

# ANNUAL REPORT 2019

Report for the Fiscal Year Ended March 31, 2019

## Targeting 5G Paradigm Shift

A LEADER IN THE FIELD OF QUARTZ CRYSTAL ELECTRONIC COMPONENTS

**NIHON DEMPA KOGYO**

## PROFILE

Nihon Dempa Kogyo Co., Ltd. (NDK) was established in 1948 as a company specializing in the manufacturing of quartz crystal devices for frequency control, selection, and detection, and having a founding philosophy of “contributing to the prosperity of society and world peace through our service to customers.” Quartz crystal devices are passive components that utilize the piezoelectric effect of crystals. Applying voltage to crystal and utilizing its vibration phenomena enables oscillation at a frequency that is highly stable and precise. Quartz crystal devices were primarily used in clocks and in the communications equipment field. However, given that microcontrollers have come to be used for so many applications, crystal devices are now used across a wide range of fields, in mobile phones, digital appliances and automobiles. Subsequently, as the smartphone market reaches maturity, the scale of the global quartz crystal device market has currently hit a plateau.

At one point, mobile communications, including smartphones, made up approximately 30% of our overall crystal device sales, but this is currently at the 20% level of net sales. For automobile applications, however, the rise of vehicle electrification, such as with Advanced Driver Assistance Systems (ADAS), has driven year-on-year increases in crystal device demand in the automotive field, and in fiscal 2020, crystal devices for automobiles will account for close to 50% of overall net sales.

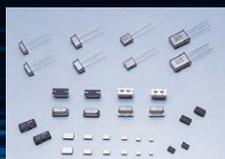
We expect that mobile phone base stations, the infrastructure for 5G wireless communications systems (next-generation high-speed communication standard), will go into full-scale operations from fiscal 2021. With 5G systems taking off, applications for quartz crystal devices will surge, from 5G-compatible smartphone terminals to IoT, including for automated driving. The advent of 5G will spur demand for high-accuracy crystal device products capable of high frequency with low-phase noise features greater than what is currently available.

We are working to meet this demand and with a capital investment into autoclaves we have commenced manufacture of high-quality synthetic quartz crystals vastly different from previous products. We are also moving away from our standard machining techniques and expanding manufacturing using photolithography processing, which incorporates semiconductor manufacturing technology. Through the integration of production, from high-quality synthetic quartz crystals to quartz crystal oscillator products, we will continue to contribute to the creation of societies that are safe, secure, and comfortable in the 5G era.

## PRODUCT LINEUP



Synthetic Quartz Crystals



Crystal Units



Crystal Oscillators



Low-G TCXO



Portable Ultrasonic Diagnostic Devices



Down Converters



Outgas Sensors



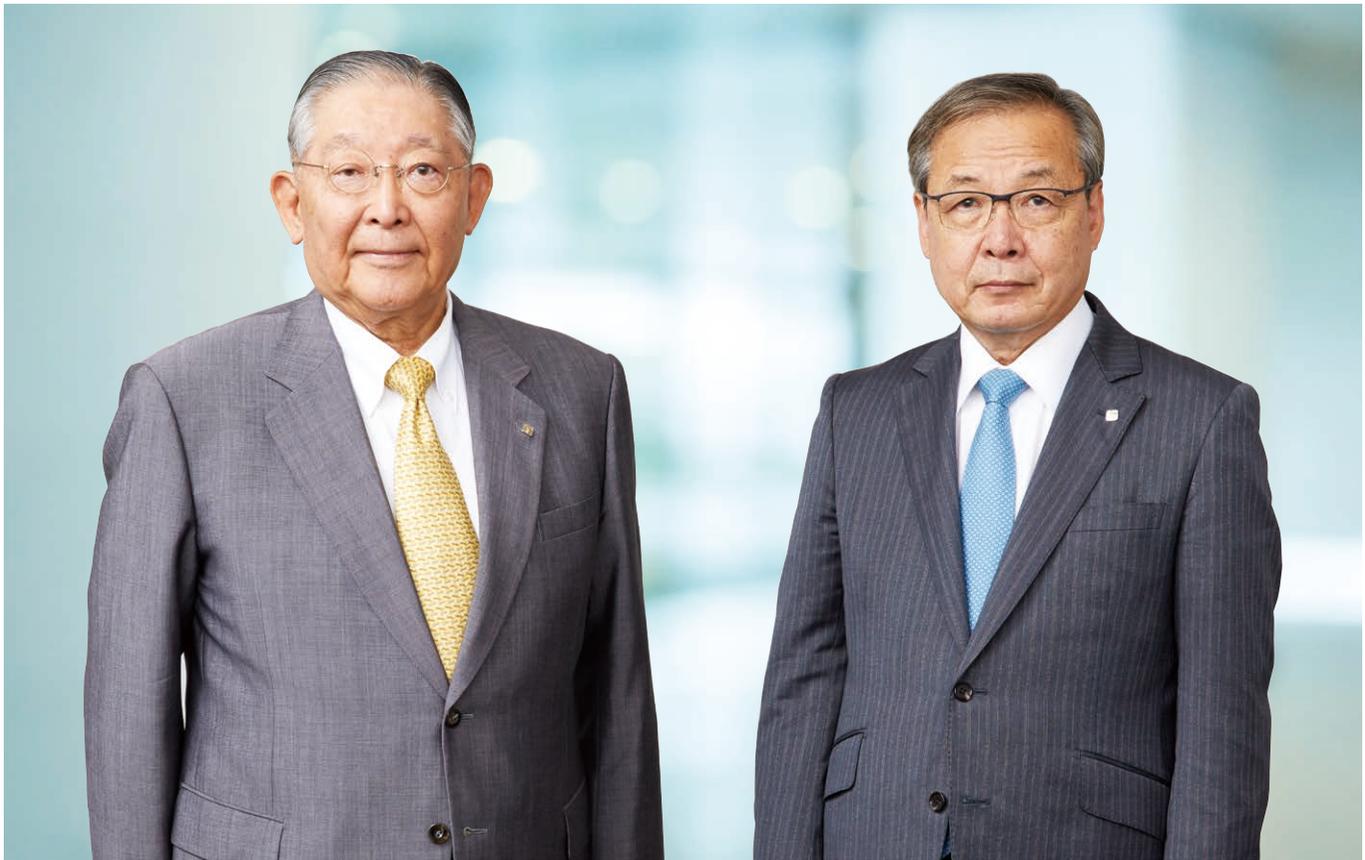
Frequency Synthesizers

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### Forward-Looking Statements

Statements made in this report with respect to our current plans, estimates, strategies, beliefs and other statements that are not historical facts are forward-looking statements about our future performance. These statements are based on management's assumptions and beliefs in light of information currently available to it. We caution that a number of important risks and uncertainties could cause actual results to differ materially from those discussed in the forward-looking statements, and therefore you should not place undue reliance on them. You also should not rely on the belief that it is our obligation to update or revise any forward-looking statements, whether as a result of new information, future events, or otherwise. Risks and uncertainties that might affect us include, but are not limited to, fluctuation of currency exchange rates, overall supply and customer demand in the industry, product development and production capacities, performance of affiliated companies, and other risks and uncertainties.



**Toshiaki Takeuchi**  
Representative Director and  
Chairman of the Board

A black ink signature of Toshiaki Takeuchi, consisting of several overlapping loops and a long horizontal stroke.

**Hiromi Katoh**  
Representative Director and  
President

A black ink signature of Hiromi Katoh, featuring a stylized, cursive script with a prominent loop at the end.

## Targeting 5G Paradigm Shift

### ■ Results for the Year Ended March 31, 2019

#### **Sales for automotive electronics and mobile communications devices fell short of expectations, and profitability could not be attained**

Net sales for automotive electronics, which account for close to 50% of the Company's net sales, were flat compared to the previous year and did not reach initial expectations. Despite increased sales for automotive cameras and radar used in vehicles equipped with Advanced Driver Assistance Systems (ADAS), factors for the shortfall included new car numbers in China that from July 2018 fell below the previous year's levels. In addition, as the smartphone market is reaching maturity, the ratio of net sales for mobile communications in the Company's overall net sales fell to a level below 20%, and in fiscal 2019 as

well, the slowdown in sales for 2018 model smartphones was greater than anticipated, and net sales experienced a larger-than-expected year-on-year decline.

As one element of the Group's structural reforms, we strived to reduce fixed costs by transferring a portion of mass-production lines from a factory in Japan to an overseas factory in a bid to raise productivity and cost-competitiveness. We also promoted greater efficiency to streamline administrative functions. As a result, the Group posted positive operating income of approximately ¥400 million. This, however, includes approximately ¥1.8 billion in proceeds from the sale of land use right and property posted in line with a decision to transfer the factory of Suzhou NDK Co., Ltd., a consolidated subsidiary. In addition, the Group posted an impairment loss of approximately ¥400 million on

Summary of Performance in FY2019

(Millions of yen)

		①	②	③	④ = ② + ③	④ - ①
	FY2018 Full Year Result	FY2019 Full Year Outlook as of May 11	FY2019 Full Year Result	Temporary Factors	FY2019 Full Year Result (excluding temporary factors)	Change from Outlook as of May 11 (excluding temporary factors)
Net Sales	43,952	44,500	42,498	0	42,498	(2,002)
Operating Income/Loss	(1,347)	500	406	(1,455)	(1,049)	(1,549)
Income/Loss before Tax	(1,369)	300	(56)	(1,455)	(1,511)	(1,811)
Net Income/Loss	(1,586)	200	(251)	(1,455)	(1,706)	(1,906)
Exchange Rate (against U.S. dollar) (yen)	¥110.81	¥105.00	¥110.69	—	—	—

<Temporary factors included in profit/loss>

	FY2018	FY2019
Impairment losses	6,515	397
Inventory valuation losses/disposal losses	1,050	
Legal settlement expenses	706	
Gain on sales of land use right and building of subsidiary in China		(1,852)
• Temporary factors in operating income/loss	8,271	(1,455)
Reversal of deferred tax assets, etc.	345	
• Temporary factors in net income/loss	8,616	

(Millions of yen)

facilities that had been idled in accordance with the review of our production framework and rebuilding. Consequently, excluding the impact of the sale of land use right and property

and the impairment loss, we posted an operating loss of approximately ¥1.0 billion.

## Initiatives to Achieve Growth

### Consolidating the strength of each and every employee, and making preparations with an eye toward 5G market launch

From this fiscal year, we are on the verge of a huge business chance for NDK – lift off to next-generation high-speed 5G communications services

#### 1. Targeting 5G Business

Our target is the 5G business, consisting of mobile phone base stations that will form 5G system infrastructure, 5G smartphone

terminals and automated driving and IoT-related applications.

#### Industrial Equipment Market (including 5G Base Stations)

We expect that the market for 5G base stations will move into full swing from fiscal 2021.

Initially, 5G base stations will be deployed primarily to urban areas in principle countries, subsequently followed by expansion to countries and regions that are rolling out 5G. In this way we anticipate that in 2023 the number of such base stations will exceed that of LTE base stations. The shorter range of 5G signals requires the installation of a greater number of base stations. As such, we anticipate that there will be an expanded number of

small cell base stations. As products geared toward 5G base stations, we are developing a high-accuracy oven-controlled crystal oscillator (OCXO) and highly stable temperature compensated crystal oscillators (TCXO) devices that will contribute to rising sales from the latter half of fiscal 2020.

■ **Automotive Electronics Market (including Automated Driving)**

With 5G, the time lag for data transmission and reception drops to a millisecond (0.001 of a second), meaning that 5G will become essential infrastructure to realize automated driving. However, actually making it possible to use 5G will require 5G coverage of roads throughout the country, without any gaps. This means that a full-fledged launch is still quite a long way off. On the other hand, electric vehicles are steadily growing in popularity, and we project that electric vehicles will use roughly the same number of crystal devices as gasoline vehicles. Hybrid vehicles that use both gasoline and electric sources of propulsion are becoming more commonplace. With hybrid vehicles, gasoline-powered engines and electricity-powered motors use the same number of crystal devices, respectively, so one vehicle uses twice the number of crystals than one or the other. Electric and hybrid vehicles are in this way gaining ground, but we also anticipate a growing number of ADAS-equipped vehicles. Now, ADAS is equipped mainly into high-end cars but going forward, the pace of adoption of ADAS in economy cars

appears to be accelerating. In addition, growing demand for applications for cameras will shift from viewing to sensing, with objectives such as recognizing the presence of pedestrians, which will mean a greater number of cameras to be equipped to ADAS. Given this, we expect the annual pace of growth in crystal device units for ADAS will be over 10%.

■ **Mobile Communications Market (including Smartphones)**

Projections are for 5G smartphones to spread worldwide going forward, and 5G smartphones will require higher frequency crystal units that form the standard for them. With the rising frequency of crystal units, producing units that are stable with high-precision specifications becomes difficult unless using photolithographic technology. This is where NDK will differentiate itself.

■ **Internet of Things (IoT)**

The IoT business, which is expected to expand its reach, is another area where 5G is to have an impact. Leveraging our global network, we will seize upon profitable projects.

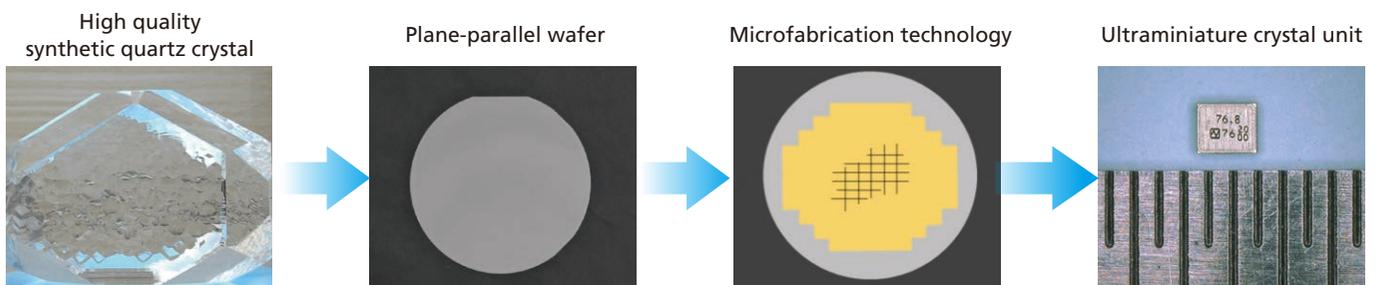
**2. Achieve Differentiation in the 5G Business**

At 100 times the communications speed of 4G, 5G offers an enormous 1,000-fold jump in the amount of information that can be transmitted in a signal. Given the high sensitivity to noise

**5G systems are driving higher frequencies**

**Responding to needs for low-noise, high-frequency crystal units**

- In-house production of high-quality synthetic quartz crystal
- Leveraging photolithographic technology



that this entails, demand exists for high-accuracy crystal device products capable of high frequency with low phase noise features greater than what has been available up until the present. Crystal devices are progressively becoming higher frequency, and this makes it difficult to mass produce crystal devices that are ultra-compact, highly stable and highly accurate crystal chips manufactured using conventional machining techniques. This is why NDK is expanding production that leverages photolithographic techniques.

It will be critical to have exceptional material technologies to meet demands for such advanced technology. For this reason, we have spent years making capital investment into autoclave vessels, and have begun to cultivate high-quality synthetic quartz crystals that offer enormous differentiation over what has been produced up to the present. NDK takes these high-quality synthetic quartz crystals as a starting point, and through in-house integrated production develops them into crystal oscillators. When the start of the 5G age arrives, this is where we will differentiate ourselves from the competition, and we believe this will be our advantage.

### 3. Strengthen Product Development and Sales of High-value-added Products

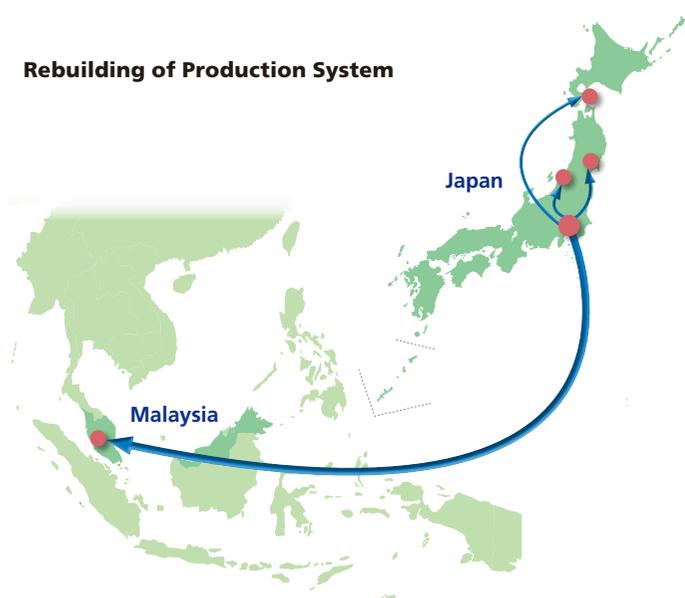
With an eye to medium- and long-term growth, we are further strengthening product development and sales of frequency synthesizers, sensors and other high-value-added products that apply our crystal device technologies. With regard to frequency synthesizer sales, together with boosting our ongoing efforts for special applications and satellite base stations, we are planning sales of down converters, the devices that employ our millimeter wave technology used for inspections of automotive radar as a new application. For sensors, two years ago we jointly developed outgas sensors with JAXA, and have broadened our sales channel from a domestic route to a space technology development organization in Europe. We are also expanding sales channels to resin makers and for other non-space applications. Needs for ultrasonic equipment in medical, nursing and nursing care is growing, and we are continuing to strive for sales of portable ultrasonic equipment small enough to be carried.

### 4. Restructure Production System

We are undertaking an extensive rebuilding of our production structure, covering all of the Group's factories so as to realize our growth strategy for 5G, and to improve productivity throughout the Group. Together with this, we are moving forward on streamlining administrative functions and curtailing fixed costs, while striving to transform to a lean corporate structure.

In fiscal 2019, we transferred a portion of our mass-production lines of components for automotive electronics, which had been produced at the Furukawa factory, to the Malaysian factory. In fiscal 2020, we will shift our production line for small mass production for mobile communications from the Sayama factory to our Hakodate factory, and will move the production line for crystal oscillators for industrial equipment to our Furukawa factory, while transferring the line for crystal resonators for radios to our Niigata factory. Then we will transfer our tuning fork-type crystal units from our Furukawa factory to our Malaysian factory. With regard to our factory in Suzhou, China, we are planning to launch and move to a new factory within Suzhou City during fiscal 2020, and manufacturing at the new factory's line is scheduled to commence in fiscal 2021.

#### Rebuilding of Production System



## 5. A ¥50 billion Medium-term Goal for Net Sales, Achieving an Operating Income Ratio of 10%

NDK is proceeding on preparations leading up to the launch of 5G systems, which from fiscal 2021 will be in full swing, by working to unite the strength of each and every employee. Our

medium-term goals are net sales of ¥50 billion and an operating income ratio that reaches 10%. Given that the age of 5G is certain to arrive, we are considering goals that can be realized by incorporating the 5G business, underpinned by the collective strengths from throughout the Group.

## ■ Outlook for the Fiscal Year Ending March 31, 2020

### Improve Group-wide profitability, restore sound financial performance

We expect that net sales for mobile communications will continue another year-on-year decline. For automotive applications, however, despite ongoing sluggishness until the first quarter, over the second half we project that net sales will recover. In addition, from the second half of the fiscal year plans are for increased sales of high-accuracy OCXO for 5G base stations, and we project that net sales for industrial equipment will rise in the bottom of the first half of the period. Moreover, we anticipate increased sales for frequency synthesizers for special applications and medical-use ultrasonic equipment. As a result, we project that net sales in the fiscal year ending March 31, 2020 will be on par with the previous fiscal year.

We will continue restructuring begun in the previous fiscal year to our production system and will expand and promote the rebuilding of the production system to encompass factories across the entire Group to improve productivity throughout the Group. Also, we will streamline administrative functions and expand efforts to cut fixed costs. Moreover, together with reviewing sales prices for products used in mobile communications devices, we are working to increase sales of highly profitable products, primarily those products geared toward 5G base stations, in the second half of the fiscal year. In this way we will improve profitability Group-wide, and return the Company back to sound financial performance.

### Outlook for FY2020

(Millions of yen)

	FY2019 Full Year	FY2020 Full Year Outlook	FY2020 First Half Outlook	FY2020 Second Half Outlook
Net Sales	42,498	42,500	20,300	22,200
Operating Income/Loss	406	600	(500)	1,100
Income/Loss Before Tax	(56)	200	(650)	850
Net Income/Loss	(251)	100	(700)	800
Exchange Rate (against dollar) (yen)	110.69	107.00	107.00	107.00

#### Capital Investment:

FY2019 (Actual) ¥2,376 million → FY2020 (Outlook) ¥1,700 million

#### R&D Expenses:

FY2019 (Actual) ¥1,884 million → FY2020 (Outlook) ¥1,800 million

## Principal Markets

### Percentage of Total Sales

Synthesizers, Sensors,  
Ultrasonic devices

4%

Consumer  
13%

Industrial  
Devices  
12%

IoT  
4%

Other  
5%

Automotive  
Electronics  
46%

Mobile  
Communications  
16%

## Number of Crystal Devices Used

## Outline of Business Results and Outlook

## Used In

### Automotive Electronics



- Ultralow-priced models: 10 to 20
- Economy models: 30 to 40
- Luxury models: 70 to 100

- Demand for quartz crystal products is growing with the spread of ADAS systems. However, with the rise of global trade friction and sluggish automobile sales, the Company's year-on-year sales were flat.
- Utilization for communications or video for self-driving vehicles and AI devices is advancing, and being used for new quartz crystal oscillation products. Consequently, NDK pursues development and design for highly reliable products that take advantage of the Company's extensive experience accumulated over its many years of operation.

- Automobiles

### Industrial Equipment



- Mobile phone base stations
- Optical communications devices (each device: 1 to 10 or more)

- Demand for quartz crystal devices used in base stations is projected to be flat through the first half of fiscal 2020, but in the second half of the year installation of 5G base stations will commence, and quartz crystal demand is anticipated to increase.
- Communications are becoming increasingly high speed and high capacity, and demand is increasing for quartz crystal products that offer high accuracy, low phase noise and high frequency, among other characteristics. NDK is leveraging its technical prowess and moving forward on the development and sales of unique and competitive products.

- Mobile phone base stations
- Optical communications devices

## Mobile Communications/IoT



- Smartphones (2 to 5 crystal units and oscillators)

- In addition to negative growth in the smartphone market, sales prices for crystal products remained low. Focusing on profitability, year-on-year sales declined.
- For crystals used in smartphones and wearable devices, miniaturization for embedded units is advancing, consequently, NDK started market introduction of 1008-sized crystal units.
- IoT is coming in all shapes and sizes, and quartz crystal demand is increasing for communications functions. In the previous fiscal year we began sales of crystal units used in a device that can provide 24-hour, real-time measurement of blood glucose levels. We continue to strengthen efforts for certification with chip set makers.

- Smartphones
- IoT devices

## Consumer

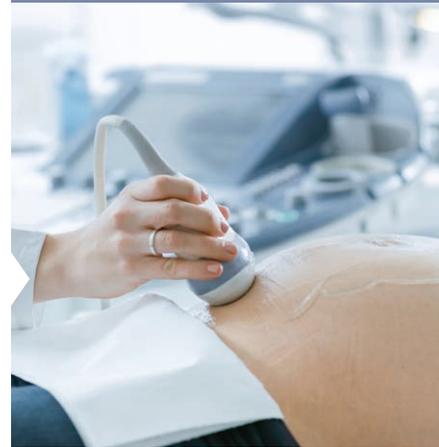


- Digital single-lens reflex cameras: 2 to 3, and 1 for optical filter
- Laptop PCs: 3 to 4
- LCD TVs: 2 to 3
- Game consoles: 3 to 5

- Sales of optical products for single-lens reflex cameras increased. However, we instituted a policy that emphasized profitability for consumer-focused products, and sales for PCs and game consoles declined year on year.

- Digital single-lens reflex cameras
- PCs
- Flat-panel TVs
- Game consoles

## Synthesizers/Sensors/ Ultrasonic devices, Other



- Frequency synthesizer sales strengthened for special applications and satellite ground stations.
- Gas sensors: Developed jointly with the Japan Aerospace Exploration Agency (JAXA), NDK launched sales of outgas sensors. We also launched outgas sensors in overseas markets. In addition, we expanded sales channels to resin makers and other non-space applications.
- Down converters: We plan sales of 76/79GHz down converters, used in embedded radar measurements, to Tier 1 automobile parts makers through a sales network of measurement device makers, which is strong in the embedded radar inspection area.
- Ultrasonic equipment: We are boosting the sales of compact mobile ultrasonic sensors that can easily display images on a tablet to meet medical, nursing, and nursing care needs.

- Frequency synthesizers
- Outgas sensors
- Down converters
- Ultrasonic probes

## Basic Stance on Corporate Governance

“Contributing to the prosperity of society and world peace through our service to customers”—this is our founding philosophy and it represents the origin of the spirit we bring to business, as well as being the foundation upon which we aim to fulfill our social responsibilities to create a sustainable society. In working to achieve this goal, NDK seeks to continue to be a company that is trusted and respected for all its stakeholders, and has therefore positioned corporate governance as one of its most critical management issues. With regard to corporate governance, we have developed five points that comprise our basic policy, namely, (a) always keep in mind sound management, efficiency and promptness; (b) heighten the effectiveness of the Board of Directors; (c) respect the rights of shareholders and ensure equality; (d) ensure transparency through the appropriate disclosure of information; and (e) aim to build long-term relationships so as to gain the trust of stakeholders, including parties other than shareholders.

## Structure of Corporate Governance

NDK adopts the Audit & Supervisory Board system and appoints six Directors and three Audit & Supervisory Board Members. To strengthen auditing and oversight functions, we appoint two

Outside Directors and two Outside Audit & Supervisory Board Members. The Board of Directors comprises two Outside Directors and four Directors, who are experts on business issues, manufacturing, markets and other fields.

To expedite management decision making and policy implementation, NDK has introduced a Corporate Officer system. Comprised of Corporate Officers, the Board of Corporate Officers, as a general rule, meets twice monthly. The Board of Directors, which convenes once a month, in principle, conducts decision making with regard to items deliberated upon by the Board of Corporate Officers, as well as items with regard to legal matters, and basic policies of management and other critical items. The Board of Directors also decides upon the responsibilities of the Corporate Officers and conducts oversight on the progress Corporate Officers have made on carrying out their tasks.

## Assessment of the Board of Directors' Effectiveness

Given the objectives of raising Board of Directors' functionality and increasing corporate value, the Company conducts self-assessments and analysis with regard to the effectiveness of the Board of Directors. Assessments are made with regard to all aspects of effectiveness, although work is also done to increase functionality by identifying and making efforts on specific issues.

### Reasons for Appointments of Outside Officers

Title	Name	Status of Activities	Directors' meetings attended	Audit & Supervisory Board meetings attended
			Attendance record for the previous fiscal year	
Outside Directors *3	Takehiko Tatsuko	Mr. Tatsuko has already served for four years as an Independent Outside Director. As he offers appropriate opinions from a fair and objective viewpoint, the Company has determined that he will continue to capably provide appropriate guidance to support the Board of Directors' decision making.	17/17	—
	Yorihisa Suwa*1	Having been in the electronics device industry for many years, Mr. Suwa has acquired a wealth of experience in management and wide-ranging insights. Consequently, the Company has determined that he will appropriately carry out his duties as an Outside Director of the Company.	17/17	15/15
Outside Audit & Supervisory Board Members	Shoji Kenmochi	Mr. Kenmochi offers abundant experience as a tax accountant and expert insights on tax and finance issues. The Company has determined that he will appropriately implement his duties as an Outside Audit & Supervisory Board Member of the Company.	16/17	15/15
	Makoto Yoshitoshi*2	In his years in the communications industry, Mr. Yoshitoshi has acquired a wealth of experience in management and wide-ranging insights. Given this, the Company has determined that he will appropriately fulfill his duties as an Outside Audit & Supervisory Board Member of the Company.	—	—

\*1 In June 2019, Yorihisa Suwa moved from being an outside corporate auditor to take up a position as an Outside Director.

\*2 Makoto Yoshitoshi appointed as an Outside Auditor in June 2019.

\*3 Hirofumi Shimada resigned as Director due to the expiration of his term in June 2019. Hirofumi Shimada attended all 17 meetings of the Board of Directors last year.

## Policy of Officer Appointments

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The Representative Director considers candidates for the position of Director from the perspectives of (1) appropriate knowledge, experience and capabilities; (2) an ability to contribute to raising corporate value; and (3) ensuring diversity in the Board of Directors. Following this, designated candidates are decided upon at the Board of Directors' meetings, taking into account opinions with regard to these candidates held by the Independent Advisory Council, which has as its primary constituents Independent Outside Directors.

## System of Internal Control

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Regarding compliance, NDK has formed a Compliance Committee, and, by conducting compliance training for Directors and employees, works to establish and improve systems for maintaining compliance with laws and regulations. In addition, NDK has introduced internal reporting systems and has put in place a framework which works to gather internal information with regard to violations of laws and other suspicious behavior as pertains to compliance, and to analyze and utilize such information.

# CORPORATE INFORMATION

## DIRECTORS, AUDIT & SUPERVISORY BOARD MEMBERS, AND CORPORATE OFFICERS

### Representative Director & Chairman of the Board

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#### Toshiaki Takeuchi

Representative Director and Chairman of the Board

### Directors

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#### Hiromi Katoh

Representative Director and President

#### Reiji Fukuhara

Corporate Officer and Director  
General Manager of Sales & Customer Service Division  
General Manager of Industrial Devices Sales Dept.

#### Akio Noheji

Corporate Officer and Director  
General Manager of Corporate Production Division  
Managing Director of ANC/NQM

#### Takehiko Tatsuko

Outside Director

#### Yorihisa Suwa

Outside Director

### Audit & Supervisory Board Members

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#### Shigeo Handa

Standing Audit & Supervisory Board Member

#### Shoji Kenmochi

Outside Audit & Supervisory Board Member

#### Makoto Yoshitoshi

Outside Audit & Supervisory Board Member

### Corporate Officers

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#### Kouji Kubota

General Manager of Quality Assurance Division

#### Hiroyuki Shinada

Deputy General Manager of Corporate Production Division,  
General Manager of Sayama Administration Dept.

#### Nobumitsu Fujiwara

Director of Suzhou NDK Co., Ltd.

#### Michio Aoyama

General Manager of Administration Division

#### Kenichi Ueki

General Manager of Engineering Division,  
General Manager of Crystal Units Engineering Division

#### Shunichi Wakamatsu

Deputy General Manager of Engineering Division,  
General Manager of Oscillators & Modules Engineering Division

#### Hideyuki Oikawa

Deputy General Manager of Sales & Customer Service Division,  
Director of NDK-E

## Environmental Preservation

### 1.Environmental Philosophy

In light of its Corporate Philosophy—NDK takes part in protecting the environment and fulfilling its social responsibilities—as a global corporation, NDK recognizes the importance of activities that reduce environmental impact and of establishing a recycling-oriented society. Possessing the will and sense of responsibility, we will deploy proactive and ongoing environmental preservation activities and pass on our irreplaceable Earth to future generations.

### 2.Basic Environmental Policy

Initiatives geared toward the preservation of the global environment are one of the major corporate management issues at NDK. We carefully analyze and assess the environmental impact of all our products and business processes through product development, design, manufacture and sale, while working to prevent environmental pollution.

For more detailed information, please refer to the sections headed Environmental Policy and CSR Activities at the following Internet address:

<https://www.ndk.com/en/environment/policy/index.html> (English)

<https://www.ndk.com/jp/environment/policy/index.html> (Japanese)

### 3.Green Crystal Technology

To reduce CO<sub>2</sub> emissions that are a contributory factor in global warming, the Company formulates and promotes medium-term plans that include specific reduction targets. To meet society's environmental needs, we are also contributing to the reduction (curbing) of CO<sub>2</sub> emissions by fully utilizing the most advanced technologies to realize product miniaturization and weight reductions as well as lower power consumption.

Chart 1

#### Manufacturing

Excellence in manufacturing that takes environmental factors into account

#### Optimization

Contributing to energy conservation through improvement in performance and efficiency



#### Environment

Eliminating and reducing substances that place a burden on the environment

#### Reduction

Conserving resources through miniaturization and incorporation of multiple functions

## Respect for and Protection of Human Rights

We will protect human rights and respect diversity, personal characteristics and individuality and must not engage in any conduct that could lead to unfair discrimination. We will not tolerate discrimination based on, for example, race, gender, disability or political affiliation, neither will we tolerate discriminatory practices, violence, or sexual or other harassment. We prohibit the exploitation of forced labor and will not employ children under the age of 15.

The Board members and managerial staff of the NDK Group must comply with the laws and regulations of each country with regard to managing the working hours of their employees. We will make efforts to ensure that our staff's working hours, including overtime, do not exceed 60 hours per week. Furthermore, we must provide statutory holidays to our staff in compliance with the relevant laws and regulations of their respective countries.

With regard to the hiring of employees, NDK Group companies must comply with the laws and regulations of the respective countries in which they operate, present the terms and conditions of employment in writing and execute an employment contract. The wages payable to the employees of the NDK Group must not be lower than the minimum wage allowed by law in their respective countries.

NDK Group companies must permit the establishment of, and membership in, labor unions.

## Health and Safety

We must keep our workplace environments clean and hygienic, and comply with internal rules for the appropriate use of chemicals and protective gear to guard against the risks to health and safety posed by toxic chemicals. The facilities used by management and employees of the NDK Group (e.g. dormitories, cafeterias and restrooms) must be kept clean and hygienic. NDK Group companies must provide information on workplace health and safety in languages that both the management and employees of their companies can understand.

## Procurement Policy

If the products manufactured or sold by the NDK Group contain substances such as tantalum, tin, tungsten, gold, and cobalt originating from the Democratic Republic of the Congo, its adjoining countries and other high-risk areas, the NDK Group will make efforts to ensure that it does not use Conflict Minerals that directly or indirectly encourage the activities of organization engaged in a risk and fraud such as 1) conflicts 2) human rights violations including child labor or 3) poor working conditions, environmental destruction or corruption.

# SIX-YEAR SUMMARY

Nihon Dempa Kogyo Co., Ltd. and Consolidated Subsidiaries  
For the years ended March 31

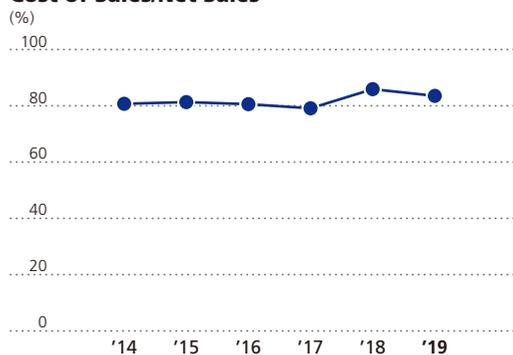
	Millions of yen						Thousands of U.S. dollars (Note)
	2019	2018	2017	2016	2015	2014	2019
Net sales	<b>¥42,498</b>	¥43,952	¥43,791	¥44,850	¥47,730	¥50,774	<b>\$382,899</b>
Cost of sales	<b>35,497</b>	37,768	34,620	36,137	38,801	40,978	<b>319,821</b>
Selling, general and administrative expenses	<b>6,255</b>	6,642	6,479	6,718	7,713	7,496	<b>56,356</b>
Research and development expenses	<b>1,884</b>	1,787	2,035	1,921	2,133	2,221	<b>16,974</b>
Operating income/(loss)	<b>406</b>	(9,618)	727	410	175	240	<b>3,657</b>
(Loss)/Income before income tax	<b>(56)</b>	(9,640)	472	102	359	191	<b>(504)</b>
Net (loss)/income	<b>(251)</b>	(10,202)	611	317	(569)	181	<b>(2,261)</b>
Net (loss)/income attributable to owners of the parent	<b>(251)</b>	(10,202)	611	317	(569)	181	<b>(2,261)</b>
Total comprehensive (loss)/income for the period	<b>(460)</b>	(9,732)	(72)	(1,414)	1,319	827	<b>(4,144)</b>
Total assets	<b>60,784</b>	60,816	68,830	67,966	71,670	76,218	<b>547,652</b>
Total equity	<b>14,725</b>	15,108	25,234	25,700	27,507	26,581	<b>132,669</b>
Depreciation and amortisation	<b>3,469</b>	4,094	3,641	3,558	3,809	3,923	<b>31,255</b>
Capital expenditures	<b>2,376</b>	7,141	6,779	2,099	2,024	2,733	<b>21,407</b>

Per Share Data:	Yen						U.S. dollars (Note)
	Net income/(loss):						
Basic	<b>¥(12.80)</b>	¥(519.87)	¥31.16	¥16.17	¥(29.00)	¥ 9.25	<b>\$(0.11)</b>
Diluted	—	—	—	—	—	—	—
Cash dividends applicable to the period	<b>0</b>	10.00	20.00	20.00	20.00	20.00	<b>0</b>

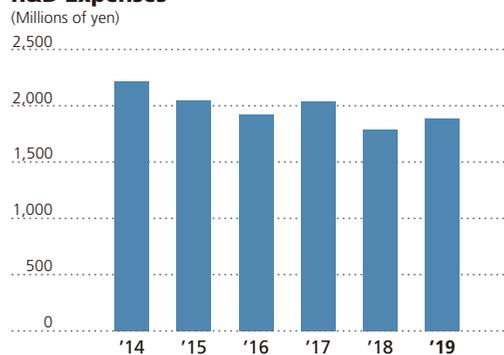
Notes: 1. Figures are presented in accordance with International Financial Reporting Standards. The U.S. dollar amounts represent translations of Japanese yen amounts at the rate of ¥110.99 to U.S.\$1.00, which was the rate prevailing on March 31, 2019.

2. The results for the year of 2014 are retrospective in line with changes in accounting policies.

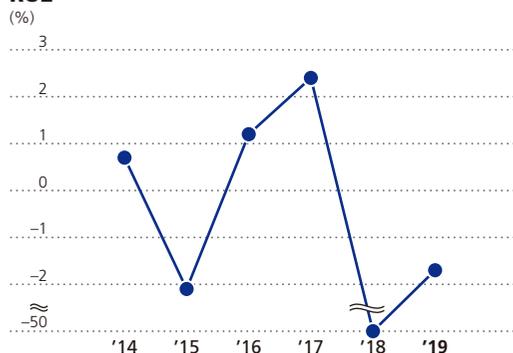
## Cost of Sales/Net Sales



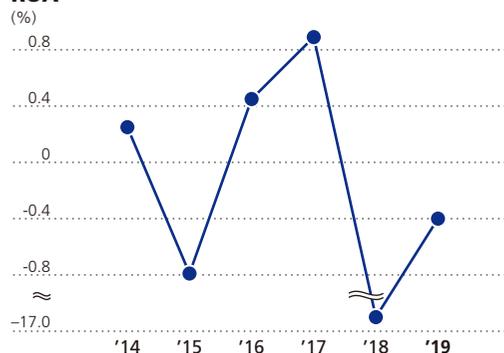
## R&D Expenses



## ROE



## ROA



## Outlook

During the year ended March 31, 2019, the global economy continued to show positive signs against the backdrop of an improved employment situation in the United States and other factors, but was buffeted by the impact of U.S.-China trade friction, and in China, decelerating personal consumption was among the clear signs of an economic slowdown. Europe is also gripped by political instability, and uncertainties for the future of the world economy continued.

In the automotive market in which the Group operates, since July 2018 the volume of new car sales in China has continued at a level that dropped below the previous fiscal period, and in Europe as well, the impact of new emissions testing introduced in September 2018 has led to a slowdown in new car sales. In addition, the quantity of smartphones shipped declined for the second consecutive year.

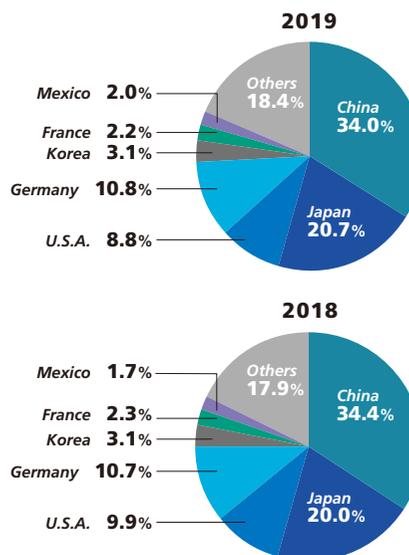
Sales rose for automotive cameras and radar used in vehicles equipped with Advanced Driver Assistance Systems (ADAS), although sales were flat compared to the previous fiscal year due to the impact of a decline in automobile demand in China and Europe. In addition, in mobile communications, net sales declined year on year due to stagnant sales for 2018 smartphone models, together with demand shifting from temperature compensated crystal oscillators (TCXOs) to crystal units with built-in temperature sensors, the sales prices for which are falling.

As one element of structural reforms, the Group transferred one part of production lines from its factories in Japan to an overseas factory to improve productivity and cost-competitiveness. Together with this, we have strived to promote the streamlining of administrative functions to reduce fixed costs. As a result, the Group posted positive operating income of ¥406 million. This, however, includes approximately ¥1.8 billion gain from selling the land use right and its buildings posted in line with a decision on the factory relocation of Suzhou NDK Co., Ltd., one of our consolidated subsidiaries. In addition, the Group posted an impairment loss of ¥396 million on facilities that had become idle in accordance with the review of productivity and rebuilding.

## Results of Operations

Orders on a consolidated basis for the fiscal year declined 0.3%, to ¥42,161 million year on year, and consolidated net sales fell 3.3%, to ¥42,498 million. The Group recorded operating income of ¥406 million in the fiscal year under review, compared to an operating loss of ¥9,618 million in the previous fiscal year, a loss before income tax of ¥56 million versus the previous year's loss before income tax of ¥9,640 million, and the net loss for the period was ¥251 million, compared to a net loss of ¥10,202 million in the previous fiscal year.

## Sales by Customer-Based Geographic Area



## Sales by Product

Sales by product were as follows.

### (1) Quartz Crystal Units

Mobile communications drove higher sales of crystal units with built-in temperature sensors and ultra-compact crystal units. For the automotive market, sales of crystal units increased for use in millimeter-wave radar used in ADAS equipment, although sales fell for high unit price products for other automotive applications, and the impact of that was a decline in net sales on a monetary basis. As a result, net sales declined 1.3% year on year, to ¥25,362 million.

### (2) Crystal Devices

In the automotive market, sales rose for crystal oscillators in products such as vehicle-use cameras used in ADAS equipment. However, in the mobile communications market, sales of crystal oscillators declined due to the progression of a shift from TCXOs to crystal units with built-in temperature sensors. In addition, sales of surface acoustic wave (SAW) devices declined. As a result, net sales fell 8.9% year on year, to ¥12,650 million.

### (3) Others

Sales of optical products for single-lens reflex cameras increased. As a result, net sales rose 2.6% year on year, to ¥4,484 million.

## Performance by Customer-Based Geographic Area

Performance by customer-based geographic area was as follows.

### Japan

Sales of optical products for single-lens reflex cameras increased. In addition, sales rose for special applications with frequency synthesizers, while sales fell for satellite stations.

Sales for automotive electronics rose slightly. As a result, net sales declined 0.2% year on year, to ¥8,782 million.

### Asia

In mobile communications, sales of quartz crystal units increased owing to the advance of a shift away from TCXOs to crystal units with built-in temperature sensors, while sales of crystal oscillators declined. In addition, automotive-use crystal set sales fell. As a result, net sales in China decreased 4.4% year on year, to ¥14,443 million; sales in South Korea fell 3.1%, to ¥1,317 million; and sales in other areas decreased 2.0%, to ¥3,447 million.

### Europe

Sales of crystal oscillators for automotive use increased, while net sales of crystal oscillators for industrial electronics declined. As a result, net sales in Germany fell 2.1% year on year, to ¥4,616 million, with sales in France of ¥919 million, down 6.8%, and sales in other regions in Europe amounting to ¥3,700 million, up 1.3%.

### North America

Sales of SAW devices for mobile communications decreased. As a result, sales fell 14.1% year on year, to ¥3,728 million in the United States, and in the rest of North America, sales declined 42.6% year on year, to ¥68 million.

### R&D Expenses

NDK engages in R&D programs that aim to establish new technologies and manufacturing methods that will be the foundation for future products in the medium and long terms. To better meet customer crystal device needs, the Group is strengthening its R&D systems, with the Sayama Plant as its hub. As part of this we are conducting R&D to develop next-generation frequency control, selection, and detection devices as well as enhancing its design and process technologies, which form the core of its R&D.

R&D expenses on a consolidated basis during the fiscal year under review totaled ¥1,884 million.

## Financial Condition

At fiscal year-end, total assets were ¥60,784 million, a decrease of ¥31 million from the previous fiscal year-end. Factors contributing to this included an increase of ¥1,379 million in cash and cash equivalents, an increase in inventories of ¥660 million, and a decrease in property, plant and equipment of ¥2,514 million. Total liabilities were ¥46,059 million, an increase of ¥350 million from the previous fiscal year-end; principal factors included an increase of ¥2,165 million in loans and borrowings and a decline of ¥1,264 million in trade and other payables. Equity attributable to the owners of the Company amounted to ¥14,725 million, a decrease of ¥382 million, mainly due to a total comprehensive loss for the period of ¥460 million. As a result, the ratio of equity attributable to owners of the Company was 24.2%, 0.6 of a percentage point lower than at the previous fiscal year-end.

## Capital Financing and Cash Flow Analysis

The Group obtains funds for working capital and capital investments from internal sources and bank loans. Bank loans include short-term loans with periods of one year or less procured for working capital and longer-term loans for long-term funding, such as for production facilities. As of March 31, 2019, the Group had outstanding balances of short-term loans and borrowings of ¥6,508 million and long-term loans and borrowings of ¥25,510 million.

The balance of cash and cash equivalents on a consolidated basis at the end of the fiscal year under review amounted to ¥8,231 million, which was an increase of ¥1,379 million from the end of the previous fiscal year. Factors positively influencing this change included a cash inflow of ¥13,500 million in proceeds from long-term loans and borrowings and depreciation and amortisation of ¥3,469 million. Factors negatively influencing the balance included the repayment of long-term loans and borrowings of ¥10,603 million and purchase of property, plant and equipment of ¥3,404 million.

Free cash flow amounted to a negative ¥671 million, which was an improvement of ¥7,575 million from the previous fiscal year. This reflects the net cash provided by operating activities of ¥1,615 million, and net cash used by investing activities of ¥2,286 million in the fiscal year under review.

Net cash provided by operating activities amounted to ¥1,615 million, a positive turnaround of ¥2,530 million compared to the previous fiscal year. While results were impacted by a gain on sales of land use right of negative ¥1,035 million, the Company posted such major cash inflows as depreciation and amortisation of ¥3,469 million.

Net cash used in investing activities was ¥2,286 million, ¥5,044 million higher than the previous fiscal year. Principal cash inflows included ¥1,214 million owing to proceeds of sales of land use right. Major cash outflows included the purchase of property, plant and equipment of ¥3,404 million.

Net cash provided by financing activities was ¥2,067 million, ¥395 million higher than the previous fiscal year. The major factors were proceeds from long-term loans and borrowings of ¥13,500 million and repayment of long-term loans and borrowings of ¥10,603 million.

## Dividends

NDK regards returning profit to shareholders as a management priority and aims to maintain stable dividend payments while taking into account earnings, financial position, and other factors. NDK seeks to maintain a virtuous circle through a reasonable balance between the accumulation of retained earnings and shareholder dividend payments, and we are committed to further improving earnings performance by conducting R&D and capital investments that enable NDK to manufacture high-value-added and high-quality products that will effectively strengthen the Company's business structure. In the fiscal year ended March 31, 2019, we sincerely regret that we cancelled the payment of dividends.

# CORPORATE HISTORY

- 1948** • Founded as Nanbu Shoko Co., Ltd.
- 1949** • Started crystal unit production and sales
- 1950** • Changed the Company's name to Nihon Dempa Kogyo Co., Ltd.
  - Transferred the Company's registered Head Office to Oyamacho in Shibuya-ku (Tokyo)
- 1954** • Relocated to newly constructed Head Office and plant in Shibuya-ku, Tokyo
- 1960** • Started crystal oscillator production
- 1962** • Started construction of Sayama Plant in Sayama, Saitama Prefecture
- 1963** • Started mass production of synthetic quartz crystals
  - Began trading of NDK stock on the OTC market
- 1964** • Opened Kansai Sales Office for sales in Osaka
- 1970** • Established production affiliate Hawk Denshi Co., Ltd., in Niigata Prefecture (converted to a subsidiary in 1990 and renamed Niigata NDK Co., Ltd., in 2005)
- 1975** • Opened representative sales office in California, U.S.A.
- 1976** • Established subsidiary Furukawa NDK Co., Ltd., in Miyagi Prefecture
- 1979** • Established subsidiary Asian NDK Crystal Sdn. Bhd. in Selangor, Malaysia
  - Established NDK America, Inc., in California, U.S.A., and dissolved representative sales office
- 1985** • Completed main building at the Sayama Plant
- 1986** • Opened Chubu Sales Office for sales in Aichi Prefecture
  - Established production subsidiary Malaysian Quartz Crystal Sdn. Bhd. in Selangor, Malaysia (now NDK Quartz Malaysia Sdn. Bhd.)
- 1988** • Established NDK Electronics Singapore Pte. Ltd. (Currently, NDK Crystal Asia Pte. Ltd.)
  - Established sales subsidiary NDK Europe Ltd. in the United Kingdom
- 1989** • Established production subsidiary Hakodate NDK Co., Ltd., in Hakodate, Hokkaido
- 1990** • Relocated Head Office functions to Shinjuku-ku, Tokyo
  - Listed NDK stock on the Second Section of the Tokyo Stock Exchange
- 1994** • Established production subsidiary Suzhou NDK Co., Ltd., in Suzhou, China
  - Established sales subsidiary NDK Italy Srl as a subsidiary of NDK Europe Ltd., which is a subsidiary of the parent company
  - ISO 9001 certification obtained
- 1995** • Established sales subsidiary NDK Electronics (HK) Limited in Hong Kong
- 1998** • QS-9000 certification obtained
  - Listed on the First Section of the Tokyo Stock Exchange
- 1999** • ISO 14001 certification obtained
- 2001** • Opened NDK Europe Ltd., German Office, for sales (functions transferred to NDK Germany GmbH upon the establishment of that company as a subsidiary of the parent company in 2008, opened and transferred functions to the German Office in March 2014, commenced NDK Germany GmbH liquidation procedures in April 2014)
- 2002** • Established production subsidiary NDK Crystal, Inc., in Illinois, U.S.A.
  - Established NDK Holdings USA, Inc., in Illinois, U.S.A. as an umbrella holding company holding 100% of the shares in NDK America, Inc., and NDK Crystal, Inc.
  - Established sales subsidiary NDK-Electronics Shanghai Co., Ltd.
- 2003** • Established NDK Crystal Asia Pte. Ltd. in Singapore as a sales subsidiary of Asian NDK Crystal Sdn. Bhd., which is a subsidiary of the parent company
- 2004** • Opened Chitose Technical Center in Chitose, Hokkaido
- 2005** • Head Office functions relocated to Sasazuka, Shibuya-ku, Tokyo
- 2008** • Quality Assurance Laboratory certified for the ISO/IEC 17025:2005 international laboratory management standard
  - Obtained approval as a specified exporter from Tokyo Customs
- 2009** • Completed Laboratory ATOM, a new research facility, within the Sayama Plant
  - Established Suzhou NDK Trading Co., Ltd., in Suzhou, China as a subsidiary of Suzhou NDK Co., Ltd., which is a subsidiary of the parent company
- 2010** • NDK became the first company in Japan to adopt IFRS
- 2014** • Subsidiary NDK Italy Srl subsumed in a merger with subsidiary NDK Europe Ltd.
  - ISO13485 certification obtained
- 2015** • Head Office functions relocated to Sasazuka, Shibuya-ku, Tokyo (within the same area before relocation)
- 2016** • Subsidiary NDK Crystal, Inc. merged with subsidiary NDK Holdings U.S.A., Inc. and went into liquidification.

# DIRECTORY

## HEAD OFFICE

### Nihon Dempa Kogyo Co., Ltd.

Merkmal Keio Sasazuka Bldg.,  
1-47-1, Sasazuka,  
Shibuya-ku, Tokyo 151-8569, Japan  
Phone: 81-3-5453-6711  
E-Mail: irmaster@ndk.com

- Kansai Sales Office (in Osaka)
- Chubu Sales Office (in Aichi)
- Sayama Plant (in Saitama)
- Chitose Technical Center (in Hokkaido)

## DOMESTIC PRODUCTION SUBSIDIARIES

**Furukawa NDK Co., Ltd.** (in Miyagi)  
**Hakodate NDK Co., Ltd.** (in Hokkaido)  
**Niigata NDK Co., Ltd.** (in Niigata)

## OVERSEAS PRODUCTION SUBSIDIARIES

**Asian NDK Crystal Sdn. Bhd.**  
**NDK Quartz Malaysia Sdn. Bhd.** (in Malaysia)  
**Suzhou NDK Co., Ltd.** (in Suzhou, China)

## OVERSEAS SALES SUBSIDIARIES

### NDK America, Inc. (in Illinois, U.S.A.)

Phone: 1-847-852-4165  
E-Mail: sales@ndkxtal.com

- Silicon Valley Office (in Northern California)  
Phone: 1-408-428-0800
- Western U.S. Regional Office (in Southern California)  
Phone: 1-949-444-3882
- Eastern U.S. Regional Office (in Pennsylvania)  
Phone: 1-717-497-8353

### NDK Europe Ltd. (in U.K.)

Phone: 44-20-8547-0500  
E-Mail: ndk@uk.ndk.com

- French Office (in France)  
Phone: 33-1-60-95-0000  
E-Mail: ndk@fr.ndk.com
- Italy Office (in Italy)  
Phone: 39-02-9670-2920  
E-Mail: ndk@it.ndk.com
- German Office (in Germany)  
Phone: 49-7261-4027-0  
E-Mail: info@ge.ndk.com

### NDK Electronics (HK) Limited

(in Hong Kong, China)  
Phone: 852-2956-3181

- Taipei Branch (in Taiwan)  
Phone: 886-2-2555-0232  
E-Mail: sales@tp.ndk.com

### NDK Electronics Shanghai Co., Ltd.

(in Shanghai, China)  
Phone: 86-21-6278-5115  
E-Mail: ndkchina-m@sh.ndk.com

- Shenzhen Branch (in Shenzhen, China)  
Phone: 86-755-2218-2269  
E-Mail: sznnew@ndk.com

### Suzhou NDK Trading Co., Ltd.

(in Suzhou, China)  
Phone: 86-5126-8252071  
E-Mail: wuyahong@sz.ndk.com

**NDK Crystal Asia Pte. Ltd.** (in Singapore)  
Phone: 65-6298-9878  
E-Mail: ndks@sin.ndk.com

## OVERSEAS SALES OFFICES

### Asian NDK Crystal Sdn. Bhd.

(in Malaysia)

- Sales/IPC Department  
Phone: 60-3-5192-3360  
E-Mail: ndks@sin.ndk.com.

**Suzhou NDK Co., Ltd.** (in Suzhou, China)

- Sales Department  
Phone: 86-5126-8252071  
E-Mail: wuyahong@sz.ndk.com

(As of August 1, 2019)

# OVERVIEW OF THE NDK GROUP

The NDK Group is currently comprised of 14 companies, including the parent company in Japan, 3 subsidiaries in Japan, and 10 overseas subsidiaries. The Group engages in the integrated manufacturing and marketing of crystal devices (including crystal units and crystal oscillators), equipment applying crystals, synthetic quartz crystals, and crystal blanks.

## Production Companies



## Main Sales Companies and Offices



# INVESTOR INFORMATION

(As of March 31, 2019)

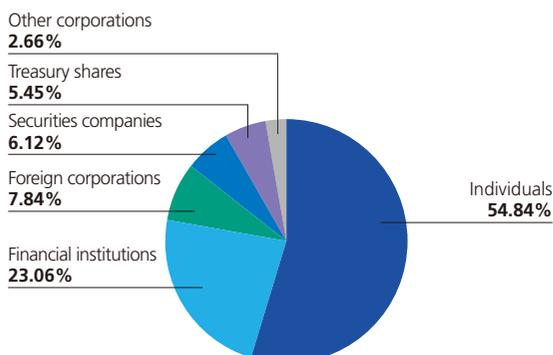
Date of Foundation : 1948

Share Capital : ¥10,649 million

Number of Shares of Common Stock : 20,757,905 shares

Number of Shareholders : 9,462

## Distribution of Ownership among Shareholders: (On a number of shares basis)



## Major Shareholders:

Shareholding Name	Number of Shares Held	
	(Thousands)	Ratio
Resona Bank, Ltd.	667	3.40%
Marusan Securities Co., Ltd.	654	3.33%
Toshiaki Takeuchi	623	3.17%
Saitama Resona Bank, Ltd.	610	3.10%
Japan Trustee Services Bank, Ltd. (Trust Account)	568	2.89%
Hiroshi Takeuchi	528	2.69%
The Master Trust Bank of Japan, Ltd. (Trust Account)	397	2.02%
Japan Trustee Services Bank, Ltd. (Trust Account 5)	353	1.80%
MUFG Bank, Ltd.	318	1.62%
Tokio Marine & Nichido Fire Insurance Co., Ltd.	315	1.60%

Notes: 1. The above list of major shareholders excludes treasury shares.

2. Shareholding ratios are calculated with the outstanding shares excluding treasury shares.

Stock Listing : First Section of the Tokyo Stock Exchange

Fiscal Year-End : March 31

General Meeting of Shareholders : June



**Crystal Bridge to the Future**

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Printed in Japan