INTEGRA FOUNDRY

Capabilities reference

Illustrative reference values. Actual capabilities depend on the partner factory and are confirmed per job in a written quote. integrafoundry.tech/capabilities

OPERATING SUMMARY — ILLUSTRATIVE REFERENCE VALUES

ASSEMBLY LOCATION	INSPECTION & TESTING	FABRICATION REGIONS	TYPICAL TURN TIME	MAXIMUM LAYER COUNT	COMPONENT PLACEMENT	RF CAPABILITIES
United States (partner cells)	**AOI · X-ray · functional**	**US domestic · selected overseas**	**Confirmed per quote**	**Up to 32 layers**	**01005 / 0.4 mm pitch**	**DC to 77 GHz laminates**

01 ASSEMBLY

Assembly

Surface-mount (SMT) and through-hole (THT) assembly, including mixed-technology boards, fine-pitch and area-array packages.

Assembly capability

REFERENCE VALUES

SPECIFICATION	CAPABILITY
Assembly types	SMT single / double-sided · THT · mixed SMT + THT · selective solder
Smallest component placement	01005 (0.4 × 0.2 mm) imperial
Package support	0201–2512 chip · SOIC · QFP · QFN · DFN · LGA · BGA · CSP · POP · connectors
Minimum pitch	0.4 mm QFP / QFN · 0.35 mm BGA (advanced)
Substrate types	FR-4 · high-Tg FR-4 · polyimide flex · rigid-flex · PTFE / hydrocarbon RF · aluminium-core
Production volume	Prototype (1 pc) through low- and mid-volume production
Turnaround	Per-quote; expedited routes available where capacity permits
Solder alloys	SAC305 · SnPb 63/37 (where permitted) · low-temperature Sn-Bi on request
Cleaning	No-clean standard · aqueous / ultrasonic on request

Inspection	SPI · AOI · 2D / 3D X-ray · first-article inspection

Equipment

PER PARTNER CELL

PROCESS STEP	EQUIPMENT CLASS	NOTES
Solder paste printing	Automatic stencil printer	Vision alignment · under-wipe · stepped stencils
Solder paste inspection	3D SPI	Volume, area, height, offset
Pick-and-place	High-speed + fine-pitch placement	Vision centering · feeder-verified loading
Reflow	Convection, 8–12 zones	Nitrogen option · profile logged per job
Wave soldering	Lead-free wave	Pallets / selective masks
Selective soldering	Programmable mini-wave	Dense mixed-technology boards
AOI	3D / multi-angle optical	Polarity, presence, offset, solder joint
X-ray inspection	2D / 3D microfocus	BGA / QFN voiding, hidden joints
BGA rework	IR / hot-air with profiling	Reball, remove, replace
Cleaning	Inline / batch	Ionic contamination testing on request

02 FABRICATION

Fabrication

Rigid, flex, rigid-flex, HDI, RF and mixed-material boards. Values are split into Standard (routine) and Advanced (engineering review) windows.

2.1 Fabrication envelope

SPECIFICATION	STANDARD	ADVANCED
Layer count	1 – 16	Up to 32
Finished board thickness	0.8 – 2.4 mm	0.2 – 6.0 mm

Maximum panel size	457 × 610 mm (18 × 24 in)	533 × 610 mm
Maximum board size	430 × 580 mm	Per-job review
Minimum board size	5 × 5 mm	Panelised with rails
Aspect ratio (through hole)	10 : 1	16 : 1

2.2 Board construction

CONSTRUCTION	STANDARD	ADVANCED
Rigid multilayer	Sequential lamination ×1	Sequential lamination ×3+
Flexible	1–2 layer polyimide	4+ layer flex · stiffeners
Rigid-flex	2 flex + rigid outer	Multiple flex cores · bookbinder
HDI	1 + N + 1	2 + N + 2 · any-layer
Heavy copper	Up to 3 oz	Up to 6 oz (extreme)
Metal-core	Aluminium single layer	Copper-core · embedded

2.3 Trace and space by copper weight

MINIMUM, OUTER / INNER

FINISHED COPPER	STANDARD	ADVANCED
½ oz (17 µm)	3.5 / 3.5 mil outer · 3 / 3 mil inner	2.5 / 2.5 mil outer · 2.5 / 2.5 mil inner
1 oz (35 µm)	4 / 4 mil outer · 3.5 / 3.5 mil inner	3 / 3 mil outer · 3 / 3 mil inner
2 oz (70 µm)	6 / 7 mil outer · 5 / 6 mil inner	5 / 6 mil outer · 5 / 5 mil inner
3 oz (105 µm)	10 / 10 mil	8 / 9 mil
4 oz and above	Per-job review	Per-job review

2.4 Board thickness by layer count

LAYER COUNT	STANDARD	ADVANCED
1 – 2 layers	0.8 – 2.4 mm ± 10%	0.2 – 3.2 mm
4 layers	0.8 – 2.4 mm ± 10%	0.4 – 3.2 mm
6 – 8 layers	1.0 – 2.4 mm ± 10%	0.8 – 3.2 mm
10 – 16 layers	1.6 – 3.2 mm ± 10%	1.2 – 4.0 mm
18 – 32 layers	–	2.4 – 6.0 mm · per-job review

2.5 Drilling

SPECIFICATION	STANDARD	ADVANCED
MECHANICAL		
Minimum drill size	0.20 mm (8 mil)	0.15 mm (6 mil)
Hole position tolerance	± 3 mil	± 2 mil
PTH diameter tolerance	± 3 mil	± 2 mil
NPTH diameter tolerance	± 2 mil	± 1 mil
LASER		
Laser via diameter	0.10 mm (4 mil)	0.075 mm (3 mil)
Laser aspect ratio	0.8 : 1	1 : 1
ANNULAR RING		
Outer layer (IPC Class 2)	4 mil	3 mil
Inner layer	4 mil	3 mil
Laser microvia capture pad	6 mil	5 mil

2.6 Via technology

VIA TYPE	STANDARD	ADVANCED
Through via	Plated, tented or plugged	Plugged and capped (VIPPO)

Blind via	Laser, 1 level	Laser or mechanical, multi-level
Buried via	Mechanical, 1 core	Multiple cores
Stacked microvia	2-deep	3+ deep · filled and capped
Via-in-pad	Epoxy-filled, plated over	Copper-filled
Back-drilling	Stub ≤ 12 mil	Stub ≤ 8 mil

2.7 Controlled impedance

STRUCTURE	STANDARD	ADVANCED
Single-ended	± 10%	± 7%
Differential	± 10%	± 7%
Coplanar waveguide	± 10%	± 8%
Impedance range	28 – 120 Ω	25 – 150 Ω
Verification	TDR coupon per panel	TDR coupon per panel + report

2.8 Silkscreen

SPECIFICATION	STANDARD	ADVANCED
Colours	White · black	Yellow · additional on request
Minimum line width	5 mil	4 mil
Minimum character height	30 mil	25 mil
Registration tolerance	± 6 mil	± 4 mil (LDI legend)
Clearance to pad	5 mil	4 mil

2.9 Soldermask

SPECIFICATION	STANDARD	ADVANCED

Colours	Green · black · blue · red · white	Matte variants · custom on request
Mask thickness	10 – 25 µm over copper	Per-job
Minimum mask dam	4 mil	3 mil
Mask registration	± 3 mil	± 2 mil (LDI)
Via treatment	Tented · open · plugged	Plugged and capped

2.10 Surface finishes

FINISH	STANDARD	ADVANCED
HASL (lead-free)	Available	–
ENIG	2 – 5 µin Au over 120 – 240 µin Ni	Thick gold on request
ENEPIG	Available	Wire-bond grades
Immersion silver / tin	Available	–
OSP	Available	–
Hard gold (edge fingers)	Available	Selective plating

2.11 Laminate and material systems

MATERIAL CLASS	EXAMPLES	TYPICAL USE
Standard FR-4	Tg 130 – 150 °C	General digital and power
High-Tg FR-4	Tg 170 – 180 °C	Multilayer · lead-free assembly
Halogen-free	Tg 150 – 170 °C	Regulatory-driven builds
Low-loss / high-speed	Df ≤ 0.005 laminates	Serial links · backplanes
Polyimide	Flex and rigid-flex	Dynamic and static flex
PTFE / hydrocarbon	Df ≤ 0.002 laminates	RF · microwave
Metal-core	Aluminium dielectric	LED · power

RIGID	FLEX	RIGID-FLEX
HDI	RF	MIXED

2.12 Product types

PRODUCT	TYPICAL CONSTRUCTION	NOTES
Rigid	1 – 32 layers	Mainstream builds
Flexible	1 – 6 layers	Coverlay · stiffeners · ZIF contacts
Rigid-flex	Rigid outer + flex core	IPC-2223 guidelines
HDI	Microvia buildup	Fine-pitch BGA escape
RF / microwave	PTFE · hybrid stackups	Controlled-depth routing
Mixed material	FR-4 + RF laminate hybrid	Per-job stackup review

2.13 RF and microwave

SPECIFICATION	STANDARD	ADVANCED
Frequency range	DC – 6 GHz	To 77 GHz (laminate-dependent)
Dielectric constant (Dk)	3.0 – 4.5	2.2 – 10.2
Loss tangent (Df)	≤ 0.004	≤ 0.0009
Hybrid stackups	RF outer + FR-4 core	Multi-RF hybrid
Edge plating / castellations	Available	Per-job
Cavity / controlled-depth routing	–	Available

All values are illustrative reference data and are not a commitment of capability.

03 DESIGN

Design

Layout and review support that carries a design through to manufacturing outputs.

Design capability

- PCB layout support
- Multilayer design
- Digital circuits
- Analog circuits
- RF circuits
- High-density PCB design
- Stackup and impedance planning

Deliverables

- DFM review report
- DFT review report
- Gerber / ODB++ output
- NC drill and netlist
- Assembly drawings
- Pick-and-place data
- Fabrication notes

Secondary operations

- Conformal coating
- Underfill and staking
- Programming
- Box build and integration
- Labelling and serialisation
- Custom packaging

Review scope

REVIEW	CHECKS	OUTPUT
DFM	Trace / space · drill · annular ring · mask dams · panelisation	Annotated findings
DFT	Test-point coverage · access · fixture feasibility	Test-coverage notes
Manufacturing outputs	File completeness · BOM / placement agreement	Release package

04 TESTING AND INSPECTION

Testing and inspection

Inspection at each stage and test coverage matched to the design.

01	**Automated optical inspection**	Detects missing, misplaced, rotated components and solder defects after reflow.
02	**X-ray inspection**	Inspects hidden joints on BGA, QFN and LGA packages, including voiding.

03	**Functional testing**	Powered tests against customer-supplied procedures or coordinated fixtures.
04	**Board bring-up**	Initial power-up, rail checks and first-boot verification of new designs.
05	**Firmware flashing**	Programming of customer-supplied images with verification.
06	**EMC-related testing coordination**	Scheduling and handoff to third-party labs; Integra Foundry does not itself certify compliance.
07	**Custom testing fixtures**	Design and build of bed-of-nails and functional fixtures.
08	**Rework**	Component replacement, BGA reball and modification per approved instructions.

05 PARTS AND SOURCING

Parts and sourcing

Components are sourced against your BOM, or supplied by you. Handling follows the same rules in both cases.

Sourcing models

TOPIC	TURNKEY	CUSTOMER-CONSIGNED
Who buys the parts	Network sourcing against BOM	Customer supplies kits
BOM verification	Automated MPN / package check	Kit audit against BOM at receipt
Overage / attrition	Included in quote by part class	Customer specifies
Lead-time risk	Flagged in the quote	Owned by customer
Substitutions	Only with written approval	Not applicable

Handling and traceability

TOPIC	PRACTICE
ESD handling	ESD-safe workstations, packaging and grounding per ANSI/ESD S20.20 practice
Moisture-sensitive components	Dry-cabinet storage and bake per J-STD-033 with MSL tracking
Lot traceability	Reel / lot and date-code recorded against each build
Inventory management	Kit-level reconciliation and returns of unused stock

06 STANDARDS

Standards

Standards and qualification criteria that apply to builds. These are not claims that Integra Foundry holds any certification; partner factories are asked to evidence theirs.

Applicable standards

STATUS: TO BE VERIFIED

STANDARD	SCOPE	STATUS
ISO 9001	Quality management systems	Partner qualification criterion
AS9100	Aerospace quality management	Partner qualification criterion
ISO 13485	Medical device quality management	Partner qualification criterion
IPC-A-600	Acceptability of printed boards	Applied as inspection reference
IPC J-STD-001	Soldered electrical and electronic assemblies	Applied as workmanship reference
UL	Laminate / board recognition	Partner qualification criterion
RoHS	Restricted substances	Material declaration on request
ITAR	Controlled defence articles / data	Domestic-only routing; contact before sending data

No certification is asserted for the company until independently verified and published here.