TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS FOR CHARGE COUPLED DEVICES

ESCC Detail Specification No. 2139020

Issue 2	August 2004

Document Custodian: European Space Agency - see https://escies.org

LEGAL DISCLAIMER AND COPYRIGHT

DOCUMENTATION CHANGE NOTICE

(Refer to https://escies.org for ESCC DCR content)

DCR No.	CHANGE DESCRIPTION
51	Specification upissued to incorporate editorial changes per DCR.

TABLE OF CONTENTS

1. SCOPE

This specification forms part of ESA/ESCC Basic Specification No. 21300 and covers Charge Coupled Devices.

2. TERMS, DEFINITIONS AND SYMBOL LETTERS

Symbol	Parameter
A	Pixel Area
a_i	Photoresponse Non-Uniformity or Dark Signal Limit for Number of Photoresponse Non-Uniformity or Dark Signal Defects
$C_{\Phi L}$, $C_{\Phi M}$ $C_{\Phi P}$, $C_{\Phi R}$	Electrode Capacitance (for Readout Register, Memory Zone, Image Zone and Reset respectively)
$C_{\Phi}L_0$, $C_{\Phi}M_0$ $C_{\Phi}P_0$, $C_{\Phi}R_0$	Electrode Capacitance with Respect to Another Clock (for Readout Register, Memory Zone, Image Zone and Reset respectively)
CTE	Charge Transfer Efficiency
CTF	Contrast Transfer Function
CTI	Charge Transfer Inefficiency
CVF	Charge to Voltage Conversion Factor
DSNU	Dark Signal Non-Uniformity
ΔU_{Ref}	Reference Voltage Error Band
ΔU_{Signal}	Signal Voltage Error Band
E	Exposure
EB_1	Reference Level Error Band
EB_2	Signal Level Error Band
ε	Charge Transfer Inefficiency for One Stage
FI	Image Zone to Memory Zone and Memory Zone to Output Register Frequency
FL	Output Register and Reset Frequency
Φ_L	Readout Register Clock
Φ_M	Memory Z0ne Clock
Φ_P	Image Zone Clock
Φ_{PS}	Photosite to Shift Register Transfer Clock
Φ_R	Reset Clock
Φ_T	Transport Clock
HCTE	Horizontal Charge Transfer Efficiency
HCTI	Horizontal Charge Transfer Inefficiency
I_{DD}	Power Supply Current
I_E	Insulation Leakage Current Between Pins (Input Current)
I_H	Internal Driver Supply Current
I_L	Leakage Current on Input Gates

Symbol	Parameter
I_{RD}	Signal Current in Reset Bias Electrode
L	Length of Image Plane
λ	Wavelength
LE	Linearity Error
MTF	Modulation Transfer Function
$Ndef_i$	Number of Photoresponse Non-Uniformity or Dark Signal Defects Beyond a_i Limit
NS	Total Smearing Factor
P	Flatness of Image Area
ρ	Pixel Pitch
PRNU	Photoresponse Non-Uniformity
QE	Quantum Efficiency
R	Responsitivity
$R(B_i)$	Spectral Responsitivity in Optical Band B_i
SPRNU	Spectral Photoresponse Non-Uniformity
TD_i	Timing Diagram i
$t_{D\text{-}Reset}$	Reset Level Setting Time
$t_{D\text{-}Signal}$	Signal Level Setting Time
t_f	Fall Time
t_h	High Level Time
Ti	Integration/ Exposure Time
TILT	Parallelism between Image Plane and window
t_l	Low Level Time
T_{op}	Operating Temperature
t_r	Rise Time
T_{ref}	Reference Temperature
TRIG	Signal for Acquisition Start
T_{sol}	Soldering Temperature
T_{stg}	Storage Temperature Range
T_t	Duration of Vertical Transfer Period
$t_{U\text{-}Ref}$	Reference Level Duration
$t_{U\text{-}Signal}$	Signal Level Duration
τ_c	Capture Time Constant or Trapping State in a CCD Buried Channel
τ_e	Emission Time Constant of Trapping State in a CCD Buried Channel
Θ	Image Plane Orientation (Skew)
V_a	Average Output Signal under Illumination
$V_{ANTIBLOOMING}$	Antiblooming Voltage

Symbol	Parameter
VCTE	Vertical Charge Transfer Efficiency
VCTI	Vertical Charge Transfer Inefficiency
V_{DD}	Output Amplifier Drain Supply
V_{DS}	Average Dark Signal
V_{GS}	Register Output Gate Bias
$V_{INVERSION}$	Inversion Voltage
V_N	Temporal RMS Noise in Darkness
V_{OFFSET}	Offset Voltage
V_{OS}	Video Output Signal
V_r	Reference Voltage for Modulation Calculation
V_{RD}	Reset Bias
V_{REF}	DC Output Level
V_{RESET}	Amplitude of Reset Feedthrough
V_S	Signal Voltage
V_{SAT}	Saturation Output Voltage
V_{SS}	Substrate Bias Voltage
V_{Video}	Video Voltage
W	Width of Image Plane
WOC	Spectral Range for Optical Coating on Window
WT	Window Thickness
X	Position of First Pixel (Horizontal)
Y	Position of First Pixel (Vertical)
Z	Optical Distance between Image Plane and Window
Z_s	Output Impedance