# ECLIPSE 99 model

## ECLIPSE 99 MODEL

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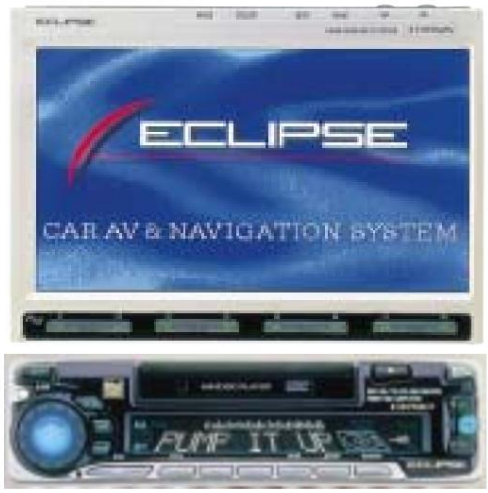


### Abstract

In the domestic car AV commercial market, user requirements are becoming more diverse and complex, and demand is high for products that are highly attractive. At the same time, there is a demand for products with clear points of differentiation from competitors. Also, in the North American aftermarket In addition to audio, there is an increasing demand for multimedia products such as navigation, and it is becoming necessary to provide products suitable for the market.

In the future, in response to these demands, we will develop comprehensive products that include multimedia, and create highly original products. It is thought that it will become important to introduce products in a timely manner.

In order to meet these market demands, we developed the ECLIPSE99 model.

I will introduce the technique.

### Abstract

In Japan, users' needs for after-market car AV products are becoming increasingly diverse and complex. Fujitsu Ten is responding to these new and growing demands by adding more attractive, unique features, unmatched by other manufacturers. In addition, demand is also increasing for multimedia products, such as car navigation systems. In view of these trends, Fujitsu Ten is moving aggressively to develop and supply an array of products that meet the specific needs of individual markets.

A comprehensive approach to development across the entire product line is one key to meeting emerging needs; timely introduction of original products is another. market.

Reading the market and working to meet its demands culminated in development of the ECLIPSE '99 models we are introducing here. General information on the new product line, as well as the main features and key technologies incorporated, follow in this short description.

## 1. Introduction

In the commercial car AV market, due to the full-fledged spread of MD and the advent of DVD video and DVD navigation for home use, The environment surrounding us is changing rapidly, with diversification of needs, intensification of competition, etc.

In 1997, we launched the "ECLIPSE" model for the domestic market on a full scale, Integrated model, 1DIN size CD changer, MD chip It has been well received mainly for products that other companies do not have, such as Jenja.

Also, in the North American commercial market, there are signs that navigation systems and DVDs are starting to take off. In such an environment, we have developed 99 models of “ECLIPSE” this time. report on key points.

## 2. Overview of ECLIPSE 99 models

ECLIPSE in Japan and North America underwent a full model change for the first time since the introduction of 97 models. For new products, we reviewed the lineup from conventional models, improved visibility, and improved market visibility. We have also strengthened our price competitiveness in the market.

### 2.1 Product concept

Cars are based on the key concepts of "safety," "comfort," and "environment." Among them, our products are also used in limited vehicle interior space. We pursue "safety", "comfort" and "environment" within We are planning and developing with the aim of providing.

As ECLIPSE, from 97 models in Japan and North America We plan and develop based on a consistent concept, In the development of the 99 model, along with the concept, further are doing a cleanup.

#### 2.1.1 Domestic ECLIPSE

The domestic ECLIPSE product concept is shown below.

(1) Media In One-Body In order to realize the new media that are appearing one after another in the limited space in the car, we will integrate the media by making full use of highly integrated technology.

(2) Feel Conscious (interface that resonates with the five senses)

What is an interface for using advanced and complicated products in the vehicle interior? We define the five senses of “auditory,” “visual,” “tactile,” “bodily sensation,” and “actual feeling” from the perspective of By doing so, we aimed to provide satisfaction to users and contribute to safe driving. This time, in particular, we focused on improving visibility and safety by increasing the size of the display and increasing brightness, Improvement of "comfort" by directing such as character display The aim is to brush up the "vision".

(3) Just Fit (Fusion with evolving moving bodies)

Responding to ever-evolving vehicles with the keywords of environment and safety, We offer a product group that fits the interior of the vehicle.

As described above, when developing domestic ECLIPSE, As a total concept composed of three elements, “Multi In One” is set, and “sensual high performance” is the key word. We proceeded with product development as a leader.

#### 2.1.2 North America ECLIPSE

Regarding ECLIPSE in North America, unlike in Japan, we are developing products that are limited to the specialty store market, and have launched the following product concepts.

(1) SOUND QUALITY

"Sound quality" suitable for products for car audio specialty stores ensure

(2) MAN-MACHINE INTERFACE An important factor that supports the enjoyment of listening to car audio. As a base, it provides comfortable "operability" and "visibility".

(3) RELIABILITY

We provide products that are totally trusted by users. e.g. ESN (ECLIPSE Security Network) Develop products that give peace of mind when enjoying audio.

As described above, when developing ECLIPSE in North America, the above Focusing on three elements, based on a product concept different from domestic, We are developing products.

### 2.2 Main product lineup

In 99 ECLIPSE, we introduced 8 new spring models for domestic models and 14 new models for North American models. Below is an overview of the main models of the new product.

#### 2.2.1 Major ECLIPSE models in Japan

(1) CD/MD main unit <E3309CMT>

In the 2Din system, as a low-priced model, CD, MD, FM / AM tuner built-in DSP/equalizer, 35W x 4 power amplifier Introduced new product.

(2) MD changer main unit <E5509MDT>

By adopting a vacuum fluorescent display (VF) for the display section and providing a display section that is linked to the operation of the rotary volume, the high visibility We are trying to ensure visibility and operability. Also, one of the designs We also implemented new

(3) CD player with built-in DSP/equalizer <E3309CDP>

Position selector, 9-band graphic equalizer Such as, the function has been improved from the conventional model, and the display

A three-dimensional display (spectral analyzer display) is also used for the parts to improve marketability.

2.2.2 Main models of ECLIPSE in North America

(1) E-COMMANDERÿ9002ÿ

Voice recognition audio and phone control Functions and voice navigation (guidance and arrows by voice synthesis display). This unit is a CD main Used in combination with the unit, optional A GPS unit can also be added.

(2) CD changer main unit <5605>

Newly developed 6-disc CD player with new sliding unit Commercialized a 1-Din main unit that adopted a changer deck. bottom. Regarding the CD changer part, the active model is used from the conventional model. In addition to shortening the processing time and disk exchange time, The size of the cookies has been reduced.

(3) CD main unit <5506>

The pre-out output 5V, which has been well received in the current model, is added. Higher voltage and the best class 8V plug in the industry Realized reout. In addition, map CD playback, digital output power, control terminals, etc. Supports connection to the COMMANDER unit and enables voice recognition It was possible to upgrade the system to the arrow navigation that

(4) Hideaway 8 CD changer <5083>

Compact, lightweight deck mechanism and variable fine pitch By adopting a magazine, it is smaller than the conventional 6-play type. We realized an 8-play CD changer with two more discs at a larger capacity.

<E3309CMT>


<E5509MDT>

<E3309CDP>

Figure 1 Domestic ECLIPSE new products

Fig.1 New ECLIPSE Model (Domestic)

<9002>

<5605>

<5506>


<5083>

Figure 2 North American ECLIPSE new products

Fig.2 New ECLIPSE Model (USA)

## 3. Major initiatives in the ECLIPSE 99 model

### 3.1 Design concept

The design concept of the 99 model is “refinement and reconstruction in a new dimension”. In the commercial market, the creation of added value for customers through design production has become particularly important, and competition is intensifying year by year. As a result, imitation eccentricities and complicated designs aimed at replicating mainstream manufacturers are flooded, and design trends in the entire market are crowded. With this in mind, we decided to target young people, who are starting to get tired of these “wacky and crowded designs,” as a specific core target. The aim was to select only the “beauty you really want” and reconstruct it. The following three points are the outline of the design development to realize the concept.

(1)Sharp & Pliable - Forged beauty learned from the natural world

There are no straight or flat objects in nature.
In addition, all living things, including human beings, have the background of necessity and selection.
From the scenery, with a refined and beautiful form
there is In this modeling, we have carefully trained "sharpness" and
The aim was to express a suppleness that evokes vitality.

(2) Visual Color Harmony - color harmony in display

At present, the beauty of the display is the most attractive and differentiating factor in the commercial market, and it consists of three elements: color, shape, and brightness. In particular, color and brightness (light) are elements that appeal to the sense of sight, which accounts for more than 80% of the five senses. aimed.

Figure 3 Market verification of design using users
Fig.3 Design Evaluation by The Product Users

(3) Direction of Textures - Texture that resonates with tactile and visual sensations

In addition to shape, color, and structure, “texture” is an important design element.
Inherited from the 1997 design, the tactile texture during operation

In addition, we aimed to enhance the "texture that appeals to the sense of sight."

3.2 Design Evaluation - Market Verification for Reconstruction

Excess supply and strictness of commercial designs for customers
In order to overcome the current situation of severe market selection, design
It is necessary to determine "what is necessary and what is not necessary" from the point of view closest to the customer. In this design development, we conducted design evaluation and market verification activities at an earlier stage than the previous time (97 models). rice field. Its main activities are the following two points. ÿ Design questionnaire survey (evaluation and analysis of conventional designs)

Aftermarket salesmen and helpers at sales companies and sales offices nationwide (about 100 people), the design of the conventional model (1997-98)
We conducted a questionnaire evaluation. The purpose of this study is to
From the perspective of marketability for customers on the front line, we objectively and multilaterally consider “what should be nurtured and what should be improved” in our designs.
It is to evaluate the design and aims to "reflect on the design".

(2) Design market verification (design verification using users)

In Tokyo and Osaka, 18 show the most interest in commercial car AV products
~ Dozens of general users aged 26 were selected, divided into small groups,
The survey was conducted in an interview format using a professional interviewer.
was There are two purposes of this survey, one is the current company and other
Evaluate each company's products and extract the "strengths and weaknesses" of each company do. The other is a design hypothesis model at the planning stage at our company.
Proposals (several proposals) are evaluated in the same way, and preliminary verification of the next design is performed.
cormorant. The point is to evaluate from the user's point of view.
The aim is to predict the future and extract keywords.
Through these research activities, we can learn about other companies (enemies) and
It is to verify the future of (self) in advance.

3.3 Differentiation point of design

Keywords obtained from the aforementioned design concept and market verification
The originality of the 1999 NEW model was reflected in the design development.
created a point of differentiation.

(1) Further evolved jog volume knob

Jog volume that has been well received in the market since the 1997 model
Along with following the concept of Mutsumami, both operability and originality
Newly evolved on the surface. Excellent visibility and guidance even in the daytime
Adopted blue LED lighting and thermoplastic elastomer resin and transparent
The three-layer structure of PC resin, etc., provides a sense of touch and vision during operation.
Realizing a texture that is soft and comfortable, it is standard equipment on the 1999 NEW model.
let me

In addition, this part is part of the fall 1998 model (CD/MD AV integrated
Models: E8808DVZ, E5508AVZ), and further improvements have been made to
lighting brightness and lighting specifications. (2) Spatial display design
with depth

The display design of the current model, which was planar (two-dimensional)
In the 1999 model, the spatial (three-dimensional) depth and width
The design was designed to express a sense of grit. The display content is the
Production that enhances communication and driving
It has a spectrum analyzer that is conscious of the tone. more in color
In the above-mentioned market verification, "Key words that give a favorable impression to users
Light blue, which was one of the
Similar color harmony representing rhythm (Main 70: Sub 25: Accent 5
color ratio) to achieve area harmony of colors.

(3) Display presentation linked to operation status

"Can be done with one finger", which is also the identity of our products
In the 1999 model, the operation status and movement of the volume control
By linking the display with the display, we performed a visually appealing production.
As a result, you can adjust the volume as well as audio such as BASS/TREBLE.
You can check the operating status of the audio control graphically.

I'm trying to do it.

(4) Texture design that further enhances modeling expression

For the 1999 domestic model, we chose a warm silver metallic paint color that expresses “elegance and warmth,” while the North American model adopted a half-flat black that expresses “stateliness and calmness.” Also common is the transparent acrylic material.

Plating that expresses lucidity and intelligence, and is associated with precious metals Parts are used as accents.

3.3 Improvement of ESN (ECLIPSE Security Network) system

3.3.1 Outline of ESN system

In the North American market, countermeasures against vehicle theft (security) are widely used.

Similar measures are being taken. Car Audio

Although the detachable system (front panel removal system) is generally used for security, we have been proposing our original “ESN” system since 1994,

installed in the

"ESN" proposes a comprehensive security network that differs from other car audio security systems.

be.

(1) Customer

management First, managing product serial numbers and customer information

It makes it possible to identify the owner of the product.

(2) Adoption of electronic serial numbers

The serial number of the product can be determined by affixing a sticker or engraving on the main unit.

are common, and the serial numbers of stolen products are known?

It will be erased as if it is not there. We protect stolen products

Employs an electronic serial number that records the serial number in the internal memory of the product so that the serial number of the product can be identified.

are doing.

(3) TOC (Table Of Contents) security method

As a security method for the product itself, we have developed and adopted a method that uses the TOC information of the CD as a “key”. This is because if the product is removed from the battery, such as when the product is stolen, the product itself will not operate.

It is a method to restore.

3.3.2 Improvement of ESN system

In "ESN", in order to improve security,

If you insert the CD that is the "key" incorrectly five times from the state where you cannot work,

The user will not be able to cancel the disabled state.

is designed to

In such a situation, conventionally, the product body is FTCA (Fujitsu Ten Corp. of America)

This results in spending “time” and “cost”

board. In order to improve this situation and improve systemability, we adopted the “set ID” method from this model.

This is done by setting a 6-digit release number for each product, and in the event of inoperability, the dealer (sales shop) confirms the user with the FTCA, and the serial number and owner of the product are registered with the FTCA.

If it matches the data contained in the

Contacted the dealer, and it was possible to cancel at the dealer. (Figure 4)

With this method, the "time" and "cost" it takes to cancel can be realized. Also, security

Unlocking by “set ID” is implemented to ensure security

Designed/programmed to change the "set ID" each time

The set ID used this time is

If it becomes, it can not be used.

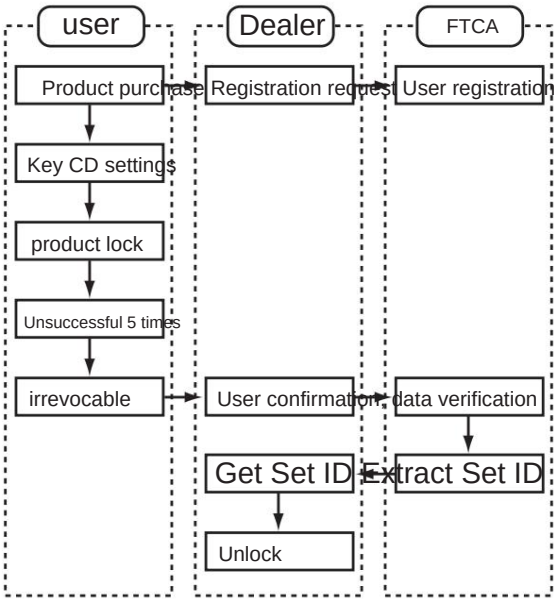


Figure 4 Security release flow

Fig.4 Security Cancel-Flow

3.4 3D-CAD design

In recent years, product price competition has intensified, and mechanical parts are being exported overseas.

There are increasing opportunities to procure Traditionally with 2D drawings

However, there is a limit to the expression of complicated design surfaces.

I have corrected the master at the place, but the overseas manufacturer's

In such cases, communication of accurate shape (design) information becomes an issue due to language problems and the lack of know-how of domestic manufacturers.

was

In order to solve this problem with the 99 model, 3D CAD 'Pro/E' (Pro/ENGINEER: U.S. Parametric Technology) introduced.

3.4.1 Features of Pro/E

(1) The concept is different from conventional 2D CAD, Solid data (* Create a shape by adding and cutting in 1). create The model data can be rotated freely, making it easy to check the shape. *1 Solid data: A three-dimensional shape representing the inside of an object data. Drilling holes in objects and subtly modifying their shapes Internal processing of operations such as

(2) The shading function (Figure 5) creates tension on the design surface It is possible to express the condition etc. in three dimensions, and the finish condition of parts (products) You can see the appearance (shadow of the design surface).

(3) Combining components using the assembly function (Fig. 6) and prevent component interference in advance with the interference check function. can

(4) Pro/E data is sent to the mold maker, and the data is It can be used for design.

[Actually, Pro/E data is converted to IGES (Initial Graphics Exchange Specification U.S. CAD data exchange standard) format and pass it to the mold design system. ]

Figure-5 Shading function
Fig.5 Shading Function

Figure 6 Assembly function
Fig.6 Assemble Function

3.4.2 Effects of introducing Pro/E (1)

Data in the middle of design can be used instead of mockups. Therefore, concurrent design with the designer became possible.

(2) Interference check prevented parts interference due to design factors.

(3) Modification of the mold master is generated by utilizing Pro/E data. didn't live

## 4. E-COMMANDER system

4.1 Aim of development

The navigation market in North America is etc. are not meeting the needs well and are sluggish It is the actual situation. In addition, as automotive devices become more multimedia compatible, it is becoming an urgent task to establish technology for future multimedia applications.

Based on this background and reflections on the first-generation voice-activated audio navigation “VAAN” (Voice-Activated Audio Navigation) launched in the market in 1996, the development of this model focused on the following points. (1) Product introduction (selling price, specifications) adapted to the North American market

We have developed a system/specification that takes into account the needs of navigation in North America (such as complete road signs, methods of route guidance, and enhancement of services such as road maps).

In North America, road conditions (every road has a name) and address notation (basically everything is represented by state, city, street name, building number, postal code), etc. It is quite possible to provide guidance by voice guidance + simple display (direction, street name, etc.) instead of conventional navigation. (Fig. 7) In addition, map-based navigation is expensive ($2,000 to $3,000), and there is a strong demand for a less expensive system.

Figure-7 Arrow navigation
Fig.7 Turn-by-Turn Navigation

(2) Verification of voice interface (voice recognition) marketability

(3) Accumulation of voice interface technology know-how

Audio to in-vehicle devices for the coming multimedia age The importance of recognition technology is increasing. In addition, instead of operating various media separately, the in-vehicle device

There is also a need to concentrate the control of the system, so in this system, audio operation, telephone control, navigation Gation operation is realized by voice recognition, and one unit We will verify its marketability by realizing them. In addition, we will accumulate know-how by introducing the technologies that will become necessary in the future into the market, and develop new products in the future. I will help you to start.

4.2 System overview

ECLIPSE COMMANDER (hereinafter referred to as E-COM) is a CD It is a comprehensive system with an integrated machine at its core, The bits are as follows.

ÿ CD integrated machine

ÿ E-COM unit

ÿ GPS unit

ÿPHONE control unit

The E-COM unit provides navigation pathfinding and voice Voice recognition for control, GPS unit is own vehicle position GPS data reception for grasping, PHONE control unit Each has an interface function with a commercially available cellular phone. Also, the PHONE control unit differs depending on the type of cellular phone connected.

A dedicated communication line (4 wire serial, control signal and power supply line) and the DIGITAL output from the CD deck. navigator The route information of the option can be obtained from the map CD inserted in the CD-integrated machine. input to the E-COM unit through the DIGITAL output, calculated and stored in the E-COM unit. For this reason, the route After the information is set, the map CD is no longer needed and the music CD It is also possible to listen to The route guidance information is displayed in text and voice when commands are entered or when automatic guidance is activated by GPS. It is input to the CD integrated machine as a number, and is displayed and output.

Route information is memorized during Acc-ON and deleted at the same time as Acc-OFF. be removed. However, the final destination, departure point, and final guidance point (current location when GPS is connected) are not erased and are memorized, so even if the vehicle stops in the middle of the route (IG-OFF when refueling, etc.) Facilitates rerouting. (Figure 8)

4.3 Speech recognition and synthesis

One of the major features of E-COM is voice recognition for all operations. What has been achieved is given. Below, E-COM voice recognition Describe the characteristics of consciousness.

4.3.1 Voice input method

Voice input methods are divided into “command input” for instructing actions according to purpose and “alphanumeric input” for inputting arbitrary data. be.

(1) Command input

Starting navigation, calling each function, audio

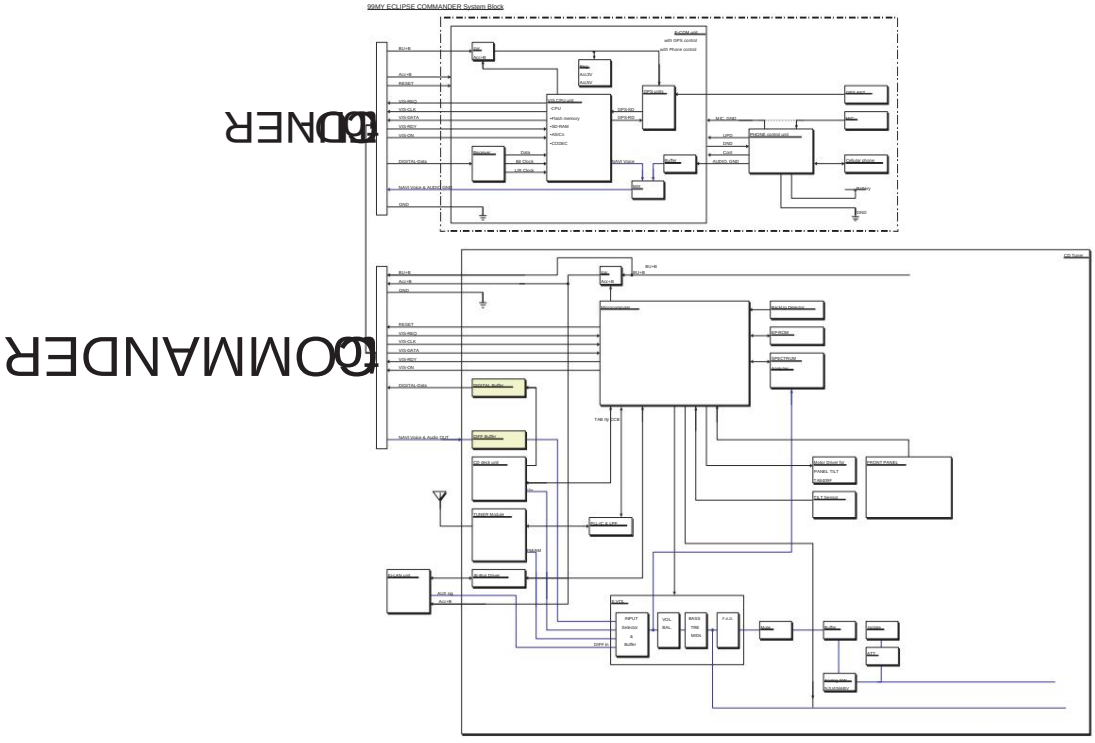


Figure-8 System block diagram

Fig.8 System Block

E-COM performs actions corresponding to each voice command by uttering specific words called voice commands for telephone operations.

(2) Alphanumeric input

Alphabets A-Z, Numbers 0-9. Current location, destination address Names of places and landmarks (specific place names, facility names: Disneyland, Dodger Stadium, etc.) are spelled out.

The following merits are obtained by taking the input method by spelling be.

(1) Template used for speech recognition (speech data for recognition matching) data) requires less memory. 26 alphabets and 10 numbers for a total of 36 templates with tens of thousands of words

It becomes possible to search for target names and landmarks.

(2) Since the input result becomes text data as it is, the map data Searching from the database becomes easy.

(3) Since the data to be handled is text data,

It can correspond to the recto

function. 4.3.2 Wildcard function

You can enter the navigation destination and current location by entering the address, First name must be spelled and pronounced correctly, but this is English It is also difficult for Americans whose mother tongue is this In order to improve the inconvenience, E-COM entered all spellings

It has a function that allows you to search for place names and landmark names without be.

For example, when entering "DISNEYLAND", "DISNEY" If you stop the input with "DISNEY..." List the corresponding words that begin with The user has the desired word It is possible to select with the voice command of "YES / NO" until it comes be.

4.3.3 E-COM response method

The E-COM response method should also be familiarized with the user's system. "Beginner mode" and "Expert mode" according to maturity Do" is set.

(1) Beginner mode

The user can receive a message from E-COM by inputting the destination and current location. According to the page, select the input method (address, landmark, interchange, intersection name, etc.) with "YES/NO", then enter the spelling. Can be operated even for the first time, but "YES / NO" It takes time to choose.

(2) Expert mode

Declare the direct input method to E-COM, then spell force. It is used by users who understand how to operate E-COM. input is completed more quickly than in beginner mode.

## 5. CD changer main unit

5.1 Product overview

5.1.1 Product aim

98 model adopts in-dash CD changer deck 1Din source unit was introduced to the market, but it was In the

(1) The CD should be the center of the source.

(2) 1Din installation vehicle is the center of the market.

Under these circumstances, there was a great demand for an in-dash CD changer that could be changed at hand as the main unit. However, the deck used in the 98 model has a problem with the depth dimension (installation corresponding to the display on the front)

The number of vehicles that can be installed is reduced due to the extension of the mounting depth) and It could not be commercialized.

This time, the depth dimension has been reduced for the main unit. We have developed a new deck and commercialized it. (Figure 9)

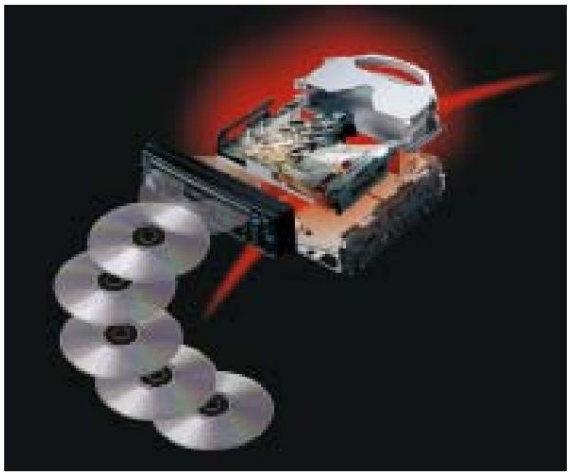

Fig.9 In-dash CD Changer MainUnit

5.1.2 Features The

following functions are mainly installed.

•Fluorescent display tube (VF) display •Jog volume with blue illumination

•Newly developed 6 CD changer mechanism

•High voltage/low impedance pre-out (5V/55ÿ)

•ESN

In addition, as a feature of the in-dash CD changer part,

It has the following functions.

•Built-in shock-proof memory circuit to prevent sound skipping

•Easy insertion/continuous insertion function to improve operability when inserting

Reduced time required for evacuation

5.2 Improved operability and visibility This

model is the main unit and has a display on the front.

I had to let it go. However, with this model, which has a lower CD opening than the single CD main unit, the same series

In the design of the display part was not established.

Therefore, we reviewed the button layout, and on other models, the front lower part

The operation buttons on the side are concentrated on the right side, and the display content is also as simple as possible.

display using a vacuum fluorescent display (VF).

manifested. (Figure 10)

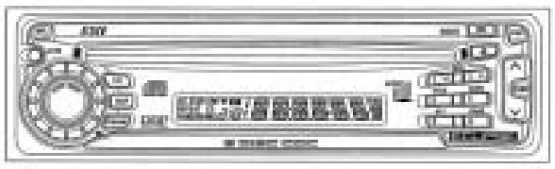

Figure-10 Design drawing

Fig.10 Design

Also, discs from conventional in-dash CD changers

The operation method at the time of insertion has been changed to further improve operability.

Conventionally, when inserting a disc,

(1) No disk is loaded with number buttons 1 to 6.

Select an arbitrary

number ÿWhen the indicator at the CD opening blinks and the disc can be inserted, insert the disc.

(3) If you want to continue inserting discs, follow steps (1) and (2) above.

repeat.

was the operation. But the disc while driving the car

When performing the insertion operation, it was necessary to check the numbers of the discs that were not loaded each time, and since continuous insertion was not possible, there was room for improvement in operability.

Therefore, along with the development of this CD changer deck,

Method of specifying a free disk number when inserting a disk

Instead, by operating the "Insert" button, the youngest available

The number is automatically selected. This eliminates the need for the user to check the number and press the button each time, and the same operation (insert button operation) is performed each time, improving operability.

rice field. Also, by pressing and holding the "Insert" button, continuous insertion mode

, and when the disc insertion is completed, the next disc automatically start the disk insertion operation. This eliminates the need to repeat the same operation when inserting multiple discs in succession, shortening the time and improving safety when inserting multiple discs in succession.

be.

## 6. in conclusion

Above is an overview of the main products of the ECLIPSE 99 model.

Stated.

There are some drastic changes in the environment surrounding the market.

By focusing on developing products that will please our customers,

Improving the ECLIPSE brand image and corporate image

I want to contribute to the top.

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