0 [31:24]											
74	4745	0x1289	coeffData p1 [7:0]								float32			
74	4746	0x128A	coeffData p1 [15:8]											
74	4747	0x128B	coeffData p1 [23:16]											
74	4748	0x128C	coeffData p1 [31:24]											
74	4749	0x128D	coeffData p2 [7:0]								float32			
74	4750	0x128E	coeffData p2 [15:8]											
74	4751	0x128F	coeffData p2 [23:16]											
74	4752	0x1290	coeffData p2 [31:24]											
74	4753	0x1291	coeffData p3 [7:0]								float32			
74	4754	0x1292	coeffData p3 [15:8]											
74	4755	0x1293	coeffData p3 [23:16]											
74	4756	0x1294	coeffData p3 [31:24]											
74	4757	0x1295	coeffData p4 [7:0]								float32			
74	4758	0x1296	coeffData p4 [15:8]											
74	4759	0x1297	coeffData p4 [23:16]											
74	4760	0x1298	coeffData p4 [31:24]											
74	4761	0x1299	distCenter X [7:0]								float32			
74	4762	0x129A	distCenter X [15:8]											
74	4763	0x129B	distCenter X [23:16]											

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74	4764	0x129C	distCenter X [31:24]											
74	4765	0x129D	distCenter Y [7:0]								float32			
74	4766	0x129E	distCenter Y [15:8]											
74	4767	0x129F	distCenter Y [23:16]											
74	4768	0x12A0	distCenter Y [31:24]											
74	4769	0x12A1	Temperature - MPC cal mean sensor temp [deg C] [15:8]								uint16/500			
74	4770	0x12A2	Temperature - MPC cal mean sensor temp [deg C] [7:0]											
74	4771	0x12A3	Temperature - MPC cal mean driver temp [deg C] [15:8]								uint16/500			
74	4772	0x12A4	Temperature - MPC cal mean driver temp [deg C] [7:0]											
74	4773	0x12A5	Temperature - MPC cal mean NTC temp [deg C] [15:8]								uint16/500			
74	4774	0x12A6	Temperature - MPC cal mean NTC temp [deg C] [7:0]											
74	4775	0x12A7	P2P NVM version								uint8			
74	4776	0x12A8	P2P software version								uint8			
74	4777	0x12A9	P2P scan version								uint8			
74	4778	0x12AA	Temperature - P2P cal mean sensor temp [deg C] [7:0]								uint16/500			
74	4779	0x12AB	Temperature - P2P cal mean sensor temp [deg C] [7:0]											
74	4780	0x12AC	Temperature - P2P cal mean NTC temp [deg C] [7:0]								uint16/500			
74	4781	0x12AD	Temperature - P2P cal mean NTC temp [deg C] [15:8]											
74	4782	0x12AE	Temperature - P2P cal mean driver temp [deg C] [7:0]								uint16/500			
74	4783	0x12AF	Temperature - P2P cal mean driver temp [deg C] [15:8]											
74	4784	0x12B0	P2P scale - tdc skew								uint8		picosec-onds	
74	4785	0x12B1	P2P scale - imaging pixels skew								uint8		picosec-onds	
74	4786	0x12B2	P2P scale - reference pixels skew								uint8		picosec-onds	
74	4787	0x12B3	E to A TDC skew - SP 000								int8+128			
74	4788	0x12B4	E to A TDC skew - SP 001								int8+128			
			…											
77	4930	0x1342	E to A TDC skew - SP 143								int8+128			
77	4931	0x1343	NS to A TDC skew - SP 000								int8+128			
77	4932	0x1344	NS to A TDC skew - SP 001								int8+128			
			…											
79	5074	0x13D2	NS to A TDC skew - SP 143								int8+128			
79	5075	0x13D3	NSE to A TDC skew - SP 000								int8+128			
79	5076	0x13D4	NSE to A TDC skew - SP 001								int8+128			

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			…											
81	**5218**	**0x1462**	NSE to A TDC skew - SP 143								int8+128			
81	**5219**	**0x1463**	West reference (ref 0) TDC skew - E to A								int8+128			
81	**5220**	**0x1464**	East reference (ref 1) TDC skew - E to A								int8+128			
81	**5221**	**0x1465**	Patch 007 skew, index 1 [bit 0]	Patch 000 skew (A to mean of patch), pixel index 1 [bits 6:0]										
81	**5222**	**0x1466**	Patch 007 skew, index 1 [bit 1]	Patch 001 skew (A to mean of patch), pixel index 1 [bits 6:0]										
81	**5223**	**0x1467**	Patch 007 skew, index 1 [bit 2]	Patch 002 skew (A to mean of patch), pixel index 1 [bits 6:0]										
			…											
81	**5227**	**0x146B**	Patch 007 skew, index 1 [bit 6]	Patch 006 skew (A to mean of patch), pixel index 1 [bits 6:0]										
81	**5228**	**0x146C**	Patch 015 skew, index 1 [bit 0]	Patch 008 skew (A to mean of patch), pixel index 1 [bits 6:0]										
81	**5229**	**0x146D**	Patch 015 skew, index 1 [bit 1]	Patch 009 skew (A to mean of patch), pixel index 1 [bits 6:0]										

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
81	**5230**	**0x146E**	Patch 015 skew, index 1 [bit 2]	Patch 010 skew (A to mean of patch), pixel index 1 [bits 6:0]										
			…											
81	**5234**	**0x1472**	Patch 015 skew, index 1 [bit 6]	Patch 014 skew (A to mean of patch), pixel index 1 [bits 6:0]										
			… … …											
83	**5346**	**0x14E2**	Patch 143 skew, index 1 [bit 6]	Patch 142 skew (A to mean of patch), pixel index 1 [bits 6:0]										
83	**5347**	**0x14E3**	Patch 007 skew, index 2 [bit 0]	Patch 000 skew (A to mean of patch), pixel index 2 [bits 6:0]										
83	**5348**	**0x14E4**	Patch 007 skew, index 2 [bit 1]	Patch 001 skew (A to mean of patch), pixel index 2 [bits 6:0]										
83	**5349**	**0x14E5**	Patch 007 skew, index 2 [bit 2]	Patch 002 skew (A to mean of patch), pixel index 2 [bits 6:0]										
			…											
83	**5353**	**0x14E9**	Patch 007 skew, index 2 [bit 6]	Patch 006 skew (A to mean of patch), pixel index 2 [bits 6:0]										
			… … …											

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
85	5472	0x1560	Patch 143 skew, index 2 [bit 6]	Patch 142 skew (A to mean of patch), pixel index 2 [bits 6:0]										
			… … …											
508	3256	0x7F32	Patch 143 skew, index 217 [bit 6]	Patch 142 skew (A to mean of patch), pixel index 217 [bits 6:0]										
508	3256	0x7F33	Ref pixel 0 skew - RSPX0 - bank 1 - wide pulse								int8+128			
508	3256	0x7F34	Ref pixel 1 skew - RSPX0 - bank 1 - wide pulse								int8+128			
508	3256	0x7F35	Ref pixel 2 skew - RSPX0 - bank 1 - wide pulse								int8+128			
508	3256	0x7F36	Ref pixel 3 skew - RSPX0 - bank 1 - wide pulse								int8+128			
508	3256	0x7F37	Ref pixel 10 skew - RSPX0 - bank 1 - wide pulse								int8+128			
508	3256	0x7F38	Ref pixel 11 skew - RSPX0 - bank 1 - wide pulse								int8+128			
508	3256	0x7F39	Ref pixel 12 skew - RSPX0 - bank 1 - wide pulse								int8+128			
508	3257	0x7F3A	Ref pixel 13 skew - RSPX0 - bank 1 - wide pulse								int8+128			
508	3257	0x7F3B	Ref pixel 126 skew - RSPX1 - bank 1 - wide pulse								int8+128			
508	3257	0x7F3C	Ref pixel 127 skew - RSPX1 - bank 1 - wide pulse								int8+128			
508	3257	0x7F3D	Ref pixel 128 skew - RSPX1 - bank 1 - wide pulse								int8+128			
508	3257	0x7F3E	Ref pixel 129 skew - RSPX1 - bank 1 - wide pulse								int8+128			
508	3257	0x7F3F	Ref pixel 136 skew - RSPX1 - bank 1 - wide pulse								int8+128			
509	3257	0x7F40	Ref pixel 137 skew - RSPX1 - bank 1 - wide pulse								int8+128			
509	3257	0x7F41	Ref pixel 138 skew - RSPX1 - bank 1 - wide pulse								int8+128			
509	3257	0x7F42	Ref pixel 139 skew - RSPX1 - bank 1 - wide pulse								int8+128			
509	3257	0x7F43	Ref pixel 0 skew - RSPX0 - bank 2 - wide pulse								int8+128			
509	3258	0x7F44	Ref pixel 1 skew - RSPX0 - bank 2 - wide pulse								int8+128			
509	3258	0x7F45	Ref pixel 2 skew - RSPX0 - bank 2 - wide pulse								int8+128			

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
50	3258	0x7F46	Ref pixel 3 skew - RSPX0 - bank 2 - wide pulse								int8+128			
50	3258	0x7F47	Ref pixel 10 skew - RSPX0 - bank 2 - wide pulse								int8+128			
50	3258	0x7F48	Ref pixel 11 skew - RSPX0 - bank 2 - wide pulse								int8+128			
50	3258	0x7F49	Ref pixel 12 skew - RSPX0 - bank 2 - wide pulse								int8+128			
50	3258	0x7F4A	Ref pixel 13 skew - RSPX0 - bank 2 - wide pulse								int8+128			
50	3258	0x7F4B	Ref pixel 126 skew - RSPX1 - bank 2 - wide pulse								int8+128			
50	3258	0x7F4C	Ref pixel 127 skew - RSPX1 - bank 2 - wide pulse								int8+128			
50	3258	0x7F4D	Ref pixel 128 skew - RSPX1 - bank 2 - wide pulse								int8+128			
50	3259	0x7F4E	Ref pixel 129 skew - RSPX1 - bank 2 - wide pulse								int8+128			
50	3259	0x7F4F	Ref pixel 136 skew - RSPX1 - bank 2 - wide pulse								int8+128			
50	3259	0x7F50	Ref pixel 137 skew - RSPX1 - bank 2 - wide pulse								int8+128			
50	3259	0x7F51	Ref pixel 138 skew - RSPX1 - bank 2 - wide pulse								int8+128			
50	3259	0x7F52	Ref pixel 139 skew - RSPX1 - bank 2 - wide pulse								int8+128			
50	3259	0x7F53	Ref pixel 0 skew - RSPX0 - bank 3 - wide pulse								int8+128			
50	3259	0x7F54	Ref pixel 1 skew - RSPX0 - bank 3 - wide pulse								int8+128			
50	3259	0x7F55	Ref pixel 2 skew - RSPX0 - bank 3 - wide pulse								int8+128			
50	3259	0x7F56	Ref pixel 3 skew - RSPX0 - bank 3 - wide pulse								int8+128			
50	3259	0x7F57	Ref pixel 10 skew - RSPX0 - bank 3 - wide pulse								int8+128			
50	3260	0x7F58	Ref pixel 11 skew - RSPX0 - bank 3 - wide pulse								int8+128			
50	3260	0x7F59	Ref pixel 12 skew - RSPX0 - bank 3 - wide pulse								int8+128			
50	3260	0x7F5A	Ref pixel 13 skew - RSPX0 - bank 3 - wide pulse								int8+128			
50	3260	0x7F5B	Ref pixel 126 skew - RSPX1 - bank 3 - wide pulse								int8+128			
50	3260	0x7F5C	Ref pixel 127 skew - RSPX1 - bank 3 - wide pulse								int8+128			
50	3260	0x7F5D	Ref pixel 128 skew - RSPX1 - bank 3 - wide pulse								int8+128			
50	3260	0x7F5E	Ref pixel 129 skew - RSPX1 - bank 3 - wide pulse								int8+128			
50	3260	0x7F5F	Ref pixel 136 skew - RSPX1 - bank 3 - wide pulse								int8+128			

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50	3260	0x7F60	Ref pixel 137 skew - RSPX1 - bank 3 - wide pulse								int8+128			
50	3260	0x7F61	Ref pixel 138 skew - RSPX1 - bank 3 - wide pulse								int8+128			
50	3261	0x7F62	Ref pixel 139 skew - RSPX1 - bank 3 - wide pulse								int8+128			
50	3261	0x7F63	Ref pixel 0 skew - RSPX0 - bank 4 - wide pulse								int8+128			
50	3261	0x7F64	Ref pixel 1 skew - RSPX0 - bank 4 - wide pulse								int8+128			
50	3261	0x7F65	Ref pixel 2 skew - RSPX0 - bank 4 - wide pulse								int8+128			
50	3261	0x7F66	Ref pixel 3 skew - RSPX0 - bank 4 - wide pulse								int8+128			
50	3261	0x7F67	Ref pixel 10 skew - RSPX0 - bank 4 - wide pulse								int8+128			
50	3261	0x7F68	Ref pixel 11 skew - RSPX0 - bank 4 - wide pulse								int8+128			
50	3261	0x7F69	Ref pixel 12 skew - RSPX0 - bank 4 - wide pulse								int8+128			
50	3261	0x7F6A	Ref pixel 13 skew - RSPX0 - bank 4 - wide pulse								int8+128			
50	3261	0x7F6B	Ref pixel 126 skew - RSPX1 - bank 4 - wide pulse								int8+128			
50	3262	0x7F6C	Ref pixel 127 skew - RSPX1 - bank 4 - wide pulse								int8+128			
50	3262	0x7F6D	Ref pixel 128 skew - RSPX1 - bank 4 - wide pulse								int8+128			
50	3262	0x7F6E	Ref pixel 129 skew - RSPX1 - bank 4 - wide pulse								int8+128			
50	3262	0x7F6F	Ref pixel 136 skew - RSPX1 - bank 4 - wide pulse								int8+128			
50	3262	0x7F70	Ref pixel 137 skew - RSPX1 - bank 4 - wide pulse								int8+128			
50	3262	0x7F71	Ref pixel 138 skew - RSPX1 - bank 4 - wide pulse								int8+128			
50	3262	0x7F72	Ref pixel 139 skew - RSPX1 - bank 4 - wide pulse								int8+128			
50	3262	0x7F73	Ref pixel 0 skew - RSPX0 - bank 1 - narrow pulse								int8+128			
50	3262	0x7F74	Ref pixel 1 skew - RSPX0 - bank 1 - narrow pulse								int8+128			
50	3262	0x7F75	Ref pixel 2 skew - RSPX0 - bank 1 - narrow pulse								int8+128			
50	3263	0x7F76	Ref pixel 3 skew - RSPX0 - bank 1 - narrow pulse								int8+128			
50	3263	0x7F77	Ref pixel 10 skew - RSPX0 - bank 1 - narrow pulse								int8+128			
50	3263	0x7F78	Ref pixel 11 skew - RSPX0 - bank 1 - narrow pulse								int8+128			
50	3263	0x7F79	Ref pixel 12 skew - RSPX0 - bank 1 - narrow pulse								int8+128			

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
509	3263	0x7F7A	Ref pixel 13 skew - RSPX0 - bank 1 - narrow pulse								int8+128			
509	3263	0x7F7B	Ref pixel 126 skew - RSPX1 - bank 1 - narrow pulse								int8+128			
509	3263	0x7F7C	Ref pixel 127 skew - RSPX1 - bank 1 - narrow pulse								int8+128			
509	3263	0x7F7D	Ref pixel 128 skew - RSPX1 - bank 1 - narrow pulse								int8+128			
509	3263	0x7F7E	Ref pixel 129 skew - RSPX1 - bank 1 - narrow pulse								int8+128			
509	3263	0x7F7F	Ref pixel 136 skew - RSPX1 - bank 1 - narrow pulse								int8+128			
510	3264	0x7F80	Ref pixel 137 skew - RSPX1 - bank 1 - narrow pulse								int8+128			
510	3264	0x7F81	Ref pixel 138 skew - RSPX1 - bank 1 - narrow pulse								int8+128			
510	3264	0x7F82	Ref pixel 139 skew - RSPX1 - bank 1 - narrow pulse								int8+128			
510	3264	0x7F83	Ref pixel 0 skew - RSPX0 - bank 2 - narrow pulse								int8+128			
510	3264	0x7F84	Ref pixel 1 skew - RSPX0 - bank 2 - narrow pulse								int8+128			
510	3264	0x7F85	Ref pixel 2 skew - RSPX0 - bank 2 - narrow pulse								int8+128			
510	3264	0x7F86	Ref pixel 3 skew - RSPX0 - bank 2 - narrow pulse								int8+128			
510	3264	0x7F87	Ref pixel 10 skew - RSPX0 - bank 2 - narrow pulse								int8+128			
510	3264	0x7F88	Ref pixel 11 skew - RSPX0 - bank 2 - narrow pulse								int8+128			
510	3264	0x7F89	Ref pixel 12 skew - RSPX0 - bank 2 - narrow pulse								int8+128			
510	3265	0x7F8A	Ref pixel 13 skew - RSPX0 - bank 2 - narrow pulse								int8+128			
510	3265	0x7F8B	Ref pixel 126 skew - RSPX1 - bank 2 - narrow pulse								int8+128			
510	3265	0x7F8C	Ref pixel 127 skew - RSPX1 - bank 2 - narrow pulse								int8+128			
510	3265	0x7F8D	Ref pixel 128 skew - RSPX1 - bank 2 - narrow pulse								int8+128			
510	3265	0x7F8E	Ref pixel 129 skew - RSPX1 - bank 2 - narrow pulse								int8+128			
510	3265	0x7F8F	Ref pixel 136 skew - RSPX1 - bank 2 - narrow pulse								int8+128			
510	3265	0x7F90	Ref pixel 137 skew - RSPX1 - bank 2 - narrow pulse								int8+128			
510	3265	0x7F91	Ref pixel 138 skew - RSPX1 - bank 2 - narrow pulse								int8+128			
510	3265	0x7F92	Ref pixel 139 skew - RSPX1 - bank 2 - narrow pulse								int8+128			
510	3265	0x7F93	Ref pixel 0 skew - RSPX0 - bank 3 - narrow pulse								int8+128			

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
51(	3266(	0x7F94	Ref pixel 1 skew - RSPX0 - bank 3 - narrow pulse								int8+128			
51(	3266	0x7F95	Ref pixel 2 skew - RSPX0 - bank 3 - narrow pulse								int8+128			
51(	3266	0x7F96	Ref pixel 3 skew - RSPX0 - bank 3 - narrow pulse								int8+128			
51(	3266	0x7F97	Ref pixel 10 skew - RSPX0 - bank 3 - narrow pulse								int8+128			
51(	3266	0x7F98	Ref pixel 11 skew - RSPX0 - bank 3 - narrow pulse								int8+128			
51(	3266	0x7F99	Ref pixel 12 skew - RSPX0 - bank 3 - narrow pulse								int8+128			
51(	3266(	0x7F9A	Ref pixel 13 skew - RSPX0 - bank 3 - narrow pulse								int8+128			
51(	3266	0x7F9B	Ref pixel 126 skew - RSPX1 - bank 3 - narrow pulse								int8+128			
51(	3266	0x7F9C	Ref pixel 127 skew - RSPX1 - bank 3 - narrow pulse								int8+128			
51(	3266	0x7F9D	Ref pixel 128 skew - RSPX1 - bank 3 - narrow pulse								int8+128			
51(	3267(	0x7F9E	Ref pixel 129 skew - RSPX1 - bank 3 - narrow pulse								int8+128			
51(	3267	0x7F9F	Ref pixel 136 skew - RSPX1 - bank 3 - narrow pulse								int8+128			
51(	3267	0x7FA0	Ref pixel 137 skew - RSPX1 - bank 3 - narrow pulse								int8+128			
51(	3267	0x7FA1	Ref pixel 138 skew - RSPX1 - bank 3 - narrow pulse								int8+128			
51(	3267	0x7FA2	Ref pixel 139 skew - RSPX1 - bank 3 - narrow pulse								int8+128			
51(	3267	0x7FA3	Ref pixel 0 skew - RSPX0 - bank 4 - narrow pulse								int8+128			
51(	3267(	0x7FA4	Ref pixel 1 skew - RSPX0 - bank 4 - narrow pulse								int8+128			
51(	3267	0x7FA5	Ref pixel 2 skew - RSPX0 - bank 4 - narrow pulse								int8+128			
51(	3267	0x7FA6	Ref pixel 3 skew - RSPX0 - bank 4 - narrow pulse								int8+128			
51(	3267	0x7FA7	Ref pixel 10 skew - RSPX0 - bank 4 - narrow pulse								int8+128			
51(	3268(	0x7FA8	Ref pixel 11 skew - RSPX0 - bank 4 - narrow pulse								int8+128			
51(	3268	0x7FA9	Ref pixel 12 skew - RSPX0 - bank 4 - narrow pulse								int8+128			
51(	3268	0x7FAA	Ref pixel 13 skew - RSPX0 - bank 4 - narrow pulse								int8+128			
51(	3268	0x7FAB	Ref pixel 126 skew - RSPX1 - bank 4 - narrow pulse								int8+128			
51(	3268	0x7FAC	Ref pixel 127 skew - RSPX1 - bank 4 - narrow pulse								int8+128			
51(	3268	0x7FAD	Ref pixel 128 skew - RSPX1 - bank 4 - narrow pulse								int8+128			

Page Index	Byte Index	Address (hex)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Data Format	Compression	Comments	Program Station
51(	3268(	0x7FAE	Ref pixel 129 skew - RSPX1 - bank 4 - narrow pulse								int8+128			
51(	3268'	0x7FAF	Ref pixel 136 skew - RSPX1 - bank 4 - narrow pulse								int8+128			
51(	3268	0x7FB0	Ref pixel 137 skew - RSPX1 - bank 4 - narrow pulse								int8+128			
51(	3268	0x7FB1	Ref pixel 138 skew - RSPX1 - bank 4 - narrow pulse								int8+128			
51(	3269(	0x7FB2	Ref pixel 139 skew - RSPX1 - bank 4 - narrow pulse								int8+128			
51(	3269'	0x7FB3	Zero padding TBD											
511	3276'	0x7FFF	CALU Checksum								Int8			

JA-C NVM Integrity Check (Only for MP)

Note: all values are in Hex

All listed registers should be checked with only acceptable values being those defined.

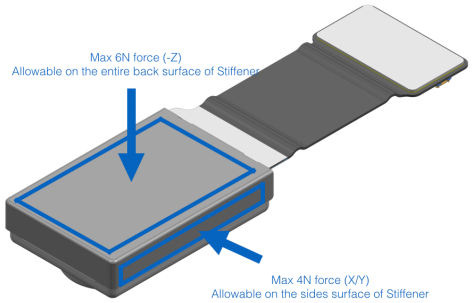
Parameter	Min	Max	Notes
0x0000 NVM Format Rev [15:8]	0xE		
0x0000 NVM Version [3:0]	0x0		
0x0001 Camera Project [7:0]	0x2B		
0x0002 Project Version [7:0]	0x0C | **0x0B**		JA-C + JA-B
0x0003 Integrator [7:3] Plant [2:0]	0x09		LGIT
0x0004 Camera Build [7:0]	0x10	0x2A	MP
0x0005 Config Number [7:0]	0x00	0x99	latest shipping plan
0x0006 Substrate [7:0]	**0x20**	0x3B	Includes DOE substrates
0x0007 Driver [7:0]	0xD4	0xD8	B0 | B05 | trims
0x0008 Kirk [7:0]	0x34 | 0x54 | 0x55		
0x0009 Periscope [7:0]	0x2A	0x2B	ES2.1
0x000A IR Filter [7:0]	0x78 | 0xB8		PTOT | Viavi
0x000B Lens1 McCoy [7:0]	0x34 | 0x54		Largan | Genius
0x000C Lens2 Spock [7:0]	0x35 | 0x55		
0x000D Sulu DOE[7:0]	0x42		TSMC L3.1 & L2.0
0x000E Lens Holder [7:0]	0x96 | 0x98		
0x000F Shield Can [7:0]	0x0D		
0x0010 Flex [7:0]	0x08	0x57	Mektec | Avary
0x0011 Stiffener [7:0]	0x0D		
0x0012 DriverShield	0xFF		None
0x001E Liner	0x55		
Module SN			

Mechanical Specifications

The JA-C Module shall conform to the mechanical dimensions and tolerances of the engineering drawing package supplied by Apple Engineering.

Mechanical Clamping requirements

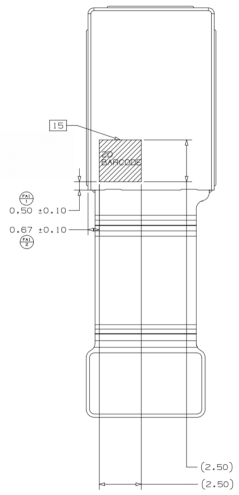
For integration purposes:



The overall outside dimensions of the JA-C module are specified by Apple document 613-13465.

Serial Number (Barcode) Decoding

Each JA-C Module will have a unique serial number that is 17 characters long. The SN is located on the stiffener as shown below :



Each serial number character is restricted to the set of base-34 characters. Valid characters are digits “0” through “9” and letters “A” through “Z” except for letters “O” and “I” which are invalid due to similarity to numbers “0” and “1”.

The serial number is generated using the rules and format detailed in table below.

INFO TYPE	Plant Code	Date Code of Manufacture at Supplier	Sequence Number	Config Code	Checksum
Format	PPP	YWWD	SSSS	EEEER	X
Number of Characters	3	4	4	5	1
Explanation	PPP = Vendor and Plant/Factory Location: The code indicating the Module vendor and where it is manufactured. This code will be assigned to the Module vendor by Apple.	Y = Year: 0 = 2010 1 = 2011 2 = 2012 3 = 2013 ... etc. WW = Week of Manufacture: 01 to 53 weeks D = Day Days 1 to 7 with 1 = Monday	SSSS = 4 character Sequence Number (base-34) Each module must have a unique sequence number for each plant and day This allows for 34^4 = 1,336,336 units per day per plant	EEEE = Module Config Codes The code indicating the Module Lens, and Sensor This code will be assigned to the Vendor by Apple. R is revision assigned by Apple in VSR.	X = Checksum See Appendix H for checksum calculation method
Example	XYZ605200Z3A2341V				
Example Meaning	XYZ Built at Vendor XYZ Inc. Singapore Plant	1052 Manufactured on Tuesday of the 5th week of 2011	00Z3 Sequence # 00Z3	A2341 Apple provided	V SN checksum

The week/day code should be assigned according to the following rules:

a) Monday is defined as the first day of the week.

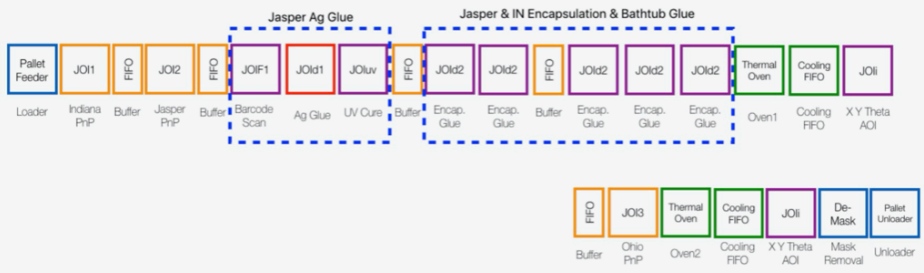
b) Week code 01 is the week that includes January the first. The week code 01 can include days that belong to the previous calendar year.

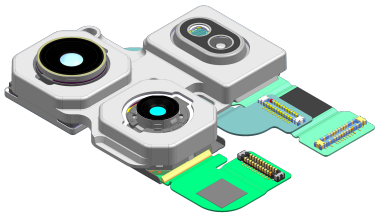
c) The Week code is increased by one at 00:00:00 AM [local time] on Monday morning. The exception is the week that includes January the first. In this case, the week code resets to 01. The year code also changes at the start of week code 01.

Note that some years have a week code 53.The “R” code defines the Module config.

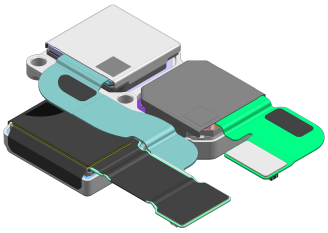
JOI Assembly Process

JA-C-Ohio-Indiana Assembly Flow (JOI)

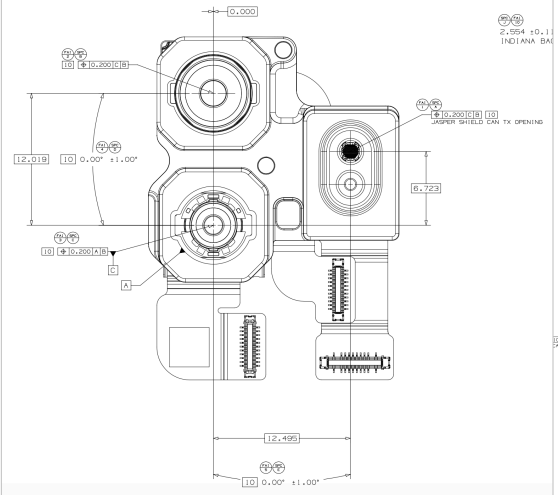




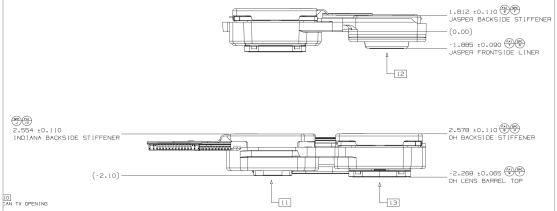
JOI Bracket Top



JOI Bracket Bottom



Baseline X,Y



Baseline Z

The following table summarizes the requirements for JA-C to rear camera (IN, OH) alignment in system:

Parameter	Symbol	Post-JOI	Post-REL	Note
Mechanical assembly	X tilt	2	0.7	degrees (°) relative to Wide Camera
	Y tilt	2	0.7	
	Z rotation	2	0.7	
	X displacement	0.25	0.1	Distance (mm) relative to Wide Camera
	Y displacement	0.25	0.1	
	Z displacement	0.25	0.1	

- The “Post FATP install” requirements specify the maximum acceptable tilt and displacement relative to the nominal baseline that can be corrected through calibration
- The “Post Reliability” requirements specify the maximum acceptable shift relative to the nominal baseline from T0 over the product lifetime.

Laser Compliance

Critical to safety Master List <rdar://problem/49532680>

V1.24 (Arun)

As a Class-1 laser device, some aspects of JA-C Module performance and assembly are critical to safety (CTS). CTS processes and parameters have special requirements regarding data integrity and retention. These requirements must be met to guarantee during all phases of the program (engineering and mass production) to guarantee module Class-1 laser compliance.

Critical-to-Safety design parameters (CTS-D)

The following parameters or components are critical to safety. Absolutely no changes to qualified sources, processes, handling, or testing can be implemented without Apple review and signoff by the module compliance DRI.

Some of these CTS parameters are additionally tagged as Critical-to-Safety Test metrics (CTS-T).

For such CTS-Ts, vendor must perform inline functional tests with a qualified reference tester. Vendor must measure and closely track all compliance-related CTS test parameters per specified test frequency, including the CTS inline test parameters listed in Table 2, and give such data high priority in failure FA and data analysis. In mass production, Vendor must comply with any additional control plan (for example, Product Safety Requirement Document, or SRD, and PCPs), defined by the Apple SQE/operations team to monitor CTS test-data quality.

JA-C-L CTS Parameters at System

#	Component	Tester Location	Tester	Parameter (*Tester spec name - if applicable*)	Units	LSL	Nominal Value	USL	Definition	CTS Justification	CTS-Test	CTS-Test **Yes/No** Decision Justification	CTS-Process	CTS-Process **Yes/No** Decision Justification	Engineering Validation Requirements
6.1	JA-C-L Module in System	FATP	System Compliance tester	Pulse train duration used for measurement (Compliance mode)- per bank.	ms	6.9	7	7.1	Light emission duration over which compliance measurement is done	Gaurantees module compliance measurement is valid	Yes	Gaurantees module compliance measurement is valid	No	Not a process metric	100% sampling
6.2	JA-C-L Module in System	FATP	System Compliance tester	AE_Eye_System (non zero orders)	uW	–	100	173.88	Max spot power. Measured using compliance mode* All non zero orders	Directly impacts compliance budget	Yes	Guarantees system compliance.	No	Not a process metric	100% sampling
6.25	JA-C-L Module in System	FATP	System Compliance tester	AE_Eye_System (Zero order)	uW	–	100	208.656	Max spot power. Measured using compliance mode* All zero orders	Directly impacts compliance budget	Yes	Guarantees system compliance.	No	Not a process metric	100% sampling
6.25	JA-C-L Module in System	FATP	System Compliance tester	AE_Eye Metrology Error (5.5 sigma one sided)	%			27.1	Metrology Error Assumption for CTS-T Item #5.15	Directly impacts compliance budget	No	Engineering validation and ongoing Audits to guarantee this budget	No	Not a process metric	100% sampling
6.3	JA-C-L Module in System	FATP	System Compliance tester	AE_Eye_System post rel	uW	–	–	315.89	Max spot power post rel. Measured using compliance mode*	Directly impacts compliance budget	No	Rel drift validation is sampling controlled by engineering	No	Not a process metric	Rel sampling per RRD spec.

#	Component	Tester Location	Tester	Parameter (*Tester spec name - if applicable*)	Units	LSL	Nominal Value	USL	Definition	CTS Justification	CTS-Test	CTS-Test **Yes/No** Decision Justification	CTS-Process	CTS-Process **Yes/No** Decision Justification	Engineering Validation Requirements
6.4	JA-C-L Module in System	FATP	System Compliance tester	Minimum spot to spot centroid distance.	deg	3.58	3.65	3.72	Minimum distance between spots . Measured using compliance mode*	Gaurantees condition 1.	Yes	Guarantees system compliance.	No	Not a process metric	100% sampling
6.45	JA-C-L Module in System	FATP	System Compliance tester	Minimum Spot to spot centroid distance Metrology Error (5.5 sigma one sided)	%	—	—	0	Metrology Error Assumption for CTS-T Item #5.21	Impacts compliance budget	No	Engineering validation and ongoing Audits to guarantee this budget	No	Not a process metric	100% sampling
6.5	JA-C-L Module in System	FATP	System Compliance tester	Minimum spot to spot centroid distance post rel	mm	3.55	3.65	3.75	Post rel. Measured using compliance mode*	Gaurantees condition 1.	No	Rel drift validation is sampling controlled by engineering	No	Not a process metric	Rel sampling per RRD spec.
6.8	JA-C-L Module in System	FATP	System Compliance tester	Zero order Alpha	mRad	3.80	4.48	—	Source size as seen from 100mm at module exit pupil. Measured using compliance mode*	Directly impacts compliance budget	Yes	Guarantees system compliance	No	Not a process metric	100% sampling
6.85	JA-C-L Module in System	FATP	System Compliance tester	Zero order Alpha Metrology Error (5.5 sigma one sided)	%	—	—	13	Metrology Error Assumption for CTS-T Item #6.8	Impacts compliance budget	No	Engineering validation and ongoing Audits to guarantee this budget	No	Not a process metric	100% sampling
6.9	JA-C-L Module in System	FATP	System Compliance tester	Zero order Alpha post rel	mRad	3.50	—	—	Source size as seen from 100mm at module exit pupil post rel. Measured using compliance mode*	Directly impacts compliance budget	No	Rel drift validation is sampling controlled by engineering	No	Not a process metric	Rel sampling per RRD spec.
6.10	JA-C-L Module in System	FATP	System Compliance tester	Zero order q	% ; ratio	—	90 ; 0.90	95 ; 0.95	Power distribution in source image. Measured using compliance mode*	Directly impacts compliance budget	Yes	Guarantees system compliance	No	Not a process metric	100% sampling
6.105	JA-C-L Module in System	FATP	System Compliance tester	Zero order q (Metrology Error 5.5 sigma one sided)		—	—	NA (Included in alpha error)	Metrology Error Assumption for CTS-T Item #6.10	Impacts compliance budget	No	Engineering validation and ongoing Audits to guarantee this budget	No	Not a process metric	100% sampling
6.11	JA-C-L Module in System	FATP	System Compliance tester	Zero order q post rel	% ; ratio	—	—	95 ; 0.95	Power distribution in source image post rel. Measured using compliance mode*	Directly impacts compliance budget	No	Rel drift validation is sampling controlled by engineering	No	Not a process metric	Rel sampling per RRD spec.
6.12	JA-C-L Module in System	FATP	System Compliance tester	AE(skin)-Average power (each bank)	mW	—	16	21.40	Total average power emitted by each back Measured using compliance mode*	Directly impacts compliance budget	Yes	Guarantees system compliance	No	Not a process metric	100% sampling
6.125	JA-C-L Module in System	FATP	System Compliance tester	AE(skin)-Average power (each bank) Metrology Error (5.5 sigma single sided)	%	—	—	27.1	Metrology Error Assumption for CTS-T Item #6.12	Impacts compliance budget	No	Engineering validation and ongoing Audits to guarantee this budget	No	Not a process metric	100% sampling
6.13	JA-C-L Module in System	FATP	System Compliance tester	AE(skin)-Average power (each bank) post rel	mW	—	—	23.01	Total average power emitted by each back post rel Measured using compliance mode*	Directly impacts compliance budget	No	Rel drift validation is sampling controlled by engineering	No	Not a process metric	Rel sampling per RRD spec.
6.14	JA-C-L Module in System	FATP	System Compliance tester	I_mon bank to bank delta	mA	—		4	Bank to bank monitor current delta. Measured using compliance mode*	Directly Impacts I_mon budget as single limit applies to all 4 banks.	No	Ensure IDAC set points are within allowed range	No	Not a process metric	100% sampling
6.15	JA-C-L Module in System	FATP	System Compliance tester	Max bank to bank delta Vf	V	—	—	0.52	Max difference between bank forward voltages. Measured using compliance mode*	Directly Impacts Vf budget as single limit applies to all 4 banks.	No	Recheck of MI actions	No	Not a process metric	100% sampling
6.16	JA-C-L Module in System	FATP	System Compliance tester	Vdd Laser to Vf_min delta	V	1.1	1.5	2.0	Spec to ensure VDD laser is set right. Measured using compliance mode* Vdd_laser-Vf_min	This ensures test integrity	No	Recheck of MI actions	No	Not a process metric	100% sampling

#	Component	Tester Location	Tester	Parameter *(Tester spec name - if applicable)*	Units	LSL	Nominal Value	USL	Definition	CTS Justification	CTS-Test	CTS-Test **Yes/No** Decision Justification	CTS-Process	CTS-Process **Yes/No** Decision Justification	Engineering Validation Requirements
6.17	JA-C-L Module in System	FATP	System Compliance tester	Module Arming Check			Armed R0x3D = 0x3E		Module Arming Check	Module Arming Check	No	Recheck of MI actions	No	Not a process metric	100% sampling
6.18	JA-C-L Module	FATP	System Compliance tester	Riker Trim OTP Version	#	–	R0x80[7:5] = 001 R0x90[7:5] = 000	–	Riker Trim (ASIC vendor programmed value) Version	Guarantees Riker CTS-Deele ments	No	Recheck of MI actions	No	Not a process metric	100% sampling
6.19	JA-C-L Module	FATP	System Compliance tester	Riker Config OTP Version	#	–	R0x40 = 0x88	–	Riker Config (module vendor programmed value) Version	Guarantees Module Arming is done right	No	Recheck of MI actions	No	Not a process metric	100% sampling

* Compliance modes are defined at <rdar://problem/40452589> Compliance Mode Definition

CTS Data Storage and Retention Policy

Vendor working with Apple, must store and retain all of the CTS-T parameter measurements described in Table 2 for a period of 5 years after that date of measurement.

Vendor must make all such data available to Apple through use of an Apple-designated systems (e.g., Panda, Groundhog, Apple PDCA/Insight, etc.) for Apple to retain parameter data as specified in ERS,CTS,TESTER REQUIREMENT (APN 099-13228), and ERS,CTS,SITE REQUIREMENT (APN 099-13229).

Qualified Reference Tester

Vendor must store and retain all of the CTS test parameter measurements described in Table above, plus the following data for a period of 5 years after that date of measurement.

- Parametric data from pre- and post-diffuser-attach testing (including audit test) and for proximity sensor.
- Ground truth data, defined as the buy-off and audit data of the reference tester, as well as correlation data that was used to qualify MP testers.
- Heat map data(for JA-C: spot power, spot-spot centroid separation and spot diameter)
- Any image used to extract an alpha value required in Table above.

Vendor must make all such data available to Apple through use of an Apple-designated systems (e.g., Panda, Groundhog, Apple PDCA/Insight, etc.) for Apple to retain parameter data as specified in ERS,CTS,TESTER REQUIREMENT (APN 099-13228), and ERS,CTS,SITE REQUIREMENT (APN 099-13229).

The zero order alpha images can be cropped to reduce the amount of storage space required. If cropping is used, the routine for cropping images must be validated to ensure compliance data can be retrieved from the cropped image.

A heat map is defined as the set of data that represents the power through a 7mm aperture located 100mm from the source, sampled over the entire FoV. In the case of JA-C, it is a data file of spot powers and spot locations measured 100mm away from the JA-C exit pupil.

The raw image from the tester is not required to be saved. If conversion from raw image to the heat map is conducted, the routine for such conversion must be validated against qualified reference tester.

Additional CTS Requirements

Vendor/Supplier must comply with the requirements contained in the most current versions of the following documents:

ERS,CTS,TESTER REQUIREMENT (APN 099-13228), and

ERS,CTS,SITE REQUIREMENT (APN 099-13229)

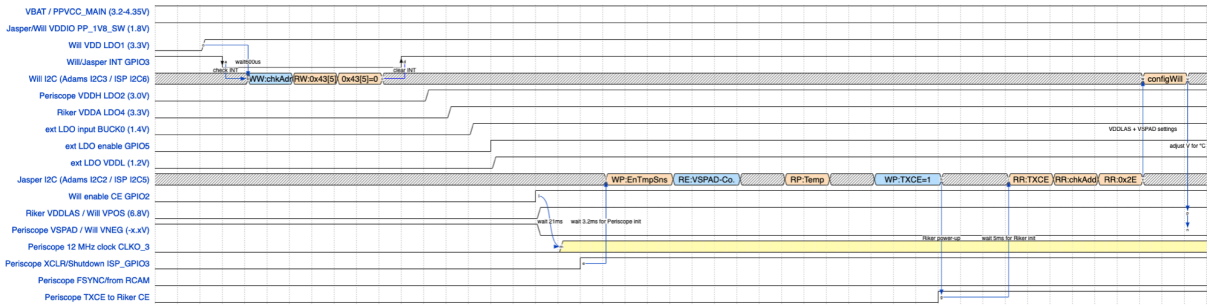
Appendix A – Power Up/Down Sequence

Set-up Power Level

1. Set drive current level in Riker address 0x54 = value **0xAA**
2. Set pulse width in Periscope address 0x941 = value **0x05**

RIKER Power Up/Down Sequence

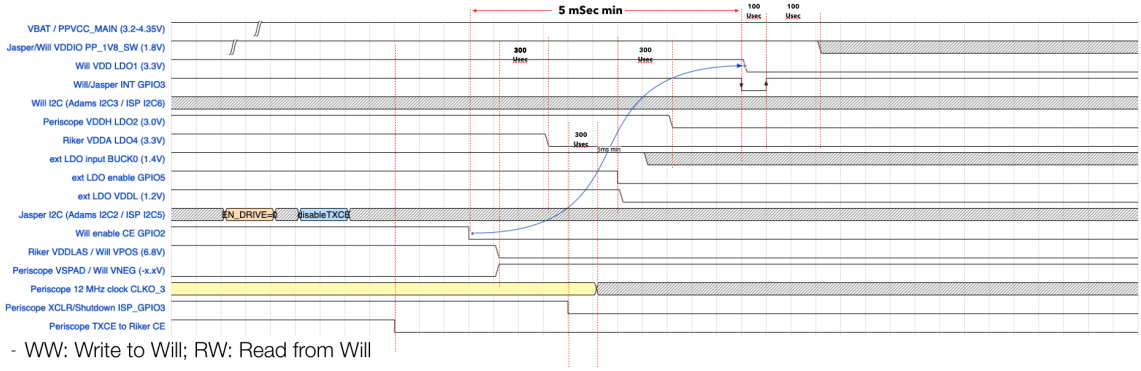
CEG | **Jasper :** Power up Sequencing



- WW: Write to Will; RW: Read from Will
- WP: Write to Periscope; RP: Read from Periscope
- WR: Write to Riker; RR: Read from Riker
- RE: Read from Jasper EEPROM
- Above sequence allows for firmware to read the Periscope VSPAD temp & coefficients from Periscope + required VDDLASER from Riker before configuring Will VDDLASER & VSPAD voltages in 1 step —> firmware can choose to separate the 2 steps as well

CEG | **Jasper : Ideal** Power Down Sequencing - w/ Firmware Assistance

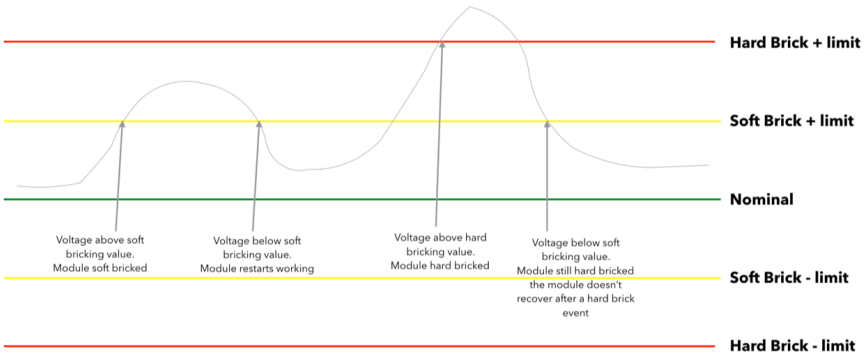
Rise/fall times : 2 < T<50 Usec, >2 usec Minimum Rise/fall time is critical.



- WW: Write to Will; RW: Read from Will
- WP: Write to Periscope; RP: Read from Periscope
- WR: Write to Riker; RR: Read from Riker
- RE: Read from Jasper EEPROM
- Above sequence allows for TXCE to be brought LOW by firmware first followed by

Appendix B : Module status register table

Arming Reg Value	Bricking Reg Value	LHZ	Riker version/ Status	Description	VF Readable	RDF Readable	Imon Readable
Tbd	Tbd	Yes	A0/B0 Armed	The module is programmed into a functional & **safe** mode of operation. The NVM is **irreversibly locked** with **safe limits.** In this state the module will emit light Only Unarmed Modules will be delivered to FATP	YES **(only when the laser is firing)**	YES	YES **(only when the laser is firing)**
Tbd	Tbd	Yes	A0/B0 Unarmed	The module is programmed into a functional & **Un-safe** mode of operation. The NVM is **unlocked** and the module can emit light. Only Unarmed Modules will be delivered to FATP **—> this needs to be confirmed w/ Arun/ Janet**	YES **(only when the laser is firing)**	YES	YES **(only when the laser is firing)**
Tbd	Tbd	Yes	A0/B0 Soft-bricked	The module is non-functional, **recoverable safe** state. This state can result when an armed module experienced a non-bricking defect (Eg: over current, max pulse width etc). In this state the module will **not** emit light. ~~if and only if the defect recovers~~ **The module could emit light after a hard reset and assuming the detect that caused the fault has gone away.**	YES **(only if the fault goes away after a hard reset)**	YES	YES **(only if the fault goes away after a hard reset)**



Appendix C : ADC Format

Address	Data bit	Default value	Type	Name	Description
0x50	7	0	R/W1	ADC_START	ADC start bit. Auto-clears. When set by the host, the CD3701 samples the selected ADC channel and updates the 10-bit ADC data.
	6	0	R	ADC_BUSY	ADC busy bit. Auto-clears when ADC completes sampling. 1'b1: ADC is busy 1'b1: ADC is ready
	[5:2]	0	R/W	ADC_CHANNEL	ADC channel selected. 4'b0000: Temperature Sensor output voltage (VOUT_TEMP_SNS) 4'b0001: Filtered TRACE pin voltage (VTRACE_FILT) 4'b0010: Headroom Sampler output voltage (VOUT_HRS) 4'b0011:Current Monitor current-proportional output voltage (VIMON) 4'b0100: Filtered thermistor's output voltage (VNTC_FILT) 4'b0101: OCP Comparator signal input voltage (VCOMP_IN_OCP) 4'b0110: OCP current threshold DAC output voltage (VOUT_-DAC_ITH_OCP) 4'b0111: VDDLASER supply divided by 8 (VDDLASER_DIV_8) 4'b1000: VF Differential amplifier output 4'b1001: Spare input with buffer 4'b1010 - 4'b1111: N/A
	[1:0]	0	R	ADC_DATA_B9_8	Bit 9 and bit 8 of 10-bit ADC data.

Appendix D : Error code table

Riker faults

Address	Data Bit	Type	Name	Description
0x43	7	R/W	CRC_B0_CONFIG_NVM	Bit 0 of the 17-bit Configuration NVM CRC.
	6	R/W	CRC_ZERO_CONFIG_NVM	Zero that must be added to the end of 17-bit Trim NVM CRC.
	5	R/W	FAULT_BIST_VF	Bricking caused by VF BIST Fault
	4	R/W	FAULT_BIST_RDF	Bricking caused by RDF BIST Fault
	3	R/W	FAULT_VF	Bricking caused by VF Fault
	2	R/W	FAULT_RDF_HI_HARD	Bricking caused by RDF HARD HI Fault
	1	R/W	FAULT_RDF_LO_HARD	Bricking caused by RDF HARD LOFault
	0	R/W	FAULT_BRICK	BRICK Fault
0x44	7	R/W1	FAULT_BIST_OCP	OCP BIST Fault status. A write 1 clears the fault
	6	R/W1	FAULT_BIST_RDF	RDF BIST Fault status. A write 1 clears the fault
	5	R/W1	FAULT_TFP_LO	Under-Temperature Fault status. A write 1 clears the fault
	4	R/W1	FAULT_TFP_HI	Over-Temperature Fault status. A write 1 clears the fault
	3	R/W1	FAULT_PLM	PLM Fault status. A write 1 clears the fault
	2	R/W1	FAULT_OCP	OCP Fault status. A write 1 clears the fault
	1	R/W1	FAULT_RDF_HI	RDF HIGH Fault status. A write 1 clears the fault
	0	R/W1	FAULT_RDF_LO	RDF LOW Fault status. A write 1 clears the fault
0x45	7	R/W1	FAULT_IDAC_LIM	Current DAC Limit Fault. A write 1 clears the fault
	6	R/W1	FAULT_SLOW_DISCHARGE	Slow Discharge Fault status. A write 1 clears the fault
	5	R/W1	FAULT_SOFTSTART	Soft Start Fault status. A write 1 clears the fault
	4	R/W1	FAULT_CLOCK	Clock Fault status. A write 1 clears the fault
	3	R/W1	FAULT_OVLO_VDDLASER	VDDLASER OVLO Fault status. A write 1 clears the fault
	2	R/W1	FAULT_UVLO_VDDLASER	VDDLASER UVLO Fault status. A write 1 clears the fault
	1	R/W1	FAULT_UVLO_VLDO	VLDO UVLO Fault status. A write 1 clears the fault
	0	R/W1	FAULT_UVLO_VDDA	VDDA UVLO Fault status. A write 1 clears the fault
0x46	7	R	-	Invalid
	6	R/W1	FAULT_BRICK	Brick Fault status. A write 1 clears the fault
	5	R/W1	FAULT_BIST_VF	VF BIST Fault status. A write 1 clears the fault
	4	R/W1	FAULT_VF	VF Fault status. A write 1 clears the fault
	3	R/W1	FAULT_RDF_HI_HARD	RDF Hard Window High Fault status. A write 1 clears the fault
	2	R/W1	FAULT_RDF_LO_HARD	RDF Hard Window Low Fault status. A write 1 clears the fault
	1	R/W1	FAULT_NVM	NVM Fault status. A write 1 clears the fault
	0	R/W1	FAULT_IN	Fault Input Fault status. A write 1 clears the fault

Will Faults

Address	Data Bit	Name
0x43	7	CLOCK_FAIL
	6	INTST_SI_MO_BAD_ST
	5	INTST_R_ST
	4	INTST_T_ST
	3	INTST_O_TP_INTEG
	2	INTST_FAULT_IN
	1	INTST_SI_MO_BAD_FCE
	0	INTST_SI_MO_NO_SVC
0x44	7	INTST_VIO_UV
	6	INTST_V3_UV
	5	INTST_VIN_UV
	4	INTST_VPOS_UV
	3	INTST_VNEG_UV
	2	INTST_VPOS_FLT_SU
	1	INTST_S1_IMAX
	0	INTST_VPOS_PROG
0x45	7	INTST_VIO_OV
	6	INTST_V3_OV
	5	INTST_VIN_OV
	4	INTST_VPOS_OV
	3	INTST_VNEG_OV
	2	INTST_VNEG_IAVG
	1	INTST_S4_IMAX
	0	INTST_VNEG_PROG

Station Error codes

errString	errCode
testerFail	10
testerInitFail	11
50_PowerOn_FAIL	50
51_ReadPeriscopeNVM_FAIL	51
52_ReadRikerNVM_FAIL	52
53_ReadEEPROM_FAIL	53
54_SetMCUVBD_FAIL	54
55_ParseEEPromData_FAIL	55
56_RWtoEEProm_FAIL	56
57_callZeframInit_FAIL	57
58_ReadAndSaveTemperatures_FAIL	58
59_SetupTesterForTestStepCase_FAIL	59
60_ZeframEndTestDll_FAIL	60
sfc_fetchFolIdFailed	310
sfc_fetchDataFailed	311
DecodeFailed	350
INCOMPLETE_TEST_TSCR	356
INCOMPLETE_TEST_TSED	357
testRecordError	383
testModeNotSupported	385
configCode_invalid	360
UnitOutOfProcess	361
CTS_Blob_Missing_Alpha	371
CTS_Blob_Missing_HeatMap	372
CTS_Blob_ChecksumFailed_HeatMap	373
CTS_Blob_ChecksumFailed_Alpha	374
missingUnload_Purge	400
lotCtrl_emptyStorageTable	450
lotCtrl_numStrFormat	451
lotCtrl_binNotSupported	452
lotCtrl_noStorageFilePath	453
lotCtrl_missRequiredInfo	454
lotCtrl_emptyLot	455
lotCtrl_infoNotSupported	456
otp_moduleSnMismatch	584
otp_addrDataCntMisMatch	585

otp_traceData_OOS	588
otp_matchCheckFail	589
otp_testStageNotSupported	590
otp_missingOtpMidData	591
otp_configNotSupported	592
otp_moduleTypeNotSupported	593
otp_mapVerNotSupported	594
otp_miNotSupported	595
otp_mapVerUnknown	596
otp_addrDataSizeNotMatch	597
otp_readWriteNotMatch	598
otp_RCodeNotSupported	599
otp_invalidModuleSn	600
otp_invalidTestData	601
otp_invalidProjectCode	602
otp_generalInfoByteMissing	603
otp_configVsRcode_mismatch	620
otp_EEEER_notSupported	621
otp_progSkipWithUnknownReason	625
POST_FILE_MISMATCH	1210
CMD_FeedBack_FAIL	1212
POST_CHECK_FAIL	1213
EEPROM_NOTLOCK	1387
EEPROM_LOCKED	1388
ROM_ARMED	1389
ROM_VF_FAIL	1390
ROM_CHECKSUM_FAIL	1391
ARM_REG_FAIL	1392
ARM_STATUS_FAIL	1393
ARM_FAULT_FAIL	1394
ROM_ADCCHECK_FAIL	1395
ROM_SNCHECK_FAIL	1396
ROM_VSRCHECK_FAIL	1397
ROM_CRC_FAIL	1398
ROM_DECODE_FAIL	1399
CALM_ALGO	1401
CALM_INTRINSIC_RX	1402
CALM_INTRINSIC_ALGO	1403

CALM_TOF_TX	1404
CALM_SYS_PERF	1405
CALM_TOF_BIAS	1406
CALM_TEMPERATURE	1407
CALM_DNL	1408
CALM_P2P	1409
CALM_NVM	1410
CALM_RDF	1411
CALM_Status	1499
CALM_OOS	1400
CALR_PULSE_WIDTH	1501
CALR_STRAY_CLIPPED	1502
CALR_STRAY	1503
CALR_TEMPERATURE	1504
CALR_VBD	1505
CALR_SPOT_FINDER	1506
CALR_SPOT_TEST	1507
CALR_DNL	1508
CALR_INTRINSIC_ALGO	1509
CALR_DEPTH_TEST	1510
CALR_PULSE_SHAPE	1511
CALR_TEST_SPOT_SHIFT	1512
CALR_CalculatePlaneFromFeatures	1513
CALR_TestLaserIntensity	1514
CALR_NVM_FAULT	1515
CALR_Status	1599
CALR_OOS	1500
RXSH_OOS	1600
CALU_CAPTURE	1701
CALU_REF_P2P	1702
CALU_TEMPERATURE	1703
CALU_VBD	1704
CALU_REF_SELECT	1705
CALU_T0	1706
CALU_PULSE_WIDTH	1707
CALU_STRAY	1708
CALU_GATING	1709
CALU_SPOT_FINDER	1710

CALU_SPOT_TEST	1711
CALU_DNL	1712
CALU_TESTER	1713
CALU_P2P	1714
CALU_INTRINSIC_ALGO	1715
CALU_INTRINSIC_RX	1716
CALU_TOF_BIAS	1717
CALU_DEPTH_TEST	1718
CALU_OOS	1700
DNCR_OOS	1800
FFVT_OOS	1900
HSPD_OOS	2000
INIT_OOS	2100
NFVT_OOS	2200
LIVF_OOS	2300
FLAT_OOS	2400
ALPD_OOS	2500
CONO_OOS	2600
SP60_OOS	2700
LIVH_OOS	2800
SP1M_OOS	2900

Station			Note
IQC/SA Tester	kMLErr_ROM_VSRCHECKFAIL	1397	NVM fail (VSR table)
	kMLErr_ROM_DECODEFAIL	1399	NVM fail
	kMLErr_CALR_depthQuality	1501	Depth Quality OOS - performance
	kMLErr_CALR_strayQuality	1502	Stray Quality OOS - performance
	kMLErr_CALR_spotQuality	1503	Spot Quality OOS - performance
	kMLErr_CALR_pulseShapeQuality	1504	Pulse shape Quality OOS - performance
	RDF Fail	1505	RDF OOS
	kMLErr_CALR_Status	1599, 1393	Tester Algo fail
	TesterFail	10	Contact fail (pogo pins, B2B)
	ARM_FAULT_FAIL	1394	Riker faults (RDF, OCP, PLM)
Compliance	kMLErr_ROM_CRCFAIL	1398	
errString	errCode		

I2C read SOP

Example i2c command:

```
script-command: #@Jasper EEPROM:
script-command: i2cread 5 0x51 0x0 2 2
```

explanation:
i2cRead [chan] [address] [subAddress] [subAddressLen] [dataLen] = generic i2c read command

Jasper i2c slave addresses: (EEPROM = 0x51)

Table : I2C devices

Devices					
Name	Address 8 bits	Address 7bits	Frequency	Master/Slave	Name
Periscope	0x20	0x10	1 MHz	Slave	Primary
	0x60	0x30			Secondary
Riker	0x66	0x33			Primary
	0x68	0x34			OVP Wrapper
EEprom	0xA2	0x51			Primary

with command: i2cread 5 0x51 0x0 2 2, expect output of 0xE02B showing NVM version and Camera project code

Jasper	NVMVersion	NVMC3					11100000	0xE0
Jasper	CameraProject	Jasper_JA	JasperJA				101011	0x2B

Appendix – Change History

Version	Description	Date	By	ECO#
0.0	Initial Draft	8/23/18	Julien Sarry	
0.1	Only applicable for D43 Version Not approved, not released,	9/19/18	Julien Sarry	
0.2	Test Flow, IQC metrics,	10/5/18	Julien Sarry	
0.3	New IQC specs and limits, changes in Green	10/15/18	Julien Sarry	
0.4	Major update, only applicable fr PP/PG P1 build (C5 module)	02/14/19	Julien Sarry	
0.5	Updates on Test flow, pre-burn and burnin coverage	02/28/19	Julien Sarry	
0.6	Updates on pre-burn and burnin coverage, Arming sequence	4/4/19	Julien Sarry	
0.7	Minor update : CTS Master Table - Appendix D	4/12/19	Julien Sarry	
0.8	Major update : EFI Diags Insight key + limits for Test/Cal stations ADC address Arming process Thermal test	4/19/19	Julien Sarry	
0.10	NVM Map Error code table (IQC/SA)	5/9/19	Julien Sarry	
1.0	Major Update : P2 coverage (C4 Module) - IQC - Preburn - Burnin - NVM Map - Compliance - Checksums		Julien Sarry	
1.1	Update : P2 coverage (C4 Module) - Stations limits - Power down sequence	7/4/19	Julien Sarry	
1.2	- Updated Riker register 0x43 - Power up sequence - Station Limits	7/17	Julien Sarry	
1.3	Major Update: EVT coverage proposal - Updated “Related document” section - Updated QT0A, CT2 and Burnin coverage - Added a “NVM Integrity Check Section” - Uploaded latest NVM Map - Updated JOI Assembly Process Section - Updated JA-C Electrical Subsystem	8/21	David Manca	
1.4	Minor Update: EVT coverage - Normal_A Operating Conditions - FOMS per stations - JOI Assembly	9/26	Julien Sarry	
1.5	Minor Update: EVT coverage - ESD coverage - Jtest Inline/REL Limits update - DCR check in bracket	10/24/19	Julien Sarry	
1.6	Minor Update : DVT mini build coverage - Agile Clocking disabled during Burnin tests	12/3/19	Julien Sarry	
1.7	Minor Update: DVT mini build coverage - JA-C NVM traceability table updated for C2.0 modules (page 59) - Test coverage (compliance parameter in burnin)	12/5/19	David Manca	

Version	Description	Date	By	ECO#
1.71	Minor Update on JA-C NVM traceability table (page 59)	12/13/19	David Manca	
1.8	Major Update : DVT Main build coverage IQC/SA coverage update QT0 coverage update (CTS + Trace ID) Burnin coverage update Flat Field coverage update JA-C Test 70 coverage update Voyager Coverage update Compliance CTS v1.24	12/17/19	Julien Sarry	
1.81	Minor update : NVM integrity test Add a condition to allow any allow any C3 modules (EVT) to pass NVM integrity only on Non-JA-C related DOE/Application	12/18/19	Julien Sarry	
1.82	Minor update : Riker Device_ID in Attributes	12/19/19	Julien Sarry	
1.83	Minor update : Register check updated to reflects VSR v28	12/20/19	Julien Sarry	
1.84	Minor update : OTP Trim check exceptions in QT0	12/20/19	Julien Sarry	
1.85	Minor update : New limits in IQC/SA and JTEST for MP	12/20/19	Julien Sarry	
1.86	Minor update : New limits in JTEST for MP	1/03/19	Julien Sarry	
1.87	Minor update : New limits in CT2 for camera config	1/08/20	Julien Sarry	
1.88	I2c read SOP	1/08/20	Julien Sarry	
1.89	APN, Substrate Reg LSL (0x00006)	1/30/20	Julien Sarry	
1.90	Minor Update : System ERS Rev. A tentative : - Update VSR table v35 - Desense online station	2/5/2020	Julien Sarry	
1.91	Minor update : - NVM table - JT70, IQC limits	2/12/2020	Julien Sarry	
A	Minor update: - Desense key + limits - JFF limits	2/14/2020	Julien Sarry	0022216302
B	Minor update: - Code names	5/03/2020	Julien Sarry	
B1	Only applicable for Jasper DOE (J4xx PRQ): - VSR list	7/1/2020	Julien Sarry	