3. The Japan Radio (JRC) receivers

The company was founded in 1923 and changed its name to Japan Radio during the war.

JRC is a major general manufacturer of communication equipment, and we are familiar with their amateur receivers such as the most recent NRD-535 and -545.

This company, JRC, has a majority share in Japan of the transmitters and receivers used in the business stations where we receive signals, and many users around the world are familiar with them. They are highly famous.

The company was established in 1915 as the "Anonymous Association Japan Radio Telegraph Manufacturing Co." , and has evolved into the current Japan Radio.

The founder is the "enemy ship viewing" radio telegraph issued from the disguised cruiser "Shinano Maru" (a cargo ship equipped with a cannon) during the Battle of the Sea of Japan (1905).

Mr. Shunkichi Kimura, a famous former naval engineer, was in charge of ordering and developing the machine, which was manufactured by Anritsu's predecessor, Annaka Electric Manufacturing Co., Ltd., and Wireless Telegraph News Agency.

The owner is Mr. Kashima and others.

The instantaneous spark type wireless telegraph of the Japan Radio Telegraph Manufacturing Co., Ltd., an anonymous association, differed from the transmission type of the time and was based on that of Telefunken.

It was called the "Nippon Radio" style.

In 1917, the company began manufacturing and selling receiver vacuum tubes, and delivered the first civilian vacuum tube receiver to Tatsuma Kisen's Kureha Maru. Big.

In 1924, the company entered into a partnership with Germany's Telefunken and acquired the license to the company's patents. In 1925, domestically produced

They delivered transmitters and receivers using vacuum tubes to the Central Meteorological Observatory at the time.

During the war, the name was changed to Japan Radio, and after the war it was converted to civilian use.

The name was changed to the current Japan Radio Co., Ltd. in 1942 during the Pacific War. Before the war, government supplies were the main focus, and during the war, Japan's Telefunken Company developed a domestically produced radar, which was used exclusively for military purposes.

After the war, the company expanded into the production of consumer radios, but was overtaken by specialized manufacturers such as Matsushita and soon withdrew from this field. Also, food

The company has re-entered the production of fishing radios, which had been temporarily suspended due to the rapid expansion of fishing boat production due to increased production. In 1946, in the Southern Ocean.

For the resumption of whaling, Nippon Suisan's "Hashidate Maru", "Settsu Maru", "Tadotsu Maru", and Otsuka were hired for their experience in manufacturing radio equipment from the prewar "Tunan Maru" fleet.

Received a bulk order for the whaling fleet radio communication equipment and direction measuring equipment for the ocean fishing vessels such as the Nisshin Maru and Kinjo Maru, as well as the Tamae Maru for its next voyage.

Ta. Overcoming difficulties such as post-war material shortages, power shortages, and labor-management conflicts opposed to whaling, the project was successfully delivered within an extremely short delivery time of three months. during wartime.

It was also equipped with a naval radar, which proved effective in detecting icebergs under bad weather conditions. During the war, the person in charge of this whaling fleet project

Mr. Seiichi Tsuda, who was involved in the domestic production of Germany's Wurzburglader, was in charge.

After that, the company expanded its sales activities for marine radio equipment. In addition, domestic fishing radio stations, etc. (Mie Prefecture Owase Coastal Station, Mie Prefecture Fisheries Radio Station, Kesennuma.

Complete design of fisheries radio stations, Fukushima prefecture fisheries radio stations, Kagoshima prefecture fisheries radio stations, Shiogama fisheries radio stations, Aomori prefecture fisheries radio stations, etc.), Indonesia.

We receive orders for overseas radio stations such as Australia, Colombia, Saudi Arabia, and Western Samoa communication systems, as well as make-to-order manufacturing for government offices and ship equipment.

We have expanded our market share within the market. They secured a 43-75% share in the first to fourth stages of planned shipbuilding after the war.

After the war, radio equipment was installed on reparation ships destined for Indonesia and the Philippines, the export of marine radio equipment increased with the expansion of ship exports, and with the establishment of locations, etc., the company has developed into one of the leading manufacturers of marine equipment in the world. In the GMDSS era, ships.

In addition to station equipment, we have also received orders for coast station systems from Taiwan, Saudi Arabia, etc., and we are the GMDSS company in the world, excluding Europe.

It boasts an approximately 60% share of compatible coast station equipment. Recently, their computerized GMDSS Sea Cliff Station in Dalian, China, etc. We have received orders.

Telefunken, which the company looked up to as a mentor, withdrew from the shipping industry, and Collins sold itself to Rockwell, and now JRC's commercial receivers are the envy of enthusiasts in the United States and the United States, but older receivers such as NRD-1, 2, 3, and earlier.

The reality is that detailed information is hardly known even among overseas enthusiasts.

If we look at the history of JRC's postwar receivers, we can clearly see the development of recent receivers. The model of JRC's receiver is known.

The items are shown in the table. The table also lists main/auxiliary receivers, remote-only equipment such as coast stations, and Self-Defense Force specification equipment.

The NRD-500 series

We also incorporate professional technology into amateur receivers, including their PA (inboard command loudspeaker) monitor receiver and auxiliary equipment for use on ships.

It has been included in this document because it is used as a commercial machine as a receiver, a fishing radio station, and a monitor receiver in a communication forest.

The appearance, overview, system diagram, performance, etc. of the main models among these are shown on the following pages.

The Japan Coast Guard model names for NRD-2, -15, and -75, which are designed for the Japan Coast Guard, are not known, so the civilian model names are used. to this matter I would appreciate it if you could provide me with information.

Single Super's best-selling NMR-1013 series and Ueda Japan Radio.

Many of the post-war single super machines had poor temperature stability, and you couldn't take your hands off the dials. Temperature compensation of local oscillator circuit NMR-1013 was developed in 1953. At the same time, they also released NMR-1014 and 1015.

These devices were produced in large quantities, mainly for fishing boats, and continued with almost the same appearance until the late NMR-1030. A total of approximately 3,000 units were produced.

It was the company's best-selling receiver, along with the NRD-1. Production was handled by Ueda Japan Radio in Nagano Prefecture, and has continued to this day.

It maintains its position as JRC's main receiver factory.

Motoiso is produced under license by Collins.

The establishment of JRC's current receiver technology is due not only to the company's technical and sales capabilities, but also to the R-388/51J-, the famous machine created by Collins.

It was produced under license for the Self-Defense Forces in 1954 as the receiving part of their JAN/GRC-26, and the company's technology was fleshed out.

This is due to the development of

After that, they produced copies of R-388/51J-3 (JR-388, NMR-240, NRD-240B /S / NRD-143, RS12) (Ueda Japan Radio), thoroughly mastered its circuit technology, manufacturing technology, and how to use the PTO.

I think one of the major factors is that they have been able to make use of it in their later receivers. Regarding domestic licensed production of R-388/51J-3, Anritsu also went there.

Their NRD-103 (1958) basically utilized the circuit configuration of the 51J-3 and was able to quickly set frequencies in the MHz digit.

(Completed in 2010), it was used as the main receiver of radio wave control stations (radio wave control station specifications), ship stations, and fishing radio stations in various places. This unit is in the MHz range.

Its most distinctive feature was its elaborate mechanical mechanism, with push-button settings and a counter-type dial display.

Standing alone from Collins NRD-1.

The next generation of receivers was the NRD-1 series, which was produced in large numbers as a standard type receiver for JRC in the 1960s.

Ru. It was announced at the company's exhibition on March 4, 1965. This NRD-1 inherited the basic configuration and PTO of the Collins 51J-3,

The following features and improvements have been made:

NRD-1 was a complete receiver for its time, including NRD-1/ A/ 1B/ 1BF/ EA/ EB/ ED/ EG/ EL/ EH/ 1ED/ EK/ 11E,

There are many versions such as their ORR-10B with Self-Defense Force specifications and special order diversity specifications, and it was used as a receiver in the 1960s.

It secured a large market share and was also used at the Showa Base in Antarctica and the mammoth tanker "JHBD Idemitsu Maru." Power the unit to the base.

It was also adopted as the receiving section of the monitoring receiving device of the wave control station. Production is carried out by Ueda Japan Radio, a subsidiary in Nagano Prefecture, and inspection is carried out by Sansan.

It was held at the Taka factory. The NRD-1 was the model with the highest production volume among the company.

The remote control receiver NRD-36 (for A3 only) of the NHK Yachiho Foreign Broadcasting Receiving System is also based on the NRD-1 and is remote controlled.

It was designed to be a synthesizer for use.

Characteristics of NRD-1

• The panel design is similar to the Collins type, but the MHz/ 100KHz range is displayed on a horizontal dial for easy viewing.

• The dial is equipped with a motor drive instead of a manual one, allowing for quick settings to distant frequencies.

• The front-stage coil is double-tuned to improve the image signal ratio and suppress spurious, and eliminates the antenna trimmer.

• The coil is of JRC's unique turret wafer type, making it possible to shorten and shorten the RF wiring and replace each coil wafer. This makes it possible and improves maintainability. (During development, they conducted over 100,000 band switching tests)

• Due to the IF limiter method, the beat sound at A1 is almost constant regardless of the signal strength.

The transition to semiconductor devices started with NRD-3.

In 1967, they introduced their NRD-2, which was a cost-reduced version of his NRD-1, for use on fishing boats and coastal vessels, and in 1967, they introduced the first RF.

The NRD-3, which was made into transistors except for the first stage (the first stage was a microtube nuvistor), was developed and used on domestic vessels such as Seikan ferry and fishing boats.

This unit uses an emission method in which the filter/AGC is also set in conjunction with the radio wave format setting, and in CW mode AGC is turned off.

The NRD-5 (completed in 1962) was developed as a semi-synthesizer (Wadley loop) system with an emphasis on stability in response to the SSB era.

It was developed for the first time by JRC and used on nuclear-powered ships such as the Mutsu. The front end has almost the same design as the NRD-1. outside

The 150-wave spot is possible with this unit, but it is not programmable, so it is necessary to specify the crystal in advance.

There is. This machine is not completely solid, but has a hybrid configuration with 10 balls and 37 stones (Wadley loop frequency reference section, etc.).

Wadley loops cannot avoid spurious waves caused by harmonics of the internal reference frequency, and there are problems in this aspect, so this method receiver is.

Due to the popularity of PLL synthesizers, it was no longer produced.

Later, the receiver also became completely semiconductor, but the circuit configuration, PTO, double tuning circuit of the RF section, etc. of the NRD-1 were kept almost unchanged.

They followed suit and replaced the vacuum tubes with semiconductors with the NRD-10 and NRD-15. The panel design of NRD-15 is similar to that of NRD-1.

Custom-made products with modified filters, AGC, etc. for radio wave monitoring are used by the Kanto Telecommunications Supervision Bureau, etc. NRD-10

Now, the dial display has been digitized, making the reading accuracy much higher than the conventional analog display, making it the next best choice after the NRD-1.

They were also active at the Showa Base in Antarctica. The NRD-10 was later improved as the NRD-1000 with a lower panel height, and the aircraft

It was produced until the same time as the NRD-90 series.

The development of synthesizer machines began with his NRD-70.

They created a full-fledged synthesizer receiver in 1974 with the NRD-70. This receiver uses a synthesizer too.

The VFO (PTO) and RF stages are controlled in conjunction with a servo mechanism. This synthesizer is not their PLL method, but uses JRC's original circuit.

When the reception frequency is set for each digit, the oscillation frequency of the VFO (PTO) is counted and the VFO is adjusted to match the specified frequency.

This is a method that automatically adjusts the oscillation frequency, and is locked with an error within ±10Hz using AFC. An early synthesizer receiver.

They set the frequency using five knobs, which was inconvenient to operate compared to today's continuously variable receivers.

In 1975, they published their PLL synthesizer, the up-conversion NRD-71, in ``Japan Radio Technical Report" No.9.

It is. Their conversion of PLL into ICs ushered in an era in which synthesizers could be made smaller and more economical than before. 11th floor high.

Although the image rejection ratio can be improved by using high IF (70.455MHz), due to cost considerations, they decided to use a wideband bandpass filter for the RF input section.

By adopting a router configuration, they were able to simplify the RF tuning stage and eliminate the need for adjustment, which was a very advantageous method for manufacturers, and subsequent receivers.

Most other companies have also adopted the up-conversion method.

In "Japan Radio Technical Report" No. 12 in 1978, they reported on the NRD-72/73/75 series. This series is still in use.

It is used by many coast stations and ships both domestically and internationally.

With this series of machines, continuous reception is now possible with a single tuning dial, compared to the conventional frequency setting method using each knob.

The operability has been improved since. Also, with the NRD-75, they can switch the number of tune steps to their three levels: 10Hz / 100Hz / 1KHz option.

An external preset unit and external scanning unit are also available as options. Their top model, is the NRD-75.

Although it doesn't come on the used market as often as the NRD-72, it is one of the models we would like to use for our reception activities.

From the NRD-90 series, they switched to a GMDSS compatible receiver. GMDSS = Global Maritime Distress and Safety System

The NRD-90 series is currently the mainstream commercial receiver. This series is based on their NRD-70 series.

It was introduced in ``Japan Radio Technical Report No. 21" in 1984 as a successor model, and their five models were NRD-90 / 92 / 92M / 93 / 95.

It also boasts an overwhelming market share in the Japan Coast Guard, commercial vessels, fishing vessels, fishing radio stations, and overseas commercial vessels. This series machines is still for specific use.

It is a long-lived receiver that has been produced in part for general purpose use, and is used on the Japan Coast Guard's newest patrol vessel "JLNK", which was completed in September 1997.

It was also installed on the Japan Coast Guard survey vessel "Shoyo" (second generation), which was completed in 1998. I'm sure the NRD-92 was last manufactured in February 2002.

The main feature of this series is the electronic tuning front end that uses variable capacitance diodes with low distortion developed in-house by JRC.

This greatly contributes to the improvement of multi-signal characteristics, putting it one step ahead of other companies' bandpass filter methods. This electric

Child tuning is also used in the company's 100W transceiver JSB-110 and 200W transceiver JSB-210 for ships.

The next model after the NRD-90 series is the NRD-240, which has passed GMDSS (Global Maritime Distress and Safty System) certification.

It is a quality item. This unit inherits the front-end electronic tuning of his NRD-90 series, and the synthesizer is DDS (Direct Digital Synthesizer) and enables 1Hz steps. It also has frequency settings using a numeric keypad and an internal on-board self-diagnosis function-

ing. Users have pointed out that oscillation noise from the internal switching power supply leaks to the outside. This unit is a remote-only type.

NRD-740 is now available. The NRD-240 was succeeded by their next model, the NRD-301A, and production ended in 1996.

They also announced NRD-301A/302A and DSP machines as current machines.

As a successor to the NRD-240, the NRD-301A/302A was developed in 1996.

The 302A has a more stable reference oscillator and is focused on remote operation, with an optional ISB receiver.

The basic configuration is the same as the previous model NRD-240, but the main improvements and changes are as follows.

Changes in NRD-301A/302A from previous model NRD-240

- All bands are electronically tuned using varicaps.
- Memory increased from 100CH to 300CH
- Restored passband shift from NRD-93.
- The numeric keypad found on the NRD-240 has been removed. (reason unknown)

JRC is a manufacturer of mainly commercial machines, but the NRD-505 incorporates technology from professional machines and is the first commercial machine manufacturer to produce amateur machines and entered the market for receivers. (Their NRD-66 is the business version of the NRD-505.) After that, they developed the NRD-515/ 525/ 535 as an ambitious receiver.

NRD-535 is sending out.

The next full-fledged DSP machine, NRD-545, was exhibited as a reference at their 1997 Ham Fair, and was released in 1998.

Advertisements were released in the monthly issue of "CQ" magazine, "Mobile Ham" magazine, etc. This is the company's first full-scale DSP receiver. The initial product is AM

The sound quality was poor, but they have already updated the ROM (software).

However, as it is difficult for the demand for this type of HF receiver to expand in the future, development of the next model in the NRD-500 series will not be carried out.

There are speculations that the NRD-545 will be the last amateur aircraft.

In the era of complete transition to GMDSS, the demand for marine receivers decreased dramatically, but in late 1997, in "Japan Radio Technical Report" No. 36, they announced that the HF industry was .

A DSP receiver for commercial use (for the Defense Agency) was announced. The details and model name are unknown, but it has a large liquid crystal display, spurious free (internal)

I'm interested in a new type of synthesizer with very small spurious components.

Based on this, a band scope function was added in response to user requests, and the more complete NRD-371 was introduced at the Ham Fair in 1999.

It was exhibited for reference. Developed in the specific equipment (defense) sector rather than the maritime sector, it is a high dynamic range front end,

The 2nd IF (455KHz) and later versions are designed with advanced ideas such as DSP and a new type of low-noise local synthesizer. This machine is from the Defense Agency.

In addition, several special specifications were apparently delivered for government offices. It is a highly anticipated receiver that is expected to be released to the general public, but for now, Well, there doesn't seem to be any plan to sell it to the general public.

JRC homepage http://www.jrc.co.jp/index.htm1

GOOGLE TRANSLATE ENKELE INTRO PAGINA'S JAPANS BOEKJE