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1. Company Summary

EMNEX is specializing in the manufacture of electronic products that supply customers with best quality and service in the best condition with pleasant production environment.

 First basement level up to 4th aboveground Floors (Total floor space is 4,900m²)

Customer-specific Line6 Room

Best

manufacturing

infrastructure

Clean for manufacturing environment

Supported ONE-STOP Service

Best quality

Desired delivery

Reasonable price

Increase customer value

• SMT: 4 LINE

• IMT (DIP) : 3 LINE

Robot solder Line

(Selective & Pointer Solder)

Function & Test

Assembly: 10 Cell Line

ease omer EMnex

Best quality customer impressions

- Create a specification approved every product
- Stabilization of manufacturing to initial products
- ERP System
- Report process flow sheet every lot

From Developmenr
Circuit and PCB artwork,
Technical review, Engineering
sample, Customer spec review,
Inspector and Jlg design

To product shipment
 Component purchase, SMT,
 IMT, Function, Testing, Repair,
 Assembly, Packaging,
 OC inspection, Shipment

Company Contents



Address : Samsung 1-ro 3-gil, Hwaseong-si, Gveonggi-do, Korea

• Number of employees : 87 people (Now a days)

Representative : Young Wook Choi

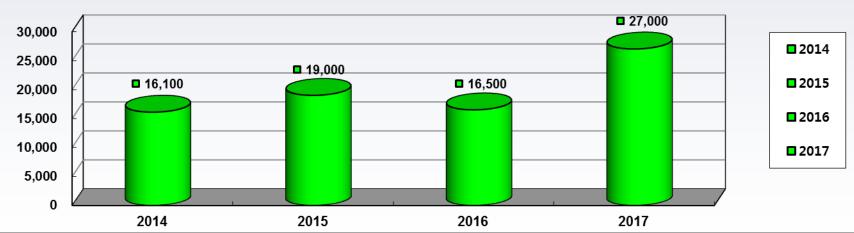
Business Status : Place_2,600m², Total floor space is 4,900m²
 New build start First basement level up to 4th aboveground Floors

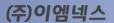
Turnover: '14yr: \$14.300,000, '15yr: \$16,800,000 '16yr: \$14,600,000 '17yr: \$23,900,000 (goal).

 Main Products: PLC, Controller (robot & elevator & railway vehicle), Driver (Servo, Stepping), X-RAY generator, sensor, Power electronics, Communication, Industrial Camera module.etc

Home Page : www. emnex.co.kr

(Unit : Millon won, ₩)





EMNEX Partnership

Industrial equipment



Power Electronics & Defense



Medical



Others













2. Company History

- 1999 yr. Incorporation, Designated as a partner company of Samsung Electronics Co., Ltd. (Manufacturing and PCB Artwork)
- 2008 vr. Establishment of Research Institute (Attached)
- 2009 yr. Selected as a promising medium Company by Gyeonggi-do Governor
 Selected as an INNOBIZ Company _ Small and Medium Business Administration a director
 ISO 9001 Certification (2009yr, SAI GLOBAL), KSQ ISO9001 (2009yr) changed
- 2011yr. Enternce New building (2011, 10) basement 1st, aboveground floor 4th (Total floor space is 4,900m²)
- 2012 yr. EMNEX ··· Change company name (2012, 10. 26)
- 2013 yr. Parts and material specializing company _ Ministry of Commerce, Industry and Energy
 Hyundai Rotem, PBA "A grade" Registered as a certified company (GQR-2015)
 ONKYO (Japan), factory and quality examination _ LED POWER Began exporting (2014yr Top prize of export),
 15yr 250 Millon dollors export
- 2014 yr. Designated as a military service exemption company _ Military Manpower Administration
 ERP SYSTEM operation.
- 2015 yr. Hanwha System (before, Samsung Thales), Registered as a defense industry company
- 2016 yr. Hanwha Techwin, QSA/ QPA Pass (quality)
 Factory registration _ PSE (Japan) , CCC (China), UL (U.S.A), CSA (Canada)

3. Main Certification Status



(Research & Development Center)



(Promising Small and Medium Business)



(ISO9001 certification)

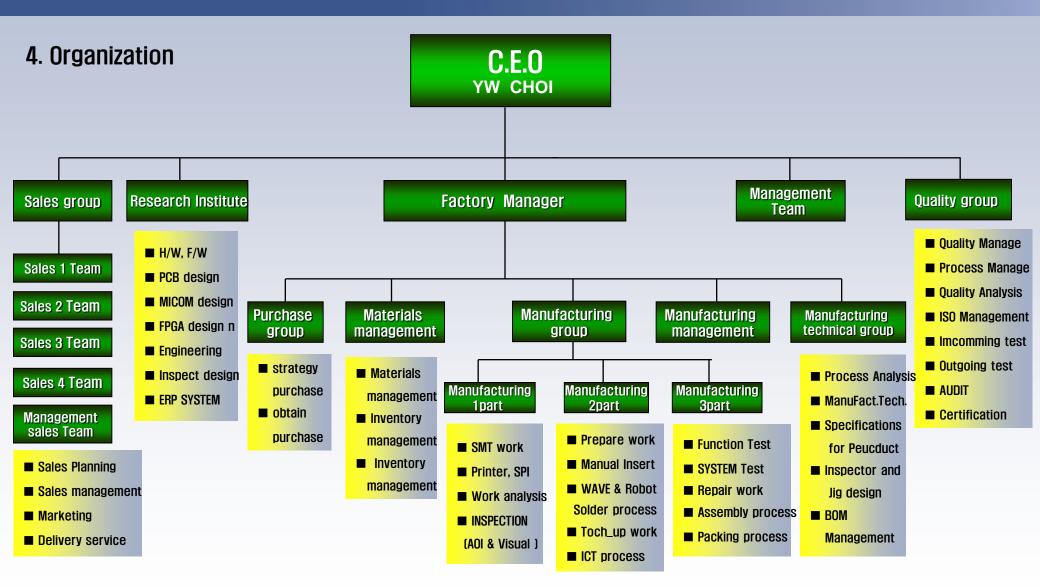


(INNOBIZ COMPANY)



(Parts and material specializing company)





5. Main manufacturing items

Controller & Driver for Industry

PLC Series (80s items)



EMNEX supported 80 kinds of OEM/ ODM (NX70, NX700 series) (SET product)



Robot controller series for Industrial (30 items)



Emex is equipped from Samsung Electronics Co., Ltd (SEC), Samsung
Display Co., Ltd. (SDC) with controller and 4 axis servo pack,
6-axis controller, AGV controller, Jetting Driver, etc...
(PBA and SET products)

Application



■ Motor driver and AGV controller etc..













■ Jetting system for display and Semiconductor Wafer Test B'D etc...













■ Elevator controller and Railway vehicle control B'D













Communication

■ Optical transmission switching B'D for LTE













Medical

■ X-RAY generator and Sensor B'D











■ Battery Management System (BMS) and Medical Measure B'D





















Other

■ Power control System and Laser detector













■ Industrial camera modules, SMT, AOI, SPI controller, etc…



















6. Manufacturing place

Material warehouse



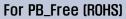








SMT Line (4 Line)











UnLoader

SMT Line configuration

(1) A_Line (Standard, FULL)



(2) **B_Line** (Larged type)

Mounter Mounter Mounter SPI Work Loader **Printer** Reflow UnLoader (CHIP) (Multi) (Multi) Table

Mounter

(Multi)

Work

Table

Reflow

Mounter

(Multi)

Mounter

(CHIP)

(3) C_Line (Larged type)

Loader

Printer

SPI



Manual Insert Line (Dip 3 Line)



For PB_Free (ROHS) Test Line



Test Line



Test Line



Quality Management



< Micro Inspection >

Selective Robot Soldering Line



Pointer Robot soldering



Ceiling type humidifying system



Squeeze blade and inspector



X-RAY inspection M/C



■ PBA water washing M/C and pure water maker



Coating system Line



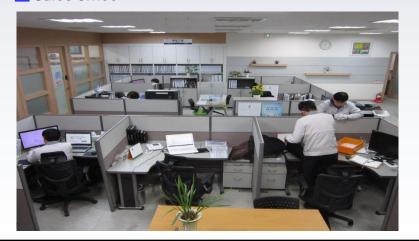
Customer Line



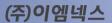
Customer Line



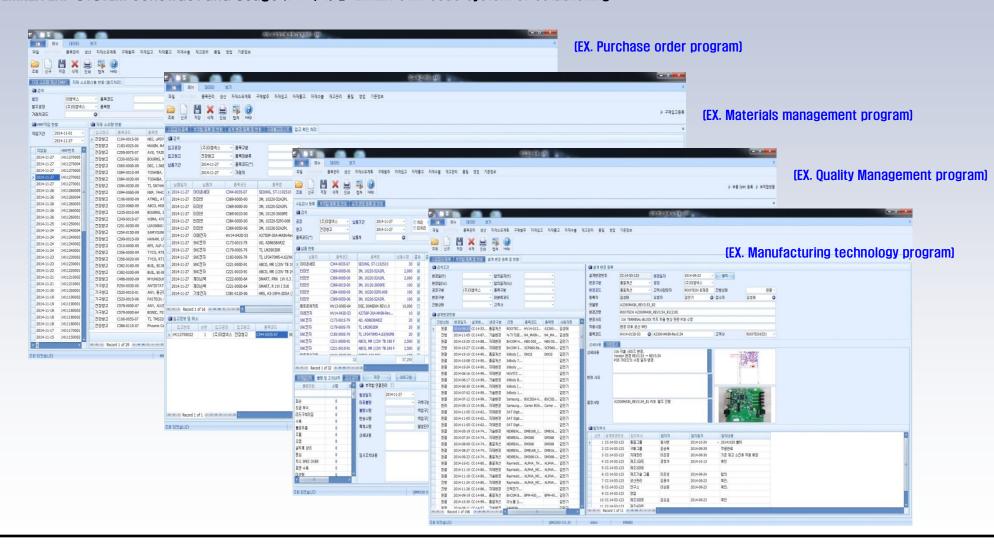
Sales Office







EMNEX ERP SYSTEM construct and Usage (example) _ EMNEX own code system of establishing.





7. Major Manufacturing Facilities

[1/2]

| | | | | (1,2) | | | |
|-----------------------------|--|--------|--|---|--|--|--|
| Division | Equipment name | Number | Equipment Maker | Etc (SPEC) | | | |
| | Standard type mounter (SMT) | 4 | Hanwha Techwin | SM471 (2 units), SM411 (2 units) | | | |
| | Multi type mounter (SMT) | 8 | Hanwha Techwin | SM482 (7 units), SM421 (1 units) | | | |
| | SCREEN Printer | 4 | Tenryu Seiki (Japan) | TSP-1200, TSP-600, TSP-550 (2 units) | | | |
| | Reflow M/C | 4 | Heller Korea | Heller MK1810 III (4 units), RoHS | | | |
| ONE Use | Solder cream checker (3D SPI) | 4 | Ko Young Technology | Aspire-3 (3D SPI) 1대, KY8020-2L [3 units], | | | |
| SMT Line
(4 Line) | Vision inspector (Included 3D AOI) | 3 | Ko Young Technology, MASS (Japan) | Zenith (3D AOI _In-Line), QUEST HDL_350, 650 [2 units] | | | |
| (4 Lillo) | Router | 1 | MS Tech | DPL-T (PCB cutting) | | | |
| | Nitrogen generator (N2) | 1 | Kyultron | N2 GENERATOR | | | |
| | Ceiling injection
Humidification system | 10 | Seil Ricoh | HU-CONSTM System, Humidity maintenance,
Installation all the field | | | |
| | Etc., equipment | 24 | NC Master, viscometer, squeegee blade washer, squeegee blade tester, Mask washer,
LCR Meter system, etc | | | | |
| IMT (Dip) Line | Auto Soldering Machine | 3 | Shin Myung | SAS-620 (2units), SAS600 (1 units) | | | |
| (Auto Soldering) | PCB washer | 1 | Aqueous (USA) | Pure water maker (DI WATER) and PCB washer | | | |
| (3 Line) | ICT M/C | 2 | OKANO(Japan), Samsung Electronics Co. | AT-01 (2 units) | | | |
| Robot Soldering Line | Selective Robot Soldering | 2 | InterSelect (Germany) | 2 port (Used fuel, Non fuel possible) | | | |
| (1 Line) | Pointer Robot soldering | 1 | MEIKO TECH (Japan) | 1 point Robot soldering machine | | | |
| Test / Assembly / | Function Cell Line | 10 | self-production | Inspection / Simple assembly process | | | |
| Packaging Line | ROOM for set assembly and Inspection. | 6 | Customer room | Specified customers room | | | |
| Automatic coating | 3 Conformal Coated System | 1 | PVA (USA) | 3 Conformal Coated Robot System | | | |
| system (1 Line) | Reflow M/C | 1 | Heller Korea | 7 zone reflow | | | |



| Division | Equipment name | Number | Equipment Maker | Etc (SPEC) (2/2) | | | |
|--|---|--------|--|---|--|--|--|
| Materials warehouse | Baking OVEN | 1 | Byum jin | Bare PCB dryer | | | |
| | Micro Dry | 6 | Seli Richo | Main material dehumidifier | | | |
| | High speed dehumidifier | 6 | Seli Richo | Main material dehumidifier (After opening rapidity dehumidification function) | | | |
| | Vaccum Packaging | 1 | JS pac | Vacuum packaging equipment | | | |
| | X-RAY inspection M/C | 1 | SEC | X-EYE5 100F | | | |
| | Microscope Inspector | 1 | SOME TECH | CAMSCOPE | | | |
| | 40 several magnifying microscope system | 4 | Sehyun Trading | Attach to Monitor function, capture possible | | | |
| | Radiation measuring instrument | 1 | SEC | | | | |
| | Thermal shock tester | 1 | Byum jin | -20~80 ° c (Medium Chamber) | | | |
| | Pressure tester | 2 | Dae Kwang | Withstanding voltage tester | | | |
| Inspector &
Environmental equipment | Digital tensile
strength meter | 1 | Yu Yu | Soldering removable test (component) | | | |
| | Large high
temperature chamber | 1 | ALL THREE | 0 $^{\circ}$ – 80 $^{\circ}$ (Large chamber, 400 x 300 x 250cm) | | | |
| | Temperature and humidity chamber | 1 | Byum jin | -20 ° - 80° (Medium Chamber) | | | |
| | Thermo-hygrostat | 6 | Kiturami (Heating / Cooling /
Dehumidification function) | PVU 50T7P1 (6 unit),
Lage Type (120 m²) | | | |
| | Static Tester | 2 | Shinhan High Tech | ESC-670 (Shoe Tester) | | | |
| | lon blower | 16 | DIT | For the removal of static electricity (2P, 3P) | | | |
| Other measuring instruments | Measuring instrument and etc | 60 | BGA REWORK equipment, Calibrator, label printer, AC, DC POWER,, Analog Tester, Oscilloscope, illuminometer, surface resistance meter, reel counter, static test (HANDY), etc | | | | |



8. Manufacturing Operations Plan

| Content | | 2017 yr. | 2018 yr. | 2019 yr. | The present | |
|------------------------------------|--------------------------------------|---|--|---|--|--|
| Equipment
and Line
operation | SMT Line (4 Line) | SMT, 4 Line operate1 Shifts | SMT 5 Line review2 Shifts review | SMT 6 Line review2 Shifts operate | 1) A, D Line; Standard type
2) B, C Line: Large type | |
| | DIP Line (3 Line)_ Wave | 3 Line operatePb (2) , Pb free (1) | 4 Line reviewPb (2), Pb free (2) | 4 Line reviewPb (2), Pb free (2) | 1) A, B Line : Pb Line
2) C Line ; Pb Free (ROHS) | |
| | Robot Solder Line
(1 Line) | 1 Line operateSelective (2), Pointer (1) | 2 Line reviewSelective (4), Pointer (2) | 2 Line operateSelective (4), Pointer (2) | 1) Robot solder line operation 2) All used for Pb/ Pb Free | |
| | Function Cell Line
(10 Line) | Function 10 Cell Line Test & Repair room | • Function 14 Line | • Function 17 Line | Function design Repair room (BGA Reball) | |
| | Set test & assembly (6) | Customer set room (6) (Set test & assembly) | • Customer set room (9)
(Set test & assembly) | Customer set room (9) (Set test & assembly) | Customer set room (6)
(space : 120 m²) | |
| | Automatic coating line | Auto coating system(1 Line) | Auto coating system(1 Line) | Auto coating system(1 Line) | 3 Conformal Coated
Robot System | |
| | Manufacturing | 50 | 60 | 65 | | |
| Man
power | Purchase / Materials | 9 | 10 | 10 | | |
| operation | Quality / Manufactuein
Management | 8 | 9 | 9 | | |
| | Manufacturing
technology (Eng.) | 8 | 9 | 9 | | |
| Total or | eration manpower | 75 | 88 | 93 | | |

9. Quality Process

Quality improvement 150 Operation

→ Progressing report: 1time/ Monthly

Quality improvement 150 Operation market faulty zero Component fault tocess fau 500 PPM process faulty 150ppm 500 PPI component faulty 1500ppm **Improve** quality Strengthen of preventive 150 plan activities and follow-up after mass production **Analysis & Improvement Tool** Market fau O PPN → Analysis by type – PARETO Chart → Management of trend -PPM management day by day **Activity Method** → Weekly quality meeting: every Friday → Progressing check meeting: 1time/ Monthly

Quality improvement strategy

- O Customers require, Quality is 'zero defect' levels.
 - → There is no defect in LOT but in case of one critical defect, require quality improvement report.
 - → In order to meet customer demand rather than simple 'bad reduction' requires uniform manufacturing.
- 1. Improve quality in development stage
- 2. Improve manufacturing quality
- 3. Customer quality satisfaction
- 4. One Team (strength cooperation among the members)

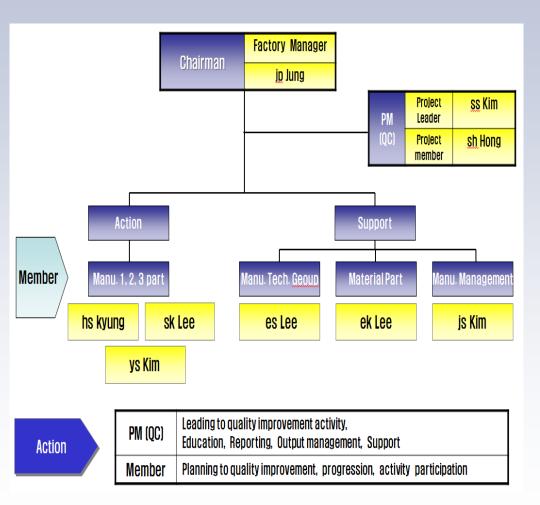
Human Resources

Technology

System

EMnex^{*}

Quality Improvement Promotion Organization



Quality improvement plan

Development ~ **Initial producs quality stabilization**

Initial quality stabilization of manufacturing products

- The time transfer production, Check the history and Issue point
- Share Issue point in development stage (quality, manu. technology, 1/2/3 part)
- When launching of new model products, Concentration for process quality

Manufacturing quality stabilization

Improve process quality

- Establish countermeasure to recurrence prevention from worst failure analysis
- Establish countermeasure after analysis, of the defect of operator error
- ① Operator quality awareness ② Check the system
- ③ Operation environment (3-way 5S) ④ Operator's body, psychological state

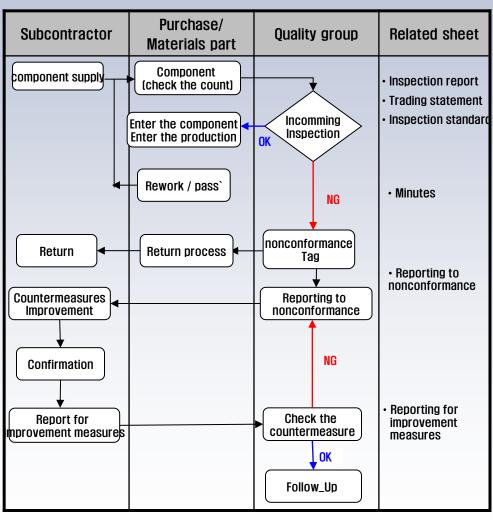
Customer Satisficaction

Establish a customer satisfaction process

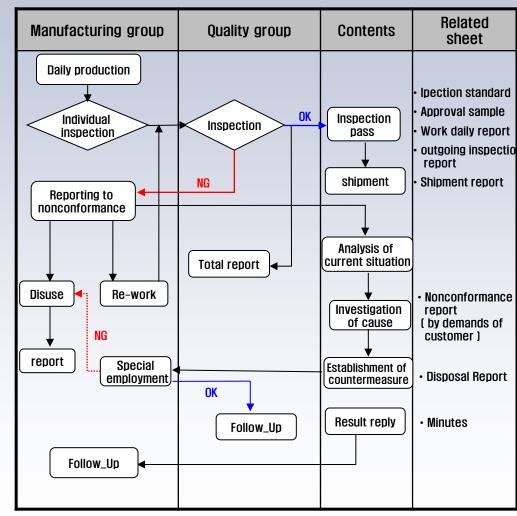
- Establishing a plan and improve problems by surveying customer satisfication.
- Establishing quality differentiation plan to applied to manufacturing line
- Establishing 3-way 5S operation plan to maintain manufacturing line need to ask the customer .

EMnex^{*}

Incomming Inspection Process

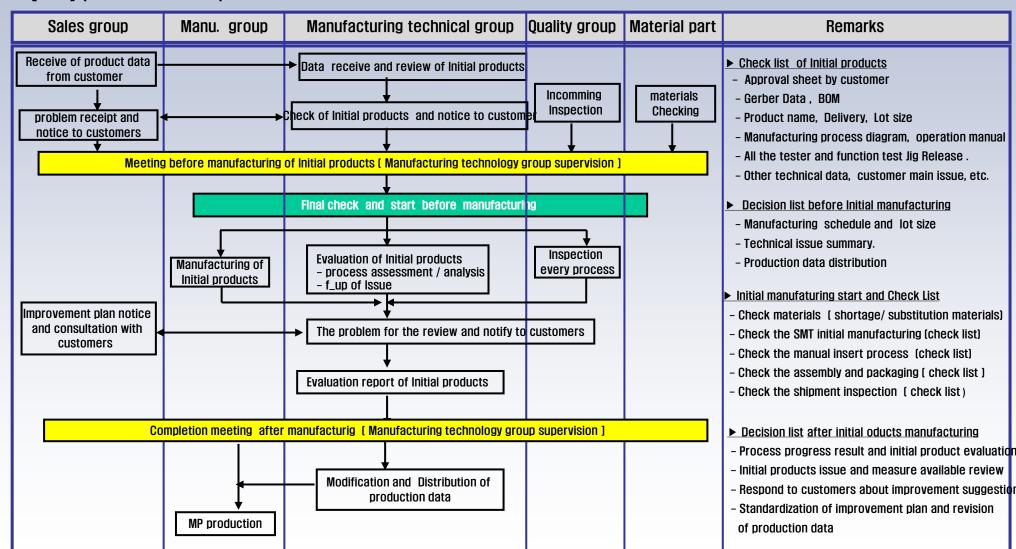


Outgoing Inspection Process





Ouality process of Initial products



A4(297*210)

EMnex

Check sheet for process flow (every lot)



Check sheet for Initial products

MNEX705-22

| J | 6 | 한탁기술
TECHNOLOGY
2014-11-26 | 초도품 | 성직 | 럭서 | | 신규 | 생산 | # N N N N N N N N N N N N N N N N N N N | # P!
Mekan
118 268 | | |
|-----------------------------|---|--|---------------|-------|--------|--------------------------------|-------------|--|--|--------------------------|--|--|
| 모델명 HTMC502J-MVB-Rev.B LOT수 | | | | | | 46 | | | 유 | 연납 | | |
| 11. | 고객사 | 한터 | 기술 | Line | B-Line | | | 검사지 | 김 | 김상순 | | |
| NO | | Chec | k 사항 | | OK | NG | 해당없음 | | 비고 | | | |
| 1 | 기술변경 및 | 생산자료 (PL, 작 | 업지도서) 최신VER | 확인 | 0 | | | VER: (HTMC502J-MVB-Rev.B) | | | | |
| 2 | PCB 외관불 | 량(패턴 벗겨짐, 휨 | , 오염) 없을 것 | | 0 | | | | | | | |
| 3 | PCB 피듀셜 | 마크, Guide V-Co | rt 누락 없을 것 | | 0 | | | | | | | |
| 4 | PCB 극성 Si | ilk Print 오류 없을 | 것 | | 0 | | | | | | | |
| 5 | SPI 과납, 소 | 납, 틀어짐 등 없을 | 를 것
- | | 0 | | | | | | | |
| 6 | 부품 미출 시 | 기고객사 승인 여부 | 후 확인 | | | | 0 | | | | | |
| 7 | 부품 Packa | ge 오류 없을 것 | | | 0 | | | | | | | |
| 8 | 부품 Spec 5 | 오류 없을 것 | | | 0 | | | | | | | |
| 9 | SMT 미샵 이상 없을 것 | | | | | | | R55,R56,R57
BOTTOM - | R1,R17,R31,R5
7,R58,R62,R64,R
C40,R83,R84,R8
L06,R108,R111) | 66, | | |
| 10 | SMT 오삽(I | 피더검사) 이상 없 | 를 것 | | 0 | | | | | | | |
| 11 | SMT 역삽(= | 극성) 이상 없을 것 | i. | | 0 | | | | | | | |
| 12 | PCB 랜드 대비 자재 Package 오류 없을 것 (납땜 상태) | | | | | | | | | | | |
| 13 | 마스크 개구부 사이즈 대비 랜드 오류 없을 것 | | | | | | | | | | | |
| 14 | 핸들링(수탑) 실장 POINT 이상 없을 것 (중점관리 POINT) | | | | | | | | | | | |
| 15 | 컨베이어 통과 후 PSR 벗겨짐, 오염등 PCB상태 이상없을 것 | | | | | | | | | | | |
| 16 | BGA 오샵 , 역샵 , 미샵 , 들똠 등 없을 것 | | | | 0 | | | XC3S1400AN-4FGG676I (U4)
AT91SAM9260B-CU (U5)
XC3S1400AN-4FGG676I (U4) | | | | |
| 17 | BGA 외관상 | 태 (팝콘 및 IC 칼 | 라짐) 이상 없을 것 | | 0 | | | | N-4FGG676I (I
260B-CU (US) | J4) | | |
| 18 | QFP 부위 소 | 납, 쇼트, 납젖음성 | 성 이상 없을 것 | | | | 0 | | | | | |
| 19 | Oscillator = | 극성 이상 없을 것 | | | 0 | | | SCO-103A | 24MHz, 3.3VD | C (OSC1) | | |
| 20 | LED ME A | 백상 , 납땜 상태 이 | 사 어유 거 | | 0 | | | SSC-GR101 ; Green | | | | |
| 61133 | - 100 | | | | 1000 | | 1 | (LD1,LD2,LD | 3,LD4,LD5,LD6, | LD7,LD8) | | |
| - | | | 재 시 냉땜 여부 확 | 인 | 0 | | | 8 | | | | |
| 22 | 매거진 간섭 | 으로 인한 PCB 표 | r손 없을 것 | | 0 | | | | | II IPA | | |
| 23 | HEADER PIN 부품 리드 평탄도 이상 없을 것(냉땜 확인) | | | | 0 | | | A2-6PA-2.54-DSA 2.54mm (HD1)
A2-2PA-2.54-DSA 2.54mm (HD2)
A1-20PA-2.54DSA,2.54mm (HD3) | | | | |
| | 점관리항목
계사 요구사항) | 2. 유사 부품 주의.
TPS78601DCQ [Re
TPS78618DCQ [Re | | | | | | | | | | |
| NO | | 문제점 | 임시조기 | Ч | 7 | 선 요청시 | 향 | 담당자 | 참고자료 | 개선여부 | | |
| 1 | AT91SAM926
1번 표식 IC상
작업시 실장 위 | 에 2개가 존재하여 | Mouser 실물 확인후 | 실장 진행 | 정품자재 (| 인지 확인 1 | ■ Ω. | | | | | |
| 2 | Crystal SSP-Ti
현품표 없이 4
용량값 표기가 | | 사급자재 | | | 현품표 부착 및 용랑값등
정확한 정보 기입 요청. | | | 1000 200 | | | |

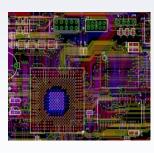
(주)이엠넥스



10. Design & Technology







| _ | | | | | | | | | a |
|-----|---|-----|-----|-------|---|----|----|-----|---|
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| DI. | к | -41 | TIA | // 1/ | ĸ | | | | 4 |
| ıu | | ш | LVI | ıuı | N | ıu | UO | чп | ı |

- NX7/ NX70/ NX700 PLC PCB ARTWORK
- □ ROBOT Controller PCB ARTWORK
- ☐ Servo Driver PCB ARTWORK
- □ OLED Encapsulation Inkjet driver (SG1024)
- ☐ LCD Encapsulation Inkjet driver (V1, V2, V3)
- ☐ Elevator controller board
- **☐ SMART GLASS Controller**

Inspection equipment and function jig

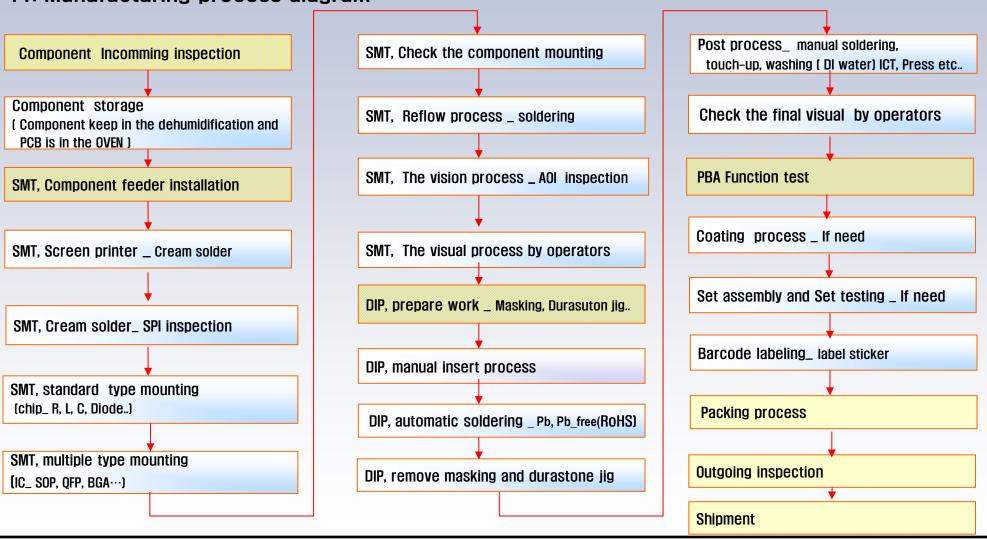
- ☐ PLC positioning module inspection equipment
- ☐ Firmware download Jig design
- ☐ Inkjet driver function jig design
- ☐ Elevator controller function jig design
- ☐ LED Power mass production process jig design

Plan and Engineering (technology)

- oxdot NX70/ NX700 PLC Enginering and CE/ UL approval
- ☐ I/O ASIC Development (circuit -> FPGA -> ASIC)
- ☐ Ultrasonic docking control module development.
- ☐ EtherCAT I/F & SERCOS module engineering
- □ Phase control B'D engineering
- ☐ AGV control system engineering
- Laser detector control system engineering
- ☐ Ultrasound Docking B'D development.
- □ OLED Inkiet driver (SG1024 driver) engineering
- □ LCD Inkjet driver (Jet driver V1, V2) engineering
- □ OLED Inkiet driver (Jet driver V3) engineering
- Elevator controller board development.
- ☐ SMART GLASS Controller development.
- ☐ LED Power module development.
- □ OLED KM Driver (KM V1,V2,V3) engineering
- ☐ Pulse DC Generator development .
- □ etc

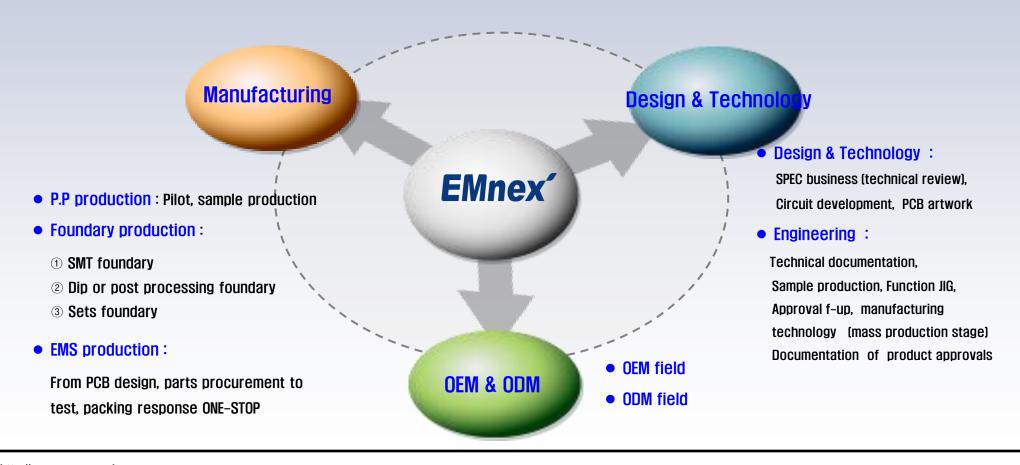


11. Manufacturing process diagram



12. EMNEX Business

EMNEX is capable of handling PCB artwork, parts purchase, assembly (SMT_ DIP process), testing, set assembly, packaging, and it supports from small lot production to mass production as below.



etc.. (subsidiary facility)



Cafeteria





Table tennis court

Place of education

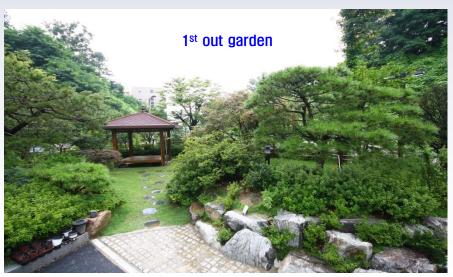
Women's rounge

















㈜ 이엠넥스

www.emnex.co.kr

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TEL: 031-8003-5947 FAX: 031-8003-4715

찾아오시는 길

* 고속도로 이용시

경부고속도로(서울방면) ▶ 기흥IC ▶기흥단지로 42m 직진 ▶기흥TG 앞 사거리(삼성2로 수원,오산(서울)방면으로 우회전 후 1.7Km이동 ▶ 삼성2로 지하차도 진입 후 1.1Km이동 ▶고가도로 진입전 우측방향(동탄방향) ▶반월삼거리(삼성1로 동탄 신도시(오산)방면으로 좌회전 후 142m 이동 ▶ 삼성1로 5길 우회전 후 688m이동 ▶ 이엠넥스

경부고속도로(부산방면) ▶ 기흥동탄IC ▶ 기흥 동탄 방면으로 우측 고속도로 출구 ▶ 수원기흥 방면으로 좌측 방향 ▶ 지하차도 우측 옆 ▶이마트 사거리에서 우회전 삼성화성캠퍼스(반월사거리방면) ▶ 삼성 1로 500m직진 ▶IT단지(변전소)에서 좌회전 ▶ 삼성1로 2길 566m 직진 ▶ 우회전 후 166m 이동 ▶ 이엠넥스

*국도 이용시

수원방면 ▶ 망포사거리 오산 동탄 방면으로 우회전 ▶ 약 800mm 직진 ▶반월교차로 (빅마트) 동탄 방면으로 좌회전(삼성1로)약792m 직진

- ▶고가도로 진입전 우측방향 (동탄방향)
- ▶반월삼거리 동탄신도시(오산) 방면으로 우측방향 ▶약 180m이동
- ▶ 삼성 1로 5길 우회전 후 688m 이동 ▶ 이엠넥스



