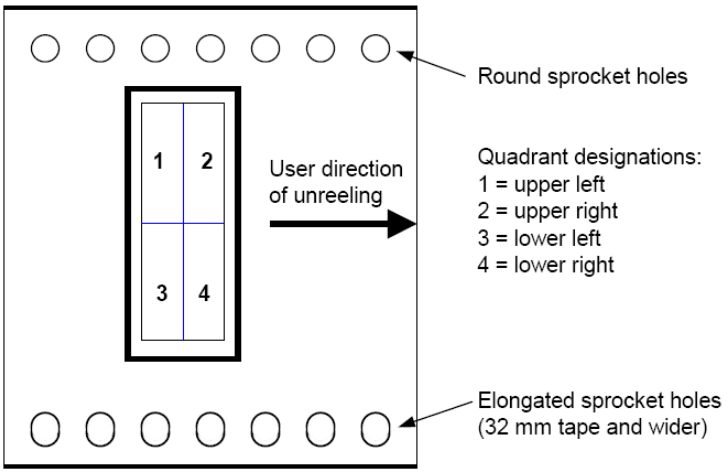
Zero Component Orientation for IPC, IEC and EIA

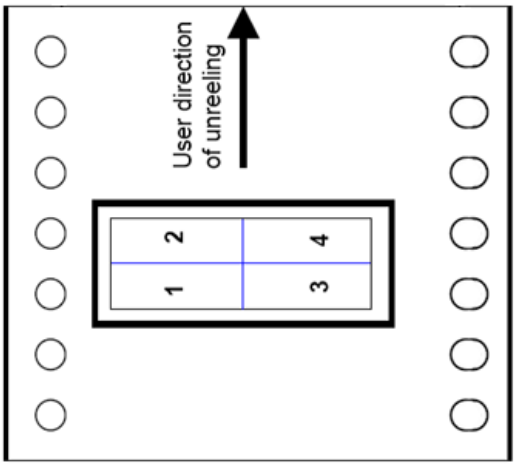
Pin 1 Location Chart

Component Family	IPC-7x51	IEC 61188-7	EIA-481-D
Chip (All Families)	Polarization On Left	Polarization On Left	Polarization On Left
Tantalum Capacitor	Polarization On Left	Polarization On Left	Polarization On Left
Molded Body Diode	Polarization On Left	Polarization On Left	Polarization On Left
SODFL	Polarization On Left	Polarization On Left	Polarization On Left
MELF	Polarization On Left	Polarization On Left	Polarization On Left
Aluminum Capacitor	Polarization On Left	Polarization On Left	Polarization On Left
Precision Inductors	Left	Left	Left
PLCC Square	Upper Center	Left Center	Left Center
PLCC Rectangle	Upper Center	Left Center	Left Center
LCC	Upper Center	Left Center	Left Center
QFP Square	Upper Left	Lower Left	Upper Left
QFP Rectangle	Upper Left	Lower Left	Lower Left
Bump QFP Side	Upper Left	Lower Left	Upper Left
Bump QFP Center	Upper Center	Left Center	Left Center
Ceramic QFP	Upper Left	Lower Left	Upper Left
SOIC	Upper Left	Lower Left	Lower Left
TSOP	Upper Left	Lower Left	Lower Left
TSSOP & SSOP	Upper Left	Lower Left	Upper Left
TSO8 (Mini US8)	Upper Left	Lower Left	Lower Right
BGA Square	Upper Left	Lower Left	Lower Left
BGA Rectangle	Upper Left	Lower Left	Lower Left
SOJ	Upper Left	Lower Left	Lower Left
CFP	Upper Left	Lower Left	Lower Left
QFN Square	Upper Left	Lower Left	Upper Left
QFN Rectangle	Upper Left	Lower Left	Lower Left
Chip Array	Upper Left	Lower Left	Lower Left
DFN	Upper Left	Lower Left	Lower Right
SON	Upper Left	Lower Left	Lower Right
SOT23-3	Upper Left	Lower Left	Lower Right
SOT23-5	Upper Left	Lower Left	Lower Right
SOT23-6	Upper Left	Lower Left	Lower Right
SOT89	Upper Left	Lower Left	Lower Right
SOT223	Upper Left	Lower Left	Lower Right
SOT143	Upper Left	Lower Left	Lower Right
SOTFL	Upper Left	Lower Left	Lower Right
SOT143 Reverse	Lower Left	Lower Left	Lower Left
TO-252	Upper Left	Lower Left	Upper Left
TO-263	Upper Left	Lower Left	Upper Left
LGA Square	Upper Left	Lower Left	Lower Left
LGA Rectangle	Upper Left	Lower Left	Lower Left
CGA Square	Upper Left	Lower Left	Lower Left
Oscillator (Multi-pin)	Upper Left	Lower Left	Lower Left
Crystal (2-pin)	Left	Left	Left
SMT Connectors	Left	Left	Left
PTH Connectors	Left	Left	Left
DIP	Upper Left	Lower Left	Lower Left
SIP	Left	Left	Left
Axial Lead	Polarization On Left	Polarization On Left	Polarization On Left
Radial Lead	Polarization On Left	Polarization On Left	Polarization On Left
PGA	Upper Left	Lower Left	Lower Left

EIA-481-D Tape and Reel Quadrant Designations



EIA-481-D



CAD Library Zero Orientation Quadrants

IPC and IEC use consistent rotations throughout their standard where EIA uses multiple rotation variations

- IPC-7x51 uses Quadrant 2 for Pin 1 Upper Left and Quadrants 2-4 for Upper Center
- IEC 61188-7 uses Quadrant 1 for Pin 1 Lower Left and Quadrants 1-2 for Left Center
- EIA-481-D uses Quadrant 1 for Pin 1 Lower Left BGA, SOIC, SOP, SSOP, QFNR, DIP
- EIA-481-D uses Quadrant 2 for Pin 1 Upper Left TO-252, TO-263, QFNS, TSSOP
- EIA-481-D uses Quadrant 3 for Pin 1 Lower Right for all SOT and miniature parts
- EIA-481-D uses Quadrants 1-2 (Pin 1 Left Center) for PLCC, LCC
- None of the 3 standards use Quadrant 4 for Pin 1 location

This study concludes that the Zero Component output Orientation in the IPC Calculator should be 100% definable to allow the user to output any of the three industry standard rotations for CAD library construction. The only alternative is for the three standards organizations to collaborate on a single standard for the future.

The IPC Calculator is being used all over the world. In the USA, military contractors, including General Dynamics in Canada, are asking for the IPC Calculator to output CAD library parts in the EIA-481-D rotation. In Japan, Germany, Australia and South Korea, IPC Calculator users are asking to output CAD library parts in the IEC 61188-7 rotation.

The IPC-7351C will introduce Level A (current IPC standard) and Level B (IEC standard) component rotations.