VERSATILE TECHNICAL SOLUTIONS

www.versatecsolutions.com

C5 Series

SMD Placement Machines
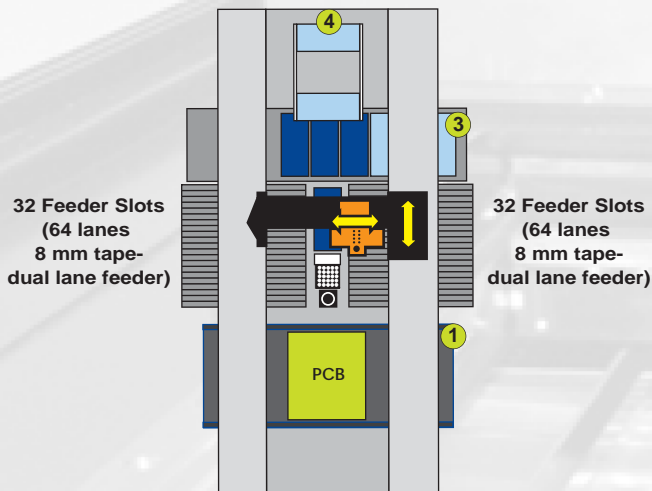
CONTACT
SYSTEMS

C5 SERIES

Single Beam SMT Placement Machines

PRICE / PERFORMANCE LEADER

C5-128

- **128** LANES 8 MM TAPE
  - DUAL LANE FEEDERS
- UP TO **22** MATRIX TRAYS
- **4** OR **8** SPINDLE HEAD
- **9,400** CPH (4 SPINDLE HEAD),
  14,200 CPH (8 SPINDLE HEAD), (IPC 9850)

32 Feeder Slots
(64 lanes
8 mm tape-
dual lane feeder)

32 Feeder Slots
(64 lanes
8 mm tape-
dual lane feeder)

PCB

VERSATILITY WITHOUT COMPROMISE
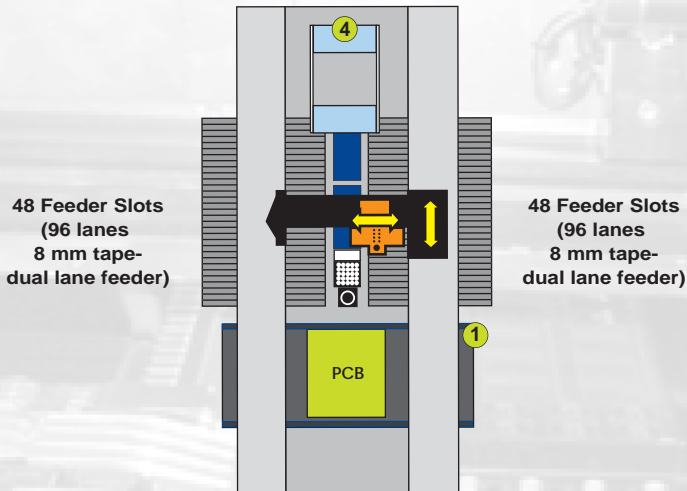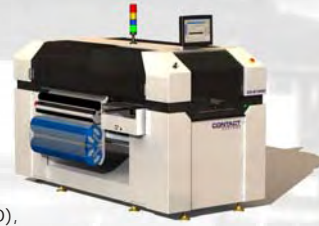
C5-192

- **192** LANES 8 MM TAPE
  - DUAL LANE FEEDERS
- UP TO **17** MATRIX TRAYS
- **4** OR **8** SPINDLE HEAD
- **9,400** CPH (4 SPINDLE HEAD),
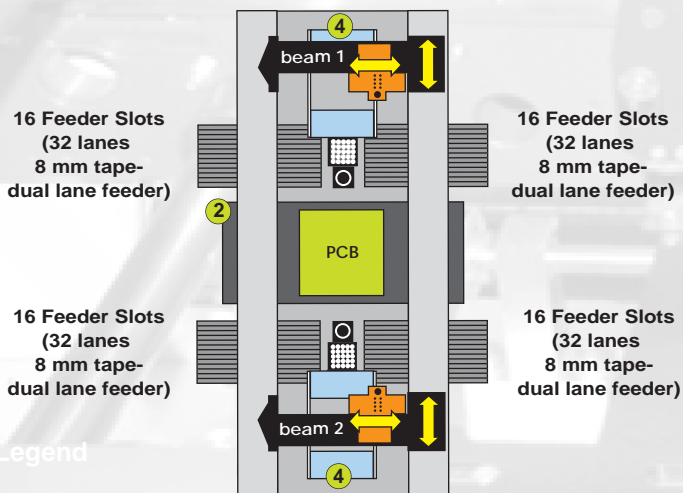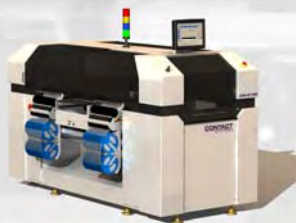 **14,200** CPH (8 SPINDLE HEAD), (IPC 9850)

48 Feeder Slots
(96 lanes
8 mm tape-
dual lane feeder)

48 Feeder Slots
(96 lanes
8 mm tape-
dual lane feeder)

PCB

Dual Beam SMT Placement Machines

FAST AND FLEXIBLE

C5d-128

- **128** LANES 8 MM TAPE
  - DUAL LANE FEEDERS
- UP TO **30** MATRIX TRAYS
- TWO **8** SPINDLE HEADS
- **22,500** CPH, (IPC 9850)

beam 1

16 Feeder Slots
(32 lanes
8 mm tape-
dual lane feeder)

16 Feeder Slots
(32 lanes
8 mm tape-
dual lane feeder)

PCB

16 Feeder Slots
(32 lanes
8 mm tape-
dual lane feeder)

16 Feeder Slots
(32 lanes
8 mm tape-
dual lane feeder)

beam 2

Legend

THE ULTIMATE SINGLE MACHINE SOLUTION

C5d-256

- **256** LANES 8 MM TAPE
  - DUAL LANE FEEDERS
- UP TO **30** MATRIX TRAYS
- TWO **8** SPINDLE HEADS
- **22,500** CPH, (IPC 9850)

beam 1

32 Feeder Slots
(64 lanes
8 mm tape-
dual lane feeder)

32 Feeder Slots
(64 lanes
8 mm tape-
dual lane feeder)

PCB

32 Feeder Slots
(64 lanes
8 mm tape-
dual lane feeder)

32 Feeder Slots
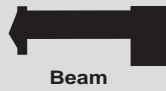(64 lanes
8 mm tape-
dual lane feeder)

beam 2

Legend

Head Beam

Standard Included Tray Mounts

Optional Tray Mounts

Nozzle Bank

CCD Camera

1 Standard FlexiFix
Board Mounting System or
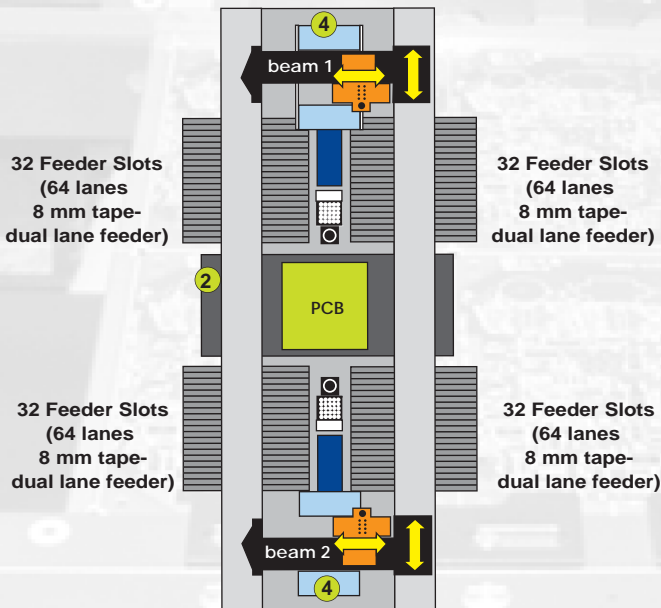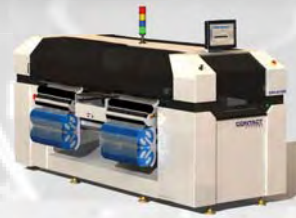Internal Conveyer (optional)

2 Internal Conveyer

3 6-Tray ModuleTM6
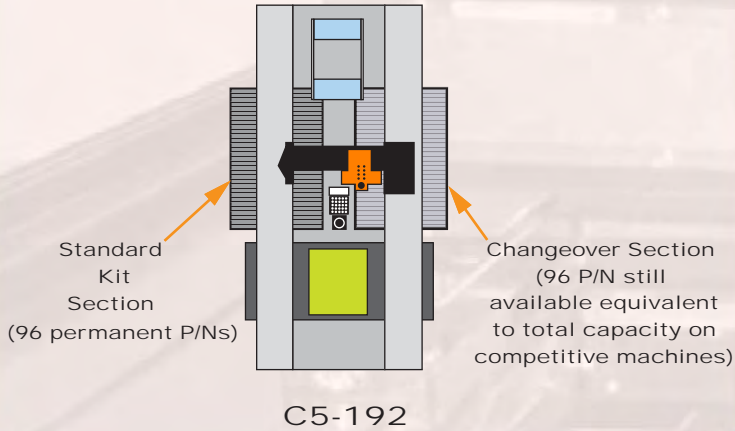
4 15-Tray Module M15 or STMR

Advantages of High Feeder Capacity / Full Component Range Machines

The C5 series has the feeder capacity and component range to handle virtually any SMT assembly on a single machine. This is an advantage in low to medium volume/high mix environments because different production enhancing concepts can be employed.

Standard Kit

Applicable to both CEM's and OEM's is the Standard Kit concept. With enough feeder capacity, a certain section of the feeder banks can be reserved for the most popular components to permanently reside thus minimizing job changeover and inventory requirements.

Standard
Kit
Section
(96 permanent P/Ns)

Changeover Section
(96 P/N still
available equivalent
to total capacity on
competitive machines)

C5-192

Dynamic Changeover

Unique to the C5 series is the concept of Dynamic Changeover. Having 30 - 60 % more feeder capacity than competitive machines means many jobs would require use of only one - half of the feeder bank(s). Because the feeders on the C5 Series can be removed and replaced while the machine is running, the next job in cue can be set up on the remaining feeder bank(s) while the machine is still producing the previous job.
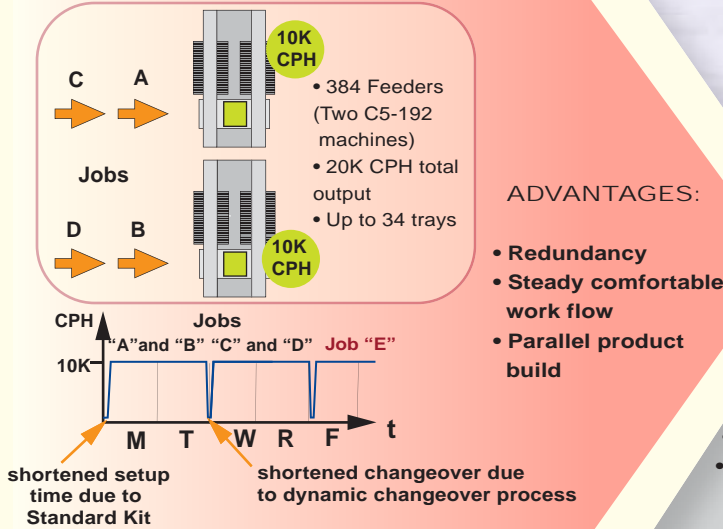
Running
Setup

A	B	C
B	C	D

Job "A"
running

Job "B"
setting up
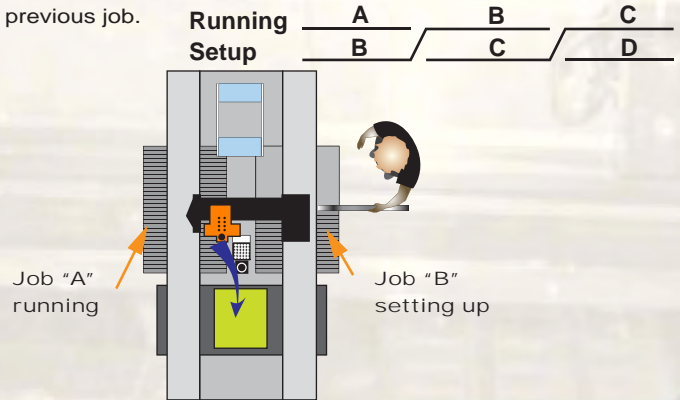
Multiple Machines Concepts
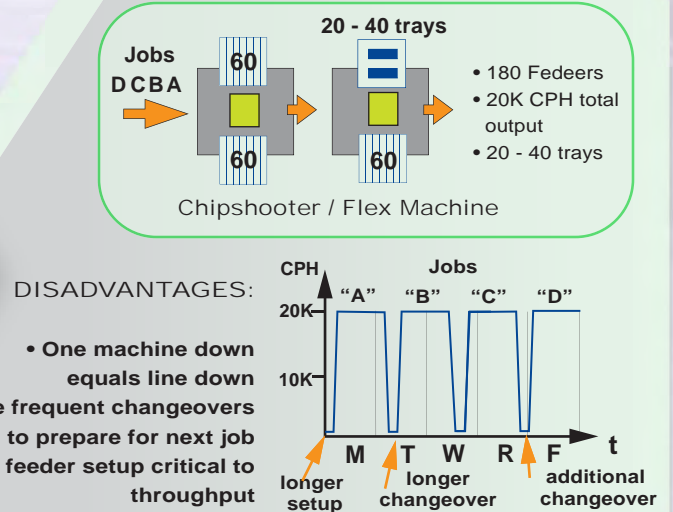
Sometimes capacity requirements dictate that multiple machines are required. There are two concepts that can be employed in this case.
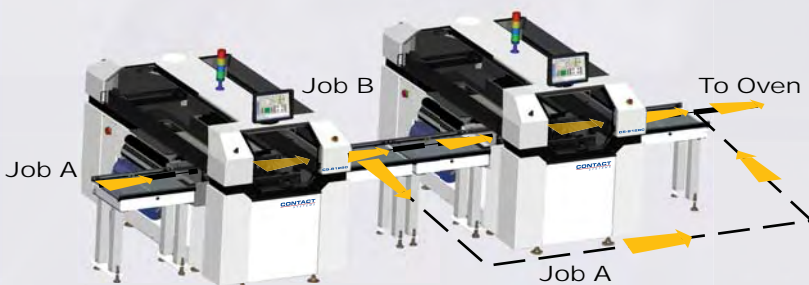
Cellular versus In Line

Two C5-192 Machine Cellular Approach

C   A

10K
CPH

• 384 Feeders
(Two C5-192
machines)
• 20K CPH total
output
• Up to 34 trays

Jobs

D   B

10K
CPH

ADVANTAGES:

• **Redundancy**
• **Steady comfortable work flow**
• **Parallel product build**

CPH

Jobs
"A"and "B" "C" and "D"   Job "E"

10K

M   T   W   R   F   t

shortened setup
time due to
Standard Kit

shortened changeover due
to dynamic changeover process

Typical Two Machine In Line Approach

20 - 40 trays

Jobs
D C B A

60

60

60

60

• 180 Fedeers
• 20K CPH total
output
• 20 - 40 trays

Chipshooter / Flex Machine

DISADVANTAGES:

• **One machine down equals line down**
• **More frequent changeovers**
• **Less time to prepare for next job**
• **Optimized feeder setup critical to throughput**

CPH

Jobs
"A"   "B"   "C"   "D"

20K

10K

M   T   W   R   F   t

longer
setup

longer
changeover

additional
changeover

Reflex Line

Job B

To Oven

Job A

Job A

**REFLEX** is short for REdundancy and FLEXibility. Redundancy is important because equally equipped machines with high feeder capacity and full component range capability are able to individually run just about any job. This means for smaller lot size jobs the machines can be operated individually (cellular) thus running two jobs in parallel. For higher volume jobs that need to be completed quickly the kit can be split across the two machines. This sort of flexibility cannot be realized with a typical chip shooter-flex machine line. The REFLEX line allows you to react quickly to your customer needs and changing production requirements.
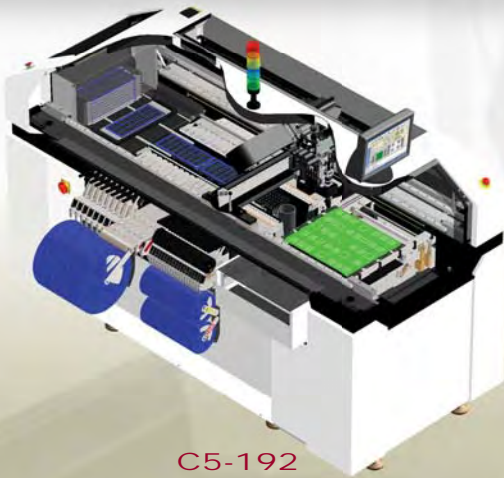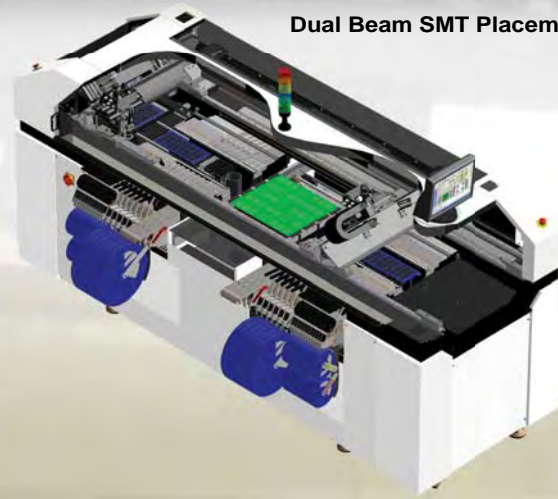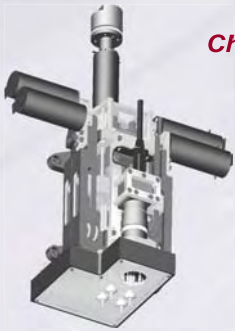
Machine Features

**Dual Beam SMT Placement Machines**
C5-256

C5-192
Single Beam SMT Placement Machines

Choice Of 4 Or 8 Spindle Heads With Independent Servo Controlled Z Axis

The single beam C5 machines can be equipped with either a 4 or 8 spindle head. All of the heads on the C5 Series are able to place the full range of components and each spindle is independently servo controlled in the Z axis. The dual beam models come standard with 8 spindle heads.
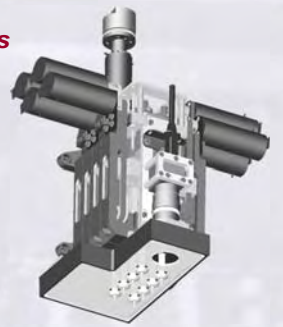
High Performance / High Reliability Gantry Design

Non-Contact Linear Encoder

Linear Motor Coil

Linear Motor Magnets

The C5 Series uses linear motors and non-contact linear encoders on both the X and Y axis. Linear motors have no moving parts and thus are maintenance free and more reliable than ball screw or belt drive systems. Unlike these systems, linear motor direct drive systems will never develop backlash.

30 Positions Automatic Nozzle Changer

The Automatic Nozzle Changer has ample capacity for a multitude of different nozzles to cover any and all jobs.

Low Cost Nozzles

IC Nozzles   Chip Nozzles

Economic Replaceable Nozzle Tips

Long Life Ceramic Inserts

Only 8 different nozzles are required to cover the complete component range. Their low cost and long life contribute to the C5's low cost of ownership.
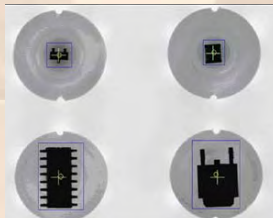
Robust Component Centering with 100% Lead Inspection

C5 machines use a Cognex based vision system to center all components prior to placement. Telecentric optics are distortion free for enhanced accuracy.
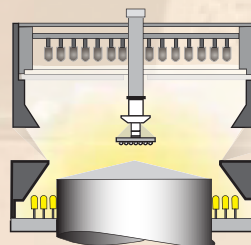
Back Lighting
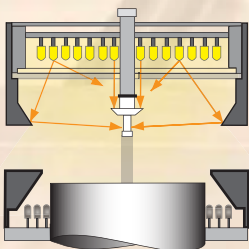
Strobed LED Back Lighting provides a crisp silhouetted component image that is impervious to variations in lead reflectivity.

Front Lighting (Optional)

Front Lighting is available for processing bottom leaded components such as BGA's and µBGA's.

Component Delivery Features

Intelligent Feeder Concept

The C5 is built around the intelligent feeder concept. Each feeder has a unique ID to which a part number or reel/tube ID can be "married to". Now you can place the feeder any- where on the machine because the feeder is constantly communicating with the machine.

Automatic Pocket Pitch

When a part is loaded onto a feeder, the machine automatically sends the correct feeder index command to that feeder.

Multi-Function Status Light
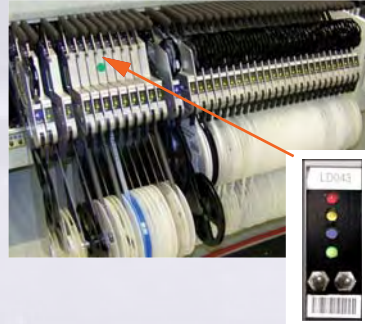
During normal operation the four color status light can warn the operator that the feeder has reached its programmed low quantity. During Job Setup the status light can indicate which feeders have part numbers on them that are used on the next job and which feeders don't.
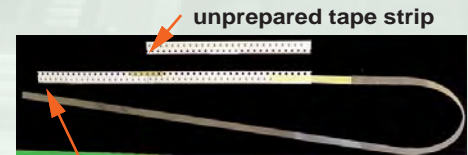
Electronic Tape Feeders

Tape Strip Feeding

The most effective way to deal with tape strips is to feed them as you would a normal tape without "special" feeders or additional programming. Tape strips can be prepared offline by splicing a small piece of scrap carrier tape as a trailer and applying the self adhesive cover tape extender. The tape strip can then be fed on a regular tape feeder with no component loss.

unprepared tape strip

tape strip ready to be loaded on feeder

Any Tape - Any Pitch

The ETF8D dual lane 8 mm tape feeder can feed punched or embossed tape with 2 mm or 4 mm pocket pitch.

Punched Tape

Embossed Tape
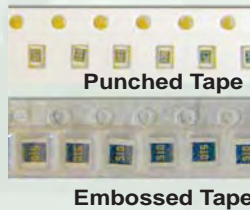
Adjustable Width Feeders

The adjustable feeder can significantly reduce your feeder inventory on the larger more costly feeders.

Air Track Feeders

Easy Load-Unload

Air tracks come with tube adapters that enable you to simply pour the remaining components back into the original tube and then pour the new component in.

Interchangeable Tracks

Components can be preloaded or stored in the Air Tracks for faster job set up. The Electronic Air Feeder Base accepts all track assemblies.

Reload "On-the-Fly"

With the included tube adaptor an entire tube can be blown into the track enabling non-stop production.

Software Features

NPI Tools

Before the first board is run you can use several features to assure the first board will be built correctly.

Feeder Setup Verification

Step through all of the feeders to verify that a reel has not been mis-labeled or a feeder incorrectly programmed. To assist, a component outline overlay is displayed at each pick up location.
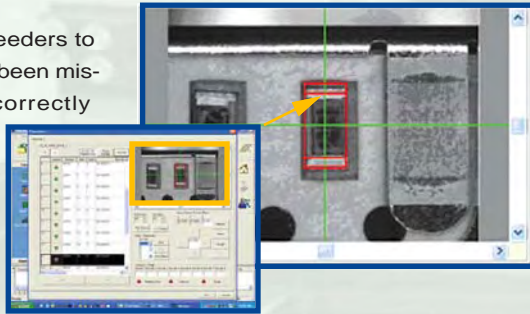
click here to see details

Placement Verification - Digitize Mode

Step through the placement program to verify component type, orientation, and placement coordinate. Make changes and save to program without leaving Digitize Mode.
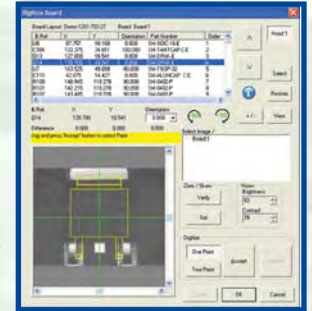
click here to see details

Dynamic Run Time Optimizer

The DRTO eliminates unnecessary machine stoppages by re-optimizing the placement program "on the fly". A feeder can be removed while the machine is running. The machine knows the feeder has been removed and dynamically changes the remainder of the program. When you replace the feeder the machine re-optimizes the remainder of the program again.

Convenience Features

Quick Navigation

Select a part number in any screen and click on the Information button and all of the information about that part number is immediately viewable in a pop up window. From that window click on any property field and go directly to that properties edit page.

**click here to see details**

Job Analyzer

With a job loaded, check to see if you have sufficient inventory to complete the job. If not the Job Analyzer reports how many complete boards can be built and which parts will be short.
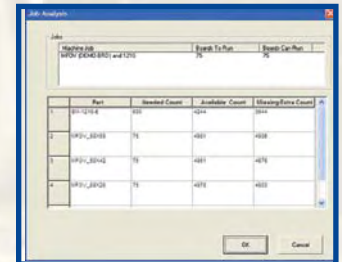
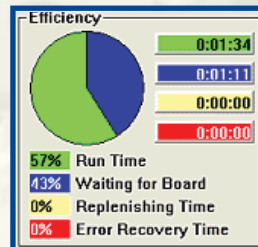**click here to see details**

Part Priority

Control the order of placements when necessary right down to the circuit reference level (i.e. R12 must be placed before U6). Select an entire group of components to be placed last (i.e. tall capacitors).
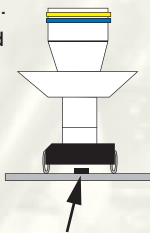
Chip component MUST be placed first

Basic MIS

See how your machine is performing "at a glance", monitor machine and operator efficiency and see job completion estimated time.

Efficiency
- 0:01:34
- 0:01:11
- 0:00:00
- 0:00:00
- 57% Run Time
- 43% Waiting for Board
- 0% Replenishing Time
- 0% Error Recovery Time

Performance

Net Throughput		835
Board	Time	CPH
Best	0:01:04	4636
Avg	0:00:25	3790
Last	0:01:04	4636

Errors

Vision	Pick	Misc.	Total
0	0	1	1

Status

Job Estimated Completion 0:01:43
56 %
Panels 5 / 9 Boards 28

Current Board / Boards
73 %

Placed	Shorted	Total Parts
8	1	12

Remote diagnostics

With an Internet connection our engineers can "take control" of your machine to quickly diagnose problems and get your machine back in production.

WWW
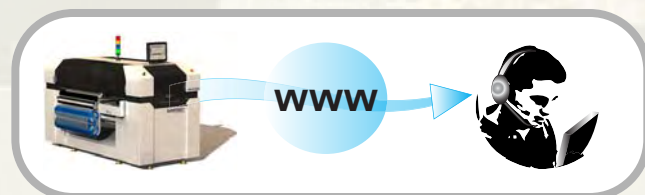
Tray Handling Options

All of the tray handling options are designed to hold standard JEDEC trays. The tray handling software allows for custom trays including multi-array trays (several parts within one tray area with unique row and column spacing for each part array). All of the tray handling options on the C5 Series have no impact on feeder capacity, board size or footprint and parts are picked directly from the trays.

STMR *Single Tray Module Retractable*

The STMR is a retractable single tray holder. One can be added to any single beam model to economically increase tray capacity when a TM15 is not present. On a dual beam machine up to two STMR's can be added.

TM6 *Tray Module with 6 Trays*

The TM6 is available on the C5-128 machine and replaces the stationary three tray holder. The simple side to side motion cost effectively expands the tray capacity from four to seven.
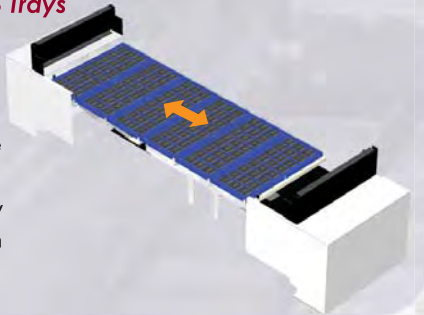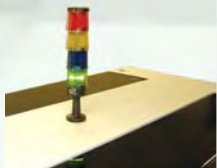
TM15 *Tray Module with 15 Trays*

The TM15 is a 15 tray capacity random access elevator system that is installed within the footprint of the machine. One can be installed on a single beam machine or up to two on a dual beam machine.

Board Handling Options

FlexiFix *Manual Board Mount System*

Standard in the single beam models, the manual board mount fixture features edge clamping similar to the internal conveyor system and a generous underside clearance. A base plate allows for unrestricted magnetic board support placement. The fixture is easily pulled to the front of the machine to a convenient position for loading and unloading.
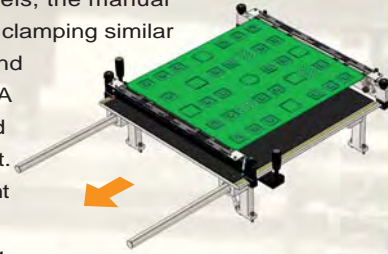
5IBC *Internal Conveyor*

For in line systems an internal conveyor is available. The internal conveyor features full edge clamping, 40 mm underside clearance and a retractable base plate for unrestricted magnetic board support placement. The internal conveyor can be configured as fixed front or fixed rear rail and left to right or right to left board conveyance. For added convenience the conveyor has options for auto width adjust.
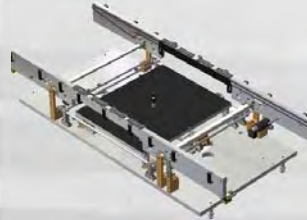
LBO *Large Board Option*

The large board option extends the maximum board size to 610 mm x 460 mm (24" x 18.1") without reducing feeder capacity. Larger boards are built in two stages without operator intervention.

Placement Area

secondary board stop
primary board stop

secondary board stop

1. place all parts in placement area
2. move board to secondary stop position
3. place remainder

The board size 24 x 18.1 in, larger on request.

5IOC *Input/Output Conveyor*

The Input/Output Conveyors are stand alone conveyors designed to fit perfectly with the C5 Series machines. Several boards can be placed on the input conveyor and automatically fed to the C5 machine freeing up the operator for other duties.

Machine Options

SL *Status Light*

The four color status light lets you know from a distance when the machine needs attention.

TS *Touch Screen*

A friendly graphical user interface can be augmented with the addition of the touch screen option.
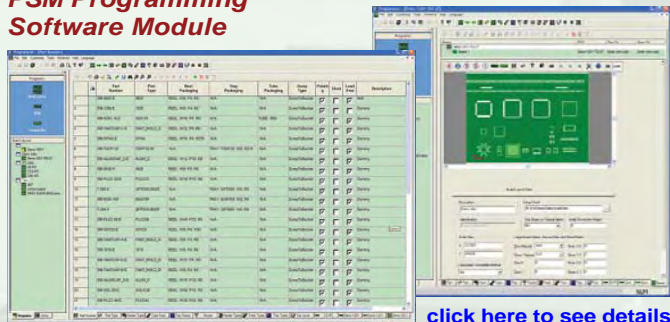
FL *Front Lighting*

Add this option if you need to process bottom leaded components such as BGA's and µBGA's.

Options Specification

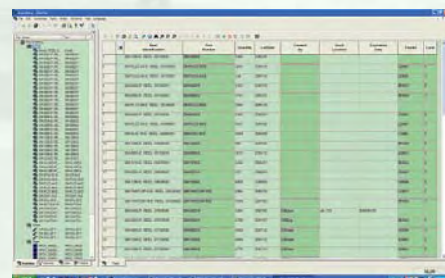|	Model No.	Options	C5-128	C5-192	C5d-128	C5d-256
Machine Options		4 Spindle Head	S	S	N/A	N/A
		8 Spindle Head	O	O	S	S
	SL	Status Light - Four color strobe light	O	O	O	O
	TS	Touch screen	O	O	O	O
Board Handling	5IBC	Internal Board Conveyor	O	O	N/A	N/A
	FlexiFix	Manual Board Mount Fixture	S	S	N/A	N/A
	5IBC-1AW	Internal Bd.Conveyor with 1 Auto. width rail	O	O	N/A	N/A
	5IBC-2AW	Internal Bd.Conveyor with 2 Auto. width rails	O	O	S	S
	5LBO	Large Board Option (31" x 18" Placement Area)	O	O	O	O
Tray Handling	STMR	Single Tray Module Retractable	O	O	O	O
	TM6	Tray Module - 6 Trays	O	N/A	N/A	N/A
	TM15	Tray Module - 15 Trays	O	O	O	O

Software

The machine comes loaded with all of the software required to program and operate the machine and revolves around a central database concept. Multiple users (machines, offline programmers, managers) can be tied to the same database and can share the same information. Optional software modules are listed below.

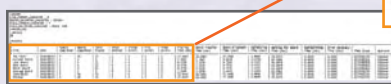### PSM Programming Software Module

click here to see details

click here to see details

Although the Programming and Inventory software is included on the machine, additional seats (floating licenses) can be purchased separately to enable offline programming and real time inventory management.

ISM Inventory Software Module

click here to see details

### MISSM Extended MIS Software Module

MIS data is generated every time a board is unloaded or a job is finished or deleted. The data is output to a file. Included with the machine is the Basic MIS view window which graphically displays the machine efficiency and performance as well as the job status.

The Extended MIS Software Module enables access the all of the data in the file and provides the tools necessary to produce customizable analytical reports.
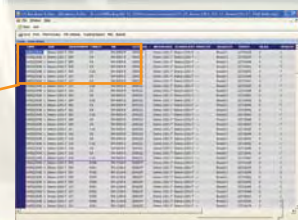

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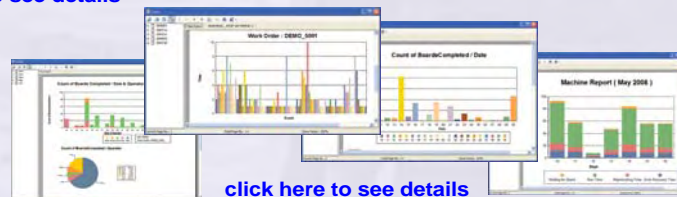
click here to see details

TSM Traceability Software Module

Provides the capability of full traceability for PCB builds including the tracking of individual reel ID's and component lots to circuit references on individual assemblies.

Feeders

Electronic Tape Feeders

ETF8D Dual Lane 8 mm Tape Feeder

ETF8D-LRF Dual Lane 8 mm Tape Feeder with large reel hanger option

ETF12SS 12 mm Tape Feeder (single slot)

ETF12-32 ETF12-44 ETF 12-56 Adjustable Tape Feeders

Slot Usage

Model	Slots
ETF8D dual lane	1
ETF12SS	1
ETF12-32	2
ETF12-44	3
ETF12-56	4
EAFB with track	2

Standard Air Tracks

Model	Lanes
SO8-16	4
SOL16-40	3
SOT223	4
PLCC20	3
PLCC20-SOC	2
PLCC28-32	2
PLCC28,32-SOC	1
PLCC44	1
PLCC44-SOC	1
PLCC52	1
PLCC52-SOC	1
PLCC68	1
PLCC68-SOC	1
PLCC84	1
PLCC84-SOC	1
SOJ16-32-300	3
SOJ14-42-400	2
SOM8-24	4
SOW24-36	2
SOY28-44	2
DPAK	3
D2PAK	2
TSSOP8-56	4

Electronic Air Feeders

Detachable Tracks
Air Tracks are available for all standard SMT components normally supplied in tubes. Custom air tracks are available upon request.

EAFB - Electronic Air Track Feeder Base

Accessories

PMK Preventative Maintenance Kit

Kit contains all the necessary tools and supplies for cleaning, lubricating, and basic machine maintenance.

ENK Extended Nozzle Kit

Extended Nozzle Kit contains 13 additional nozzles to handle the full range of components, and includes a nozzle storage and transfer fixture. An entire bank of nozzles can be removed in seconds for quick inspection.
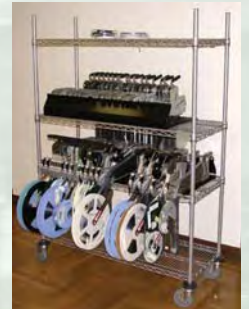
ACF Auto-Calibration Fixture

Auto-Calibration Fixture includes fixture with camera mapping grid in a durable storage case.

FSC Feeder Storage Cart

The heavy duty easy rolling Feeder Storage Cart comes with two 48-slot feeder banks to mimic the capacity of the C5-192.

TSPK Tape Strip Preparation Kit

With the Tape Strip Preparation Kit you can prepare tape strips offline that can be fed with the standard C5 Series tape feeders thus no additional "special" feeders are required. Because the strips can be prepared offline, there is no down time due to the additional programming required for competitive solutions.

Kitting Options

To facilitate faster error free feeder setup, two kitting options are available:

EZ Kit

Enables kitting without tying up the C5. Package includes the offline feeder programming software and networked feeder station. Includes a complete network ready PC (with monitor, mouse and keyboard) pre-loaded and configured with Windows 2000™ or XP™, all purchased software/hardware, and a network hub to connect to the C5.

EZ Scan

Includes everything in the EZ Kit option plus the barcode scanner and printer.

EZ Kit

PC

Offline Feeder
Program
Software

Barcode Scanner & Printer

EZ Scan
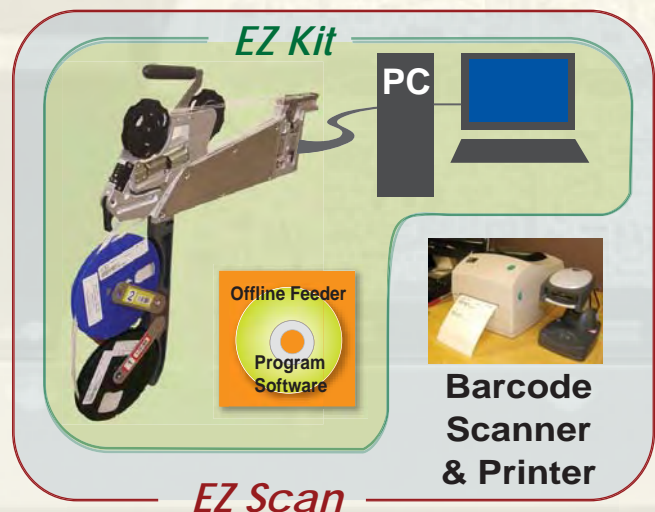
Specifications

MODEL		C5-128	C5-192	C5d-128	C5d-256
Feeder Capacity		128	192	128	256
Matrix Tray Capacity		4, 7, 19, 22	2, 3, 17	1, 2, 15, 16, 30	
Number of Heads		1		2	
Number of Spindles		4 or 8		8	
Placement Rate, cph, IPC 9850 (1608C component)		9,400 (4 Spindle) , 14,200 (8 Spindle)		22,500	
Component Range	Smallest	0.25mm X 0.5mm (0.01" X 0.02")			
	Largest	Square 50mm X 50mm (1.97" X 1.97") / Rectangle 26mm X 68mm (1.02" X 2.68")			
	Maximum Height	15 mm (0.59"), taller on request			
Minimum Lead/ Ball Size Diameter (micro BGA)		0.3mm / 12mil			
Placement Accuracy		Chip ± 65µm / 3 sigma QFP ± 40µm / 3 sigma			
Board Conveyor	Minimum Rail Width	55mm (2.2")			
	Maximum Board Size	400mm x 460mm (15.7" x 18.1")			
	W/ Large Board Option	610mm x 460mm (24" x 18.1"), larger on request			
	Maximum Board Thickness	8mm (0.315") clearance (i.e. 6 mm thickness + 2mm warp)			
	Clearance Below PCB	40mm (1.57")			
	Edge Clearance for Conveyor	4mm (0.157")			
	Conveyor Type	Single stage; left to right, or right to left travel direction (configurable), fixed front rail or fixed rear rail (programmable)			
	Conveyor Height	952.5 ± 12.5 mm (SMEMA)			
Nozzle Changer		Two nozzle banks (one for each head) 12 nozzles, standard; 30 maximum for each bank			
X\Y Axis Motors & Measuring System		Linear motors and touchless linear encoders with 5µ resolution			
Z Axis Motors		DC Servo Motors (8 per head) with 18µ resolution			
Rotation (Theta) Motors		DC Servo Motors with .005 degree resolution			
Alignment Method		100% Fly by vision alignment with full lead/ball inspection			
Camera Type / Lens Type		CCD / Telecentric			
Lighting	Standard	Strobe backlighting			
	Optional	Strobe frontlighting for bottom leaded devices, i.e. BGA's/micro BGA's			
Facility Requirements	Depth	2,520mm (99.21")			3120 mm (122.8")
	Width (with Feeders)	1,670mm (65.75")			
	Hight (with Status Light)	1,850mm (72,83")			
	Weight (without Feeders)	1725 kg / 3800 lb.	1815 kg / 4000 lb		2040 kg / 4500 lb
	Electrical Connection	208 V, 3 phase 50/60 hz / 25 amps			
	Compressed Air Supply	6 Bar (85 psi), 10 cfm clean, dry, oil free, filtered 2 mm			
	Environment	15 - 25°C, 50 - 70% relative humidity			

1,850 mm (72.83")
950±15 mm
1,470 mm (57,87")
conveyor height (SMEMA)
1,140 mm (44,88")
1,670 mm (65.75")

2,520mm (99.21")
3120 mm (122.8")