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# *Icom Factory Tour*

*Wakayama, Japan – November 5, 2010*



**Adam Farson VA7OJ**

# *APDXC and Icom*



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- Attendees at the Asia-Pacific DX Convention (APDXC 2010), held in Osaka, were invited to tour the Icom manufacturing plant in Wakayama, about 100 km SW of Osaka. The tour took place on Friday, November 5, 2010.



# *Icom and APDXC 2010*



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- Icom are the official sponsor of APDXC. Mr. Tokuzo Inoue, JA3FA, Founder and Chairman of Icom Inc., was the patron of APDXC 2010.



In exalted company: Shigeru Ueda JO3BAV, the author, Mr. Inoue and Johnny Siu VR7XMC

# *A few facts*



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- Icom is a rare example of an electronics manufacturer that has not shifted production to lower cost countries, but kept its production base 100% in Japan. All Icom radios are built in Japan.
  - Main product lines are: land-mobile, amateur, marine (VHF & HF radios, radar), aeronautical (VHF) and wireless LAN.
  - The Wakayama Icom plant has an advanced production system to produce small volume/multi-model radio-communication products.
  - 330 highly-trained production employees turn out 130,000 units/month in a highly-automated manufacturing facility.
  - The factory has eight automated production lines. A line can be switched from one product to another in as little as 5 to 12 minutes.
  - Icom's R&D organization employs 270 engineers.
  - We were given free access to the assembly line area and allowed to take all the photographs we wanted.

# *The Icom production facilities*



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Arida Factory



Kinokawa Factory

**We visited the Kinokawa factory.**

# Product showcase



- Small product showcase in factory lobby.





# *Introductory talk*

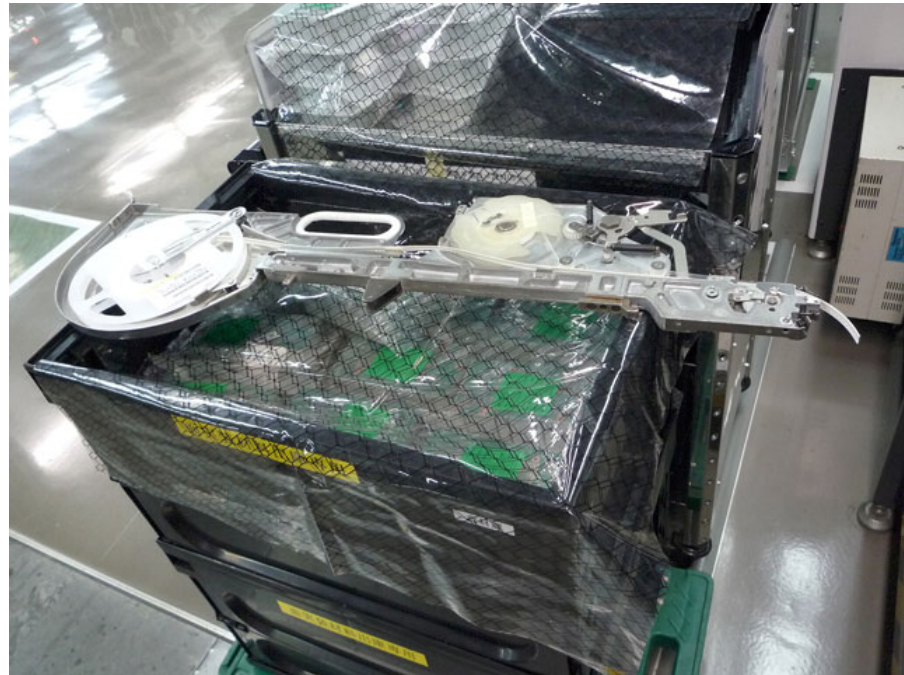


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- The factory manager gave a short introductory presentation on Icom's manufacturing capability and philosophy. The interpreter is to his left.



# Automated component handling

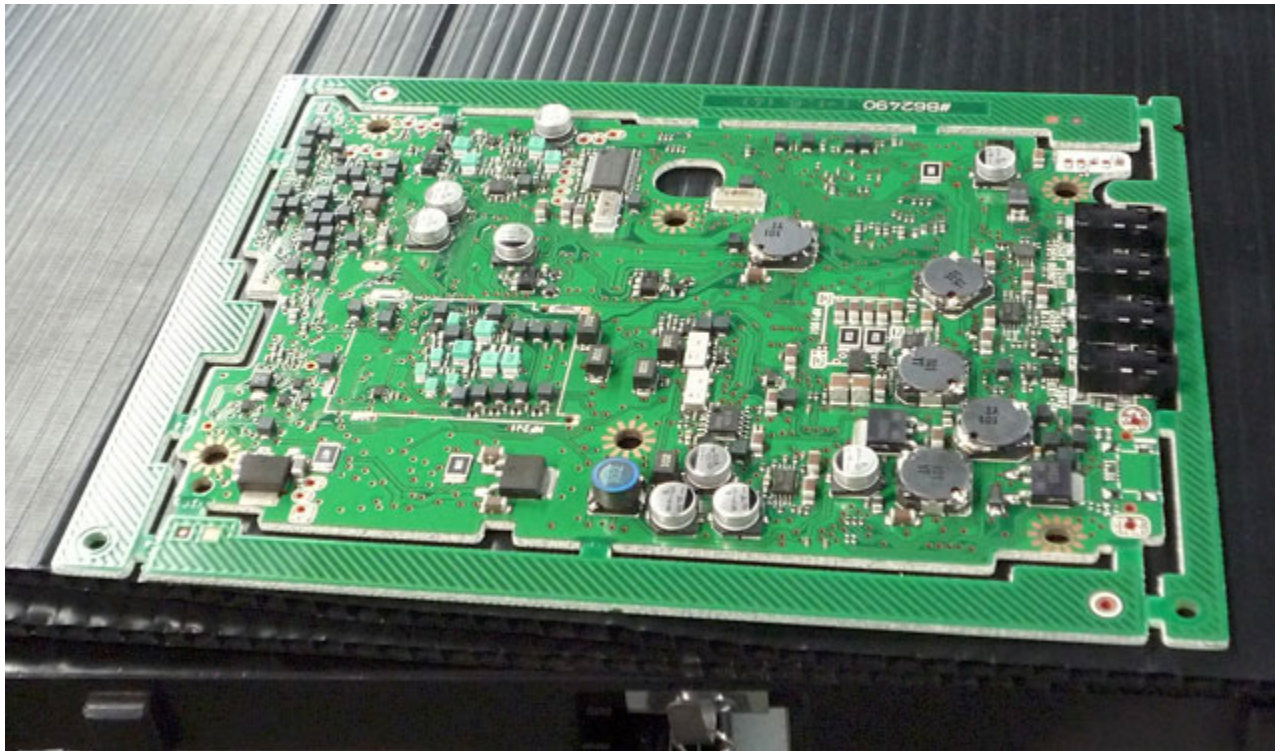
- All components, from grain-of-sand-sized SMT diodes to small integrated circuits, are delivered on Mylar tape spool cartridges.





# *Typical main radio board*

Once populated, the board will be separated from its surround and mounted on a chassis by robot machines.



# *Overall view of production floor*



- The technician is loading a tape cartridge into a board-stuffing machine.

The steam-jets in the ceiling maintain the correct humidity level for ESD suppression.

The automated PCB stuffing machines pick parts off the tape, then place the parts on the circuit board which has previously been wiped with solder paste.



# Automated component handling systems



- Component tape reels are being loaded for Line 2.





## *A view of Lines 1 and 2*

On left: Inspection machine,  
then a row of SMT board-  
stuffing machines



# *Rack of completed boards*

The boards produced by the PCB-stuffing machines are loaded into racks that are delivered by robot carts to the correct position on the assembly lines.





# Real-time status displays

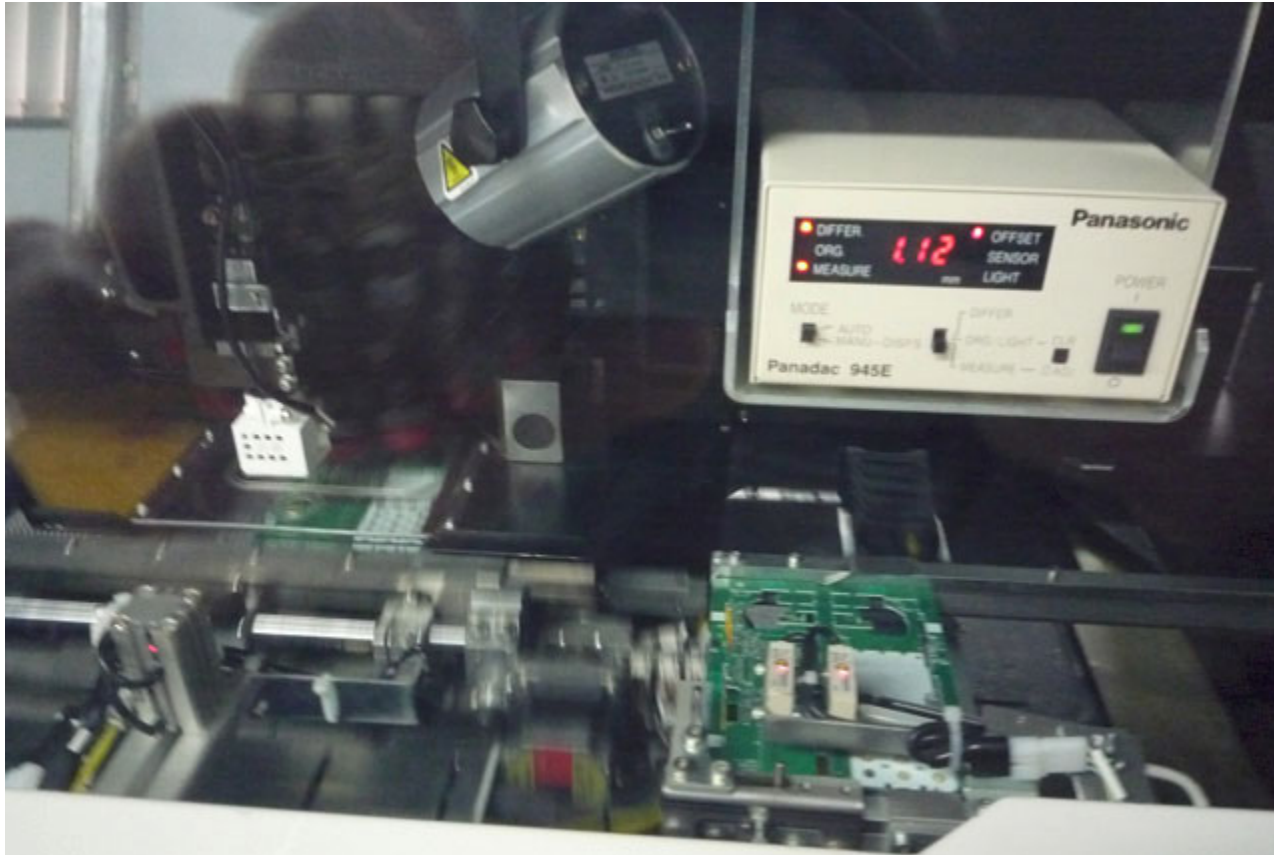


The clock displays number of minutes/hours that the line has stopped.  
12:00 denotes beginning of stopped interval.

Line status display.

Johnny VR2XMC at the line status board. The displays show start & run times, error counts, product model, line manager ID etc.

## *Board-stuffing machine in action*



## *Control computer for board line*



**Panic button!**

# *X-ray board inspection machine – scans for soldering/assembly defects in multi- layer PCB's.*



The machine is totally enclosed in a leaden cabinet.





# *Mounted PCB inspection machine*



Inside detail showing board in test



# *Detail of anti-ESD steam jets*

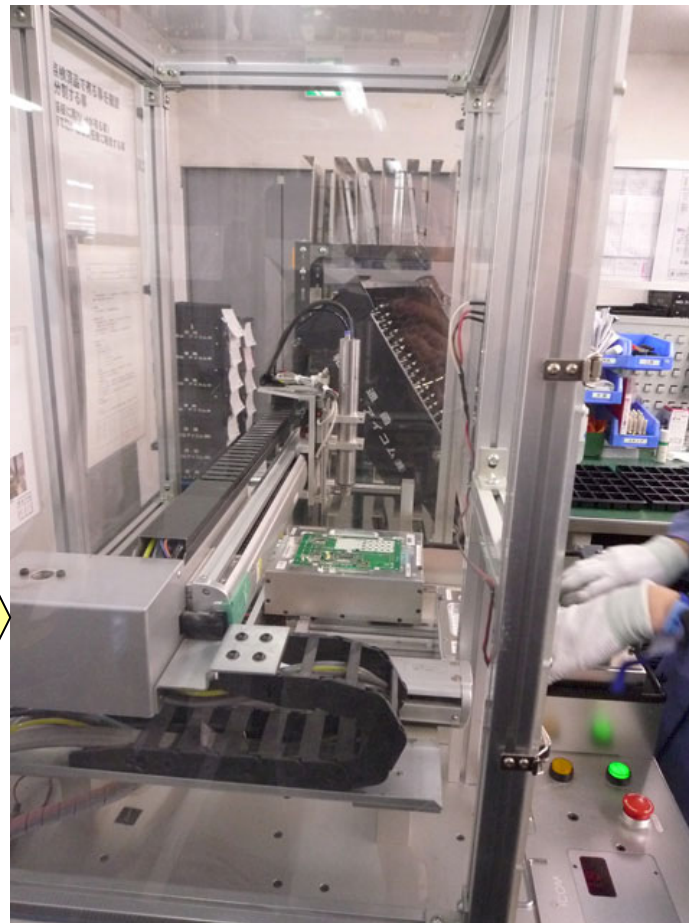


# Automated HT assembly



HT PCB  
prior to  
insertion  
in auto-  
assembly  
machine.  
Surrounds  
will be cut  
off.

HT PCB fed  
into the  
machine for  
radio  
assembly.



*"Come ride with us, Robbie."*



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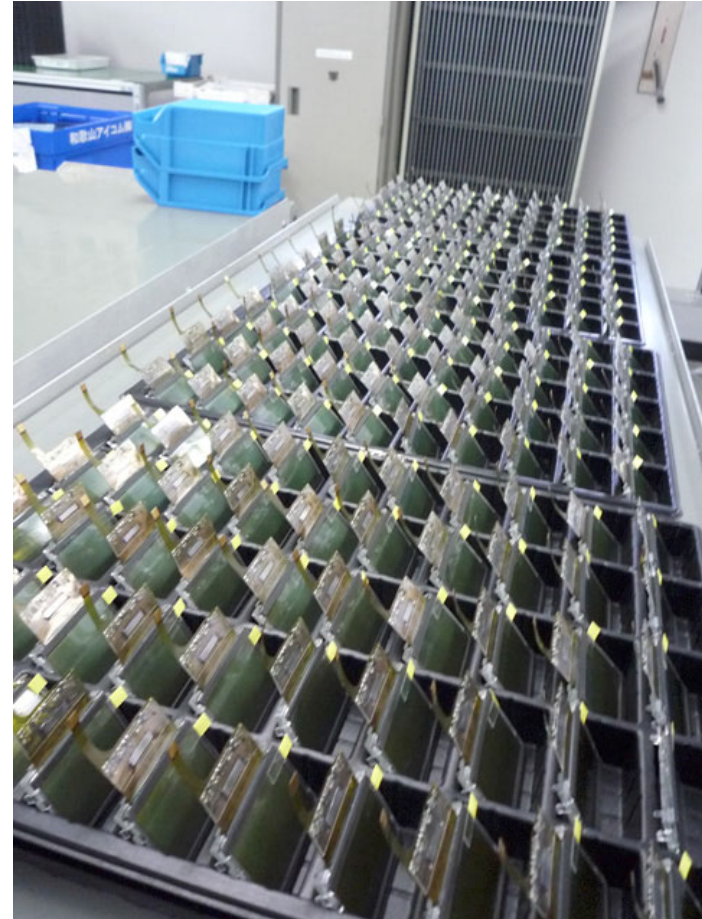
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# *Anti-ESD vacuum cleaner*

## *and completed PCBs awaiting their chassis*



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# *Final assembly area*





# *Final test/inspection area*



# *IC-718 front panels awaiting mounting on radios*



# *Chassis assembly robots:* *loading and operating*



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## *A busy corner of the final assembly/test area*



# *Final alignment of HT chassis*





# *Final alignment bench*

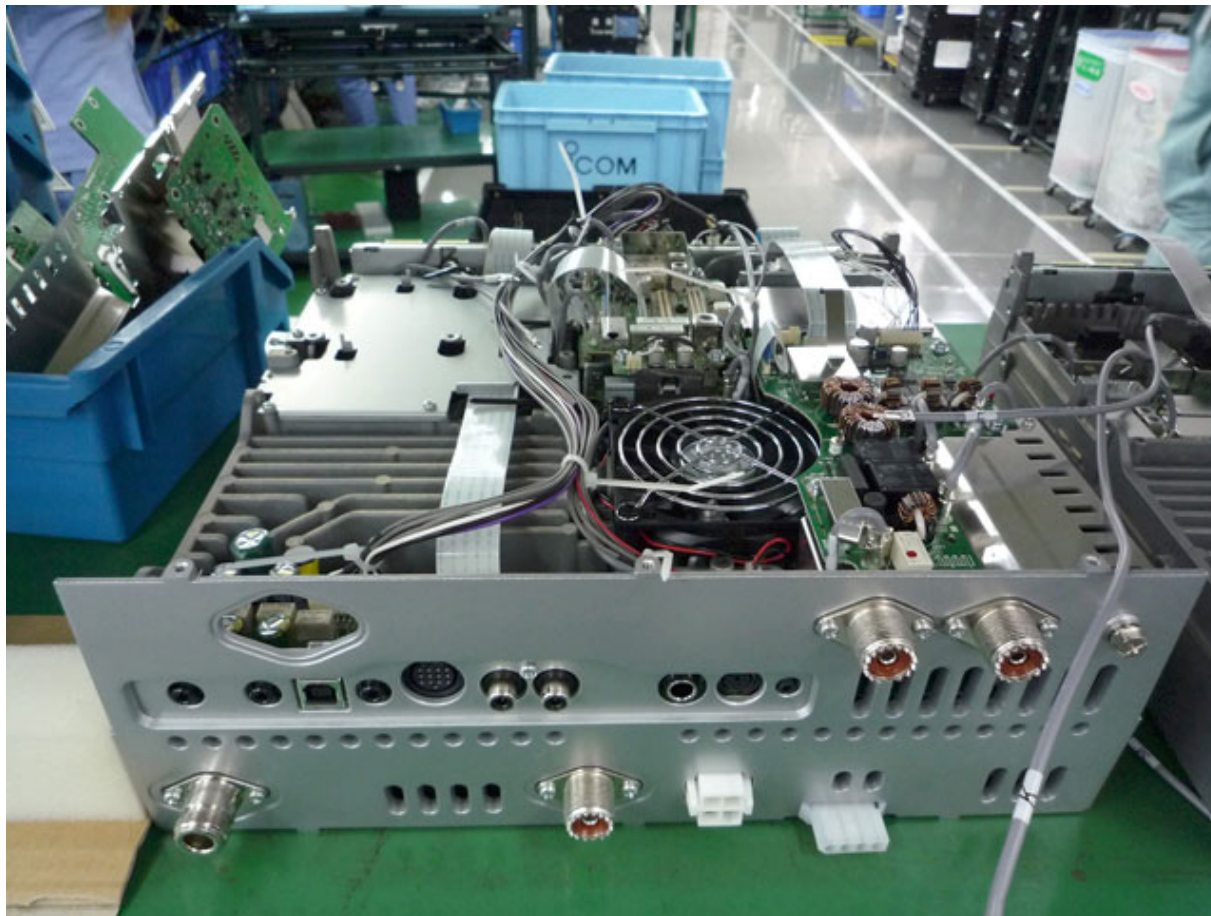


# *IC-9100 chassis*

*partially assembled*

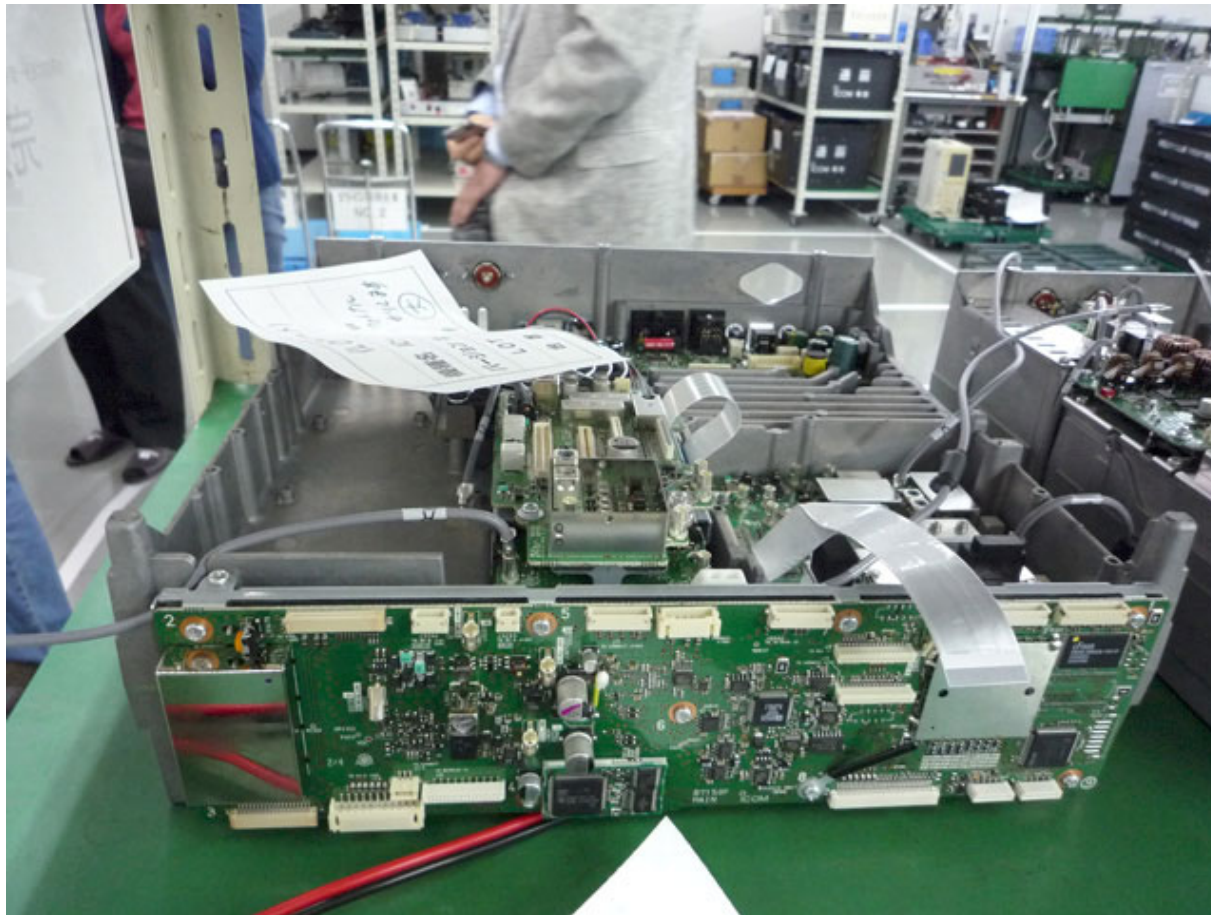


## *IC-9100 chassis, rear view*



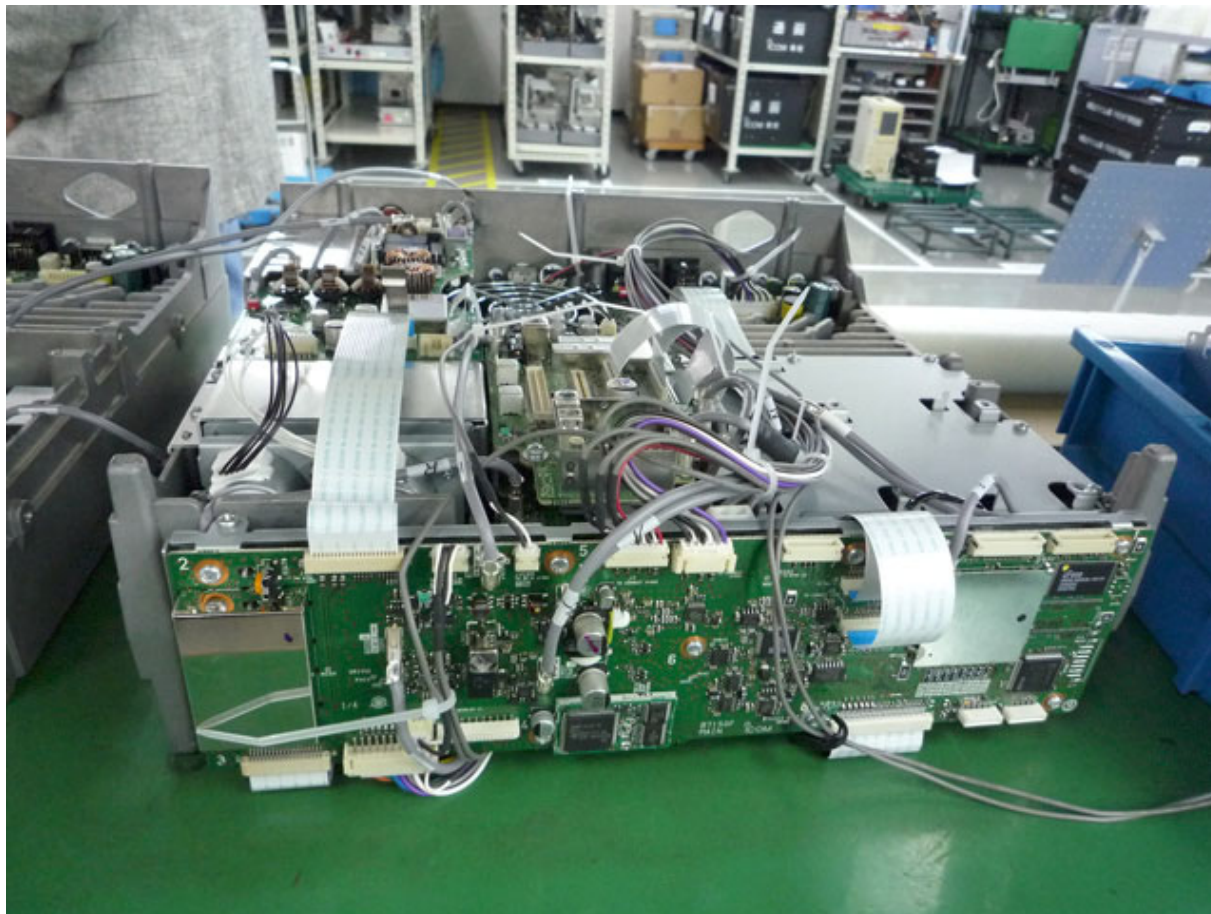


# *IC-9100 chassis, front view*

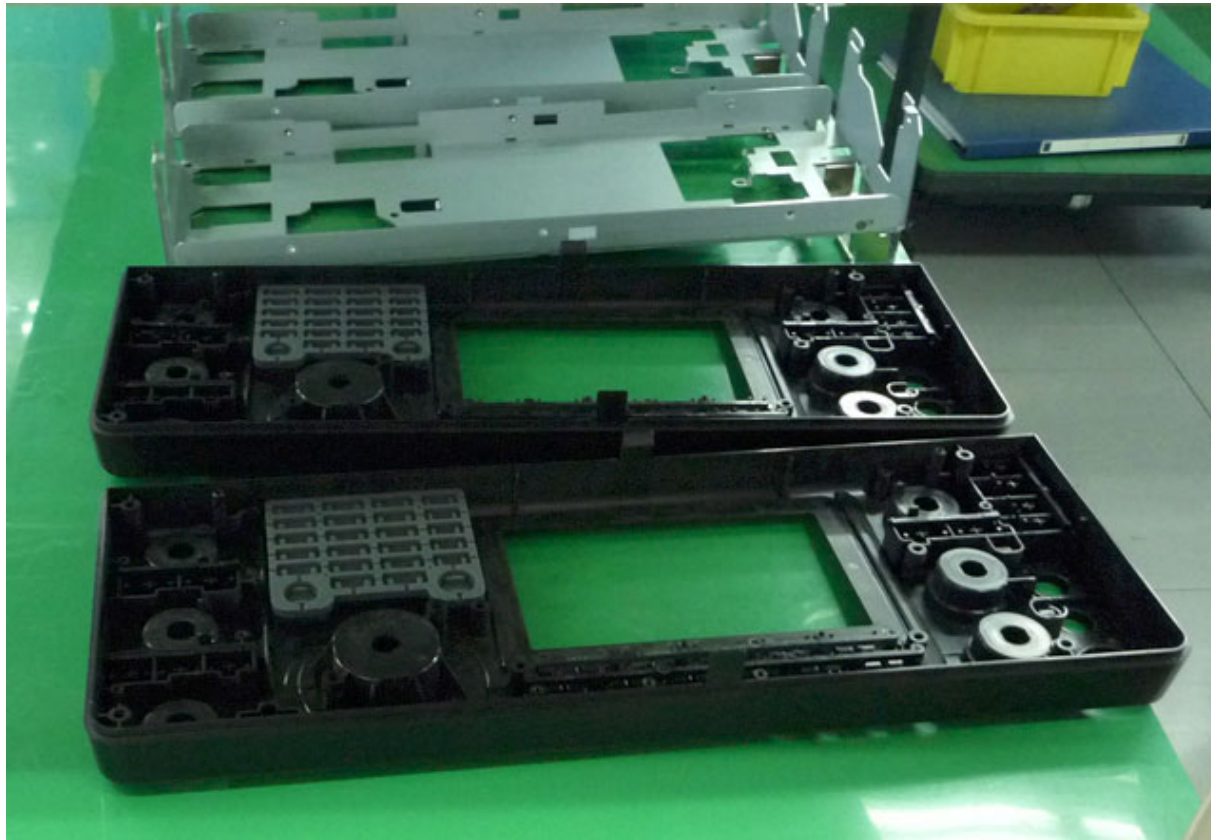




## *IC-9100 chassis: sub-assemblies added*



## *IC-9100 front-panel mouldings*



# *Chassis fan installation*





# *An RF test position*





*Packaging area: individual radios are packed in their cartons*



*“Ship it, guys!”*



# *The package conveyor*





*Carton-sealing robot: sealed cartons are loaded onto a mobile robot, which takes them to the stockroom*



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# *The stockroom (warehouse area)*



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# *Related activities*



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- At the end of the tour, we were taken to Icom's corporate HQ in downtown Osaka for a meeting with engineers and managers in the Amateur Products Division.
  - We were shown an exhibition of Icom products in the lobby, and then taken to a conference room where we viewed a presentation on Icom's new RS-BA1 remote-control software suite. We also had an opportunity to participate in a Q&A session with Icom engineering staff.
  - Our day concluded with a superb welcoming party and buffet at International House, Osaka-Uehonmachi, hosted by Mr. Inoue.
  - The following Sunday, Johnny Siu VR2XMC and I attended an IC-9100 Dealer Preview at Icom's Nipponbashi office in central Osaka.

# *Icom HQ, Osaka*





# *Lobby exhibit of Icom products*



# *Part of Icom "mini-museum"* *also in HQ lobby*

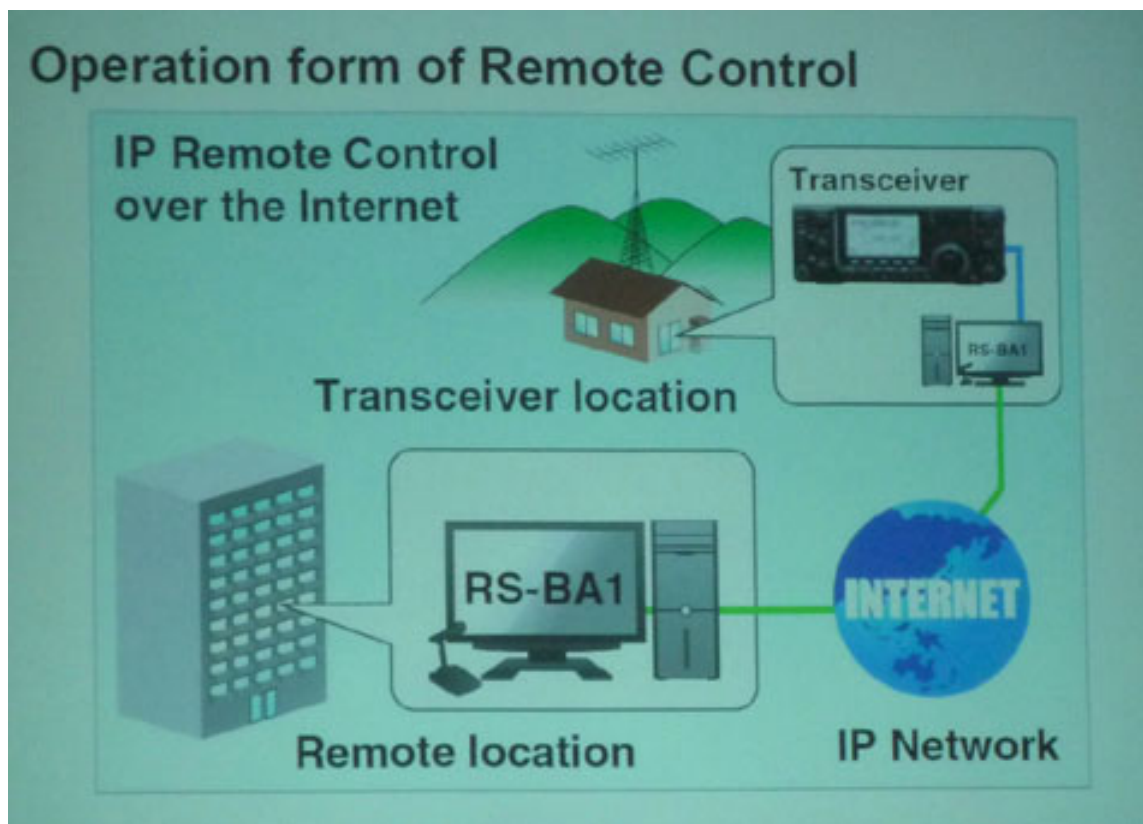


# *In the conference room*





# RS-BA1 slide showing remote control via Internet



# *Johnny Siu VR2XMC operating the IC-9100 at the Osaka Dealer Preview*



*"It's my turn!"*





# *RS-1BA Remote Control Suite*

## *demo at the Osaka Dealer Preview*



# *Thanks for watching!*

*Future presentation: "Japan"*



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