In recent years, the search for better sound quality in professional digital audio processing has seen a move away from 16-bit system towards those with 20-bit resolution. This move has gained momentum with the introduction of 20-bit A/D and D/A conversion technology.

As part of its extensive range of digital audio equipment, Sony already offers a CD Mastering system and now introduces the PCM-9000 Digital Master Disc Recorder that uses MO (Magneto-Optical) disc as its recording medium.

This significant advance in audio recording technology enables up to 80 minutes of two-channel audio to be stored in 20-bit linear mode - making it suitable for applications ranging from making master recordings in a studio to CD/MD pre-mastering and cutting.

Using an overwriteable MO disc not only brings excellent sound quality to this Digital Master Disc Recorder, it provides operational advantages such as quick access and non-linear editing. It also means that the recording medium can be removed for storage, or interchanged with other machines.
Features

MO Disc Advantages
The adoption of a new, single sided, 133mm (5.25-inch) MO (Magneto-Optical) disc makes repeated recording and playback possible, and because there is no contact with the medium during the operation of the unit, excellent durability of the discs is achieved.

Long Recording Time
The combination of a newly developed recording format and a highdensity MO disc means that up to 80 minutes of continuous recording is now possible in 20-bit linear mode. Sync-REC and Monitor-REC, two functions that are very attractive in a master recorder, are both provided and REC/READY operation of each channel allows single channel or two-channel recordings to be made.

User Data Recording
 Cue data and nondestructive editing data can be recorded in the AUX-data area, making possible nonlinear editing in which the main data.

Time Code Recording
Absolute Address is pre-mastered on to the MO disc during manufacture. External time code can also be recorded.

Quick Access for Improved Operating Efficiency
Quick access, one of the benefits of a disc recorder, has been implemented by means of a linear motor thread mechanism.

Specifications

Disc Size: 133mm (5.25-inch)
No. of Channels: 2 channels
Recording Time: 80 minutes (Sampled at 20-bit Fs=44.1kHz)
Rotational Mode: CLV (Constant Linear Velocity)
Sampling Frequency: 44.056/44.1 kHz
Quantization: 16/20/24-bit Linear, Selectable
Error Correction: CIRC

Variable Speed: ± 12.5% at 0.1% steps
Digital I/O: AES/EBU IN: XLR-3-31 type (x1)
            AES/EBU OUT: XLR-3-32 type (x1)
            SDIF-2 unbalanced (Optional), TTL level, 75Ω, BNC (x2)
Analog I/O: 18-bit or 20-bit AC/DA board (Optional)
             IN: XLR-3-31 type (x2)
             OUT: XLR-3-32 type (x2)
Sync Signal: Reference Video IN: BNC (x2)
             AES/EBU D-I Sync IN: XLR-3-31 type (x1)
             Word Sync IN: BNC (x2)
             OUT: BNC (x2)

Power Requirements: AC 100V to 240V, 50/60Hz
Power Consumption: 130W
Dimensions: 424(W) x 176(H) x 485(D) mm
(16 3/4 x 7 x 19 3/4 inches)
Weight: 15kg (33 lb 11 oz)

Three Sampling Frequencies and Quantizations
This unit is compatible with three sampling frequencies: 48kHz, 44.1kHz, and 44.056kHz. In addition, 16-bit, 20-bit or 24-bit quantization can be selected.

Sync Signal Input Flexibility
Reference video sync, D-I sync or word sync signals can be used as an external synchronization signal.

Variable Speed Recording/Playback
The speed can be varied by ± 12.5% of normal, in steps of 0.1%.

Double-Speed Copying
Double-speed copying is provided through the SCSI interface, together with double-speed copying of the AUX-data.

AES/EBU Insertion Interface
This unit is equipped with an AES/EBU insertion interface so that external digital effectors can be connected.

Disc Check Function
The unit is equipped with a disc check function that allows the user to check the condition of the medium before it is used.

Disc Erase
There are two erase modes: instant erase and disc erase. Instant erase erases only the data in the AUX data area, while disc erase erases all of the data on the disc.

Wide Options Range
A wide variety of options has been developed, making for users to customize the recorder for their particular application.
The reasons behind Sony's promotion of optical disks

Preserving human culture for posterity requires extraordinary reliability.

The lives of our remote ancestors are recorded on media such as the Rosetta Stone and parchment, and still give us valuable messages, even after many thousands of years. The more human culture advances, the greater the importance of passing it on to future generations on a reliable medium. Therefore, we at Sony have committed ourselves to optical disks on account of their extreme reliability, and their ability to store information stably without influence from environmental conditions, for an almost indefinite period of time. Moreover, in consideration of the trend towards 'multi-media', combining words, numbers, sound and pictures, optical disks, with their flexibility and applicability, are sure to play a leading role in future recording media.

Low environment-impact information-storage is vital for the future.

As economic activities need to inevitably goes worldwide consumption of paper. Mankind can no longer ignore the fact that continued deforestation at our present rate will result in environmental disaster. In fact, one of the prevailing factors when evaluating a recording medium is how well it records large inputs of information, how well it avoids wasting resources, and therefore how many trees it can save. Indeed, seen from the viewpoint of recording density, optical disks offer extraordinary performance: the capacity of a 12-inch "surtable" optical disk is an astonishing 855 gigabytes. As new technology is developed, the recording density of optical disks is sure to increase.

Optical disks have already stimulated new cultural forms.

Another factor to be considered when evaluating general-purpose media for wide use in the areas of buy, read, entertainment and instruction is ease of handling. Optical disks such as the compact disk (CD), laser videodisc (LD), CD-ROM, CD-I etc. are already enjoying widespread use and have actually stimulated the emergence of new cultural forms. In addition to their ability to store large quantities of data in a small physical space, they also offer data of excellent, easy-readable, low recording cost, and a semi-permanent. It is really no exaggeration to say that optical disks are without drawbacks and have proven the practicality of their performance.
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*Thanks to Mr. H. Ito, (General Manager of the MDO Division)*
From the latter half of the 1970s, Sony began research into writable and rewritable optical disks which users could employ in a manner similar to magnetic tape. With the data storage capacity and reliability of the medium as an important consideration, we began to develop a new mass-production technology required to manufacture a storage medium to answer the demands of the time for large storage capacity at low cost. These technological developments resulted in the release of a new type of optical disk, the "Writable Optical Disk" in 1986 and the rewritable "Magneto Optical Disk" in 1992. In 1999, we announced our most advanced technology, the "VR-STER", which we expect to enable up to 5 times the recording density of previous disks. In the flect, as in so many other ways, Sony has once again revealed its technical lead over competing manufacturers.

**Fig.1:** History of Sony's optical disk development

<table>
<thead>
<tr>
<th>Year</th>
<th>80</th>
<th>81</th>
<th>82</th>
<th>83</th>
<th>84</th>
<th>85</th>
<th>86</th>
<th>87</th>
<th>88</th>
<th>89</th>
<th>90</th>
<th>91</th>
<th>92</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROM Disk</td>
<td>Laser Vision videodisc</td>
<td>CD</td>
<td>CD-ROM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WORM</td>
<td>12-inch WD</td>
<td>12-inch Double density WD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rewritable</td>
<td>5.25-inch MO</td>
<td>3.5-inch MO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Electric Book (for DATA Disks)
Sony's optical disks are manufactured under a total development system that includes the medium itself, equipment and processes as its most important components, as well as systems for their application. It is only with such a total development system that products can be manufactured with the highest quality and reliability, to meet the demands and conditions of actual use.

The Materials Research Section conducts a wide range of basic research into various materials including magnetic glasses and semiconductors to develop and analyze the data that is the basis of future technical developments. The Systems Device Section conducts research into total performance, combining the media themselves and drive systems. In this section, all the technologies and the data concerning media, design and manufacturing, a steady stream of industry-leading technologies have been developed. Some examples of its achievements include: polycarbonate disk substrates and fly-mode writing reproducer disks. The Manufacturing Research Section is responsible for the establishment of mass-production technology, the improvement of current models, and research and development into new products. Data from these sections and analyses performed by them are quickly fed back to the Manufacturing Section and used to improve products. The close cooperation of these sections is one of the secrets of Sony's success.
The magneto optical disk was introduced to the market in 1986. Although it is still a new technology, it offers the best performance at a lower cost. Combining a magnetic head and optical head, the magneto optical disk achieves performance 10x faster than the floppy disk. As shown in Fig. 1, one considers the length, M in the technical level of conventional magnetic recording media such as floppy disks and hard disks and also the future technical improvements possible for magneto optical disks, their future is most promising. Fig. 2 shows predicted improvements in recording density for various recording media in the near future. With technical innovations such as the development of lasers with shorter wavelengths and narrower track widths, it is considered that magnetic optical disks will soon have a memory capacity exceeding the prototype ever developed.

In addition to magneto optical (MO) disks, there are various other types of rewritable optical disks, including "Phase-change" optical disks, "Dye-stir" optical disks, etc. The reason for Sony's choice of the magneto optical recording system is that, from a laser beam, together with an applied magnetic field, to change the orientation of magnetic domains on the disk. In other words, data is deleted by the heat effect under which the transparencies of the reflected laser beam are changed recording by the erosion of the media. As Fig. 3 shows, bit density and track density of each recording media.

Fig. 2 Memory capacity and access time of various recording media

Fig. 3 Bit density and track density of each recording media
Magneto Optical Disk
Technical Manual

(1) Once of read/write is virtually unlimited
Since the magneto optical recording system uses data by magnetizing a magnetic film having 'vulcanized' magnetostatic anisotropy using the heat of a laser beam and an external magnetic field, as shown in Fig. 4, the data will not change even if the data is repeated more than 10 million times. On the other hand, the phase change system considered to be the shortest "companion of MO disks", uses the ability of the atomic structure of its recording film to alternate between an amorphous structure and an "amorphous structure. Since this is thermally unstable, rewriting is possible only about 1000 times, rendering the phase change system more ideally suited for computer applications.

(2) Linear speed dependency
Fig. 5 shows the basic principle of the phase change optical recording system. When writing, the atomic structure is changed to an amorphous structure by suddenly cooling from the high melting temperature. When erasing, it is returned to a crystalline structure by heating for a fixed time at a lower temperature than in writing, and then cooling more gradually. Since the phase change system requires two conflicting conditions, it is difficult to maintain data, and at the same time, there are limitations placed on the combination of drive and media. On the other hand, as the magneto optical recording system is less dependent on linear speed, it has fewer limitations than the phase change system. In addition, although the magneto optical recording system uses magnetism for write and read operations similar to conventional magnetic recording media, its coercive force is high at 10 Oe; after bake has once been write, it is maintained in stable condition and is not affected by stray magnetic fields in a normal environment. This is one more decisive factor in Sony's choice of the magneto optical recording system.

---

### Table 1: Comparison of Magneto Optical Recording System and Phase Change System

<table>
<thead>
<tr>
<th>Change System</th>
<th>Magneto Optical</th>
<th>Phase Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layer structure</td>
<td>4-layer</td>
<td>4-layer</td>
</tr>
<tr>
<td>Number of layers</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Reliability of recorded data</td>
<td>Faulty</td>
<td>Not faulty</td>
</tr>
<tr>
<td>Linear speed dependence of recording layer</td>
<td>None</td>
<td>High</td>
</tr>
<tr>
<td>Actual results</td>
<td>ISO 5 28 3.3</td>
<td>3.28</td>
</tr>
<tr>
<td>Laser power</td>
<td>Low 20 mW</td>
<td>High 30-40 mW</td>
</tr>
<tr>
<td>Optical system</td>
<td>Magnetic field Laser pickup - bias magnetic block Laser pickup only</td>
<td></td>
</tr>
</tbody>
</table>

---

Fig.4 Principle of Magneto Optical recording system

Fig.5 Principle of Phase Change system
5.25-inch and 3.5-inch — Two MO disk specifications

5.25-inch MO disks are double-sided, as a rule. With their size advantage, 5.25-inch MO disks are ideal for providing large memory capacity. They are now being proposed for use as computer memory storage devices and may promise to be useful in a wide range of applications as a disk storage medium.

Table 2 5.25-inch MO Disk Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>EDX-10DA</th>
<th>EDX-10DA1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Format</td>
<td>32-56pin</td>
<td></td>
</tr>
<tr>
<td>User area radius</td>
<td>147.5mm</td>
<td>158.5mm</td>
</tr>
<tr>
<td>Number of user tracks</td>
<td>12751</td>
<td>13238</td>
</tr>
<tr>
<td>Sector size</td>
<td>124.8-byte sectors 22 cylinders</td>
<td>122 cylinders</td>
</tr>
<tr>
<td>Number of sector tracks</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>Configuration of track</td>
<td>50nm</td>
<td></td>
</tr>
<tr>
<td>Track pitch</td>
<td>1.8μm</td>
<td></td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>CCW (seen from drive side)</td>
<td></td>
</tr>
</tbody>
</table>

Mechanical characteristics

| Diameter of disk                   | 150mm     |
| Diameter of hub                    | 25mm      |
| Cartridge dimensions (WxDxH)       | 138 x 130 x 14mm |
| Disk weight without cartridge      | 45g       |
| Total weight                       | 15g       |
| Radial run-out                     | 50μm      |
| Axial run-out                      | 330μm     |
| Tilt                               | 2.5°       |

Optical characteristics

| Source characteristics              | 1.2mm     |
| Reflective index                   | 1.85      |
| Reflectivity at blank area         | 19%       |
| Read/write characteristics         |          |
| Nominal read power at 2400rpm      | 1.5mW     |
| Nominal write power at 2300rpm     | 9.3mW     |
| Nominal erase current at 2400rpm   | 10.5mW    |
| Nominal erase current at 2220rpm   | 14.6mW    |
| Carrier to noise ratio             | ≥47dB     |
| Raw byte error rate                | 6.5 x 10^-5 |

Drive conditions

| Puncture ratio                     | 0.40-0.66 |
| Track cross ratio                  | 0.30-0.47 |

Recording capacity

| Uniform format                      | 325.5 MB side, 223 MB slice |
| Number of side used                | 2 (Double-sides) |

Reliability (acceleration test results)

| Read cycle                         | 0.10      |
| Erase/write/read cycle             | 0.12      |
| Logical upload cycle               | >2 x 10^6 |
| Arrival life                       | > 10 year |
| Shelf life                         | > 15 year |

Environmental requirements

| Operating temperature              | 5-65°C   |
| Operating humidity                 | 0-80%RH  |
| Storage temperature                | 5-30°C   |
| Storage humidity                   | 0-90%RH  |

* When used with Sony drives.
** Maximum wet bulb temperature: 29°C.
### Table 3: 3.5-inch MO Disk Specifications

<table>
<thead>
<tr>
<th>MO</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Format</strong></td>
<td>MO</td>
</tr>
<tr>
<td>User area radius</td>
<td>26~28mm</td>
</tr>
<tr>
<td>Number of user tracks</td>
<td>10220 Tracks single side</td>
</tr>
<tr>
<td>Sector size</td>
<td>312 Bytes sector</td>
</tr>
<tr>
<td>Number of sector track</td>
<td>25</td>
</tr>
<tr>
<td>Configuration of track</td>
<td>Spiral</td>
</tr>
<tr>
<td>Track pitch</td>
<td>1.6μm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>CCW (Same from optics side)</td>
</tr>
<tr>
<td><strong>Mechanical characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Outer diameter of disk</td>
<td>85mm</td>
</tr>
<tr>
<td>Diameter of hub</td>
<td>15mm</td>
</tr>
<tr>
<td>Cartridge dimensions (WxDxH)</td>
<td>90x94.6mm</td>
</tr>
<tr>
<td>Disk weight without cartridge</td>
<td>12g</td>
</tr>
<tr>
<td>Total weight</td>
<td>40g</td>
</tr>
<tr>
<td>Radial run-out</td>
<td>≤50μm (max)</td>
</tr>
<tr>
<td>Axial run-out</td>
<td>≤0.020μm</td>
</tr>
<tr>
<td>Tilt</td>
<td>≤ 3° max</td>
</tr>
<tr>
<td><strong>Optical characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Substrate thickness</td>
<td>12μm</td>
</tr>
<tr>
<td>Refractive index</td>
<td>1.67</td>
</tr>
<tr>
<td>Reflectivity of blank area</td>
<td>19%</td>
</tr>
<tr>
<td><strong>Read Write characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Carrier to noise ratio</td>
<td>44dB</td>
</tr>
<tr>
<td>Raw byte error rate</td>
<td>≤5×10⁻⁸</td>
</tr>
<tr>
<td><strong>Groove conditions</strong></td>
<td></td>
</tr>
<tr>
<td>Push-pull ratio</td>
<td>0.5~0.7</td>
</tr>
<tr>
<td>Track-to-track ratio</td>
<td>2.0~2.6</td>
</tr>
<tr>
<td><strong>Recording capacity</strong></td>
<td></td>
</tr>
<tr>
<td>Disk recording capacity</td>
<td>128 MB 2-side</td>
</tr>
<tr>
<td>Number of side used</td>
<td>Single sided</td>
</tr>
<tr>
<td><strong>Reliability/acceleration test result</strong></td>
<td></td>
</tr>
<tr>
<td>Read cycle</td>
<td>≥10^6</td>
</tr>
<tr>
<td>Endurance read cycle</td>
<td>≥2×10⁵</td>
</tr>
<tr>
<td>Operation life</td>
<td>≥ 5 years</td>
</tr>
<tr>
<td>Shelf life</td>
<td>≥10 years</td>
</tr>
<tr>
<td><strong>Environmental requirements</strong></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>5~65°C</td>
</tr>
<tr>
<td>Operating humidity</td>
<td>20~80% RH</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>5~40°C</td>
</tr>
<tr>
<td>Storage humidity</td>
<td>20~80% RH</td>
</tr>
</tbody>
</table>

### Table 4: 3.5-inch ROM Disk Specifications

<table>
<thead>
<tr>
<th>CD-ROM</th>
<th>P-ROM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Format</strong></td>
<td>CD-ROM</td>
</tr>
<tr>
<td>User area radius</td>
<td>26~27mm</td>
</tr>
<tr>
<td>Number of user tracks</td>
<td>10220 Tracks single side</td>
</tr>
<tr>
<td>Sector size</td>
<td>512 Bytes sector</td>
</tr>
<tr>
<td>Number of sector track</td>
<td>25</td>
</tr>
<tr>
<td>Configuration of track</td>
<td>Spiral</td>
</tr>
<tr>
<td>Track pitch</td>
<td>1.6μm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>CCW (Same from optics side)</td>
</tr>
<tr>
<td><strong>Mechanical characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Outer diameter of disk</td>
<td>85mm</td>
</tr>
<tr>
<td>Diameter of hub</td>
<td>15mm</td>
</tr>
<tr>
<td>Cartridge dimensions (WxDxH)</td>
<td>90x94.6mm</td>
</tr>
<tr>
<td>Disk weight without cartridge</td>
<td>12g</td>
</tr>
<tr>
<td>Total weight</td>
<td>40g</td>
</tr>
<tr>
<td>Radial run-out</td>
<td>≤50μm (max)</td>
</tr>
<tr>
<td>Axial run-out</td>
<td>≤0.020μm</td>
</tr>
<tr>
<td>Tilt</td>
<td>≤3° max</td>
</tr>
<tr>
<td><strong>Optical characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Substrate thickness</td>
<td>12μm</td>
</tr>
<tr>
<td>Refractive index</td>
<td>1.67</td>
</tr>
<tr>
<td>Reflectivity of blank area</td>
<td>75%</td>
</tr>
<tr>
<td><strong>Read/Write characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Carrier to noise ratio</td>
<td>≥44dB</td>
</tr>
<tr>
<td>Raw byte error rate</td>
<td>≤5×10⁻⁸</td>
</tr>
<tr>
<td><strong>Groove conditions</strong></td>
<td></td>
</tr>
<tr>
<td>Push-pull ratio</td>
<td>0.3~0.7</td>
</tr>
<tr>
<td>Track-to-track ratio</td>
<td>2.0~2.6</td>
</tr>
<tr>
<td><strong>Recording capacity</strong></td>
<td></td>
</tr>
<tr>
<td>Disk recording capacity</td>
<td>128 MB 2-side</td>
</tr>
<tr>
<td>Number of side used</td>
<td>Single sided</td>
</tr>
<tr>
<td><strong>Reliability/acceleration test result</strong></td>
<td></td>
</tr>
<tr>
<td>Read cycle</td>
<td>≥10^6</td>
</tr>
<tr>
<td>Endurance read cycle</td>
<td>≥2×10⁵</td>
</tr>
<tr>
<td>Operation life</td>
<td>≥ 5 years</td>
</tr>
<tr>
<td>Shelf life</td>
<td>≥10 years</td>
</tr>
<tr>
<td><strong>Environmental requirements</strong></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>5~65°C</td>
</tr>
<tr>
<td>Operating humidity</td>
<td>20~80% RH</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>5~40°C</td>
</tr>
<tr>
<td>Storage humidity</td>
<td>20~80% RH</td>
</tr>
</tbody>
</table>

*Maximum will but temperature: 20°C*
The MO disk consists of four layers: a poly-carbonate substrate, see Fig. 7, the signal is written in the form of a magnetization on the MO layer made of Fe-Cr which is sandwiched between an opaque Al film on one side and a transparent Al film on the other. The disk axis of these operations are shown in Figs 8-10.

**Writing**

As shown in Fig. 8, the MO drive gives a powerful electromagnetic field that excites the disk and a laser beam is focused under the disk.

In the initial state, Fig. 9(a), the direction of magnetization of the MO layer is upward. When writing data, a powerful magnetic field is applied while the laser beam is applied on the disk recording area in the MO layer. The temperature at the point where the laser beam is applied rises and when it reaches the Curie point, the magnetic field is applied to the MO layer is decreased and in the recorded sections the magnetization is reversed due to the external magnetic field (Fig. 8-9), thus recording data.

**Erasing**

In the reverse way, the drive and an upward external magnetic field is applied while the laser beam is also led to the MO layer. When the temperature reaches the Curie point, the direction of magnetization is returned to its initial status, thereby erasing data (Fig. 9(b)).

**Reading**

To read the recorded data, i.e., to read whether the magnetization direction of the MO layer is reversed or not, a magneto-optical phenomenon called the “Kerr effect” is used. As shown in Fig. 10, this phenomenon appears as a slight rotation of the plane of polarization of the reflected laser beam. By measuring the MO layer at about 0.2°, the change of rotation angle is converted into a change of light intensity using an analyzer (Polarized Beam Splitter), and this is applied to a photocell so that it can be converted to an electric signal.
Fig. 6 Write Erase Operation Principle of MO Disk

Fig. 10 Read Operation Principle of MO Disk

---

**Write Operation**

- Laser Beam

---

**Read Operation**

- Laser Beam
  - Rotated Beam
  - Incident Beam

---

**Kerr Rotation Angle**

- Rotation of Plane of Polarization

---

Uphill or downhill magnetization appears as a rotation of the plane of polarization of the laser beam. Difference between $\theta$ and $\phi$. 

---

**Kerr Rotation Angle**

- $\theta$

---

**Kerr Rotation Angle - Theta**

- Counterclockwise

---
Sony MO disks: manufactured by the most adv

Sony's MO disks are manufactured in a class-100 clean room, equivalent to that of a plant used to fabricate semiconductors with sub-micron order precision. This excellent performance and quality are the result of a highly advanced manufacturing system with quality inspection procedures implemented at many points on the manufacturing line. These strict process control measures assure extraordinary reliability allowing the disks to handle important data with virtually no possibility of a crash.

Sony developed its own laser cutting machine for use in the mastering process. Long experience manufacturing compact disks and LaserVision videodiscs allows us to make high-quality standards to accommodate any required format.

In this process, the polycarbonate substrate is made using an injection molding machine. To pass severe standards for overprinting, flatness, signal transmission, etc., Sony employs carefully selected materials as well as highly advanced molding technology.

In this process, the thin films for recording, reflection, etc., are deposited on the substrate. Here, it is vital to maintain the optimum combination of materials, uniformity of layer thicknesses and reproducibility. To achieve the required accuracy, Sony uses high-precision sputtering machines and know-how gained through long experience.

In this process, the hubs are mounted on the disks. To construct a 5.25-inch MO disk, two disks are bonded together to create a double-sided disk. Then, the Springs are attached and the completed disk is placed in a cartridge. Quality checks are repeatedly applied before final shipment.
A disk's physical and mechanical characteristics are critical for writing, reading stability, and the laser beam formed by the drive's optical pickup. ISO MD disks are designed with superior mechanical characteristics to ensure excellent performance and maintain high-speed operation. In this ISO standard, various parameters are specified at 800 rpm rotational speed, as described below.

Tilt

Shows the inclination of the disk. When there is a tilt amount of tilt, the light reflected from the disk may not return to the pickup correctly, and this may cause errors.

Deflection

Shows the amount of deviation of the disk rotational plane from the reference plane.

Axial acceleration

Shows the acceleration when the objective lens, which focuses the laser light, follows the axial direction along the disk during rotation. The smaller this value, the better the drive's focus ability.

Radial runout

Shows the variation in radial direction of the track when the disk is rotating, that is, its "Radial run-out." The smaller this value, the better the drive's tracking accuracy.

Radial acceleration

Shows the acceleration when the objective lens follows the radial direction during rotation. The smaller this value, the better the drive's tracking accuracy.

Table 6 ISO Standards for Mechanical Characteristics of 5.25-inch MD Disks

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
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<td>5</td>
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<tr>
<td>Deflection</td>
<td>3</td>
</tr>
<tr>
<td>Axial Acceleration</td>
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<tr>
<td>Track Eccentricity</td>
<td>80</td>
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<tr>
<td>Radial Acceleration</td>
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</table>

Table 5 Comparison of Signal Imbalance of MD Disks from Various Manufacturers (Wavelength: 825 nm, inner section)

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<thead>
<tr>
<th>Manufacturer</th>
<th>Signal Imbalance</th>
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<tr>
<td>Sony</td>
<td>1.7%</td>
</tr>
<tr>
<td>Company A</td>
<td>2.5</td>
</tr>
<tr>
<td>Company B</td>
<td>0.5</td>
</tr>
<tr>
<td>Company C</td>
<td>2.2</td>
</tr>
<tr>
<td>Company Digitalis</td>
<td>1.0</td>
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<td>ISO standard</td>
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<td>2.0</td>
</tr>
</tbody>
</table>
This calculates the shape of the groove as an

enveloped signal from a photodiode detector which detects

the flux of light through the light intensity.

Since it is very dependent on the plane of

polarization of the incident light, in the development

of MO disks, Sony has always taken into

consideration compatibility with various other drives

and has incorporated such characteristics into its

standards.

Path-put Signal Ratio

The drive monitors the tracking by using the

path-put method, as it is desirable to perform with

the path-put characteristic applied to this time.

Problems will occur if the figure is either too large or

too small. ISO standards specify 0.4 to 0.66 for

0.8 to 1.6 m/s.

TCS (Track Cross Signal)

S shorting modulation when the pickup crosses the

track. This seek operation is performed based on

this signal. It is defined as 0.2 to 0.33 for

0.8 to 3.6 m/s in the ISO standard.

Precaution: Scanning across a microgroove of single pre-grooved platen

or both sides of MS disk MBC disks.
Checking the performance of Sony MO disk with...
At Sony we believe that one of the most important prerequisites for a practical disk data storage medium is the capability for repeated writing and erasing operations.

We perform tests under a wide range of conditions including harsh environments, and check on repeated operation and long-term storage performance in the making of Sony MO disks. Therefore the computer data storage media provides the reliability and durability that users demand for real-world applications and working.

**The Number of Repeated Read Times**

Sony MO disks achieve at least 10^5 repeated data read operation of recorded data under harsh test conditions. The repeated read test is performed with a media at high temperature (60°C) with maximum magnetic field applied, and with maximum read power. In a typical office environment, the media can survive repeated read operations well beyond this 10^5 figure.

**The Number of Repeated Erasure, Write, and Read Times**

As a highly reliable and highly durable media that is capable of rewriting data, the Sony MO disk attains rewrite performance exceeding 10^5 times.

In fact, as the test results of our tests shown in the figure verify, more than 10^12 rewrite operations are actually achieved.

This table shows witness to the superiority of Sony MO data storage media that assure high reliability and high durability.

---

**Fig. 14** Sony 5.25-inch MO disk Repeated rewrite characteristics

![Graph showing repeated rewrite characteristics](image)

**Fig. 15** Sony 5.25-inch MO disk Signal waveform after repeated rewrite.

![Signal waveform comparison](image)
Data Accruing Capability
Sony MO disk life operation is determined by a variety of tests, as we as a range of tests. In figure a, we see the example of accelerated aging test results which reveal a predicted life of at least 15 years.

![Sony 5.25-inch MO Disk data storage life](image)

Data obtained from accelerated aging tests under various environments conditions is plotted as a curve with a normalized time axis.

For example, if a byte error rate of 10^-5 is set as the limit to life then the life at 22°C room temperature can be forecasted to be about 100 years in 100K hours.

Auto Disk Cleaner MD-85
This is an auto disk cleaner exclusively for 5.25-inch magnetic optical disks. Periodic cleaning with this will remove dust and dirt from the disk and maintain the initial performance over a long period. It is recommended that MO disks be cleaned once every three months.

- Clean the disk twice, replacing the moistened and dry pads.
Fig. 17 Structure of Sony MO Disk Cartridges.

Fig. 18 Structure of Sony MO Disk Plastic Case.
Based on the above data, the most important factors are summarized in the following graphs. The larger the size of the circle section made by connecting the points plotted for each characteristic, the better the performance of the disk, generally speaking.

The graphs formed in these results show the overall quality of each disk. As Sony, to accommodate a wider range of drives, we emphasized balancing the characteristics of all factors. Our development policy can be understood by looking at the following graphs.

**Graph 1: Overall Characteristics of Sony MO Disks**

- **Byte error rate**
- **Axial acceleration (m/s²)**
- **The number of repeated rewrite times**
- **The number of recorded rewrite times**
- **Signal-to-noise ratio (%)**
- **Center to noise ratio (%)**

*1. When used with 5GB drives.
2. The number of times which 3:1 data to noise ratio is deteriorated when the ambient is 1°C.
3. Baseline temperature: 30°C.
4. Bias magnetic field: 30,000 Arms (400 Oe) at 2,400 rpm.
Graph 2: Overall Evaluations of MO Disks from Various Manufacturers (Shaded section shows Sony)

(Company A)  
(Company B)  
(Company C)
A potential source of error in the system was the improper alignment of the mirrors, which caused a significant loss of light. A corrective feedback system was implemented to minimize this error.

Dempster's system for data storage utilized a novel method of data encoding and decoding. This approach significantly improved the reliability and efficiency of the storage system.

A disk in an optical disk drive contains data in the form of microscopic pits on the surface. The optical read/write head is used to read the data and write new data to the disk.

A new technique for data encryption was developed, which provided enhanced security for sensitive information. This technique involved the use of advanced mathematical algorithms to protect the data.

An example of a data storage system was described, which utilized a combination of magnetic and optical storage technologies. This system offered high capacity and fast access times.

A system for data retrieval and analysis was presented, which utilized advanced software algorithms to process large datasets efficiently.

A system for data transmission was discussed, which utilized advanced modulation techniques to improve the reliability and quality of the transmitted data.
SONY
DIGITAL MASTER DISC RECORDER
PCM-9000
REMOTE CONTROLLER
RM-D9000

DABK-9001  DABK-9003  DABK-9004
DABK-9005  DABK-9006

OPERATION MANUAL  [English]
1st Edition (Revised 2)
Serial No. 10001 and Higher
WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

CAUTION

As the laser beam used in this HD videodisc recorder is harmful to the eyes, do not attempt to disassemble the cabinet. Refer servicing to qualified personnel only.

DANGER

This label is located on the top of the unit.

For the customers in the USA

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

WARNING

Um Feuergala und die Gefahr eines elektrischen Schlages zu vermeiden, darf das Gerät weder Regen noch Feuchtigkeit ausgesetzt werden. Um einen elektrischen Schlag zu vermeiden, darf das Gehäuse nicht geöffnet werden. Überlassen Sie Wartungsarbeiten stets nur einem Fachmann.

CLASS 1 LASER PRODUCT TO EC 825
LASER KLASSE 1
PRODUKT NACH EC 825

This Master Recorder is classified as a CLASS 1 LASER PRODUCT. The CLASS 1 LASER PRODUCT label is located on the rear panel of the recorder.

Bei diesem Master-Recorder handelt es sich um ein Gerät der Laser-Klasse 1. An der Rückseite des Gerätes befindet sich ein Aufkleber mit der Beschriftung LASER KLASSE 1 PRODUKT.

DANGER

VORSICHT

Dieser Aufkleber befindet sich oben am Gerät.

For the customers in Europe

WARNING

This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Pour les utilisateurs en Europe

AVERTISSEMENT

Il s’agit d’un produit de Classe A. Dans un environnement domestique, cet appareil peut provoquer des interférences radio, dans ce cas l’utilisateur peut être amené à prendre des mesures appropriées.

Für Kunden in Europa

Warnung

Dies ist eine Einrichtung, welche die Funk-Entstörung nach Klasse A besitzt. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen.
For the customers in Canada
This apparatus complies with the Class A limits for radio noise emissions set out in Radio Interference Regulations.

Pour les utilisateurs au Canada
Ce matériel est conforme aux normes Classe A pour bruits radioélectriques, spécifiés dans le Règlement sur le bruitage radioélectrique.

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<th>785 nm</th>
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<tr>
<td>Wavelength</td>
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<td>Emission duration</td>
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<td>(V) 24 ± 7°</td>
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<td>(V) 24 ± 1°</td>
<td></td>
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</tbody>
</table>

For the customers in the United Kingdom

IMPORTANT
The wires in this mains lead are coloured in accordance with the following code:
- Green-and-yellow: Earth
- Blue: Neutral
- Brown: Live

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows:

The wire which is coloured green-and-yellow must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol Y or coloured green or green-and-yellow.
The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.
The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

VAROITUS!
Laiteen käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittäville näkeyritysmalleille laajennusosille.

KLASS 1 LASER APPARAT

WARNING
Om apparaten används på annat sätt än i denna bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.
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Purpose and audience
This manual is provided as the Operation Manual for the PCM-9000 Digital Master Disc Recorder. It contains the information you need to operate the PCM-9000, the RM-D9000 Remote Controller, and their peripherals.
The manual is aimed at professional operators in production companies, recording studios or broadcasting stations. It is assumed that the user has experience of using digital audio recorders.

Organization
This manual is divided into the following eight chapters and appendices.

Chapter 1 Overview
Introduces the PCM-9000 features and optional equipment.

Chapter 2 Location and Function of Parts and Controls
Gives the names and functions of the controls and other parts.

Chapter 3 Preparations
Describes the basic connections, settings and disc handling, with which you should be familiar before operating the PCM-9000.

Chapter 4 Basic Operations
Describes basic operations such as recording, playback, and search. It also explains operation modes, one of the main features of the PCM-9000.

Chapter 5 Program Editing
Describes program editing, performed in units of tracks and files.

Chapter 6 Time Code Chase
Explains synchronized operation with the time code chase function.

Chapter 7 Optimum Use of a Disc
Describes the disc check and the deletion of the contents of a disc.

Chapter 8 Advanced System Configurations
Presents several example system configurations based on the PCM-9000.

Appendixes
Include the specifications of this unit and its optional boards.
As well as this manual, the following manual is supplied with the PCM-9000. Refer to this as necessary.

**Maintenance Manual**

Provides the technical information necessary for installing and maintaining the PCM-9000 and its peripherals.
Chapter 1 Overview

This chapter introduces the features of the PCM-9000 and optional equipment. Read this chapter to help you make the best use of the PCM-9000.

1.1. Features of the PCM-9000.................................................. 1-2
The PCM-9000 Digital Master Disc Recorder is a 2-channel digital audio recorder, which uses a magneto-optical (MO) disc as its external storage device. The PCM-9000 system is composed of the master disc recorder unit and the RM-D9000 Remote Controller. The use of MO discs allows the PCM-9000 to provide quick and easy operation. In addition, you can configure versatile systems with a variety of features such as program edit, automatic punch in/out, record/monitor channel setting, variable speed playback, time code chase, and digital copy through a SCSI (Small Computer System Interface).

Optional equipment

**RM-D9000 Remote Controller**
Enables the remote control of the PCM-9000. Many of the PCM-9000’s functions, including program edit, can be accessed via the remote controller.

**DABK-9001 Converter Board**
Converts an analog input signal into a 20-bit digital signal, or a 20-bit digital signal into an analog output signal.

**DABK-9003 Interface Board**
Enables the PCM-9000 to input/output external time codes, parallel remote signals and 9-pin remote control signals. This board is necessary to record an external time code onto the time code channel.

**DABK-9004 Digital I/O Board**
Adds SDIF-2 format digital audio input and output connectors, each having two channels, to the PCM-9000.

**DABK-9005 Interface Board**
Adds SCSI connectors. The PCM-9000 can be controlled from an external editor or computer through the SCSI. This board is necessary to perform double-speed digital copy between two PCM-9000 units.

**DABK-9006 Interface Board**
Enables the PCM-9000 to be connected to the DAQ-1000 Cue Editor. This lets you make master discs onto which cue signals have been recorded.
Chapter 2
Location and Function of Parts and Controls

This chapter briefly describes the functions and purposes of the principal controls and connectors. Read this chapter before moving on to the operating procedures, covered in chapter 3 and subsequent chapters.

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2-1-1. PCM-9000 Control Panel

(1) Unit and disc controls
EDIT DATA SAVE key
Press to save edit data from memory to the loaded disc.
*For details, see "5-5 Saving the Edit Data"

EJECT key
Press to eject the disc.

POWER switch
Turns the power on and off.

SCSI ID indicator
Shows the ID number of this unit, as set with the ADDRESS switch on the optional DABK-9005.

PHONE LEVEL (headphones level) control
Adjusts the volume level of the headphones.

HEADPHONES (headphones) connector
Used to connect a set of stereo headphones for monitoring the output sound.

(2) Status indicators
ALARM indicator
Lights if a fault arises in the PCM-9000.

WARNING indicator
Lights when a disc which has only partial INSTANT ERASE/DISC ERASE is loaded.
REC READY (recording ready) indicator
Lights when the REC PROTECT switch on the loaded disc is set to the recording enable position, provided the unit is set to recording ready status.

REC (recording) indicator
Lights while recording to a disc.

(3) Operating condition setting keys

SAMPLING FREQ (frequency) key
Press to select the recording sampling frequency to be used by the unit. During playback, the sampling frequency setting follows that recorded on the disc. One of the following indicators lights, according to your selection.
• 48 kHz: the sampling frequency is set to 48 kHz
• 44.1 kHz: the sampling frequency is set to 44.1 kHz
• 44.056 kHz: the sampling frequency is set to 44.056 kHz

Setting DIP switch number 6 on the PCM-9000 to II (Fs-shift mode) allows you to reduce the 48-KHz sampling frequency in units of 0.1%. The corresponding indicator flashes when using the sampling frequency shift function.

Notes
• To adjust the Fs-shift mode, contact your Sony system engineer.
• You cannot record data using a sampling frequency that differs from that already recorded on the disc.

WORD LENGTH key
Press to select the quantization word length for recording. During playback, the word length setting follows that recorded on the disc. One of the following indicators lights, according to your selection.
• 24 BIT: word length is 24 bits
• 20 BIT: word length is 20 bits
• 16 BIT: word length is 16 bits

Notes
• You can set the word length regardless of the word length set for the installed converter board.
• You cannot record data using a word length that differs from that already recorded on the disc.

REC MODE (recording mode) key
Press to set the recording mode to either monitor or sync. One of the following indicators lights, according to your selection,
• MONITOR: Audio channels 1 and 2, as well as the time code channel, are used for recording or playback. During recording, the sampling frequency and word length correspond to those set with the PCM-9000, or those recorded on the disc.
• SYNC: Audio channels 1 and 2, as well as the time code channel, can be used independently while playing back a previously recorded signal. The sampling frequency and word length settings follow those of the previously recorded material.

INPUT SELECT key
Press to select the input audio signal. One of the following indicators lights, according to your selection.
• ANALOG: analog audio signal (the optional DABK-9001 Converter Board must be installed.)
• AES/EBU: AES/EBU format digital audio signal
• SDIF-2: SDIF-2 format digital audio signal (the optional DABK-9004 Digital I/O Board must be installed.)
• SCSI: SCSI format digital audio signal (the optional DABK-9005 Interface Board must be installed.)

Note
• If you try to select a format for which the required options are not installed, the corresponding indicator will not light.
• When you select AES/EBU or SDIF-2, the corresponding indicator flashes if the required signal is not being supplied to the PCM-9000.
SYNC CLOCK key
Press to select the reference signal to be used to synchronize the PCM-9000. One of the following indicators lights, according to your selection.
• INT: internal master clock
• EXT: word sync signal input to the WORD SYNC INPUT connector
• D-I: digital signal input to the D-I SYNC connector or DIGITAL I/O AES/EBU D-I connector.
• VIDEO: video signal input to the REFERENCE VIDEO INPUT connector

Note
The corresponding indicator flashes if the required signal is not supplied to the PCM-9000.

TIME CODE key
Press to select the time code to be used for search. One of the following indicators lights, according to your selection.
• AAPI: time code converted from the address that is pre-grooved on a disc (AAIP—Absolute Address In Pre-groove). When using this time code, you cannot record an external time code.
• EXT TC: external time code, input to the unit, and recorded to the time code channel. To use this time code, an external time code must be recorded onto the disc (the optional DABK-9003 Interface Board must be installed).

SYSTEM CONTROL key
Press to select the unit to be used to control the PCM-9000. One of the following indicators lights, according to your selection.
• LOCAL: any unit connected to the PCM-9000
• REMOTE 1 (9 PIN): the unit connected to the REMOTE 9 PIN connector on the rear of the PCM-9000 (the optional DABK-9003 Interface Board must be installed)
• REMOTE 2 (SCSI): an editor or computer connected to the SCSI connector (the optional DABK-9005 Interface Board must be installed)

FORMAT (time code format) key
When AAPI is selected as the time code, press to select the format of the time code displayed on the RM-D9000 and output from the PCM-9000. One of the following indicators lights, according to your selection.
• 30: 30 frames/second, non-drop frame mode (NTSC)
• 29.97 NDF: 29.97 frames/second, non-drop frame mode (NTSC)
• 29.97 DF: 29.97 frames/second, drop frame mode (NTSC)
• 25: 25 frames/second (EBU)
• 24: 24 frames/second (film)

Notes
• You cannot convert from the selected time code format to another.
• The corresponding indicator flashes if the selected format differs from that of the input or playback time code.

GEN MODE (generator mode) key
Press to select the operating mode of the internal time code generator. One of the following indicators lights, according to your selection.
• THROUGH: the input time code is recorded as is
• REGEN: the input time code is regenerated before being used

SLAVE LOCK indicator
Lights while the time code format and signal phase between the internal time code generator and external time code match during regenerating.

(4) Disc maintenance keys
REC READY (recording ready) key
Press to set three channels (audio channels 1 and 2, and the time code channel) to recording ready status.

STOP key
Press to stop the disc transport. If you leave the unit in the stop state, the STOP key starts flashing after about 3 minutes. To resume the operation in this state, press the STOP key so that it lights.
DISC CHECK key
While holding down the STOP key, press this key to check a disc.
*For details, see “7-1. Checking a Disc”.

DISC ERASE key
While holding down the STOP key (in recording ready status), press this key to delete all data on the disc. Deleting all data on a disc takes about 20 minutes.
*For details, see “7-2-2, Full Erasing”.

INSTANT ERASE key
While holding down the STOP key (in recording ready status), press this key to delete all disc management data (rec IDs, BEGINS, ENDS and so on).
*For details, see “7-2-1, Instant Erase”.

**Note**
After using this function, any audio signals recorded to the main data area of a disc cannot be played back, as all rec IDs will have been erased.

ANALOG LEVEL ADJUST controls
Control the levels of the analog input and output signals. Channels 1 and 2 can be adjusted independently within a range of ±2 dB.
*For details, see “4-2-3, Adjusting the Input/Output Signal Levels”.

(5) DIP switches and indicators
Used to set modes and functions.

<table>
<thead>
<tr>
<th>Switch number</th>
<th>Function</th>
<th>Set to I</th>
<th>Set to II</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Test mode*1</td>
<td>Normal mode</td>
<td>Test mode</td>
</tr>
<tr>
<td>2</td>
<td>Memory backup function*2</td>
<td>Disabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>3</td>
<td>TC sync playback</td>
<td>Disabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>4</td>
<td>TC sync playback mode</td>
<td>ONCE</td>
<td>CONTINUE</td>
</tr>
<tr>
<td>5</td>
<td>Phase correction bit function</td>
<td>Enabled</td>
<td>Disabled</td>
</tr>
<tr>
<td>6</td>
<td>Sampling frequency shift function</td>
<td>Disabled</td>
<td>Enabled (0.1% shift down)</td>
</tr>
<tr>
<td>7</td>
<td>Video input signal</td>
<td>Video signal</td>
<td>Clock pulse</td>
</tr>
<tr>
<td>8</td>
<td>Reference signal</td>
<td>Sync component in the AES/EBU signal being input</td>
<td>Reference D-1 sync signal being input</td>
</tr>
<tr>
<td>9</td>
<td>Parallel remote</td>
<td>Mode(1)</td>
<td>Mode(2)</td>
</tr>
<tr>
<td>10 - 14</td>
<td>For future use</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>15</td>
<td>Clock mode*3</td>
<td>Normal</td>
<td>Sharp</td>
</tr>
<tr>
<td>16</td>
<td>Connector for RM-D9000</td>
<td>PCM-9000 front panel</td>
<td>PCM-9000 connector panel</td>
</tr>
</tbody>
</table>

Factory setting: All switches set to 1

1) To set the PCM-9000 to test mode, first turn off the power before setting the mode.
   To set to the PCM-9000 back to normal mode, first turn off the power before resetting the mode.
2) When the memory backup function is enabled, the following settings are held for three days.
   - Basic settings (recording mode and input signal, variable speed value, Fs, word length)
   - Time code settings (format, generator mode)
   - Offset value (AAAP and time code chase offset and parameters)
3) When the clock mode is set to sharp mode, you cannot execute variable speed playback and recording, or time code sync playback.
   To execute time code chart, switch to normal mode.
4) Switching of DIP switch number 16 must be executed while PCM-9000 is stopped or while the power supply is turned off.
RESET button
Press to reset the PCM-9000 to its power-on status. Any unsaved edit data in the PCM-9000’s RAM (Random Access Memory) will be lost.

TEST MODE switch
Select test mode to check the performance of the PCM-9000. This switch is activated when DIP switch 1 is set to 1 (test mode).

C1 indicator
Lights when the PCM-9000 detects, during playback, a C1 error in the playback signal that cannot be corrected by C1 correction. In this case, the unit automatically applies C2 correction to correct the error.

AVERAGE indicator
Lights when error correction cannot be applied to the playback signal, and the signal has been interpolated.

HOLD indicator
Lights when error correction cannot be applied to the playback signal, and the signal has been held, that is, the last value is repeated.

MUTE indicator
Lights when error correction cannot be applied to the playback signal, and the signal has been muted.

(6) Connector and release lever for RM-D9000
REMOTE CONTROLLER connector (Round 10 pin)
Used to connect the PCM-9000 to the RM-D9000, using the supplied cable. When the RM-D9000 is connected to this connector, DIP switch No.16 must be set to 1.

RELEASE lever
Move to the right to detach the RM-D9000 from the PCM-9000.
2-1-2. PCM-9000 Connector Panel

(1) PCM-9000 unit
REFERENCE VIDEO INPUT connectors (BNC type) and 75-ohm termination switch
Input the reference video signal to one of the two connectors. When outputting the input signal through the other connector, set the 75-ohm termination switch to OFF. Otherwise, set it to ON.

AC IN connector
Connect to an AC outlet using the supplied power cord.

b (ground) terminal

WORD SYNC INPUT connectors (BNC type) and 75-ohm termination switch
Input the word sync signal for synchronization reference to one of the two connectors. When outputting the input signal through the other connector, set the 75-ohm termination switch to OFF. Otherwise, set it to ON.

Note
If you connect PCM-3402 to PCM-9000, use the switch setting to stabilize the operation.

WORD SYNC OUTPUT connector (BNC type)
Outputs the word sync signal.

INSERTION RETURN connector (XLR-3-31)
When using the insertion function, this connector is used to input the AES/EBU-format digital audio signal, output from the INSERTION SEND connector, for processing by an external effector.

INSERTION SEND connector (XLR-3-32)
When using the insertion function, this connector is used to output the AES/EBU digital audio signal to be processed.
D-1 SYNC connector (XLR-3-31)
Inputs the D-1 signal used for synchronization reference.

DIGITAL I/O AES/EBU D-1 connector (XLR-3-31)
Inputs an AES/EBU-format 2-channel digital audio signal.

DIGITAL I/O AES/EBU D-O connector (XLR-3-32)
Outputs an AES/EBU-format 2-channel digital audio signal.

REMOTE connector (Round type 10-pin)
Connects the PCM-9000 to the RM-D9000 when it is detached from the PCM-9000 front panel. Set DIP switch 16 on the PCM-9000 to II when connecting the RM-D9000 to this connector.

(2) DABK-9005 (Optional): Install this board in slot 1.
SCSI connectors (50-pin)
Input and output SCSI-format signals.

ADDRESS switch
Used to set the SCSI ID. The SCSI ID is displayed in the SCSI ID indicator.

Note
Do not set the same SCSI ID for different PCM-9000s connected through the SCSI interface. Doing so will cause a malfunction.

(3) DABK-9003 (Optional): Install this board in slot 2 or 3.
TIME CODE IN connector (XLR-3-31)
Inputs SMPTE/EBU-format time code signals.

TIME CODE OUT connector (XLR-3-32)
Outputs SMPTE/EBU-format time code signals.

PARALLEL REMOTE connector (D-sub 50-pin, female)
Used when controlling the PCM-9000 with 50-pin parallel remote control signals.

REMOTE (9PIN)/RS-232 connector (D-sub 9-pin, female)
Used when controlling the PCM-9000 with 9-pin remote control signals. Use this connector to connect the DAE-3000 digital audio editor. This connector can also be connected with RS-232C by changeovering REMOTE (9PIN)/RS-232 Switch.

REMOTE (9PIN)/RS-232 Switch
Changes the function of the D-SUB 9 pin connector. Either 9 pin remote or RS-232C is selectable.
For details of how to output RS-232C format signals, see the maintenance manual.

(4) DABK-9004 (Optional): Install this board in slot 2 or 3.
INPUT CH-1 and CH-2 connectors (BNC type)
Input SDIF-2 format digital audio signal channels 1 and 2.

OUTPUT CH-1 and CH-2 connectors (BNC type)
Output SDIF-2 format digital audio signal channels 1 and 2.

(5) DABK-9001 (Optional): Install one of these boards in slot 4.
LINE INPUT CH-1 and CH-2 connectors (XLR-3-31)
Input analog audio signal channels 1 and 2.

LINE OUTPUT CH-1 and CH-2 connectors (XLR-3-32)
Output analog audio signal channels 1 and 2.

(6) DABK-9006 (Optional): Install this board in slot 1, 2, or 3.
CUE DATA IN connector (XLR-3-31)
Inputs cue data from the DAQ-1000.

CUE DATA OUT connector (XLR-3-32)
Outputs cue data to the DAQ-1000.

REMOTE connector (36-pin)
Connects to the VTR REMOTE connector of the DAQ-1000 to enable control of the PCM-9000 from the DAQ-1000.

STATUS OUT connector (D-sub 25-pin)
Connects to the EDITOR TRANSFER INPUT connector on the DAQ-1000.
2-2. RM-D9000

2-2-1. RM-D9000 Control Panel

(1) Function keys

REPEAT key
Used to repeatedly play back audio between two specified points (repeat playback). Press this key to select the point from which repeat playback will start, then press the key again at the end point. Repeat playback starts. To stop repeat playback, press the STOP key.
For details, see "4-3. Playing Back".

METER RESET key
Press to reset the level peak level when the level meter is in peak hold status.

METER SCALE key
Press to set the display scale of the level meter to normal, fine, or bit mode.
For details, see "3-3. Setting the Level Meter Display".

REF MARKER (reference marker setting) key
Used to adjust the reference marker.
For details, see "4-2-3. Adjusting the Input/Output Signal Levels".

and keys
Press these keys to move the cursor to the left or right when entering time code data, and so on.

SET key
Used to register files, and so on.
For details, see "5-3. Making Files".

TIMER MODE key
Press to select the timer display mode. Every time the key is pressed, the mode changes.
For details, see "3-2. Time Data Display".
OPR MODE (operation mode selection) key
Press to set the disc, file, copy, or normal operation mode. The selected mode indicator appears in the display window.
For details, see "4-1. Overview of Operation Modes".

(2) Record/monitor channel selection keys
REC MUTE (mute signal recording) key
Press to record mute signals on the channels set to recording ready status.
For details, see "4-2-5. Recording".

REC READY (recording ready) keys
Press the REC READY key corresponding to the channel to set to recording ready status. When the PCM-9000 is set to sync recording mode, audio channels 1 (CH-1) and 2 (CH-2), as well as the time code channel (TC), can be selected independently. In monitor recording mode, all channels are set to recording ready status when one of the REC READY keys is pressed.

REPRO (playback monitor) keys
Press the REPRO key corresponding to the channel to be set to playback signal monitoring status. When the PCM-9000 is set to sync recording mode, audio channels 1 (CH-1) and 2 (CH-2), as well as the time code channel (TC), can be selected independently. In monitor recording mode, all channels are set to the playback signal monitoring status when one of the REPRO keys is pressed.

INPUT (input monitor) keys
Press the INPUT key corresponding to the channel to be set to input signal monitoring status. When the PCM-9000 is set to sync recording mode, audio channels 1 (CH-1) and 2 (CH-2), as well as the time code channel (TC), can be selected independently. Regardless of the setting, the selected channels are automatically set to input signal monitoring status during sync recording. In monitor recording mode, all channels are set to the input signal monitoring status when one of the INPUT keys is pressed.

(3) Auto punch In/out keys
IN key
While holding down the ENTRY key, press this key to specify the recording start point (in point) for automatic punch In/out.

OUT key
While holding down the ENTRY key, press this key to specify the recording end point (out point) for automatic punch In/out.

ENTRY key
Press this key and the IN or OUT key simultaneously to specify the in or out point for automatic punch In/out.

AUTO EDIT key
Press to execute automatic punch In/out recording.
For details, see "4-2-6. Automatic Punch In/Out".

(4) Program edit keys
BEGIN key
Press to specify or recall the begin point (track start point).
For details, see "5-2. Making Tracks".

END key
Press to specify or recall the end point of a track.
For details, see "5-2. Making Tracks".

MODIFY key
Press to modify the registered begin, end, or mark point.
For details, see "5-2-2. Modifying Tracks and Mark Points".

MARK key
Press to specify or recall the mark point.
For details, see "4-4-3. Searching with the Registered IDs".

DELETE key
Used to delete a specified mark point, track or file.
For details, see "5-3-3. Deleting Tracks and Mark Points" or "5-3-2. Deleting a File".

INSERT key
Used to insert a new track into a specified file.
For details, see "5-3-1. Making a File".
ENABLE key
Press this key, such that its indicator lights, to enable the registration, modification, or deletion of mark points, tracks and files, as well as the renumbering of tracks.

RENUMBER key
Used to renumber mark point and track ID numbers according to the AAPI order on a disc.
*For details, see "5-2-4. Renumbering Tracks and Mark Point".

DATA SAVE key
Press to save edit data to the disc.
*For details, see "5-5. Saving the Edit Data".

(5) Time code chase setting keys

INSERTION key
Press to activate the insertion function. This function allows you to use external equipment to add an effect to the playback signal, and to record the modified signal with another PCM-9000.

TC SET (time code set) key
Used to set the offset time of the disc time code (AAIP).

TC CHASE (time code chase) key
Press to execute time code chase. To execute the time code chase function, the optional DABK-9003 must be installed.
*For details, see "6-3. Executing Time Code Chase".

SETUP key
Press to set the time code chase parameters to one of the following:
- Disc/tellcote point display (normal display)
- Chase mode menu: used to set time code chase mode.
- Lock window setting menu: used to set the lock window value (the allowable difference between the playback and external time codes) for time code chase.
- Display window setting menu: used to set the display window value (the PLAY key flashes if the difference exceeds this value) for time code chase.
- Re-sync window setting menu: used to set the re-sync window value (allowable variation in playback speed for vari-sync playback) for time code chase.
- Offset time setting menu: used to set the sync offset time (a constant margin relative to an external time code) for time code chase.
- Offset error display: shows the offset error ((playback time code) - (external time code) - (sync offset time)).

VARI (variable) key
Press to execute variable speed playback at a specified vari speed.
*For details, see "4-3-2. Variable Speed Playback".

VARI SET (variable speed set) key
Press to set the variable speed.
*For details, see "4-3-2. Variable Speed Playback".

RESET key
Press to reset the sync offset time, parameters for time code chase or to reset the vari speed and time code offset.
*For details, see "3-2-2. Setting the Time Code Offset", "4-3-2. Variable Speed Playback", "6-2. Setting for Time Code Chase".

(6) Disc transport control keys

END SEARCH (recording end point search) key
Press to locate a point 2 seconds after the final recording end point (the rec ID whose address is the largest in AAIP).
LOCATE key
Press to locate the specified mark, rec in, rec out, track begin and track end point.
For details, see "4-4-2 Searching with Specified Address", "4-4-3 Searching with the Registered IDs".

SHUTTLE key
Press this key, such that it lights, to enable shuttle mode playback. In this mode, you can make an appropriate search, at a speed corresponding to the rotation angle of the search dial.
For details, see "4-4-1 Searching with the Jog/Shuttle Dial".

JOG key
Press this key, such that it lights, to enable jog mode playback. In this mode, you can make a precise search for a point by rotating the search dial.
For details, see "4-4-1 Searching with the Jog/Shuttle Dial".

Search dial
The search dial has the following two functions:
- Changing the search speed during jog/shuttle mode playback
- Setting parameters (begin/end points of a track, mark points, and so on)
2-2-2. Display Window

(1) Entry ID Indicators
Light to indicate the conditions of the entry ID indicator area, as follows:
- **TRACK**: The track number is displayed.
- **MARK**: The mark point number is displayed.
- **REC-ID**: The rec ID number is displayed.
- **FILE**: The file number is displayed.

(2) REPEAT I-II Indicator
Lights during repeat playback. Press the REPEAT key once at the repeat start point. The REPEAT I-Indicator starts flashing. Press the REPEAT key again at the repeat end point. The REPEAT I-II indicator stops flashing and lights steadily, after which repeat playback starts.

(3) MODIFY Indicator
Lights while you are modifying edit data.

(4) Current ID Indicators
One of following indicators lights to distinguish the type of data being displayed:
- **TRACK**: lights while the BGN or END indicator is lit for a track.
- **REC-ID**: lights while the BGN or END indicator is lit for a rec ID.
- **BGN**: lights while a track begin or recording in point is being displayed by the disc time display.
- **END**: lights while a track end or recording out point is being displayed by the disc time display.

Chapter 2: Location and Function of Parts and Controls | 2-13
(5) Data protection indicators
Indicate the data protection status of the loaded disc, as follows:
- M. DATA PROTECT: Audio data on the disc is protected (the REC PROTECT switch on the disc is set to the MAIN DATA position).
- E. DATA PROTECT: Audio and edit data on the disc is protected (the REC PROTECT switch on the disc is set to the MAIN/EDIT DATA position).

Note
A lit E. DATA PROTECT indicator does not mean that edit data in the PCM-9000 memory is protected, but that the edit data recorded on the disc is protected. In this status, you cannot save new edit data to the disc.
For details, see “3-4-4. Preventing Accidental Erasure”.

(6) Time code chase indicators
Indicate the status of the time code chase function, as follows:
- VARI: lights during variable speed playback
- TC CHASE: lights during time code chase
- TC CHASE OFFSET: lights while the sync offset time is being displayed by the disc time display
- TC PRESET: lights while the time code offset is being set. (This offset time is not related to the sync offset time for time code chase.)

(7) WARNING and ALARM indicators
Light in the following cases:
- WARNING: Lights when a disc which has only partial INSTANT ERASE/DISC ERASE is loaded.
- ALARM: Lights if a misoperation is detected.

(8) INSERTION indicator
Lights while insertion is being performed.

(9) DE EMPH (de-emphasis) indicator
Lights when playback signals are emphasized.

(10) SCSI ID indicators
Indicate the following:
- SCSI ID: displays the SCSI ID of this unit.

(11) DOUBLE SPEED indicator
Lights when REMOTE2(SCSI) is selected. This function requires the installation of the optional DABK-9005 SCSI Interface Board.

(12) Disc time display
Shows the following three kinds of information:
- Time code: the AUP (converted from block addresses that have been pre-grooved on a disc) or the EXT TC (recorded to a disc from external equipment) for the currently located position, a track BEGIN/END point, or a mark point.
- Track numbers registered in the file
- Messages

Note
If the time code chase mode is EXT TC mode, the RM-D9000 will freeze the displayed time at the last read value under the following conditions:
- when playing parts where time code is not recorded with the time code channel in REPRO mode.
- when there is no time code being input during INPUT mode.

(13) Meter mode indicators
One of the following indicators lights to indicate which level meter scale is being used:
- NORMAL: Normal scale (peak meter mode)
- FINE: Fine (magnified) scale
- BIT: Bit length scale
For details, see “3-3. Using the Level Meter Display”.

(14) TC (time code) indicator
When you select EXT TC as the time code while the external time code is being input to the unit while in input signal monitoring status, or the unit is playing back the time code signal in playback signal monitoring status, this indicator displays the time code signal level, as follows:
- Flashes: level of the time code signal is too high.
- Lights: time code signal is of an appropriate level.
- Goes out: time code signal is too low.
(15) **Level meters**  
Indicate the input or playback signal levels.

(16) **Operation mode indicators**  
One of the following indicators lights to indicate the current operation mode:  
- NORMAL: Normal operation mode (with a sequential recording/playback operation, such as with a conventional tape recorder)  
- DISC: Disc operation mode (playback only, such as with a CD player)  
- FILE: File operation mode (file playback only)  
See "4.1. Overview of Operation Modes" for details of operation modes.

(17) **Timer mode indicators**  
One of the following indicators lights to indicate the current timer mode.  
- ABSOLUTE: Absolute time code  
- REMAIN: Remaining time left on a disc, or remaining play time left in a track/file  
- ACTUAL: Elapsed playback time for a track/file

---

**Characters used in the disc time display**  
The following characters are used to represent numeric and alphabetic characters in the disc time display.

```
0 1 2 3 4 5 6 7 8 9  
A B C D E F G H I J  
K L M N O P Q R S T  
U V W X Y Z  
```

---

**2-2-3. 10 Key Unit**

The 10 key unit (numeric keypad) allows you to enter time code addresses and other values directly, without using the search dial.  
You cannot connect the 10 key unit while the RM-D9000 is attached to the PCM-9000 front panel. Connect the RM-D9000 to the connector on the PCM-9000 rear panel, then connect the 10 key unit to the RM-D9000.
2-2-4. RM-D9000 Connector Panel

(1) PCM-9000 connector (Round 10-pin)
Used to connect the RM-D9000 to the REMOTE CONTROLLER connector on the front panel or connector panel of the PCM-9000, using the 10-pin cable supplied with the RM-D9000.

(2) DIP switches
Switches 1 to 3: Overload indication adjustment switches
Used to set the number of words corresponding to full scale (overload signals) which are continuously input to the unit, and which are indicated with the OVER level indicators of the level meters.

<table>
<thead>
<tr>
<th>Number of words</th>
<th>Switch 1</th>
<th>Switch 2</th>
<th>Switch 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>2</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>3</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>4</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>5</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>6</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>7</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

Factory setting: 4 words (Switch 1: ON, Switch 2 and 3: OFF)

Note:
If all switches (switches 1 to 3) are set to OFF, the meters will always indicate an overload level. Set at least one of these switches to ON.
Switches 4 to 8: Mode selectors
Used to select the level meter indication mode.
They set the peak hold time and determine whether
the overload peak level indication is to be held.

<table>
<thead>
<tr>
<th>Switch Number</th>
<th>Function</th>
<th>Set to ON</th>
<th>Set to OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Overload level setting</td>
<td>-0.2 dB</td>
<td>0 dB</td>
</tr>
<tr>
<td>5</td>
<td>Reserved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Peak hold time (when switch number 7 is set to ON)</td>
<td>1.5 seconds</td>
<td>Continuous</td>
</tr>
<tr>
<td>7</td>
<td>Peak holding</td>
<td>Held</td>
<td>Not held</td>
</tr>
<tr>
<td>8</td>
<td>Test mode</td>
<td>Test mode</td>
<td>Normal mode</td>
</tr>
</tbody>
</table>

Factory setting: Switch 4 is set to ON, all other
switches are set to OFF.

Notes:
- Set switch 4 to ON when the DABK-9001
  Conveyor Board is installed.
- Turn off the power before attempting to set DIP
  switch 8 to ON.

(3) DC IN connector
Connects the unit to an external power supply (9 V
to 12 V DC). By using an external power supply
and optional cable, the RM-D9000 can be remotely
controlled from a distance of up to 20 m.

(4) 10KEY UNIT connector (Round 8-pin)
Used to connect the 10 key unit supplied with the
RM-D9000.
Chapter 3 Preparation

This chapter describes the preparations necessary prior to operating the PCM-9000. Included are basic connections, switch settings, and disc handling.

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3-2. Time Data Display ........................................................................... 3-4
   3-2-1. Operation Modes and Time Data Display .............................. 3-4
   3-2-2. Setting the Time Code Offset ............................................... 3-6
3-3. Setting the Level Meter Display ................................................... 3-8
3-4. Handling the PCM-9000 and Discs .............................................. 3-9
   3-4-1. Notes on Installation ............................................................... 3-9
   3-4-2. Supported Discs and Notes on Disc Handling ....................... 3-9
   3-4-3. Inserting and Ejecting a Disc ............................................... 3-10
   3-4-4. Preventing Accidental Erasure ............................................. 3-12
   3-4-5. Cleaning a Disc ..................................................................... 3-12
This section describes how to attach/detach the RM-D9000, and presents basic system configurations.

Attaching the RM-D9000

Attach the RM-D9000 to the PCM-9000 by following the procedure below.

1. Connect the REMOTE CONTROLLER connector on the PCM-9000 front panel to the PCM-9000 connector on the RM-D9000 upper side panel, using the 10-pin cable supplied with the RM-D9000.

2. Align the top edge of the RM-D9000 with the recess in the PCM-9000 front panel, then push the RM-D9000 into the PCM-9000.
Detaching the RM-D9000

Move the RELEASE lever to the right, then detach the RM-D9000 from the PCM-9000. This lever is located at the lower edge (right side) of the PCM-9000 front panel.
3-2. Time Data Display

3-2-1. Operation Modes and Time Data Display

The time data displayed in the disc time display differs with the operation mode, kind of time code (AAIP/EXT TC), and timer mode. The following tables list the time data displayed in each operation mode. For details of the operation modes, see "4-1. Overview of Operation Modes".

Time data display in normal operation mode

In normal operation mode, the ABSOLUTE and REMAIN timer modes can be used when you select AAIP as the operating time code. Only the ABSOLUTE time code is output as the time code signal. When you select EXT TC as the operating time code, ABSOLUTE timer mode is automatically set as the timer mode.

<table>
<thead>
<tr>
<th>Timer Mode</th>
<th>Time code</th>
<th>AAIP offset setting</th>
<th>Time data displayed</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSOLUTE</td>
<td>AAIP</td>
<td>Available</td>
<td>(AAIP absolute value)</td>
</tr>
<tr>
<td>REMAIN</td>
<td>AAIP</td>
<td>Unavailable</td>
<td>(Largest AAIP value for a disc (Total recording time available on a disc))</td>
</tr>
<tr>
<td></td>
<td>EXT TC</td>
<td>Unavailable</td>
<td>External time code, recorded on time code channel of the disc</td>
</tr>
</tbody>
</table>

Time data display in disc operation mode

In disc operation mode, the ACTUAL and REMAIN timer modes can be used.

<table>
<thead>
<tr>
<th>Timer mode</th>
<th>Time code</th>
<th>AAIP offset setting</th>
<th>Time data displayed</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTUAL</td>
<td>AAIP</td>
<td>Unavailable</td>
<td>(Elapsed time from track begin point)</td>
</tr>
<tr>
<td>REMAIN</td>
<td>AAIP</td>
<td>Unavailable</td>
<td>(Remaining time till track end point)</td>
</tr>
</tbody>
</table>

Notes:
- The time code is automatically set to AAIP in disc operation mode, regardless of any previous switch settings.
- The unit outputs only the ACTUAL time code as the output time code (with the optional DABK-9003 Interface Board installed).
- In disc operation mode, time code offset cannot be added to either the display time code or output time code.
Time data display in file operation mode

In file operation mode, you can select either indication of the file contents or the timer indication. When you select the timer indication, the following two modes are available:

- Timer indication for a file
- Timer indication for a track

The time code is automatically set to AAIP in file operation mode.

For details of setting the time code offset in file operation mode, see "3-2-2. Setting the Time Code Offset".

Timer mode and displayed information

You can display the information listed in the table below by changing the timer mode.

<table>
<thead>
<tr>
<th>Timer mode</th>
<th>Time code</th>
<th>AAIP offset setting</th>
<th>Time data displayed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute</td>
<td>AAIP</td>
<td>Available</td>
<td>Elapsed time from beginning of the file</td>
</tr>
<tr>
<td>Remain</td>
<td>AAIP</td>
<td>Unavailable</td>
<td>Remaining time until the end of the playback file</td>
</tr>
<tr>
<td>Actual</td>
<td>AAIP</td>
<td>Unavailable</td>
<td>Elapsed time from the begin point of the playback file</td>
</tr>
<tr>
<td>Remain</td>
<td>AAIP</td>
<td>Unavailable</td>
<td>Remaining time until the end of the playback file</td>
</tr>
</tbody>
</table>

Timer mode selection while the PCM-9000 is stationary

1. Press the ← or → key to position the cursor to the desired file number, track number, or pause time indication.

2. Press the TIMER MODE key.
   Every time you press the TIMER MODE key, the display indication changes, in the order shown below. The display order depends on the selection you made in step 1.

1) When the file number was selected in step 1.
   - Contents of a file
   - Absolute time for a file
   - Remaining time for a file

2) When the track number or pause time was selected in step 1.
   - Contents of a file
   - Absolute time for a file
   - Actual time for a track
   - Remaining time for a file

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**3-2. Time Data Display**

**Timer mode selection during playback**
Press the TIMER MODE key to display the desired indication. The timer indication changes in the order shown below.

```
<table>
<thead>
<tr>
<th>Absolute time for a file b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remaining time for a file b)</td>
</tr>
<tr>
<td>Contents of a file</td>
</tr>
<tr>
<td>Absolute time for a file</td>
</tr>
<tr>
<td>Actual time for a track</td>
</tr>
<tr>
<td>Remaining time for a track</td>
</tr>
</tbody>
</table>
```

(a) When the absolute time for a file was displayed before playback.
(b) When the remaining time for a file was displayed before playback.

**Notes**
- The duration between two tracks constitutes about 0.1 seconds, as though no pause time is registered in the file. Note that the total file playback time contains this duration time.
- You cannot display track time information if the track is not registered in the file.
- The unit outputs only the actual time code as the output time code (with the optional DABK-9003 Interface Board).

**3-2-2. Setting the Time Code Offset**

When AAIP is selected as the time code, you can add the time code offset to the displayed time code address in the following cases.
- Normal operation mode is selected.
- File operation mode is selected.
- In file operation mode, you can set the time code offset on each file.

**Note**
It is impossible to set the time code offset during the disc operation. If you set the offset when EXT TC is selected, the Time code offset of the AAIP TC mode will be set.
Setting the offset time

1. Press the 'TC SET' key.

   The disc time display changes as shown below. The cursor is positioned to the seconds digit and flashes.

   ![TC preset display](image)

2. Press the ← or → key to move the cursor to the digit you want to change.

   The selected digit flashes.

3. Use the search ↓△ or ↑ key unit to enter the desired value.

   When you set the offset time with the 10 key unit, position the cursor to the lowest-order digit of the value which you want to modify. Then, input the value in the order of hours ("H"), minutes ("M"), seconds ("S") and frames ("F").

4. Press the SET key.

   The designated value is registered as the offset time.

5. Press the TC SET key.

   [Notes]
   - When using the 10 key unit, input the value in the order of hours ("H"), minutes ("M"), seconds ("S") and frames ("F").
   - In file operation mode, select the file number before setting the time code offset.
   - If you change the time code format, the offset value is automatically converted to the corresponding value in the designated time code format.
   - The offset value with time code format can be saved by saving the data.

To reset the offset value to 0

1. While the offset time is displayed, press the RESET key on the RM-D9000 or the CLR key on the 10 key unit.

2. Press the SET key.

   The offset time is reset to 0.
3-3. Setting the Level Meter Display

The PCM-9000 allows you to set the scale and peak hold mode of the level meters.

Setting the meter scale

Press the METER SCALE key to change the level meter scale. The mode indicators light in the following order:

- **NORMAL mode**: Normal peak level meter display
- **FINE mode**: Each segment of the display represents 0.2 dB, with a reference marker indicating the reference level. The "0" segment flashes when the level exceeds the scale range (over scale), and the "-60" segment flashes when the level is below the scale range (under scale).
- **BIT mode**: Each segment of the display represents a single bit. When the unit is set to input signal monitoring status, the number of segments flashing indicates the word length of the input signal. So, you can check the word length.

When the unit is in playback signal monitoring status, the indication word length varies with the word length of the playback signal. Those segments that do not correspond to the specified word length do not light (in the left part of the level meter).

![Meter Scale Diagram](image)

**BIT mode (Example: word length = 20 bits) level meter display**

Setting the meter mode

By setting the DIP switches on the RM-D9000 connector panel, you can switch the peak hold and over-scale indications of the level meters, adjust the over scale, and so on.

For details of the mode and parameters that can be set with the DIP switches, see "2-2-4. RM-D9000 Connector Panel".

3-8 | Chapter 3 Preparations
The PCM-9000 uses 5.25-inch magneto-optical (MO) discs as its recording medium. This section provides notes on the installation, disc handling, data protection, and so on.

3-4-1. Notes on Installation

When installing the PCM-9000, note the following:

- Install the unit on a level surface, no more than 5 degrees from the horizontal. If the unit is not level, it may malfunction.
- Install the unit in a location where it will not be subjected to vibration or shock. Failure to do so may result in sound skipping.
- Do not install the unit in locations subject to high temperatures (more than 40 °C). High temperature will shorten the life of the laser.

3-4-2. Supported Discs and Notes on Disc Handling

Supported discs
Use MSD-1200 Digital Audio Master Discs which are designed for use with the master disc recorder. Note that you cannot use MO discs designed for computer data storage.

Handling discs
- Do not drop a disc cartridge or subject it to any extreme shocks or vibration.
- Do not open the shutter of the disc cartridge or touch the disc inside.
- Do not use the disc under conditions such as high humidity or wide temperature fluctuations. If condensation forms on the disc's surface, the unit will be unable to read or write data.

Storing discs
Store disc cartridges, in their cases, in a cool place.
3-4. Handling the PCM-9000 and Discs

3-4-3. Inserting and Ejecting a Disc

Inserting a disc

1. Turn on the PCM-9000.
2. Insert a disc.

The disc is automatically loaded. After the unit reads the auxiliary data on the disc, the STOP key lights to indicate that the unit is ready for operation.

If data cannot be read from the disc, eject the disc and insert it again.

Note:
If you turn on the power of the PCM-9000 while a disc is loaded, the disc is automatically ejected.

Ejecting a disc

Upon pressing the EJECT key, one of following will occur.

If you have neither recorded new material or performed program editing
The disc is ejected immediately. Also, even if you have performed either operation, but have already saved your data before pressing EJECT key, the disc will be ejected immediately.
If you have recorded new material
The EDIT DATA SAVE key lights, and the REC ID data is automatically recorded onto the disc. Once the data has been saved, the disc is ejected automatically.

If you have performed program editing but have not yet saved your data
The EDIT DATA SAVE key flashes to warn you that the edit data has not yet been saved.
To save the edit data: press the EDIT DATA SAVE key.
The unit writes the data to the disc. Then, press the EJECT key.
The disc will be ejected.
To abandon your edit data: press the EJECT key again. The disc is ejected.

If the REC PROTECT switch on the disc is set to any recording protect position, EDIT DATA SAVE key is flushing after you press EJECT key. In this case, you press EJECT key again, then the disc is ejected. No data can be written to the disc.
To save your editing, set the REC PROTECT switch to the recordable position, then insert the disc again. Then, press the EDIT DATA SAVE key.
If you do not want to save the edit data, press the EDIT DATA SAVE key, after ejecting the disc such that the key indicator goes out.
If you insert another disc, the EDIT DATA SAVE key will go out.
For details of REC PROTECT, see "3-4-4. Preventing Accidental Erasure".

Manually ejecting a disc

In emergencies, you can manually eject a disc.

1 Turn off the power.
2 Insert the supplied L-wrench into the hole illustrated below, and push.

The disc is ejected.
3-4. Handling the PCM-9000 and Discs

3-4-4. Preventing Accidental Erasure

Disc cartridges are equipped with a REC PROTECT switch (a red tab) to prevent the accidental erasure of data on the disc or the inadvertent writing of unwanted data.

The REC PROTECT switch can be set to any of three positions: two for protection, and one for writing.
- Leftmost position: Both audio and edit data can be written.
- MAIN DATA: Audio data on the disc is protected. You can write edit data.
- MAIN/EDIT DATA: All data (audio and edit data) is protected. You can only read data from the disc.

Dust and stains may accumulate on a disc when it is used for a long period of time. To avoid resultant data read/write errors, clean the disc using the optional disc cleaning kit. To maintain high performance and prolong the useful life of a disc, clean it at least once every three months.

In addition, check your data, by performing disc checks periodically. See "7-1. Checking a Disc".

Cleaning kit
Use the optional MOA-DS1 Disc Cleaning Kit. Do not use any other type of disc cleaner as this may result in data read/write errors. Cleaning instructions are given in the manual supplied with the disc cleaning kit.

3-12 Chapter 3 Preparations
Chapter 4
Basic Operation

This chapter explains the basics of PCM-9000 operation, and includes an explanation of the operation mode, recording, playback, and searching.

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You can operate the PCM-9000 in any of the following four operation modes. While the unit is stationary, you can select the desired operation mode by pressing the OPR MODE key.

Normal operation mode
This mode is used to record the external audio data to be edited. You can make tracks and register mark points in this mode. The locating of desired points by using registered rec IDs, track begin/end points and mark points, is supported.

Disc operation mode
This mode is used to play back tracks. You can register mark points to enable the easy location of points on the disc.

File operation mode
This mode is used to make files and execute program editing. Only registered files can be played back in this mode. By manipulating the editing data in this mode, you can make and play back files, containing desired tracks, in any order. For details of making tracks and files, see "Chapter 5 Program Editing".

For details of making tracks and files, see "Chapter 5 Program Editing".
4-2. Recording

This section explains recording procedures, in the following order:
• Recording mode selection
• Record/monitor channel selection
• Input/output signal level adjustment
• Recording an external time code
• Recording operation
• Automatic punch in/out

4-2-1. Selecting the Recording Mode

You can operate in either of two recording modes: monitor recording mode or sync recording mode.
Select the recording mode appropriate to the recording situation and source.

Selecting monitor recording mode
Monitor recording mode is intended for monitoring sound while it is being recorded. In this mode, continuity of the PCM data between previously and newly recorded signals is not preserved and the setting of individual channels for recording is impossible. Recording is performed for all channels (CH-1, CH-2, TC) together.
To select monitor recording mode, press the REC MODE key on the PCM-9000, such that the MONITOR indicator lights.

Notes:
• When you record in monitor recording mode, record a blank area for a few seconds at the head of the recording.
• When inserting new material over previously recorded parts in monitor recording mode, there is some possibility that noise will be recorded at the begin/end point. Insert in sync recording mode.
4-2. Recording

Selecting sync recording mode
In sync recording mode, recording is executed while preserving the continuity of the PCM data. Therefore, punch in/out is possible in this recording mode, as is individual channel setting.
To select sync recording mode, press the REC MODE key on the PCM-9000, such that the SYNC indicator lights.

Notes
• When you record with executing SYNC CLOCK by external synchronizing, do not change the frequency of external sync signal.
• When connection of the synchronizing signal is cut by mistake, press STOP key immediately and cancel the recording, and start the recording again.

4-2-2. Selecting Record/Monitor Channels

You can select the channel status for each channel (CH-1, CH-2, TC) when recording, playing back or monitoring.

Setting a channel to recording ready status
• In sync recording mode, you can set each channel's status individually: press the REC READY key on the RM-D9000 corresponding to the channel to be set. The corresponding indicator will light.
• In monitor recording mode, you cannot set each channel’s status individually. If you press any of the REC READY keys on the RM-D9000, all channels are set to recording ready status.
• In both recording modes, you can simultaneously set all channels to recording ready status simply by pressing the REC READY key on the PCM-9000.

Setting a channel to playback signal monitoring status
Press the REPRO key on the RM-D9000 corresponding to the channel to be set. The corresponding indicator will light.
In sync recording mode, all channels are automatically set to input signal monitoring status while recording (the REPRO and INPUT key indicators light).

Setting a channel to input signal monitoring status
Press the INPUT key on the RM-D9000 corresponding to the channel to be set. The corresponding indicator lights.

4-2-3. Adjusting the Input/Output Signal Levels

You can adjust the analog input/output signal level by using the reference marker (with the optional DABK-9001 Converter Board installed).
Selecting a channel to be adjusted

Set the DIP switches on the DABK-9001 Convertor Board corresponding to the channel and level range you want to adjust.

<table>
<thead>
<tr>
<th>Switch Number</th>
<th>DIP switch setting</th>
<th>Maximum input level</th>
<th>Head room</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Range</td>
<td>Center</td>
</tr>
<tr>
<td>CH 1</td>
<td>Only bit 4 set to ON</td>
<td>+22 to +26 dBs</td>
<td>+24 dBs</td>
</tr>
<tr>
<td></td>
<td>Only bit 3 set to ON</td>
<td>+19 to +23 dBs</td>
<td>+21 dBs</td>
</tr>
<tr>
<td>CH 2</td>
<td>Only bit 2 set to ON</td>
<td>+16 to +20 dBs</td>
<td>+18 dBs</td>
</tr>
<tr>
<td></td>
<td>Only bit 1 set to ON</td>
<td>+13 to +17 dBs</td>
<td>+15 dBs</td>
</tr>
</tbody>
</table>

For details of the location of the level range setting switches, see Chapter 5 of the Maintenance Manual.

Adjusting the input signal level

1. Press the METER SCALE key, such that the FINE indicator lights in the display window. The -16 dB segment indicator of the level meter lights. The unit enters fine indication mode.

2. Press the REF MARKER key. Each time you press the REF MARKER key, the reference marker on the level meter moves to the right in steps of 2 dB. The reference marker returns to the -20 dB position after exceeding the -10 dB position. The level indication shows the head-room relative to digital full scale.

3. Select the channel to be set to input signal monitoring status by pressing the corresponding INPUT key.

4. Input the reference signal to the LINE INPUT CH-1 or CH-2 connector of the DABK-9001 Convertor Board.

5. Adjust the appropriate ANALOG LEVEL ADJUST IN control to match the input signal level indication to the reference marker.

Note: In fine level indication mode, each segment corresponds to 0.2 dB.
4-2. Recording

Adjusting the output signal level

After adjusting the input signal level, adjust the output signal level. Adjust the appropriate ANALOG LEVEL ADJUST OUT control to set the output signal to the desired level.

Performing adjustment using the level meter of the mixing console

1. Press the INPUT key corresponding to the channel to be adjusted. The channel is set to input signal monitoring status.
2. Adjust the ANALOG LEVEL ADJUST OUT control, such that the level meter on the mixing console indicates the desired level.

Using a recorded disc for adjustment

1. Record the adjusted input reference signal onto a disc. For details of the recording procedure, see "4-2-5. Recording".
2. Press the REPRO key corresponding to the channel to be adjusted. The channel is set to playback signal monitoring status.
3. Press the PLAY key such that the recorded reference signal is played back.
4. Adjust the ANALOG LEVEL ADJUST OUT control, such that the level meter connected to the output signal indicates the desired level.

Note
When you use a digital audio signal (AES/EBU and SDIF-2 format) as the input signal, level adjustment is not possible.

4-2-4. Recording an External Time Code

You can record an external SMPTE/EBU-format time code signal onto the TC (time code) channel by installing the optional DABK-9003 Interface Board. For details of playing back the time code signal, see "4-3-3. Time Code Sync Playback".
Notes on recording an external time code

- When you record external time code signals, the unit should be synchronized with the external equipment from which the external time code is supplied. But, to record external time code signals from equipment that has no function for synchronization (such as an analog tape recorder), synchronization is not necessary.
- You cannot record external time code signals that are not supported by the PCM-9000, such as MIDI-format time codes, and so on.
- It is recommended that time code be continuously recorded from disc top to disc end for the correct operation of the following functions (to do the finding in BGN, END, MARK, REC ID correctly, or to do the time code chasing correctly).

Recording an external time code with synchronization

1. Press the SYNC CLOCK key, such that the VIDEO indicator lights.
2. Press the TIME CODE key, such that the EXT TC indicator lights.
3. Press the TC FORMAT key, such that the indicator corresponding to the desired time code format lights.
4. Press the REC READY key of the TC channel.
5. Record the input signals.
   *For details of the recording procedure, see “4-2-5. Recording”.

Recording an external time code without synchronization

The operation is the same as that explained above, except that synchronizing signal is not performed.

To output an input time code signal

The PCM-9000 can output time code signals when the optional DABK-9003 Interface Board is installed. The output time code depends on the TC channel status, as follows:
- Input signal monitoring status: time code signal input to the TIME CODE IN connector is output
- Playback signal monitoring status: time code recorded on the TC channel (playback time code) is output

*Note*
You cannot add an offset to the output time code.
4-2. Recording

Regenerating an external time code

An input time code can be regenerated even if the input time code has many dropouts. To regenerate an input time code, press the GEN MODE key, such that the REGEN indicator lights.

Notes

• The time code offset, phase shift, and related functions are not available with the regenerated time code. Becomes free running mode when no time code is input.
• Cancel regeneration when performing time code chase.

If the FORMAT indicator does not light steadily

If there is any difference between the input and regenerated time codes, the FORMAT indicator flashes. Press the TC FORMAT key, such that the FORMAT indicator lights steadily.

Note

The internal time code reader cannot discriminate between the 30-frame/s and 29.97-frame/s NDF formats.

4-2-5. Recording

Once you have performed recording mode selection, channel setting and input signal level adjustment (when an analog signal is input), the unit is ready to be used for recording.

What are rec IDs?

The MS disc format adopts a rec ID system. When you record new material on the disc, rec IDs are automatically registered at the recording begin/end points, together with a number (rec ID number). You cannot specify or change a rec ID number, as rec ID numbers are assigned automatically. When recording over a previously recorded section in sync recording mode, the rec IDs are not newly registered.

Notes

• No rec ID is registered if the recording duration is less than two seconds.
• After maximum rec ID number has been registered, no further material can be recorded onto that disc.
A rec ID is automatically written at every recording begin/end points.

TO EXECUTE RECORDING

1. When executing monitor recording
   (1) Press the REC MODE key, such that the MONITOR indicator lights.
   (2) Select the sampling frequency, word length, time code format, and so on.

2. When executing sync recording
   Press the REC MODE key, such that the SYNC indicator lights.

3. While holding down the REC key of the RM-D9000, press the PLAY key.
   A rec ID (in point) is registered at the recording start point, and recording starts.

STOPPING RECORDING

Press the STOP key on the PCM-9000 or RM-D9000.
A rec ID (out point) is registered at the recording end point, and recording ends.
4-2. Recording

Recording muting signals

1. Press the REC MUTE key, such that its key indicator lights.
2. Press the REC READY key corresponding to the channels on which you want to record (in sync recording mode). Or, press the REC READY key, such that its key indicator lights (in monitor recording mode).
3. While holding down the REC key, press the PLAY key.
   Recording starts, and muting signals are written to those channels that are in recording ready status.
4. Press the REC READY key corresponding to the recording channel. The indicator will go out.
   Recording ends.
5. Press the REC MUTE key, such that its key indicator goes out.

Variable speed recording

You can execute variable speed recording at -12.5% to +12.5% normal recording speed, in increments of 0.1% normal playback speed.

1. Set the recording speed.
   For details, see "4-3-2 Variable Speed Playback"
2. Press the VARI key, such that its key indicator lights.
3. Press the REC READY key corresponding to the channels to which you want to record (in sync recording mode). Or, press the REC READY key, such that its key indicator lights (in monitor recording mode).
4. While holding down the REC key, press the PLAY key.
   Recording starts at the stored variable speed.

Notes:
- You cannot execute variable speed recording while executing time code chase in address mode.
- If the clock mode is set to sharp, you cannot execute variable speed recording and playback.
You can execute recording automatically between a designated recording start point (in point) and recording end point (out point) (automatic punch in/out).

Registering an in/out point

1. Press the REPRO key to set the desired channel to playback signal monitoring status.

2. Locate the in point.

3. While holding down the ENTRY key, press the IN key. The IN key indicator lights, showing that the in point has been registered. The OUT key indicator flashes.

4. Locate the out point.

5. While holding down the ENTRY key, press the OUT key. The OUT key indicator lights, showing that the out point has been registered.

Notes
- When you register only an in point, the out point is automatically registered at the end of the disc.
- When you register only an out point, the in point is automatically registered at the beginning of the disc.
4-2. Recording

Re-registering an in/out point

1. Press the IN (or OUT) key.
   The current in (or out) point address appears in the display window.

2. While holding down the IN (or OUT) key, press the LOCATE key.
   The time code address is positioned to the displayed address.

3. Locate the desired address.
   For details of the jog function, see "4-4.1. Searching with Jog/Shuttle".

4. While holding down the ENTRY key, press the IN (or out) key.
   The in (or out) point is re-registered.

Trimming an in/out point directly

1. While holding down the IN (or OUT) key, rotate the search dial.
   The in (out) point indication in the display window changes as you rotate the search dial. Do not release the IN (OUT) key yet, even once the desired in (out) point address appears.

2. Press the ENTRY key.

3. Release the IN (OUT) key.
   The stored in (out) point address data is changed to the new address data, then stored in memory.

**Note**
Trimming is canceled if you release the IN (OUT) key while rotating the search dial in Step 1.

Recalling an in/out point

Press the IN (OUT) key.
Pressing either key causes the corresponding address data to be displayed.

Locating an in/out point

While holding down the IN (or OUT) key, press the LOCATE key.
**Rehearsing automatic punch in/out**

1. Press the REC MODE key, such that the SYNC indicator lights.

2. Press the REPRO and REC READY key corresponding to the channel for which you want to execute automatic punch in/out.

3. Check that both the IN and OUT key indicators are lit. Then, hold down the AUTO EDIT key and press the PLAY key.

   Automatic punch in/out rehearsal is executed for selected channels, while you can monitor the input signal between the in and out points.

   The preroll time (about 8 seconds) and postroll time (about 3 seconds) are fixed.

**Executing automatic punch in/out**

1. Press the REC MODE key, such that the SYNC indicator lights.

2. Press the REPRO and REC READY keys corresponding to the channel for which you want to execute automatic punch in/out.

3. Check that both the IN and OUT key indicators are lit. Then, while holding down the AUTO EDIT key, press the REC key.

   Recording is automatically executed to the channels between the in and out points. During punch in/out, the channels being recorded are automatically set to input signal monitoring status.

   After automatic punch in/out has been completed, the indicators of the IN and OUT keys go out. The in and out point data remains stored, however.

---

**Notes**

- If an out point precedes an in point, "ILLEGAL" appears in the display window and automatic punch in/out is canceled.
- You cannot execute automatic punch in/out in monitor recording mode.
- The preroll time (about 8 seconds) and postroll time (about 3 seconds) are fixed.
- When performing automatic punch in during time code sync play, use ONCE mode.
- It is impossible to do automatic punch in during time code chase.
4-2. Recording

Re-executing automatic punch in/out after canceling execution
After checking that the IN/OUT key indicators light, hold down the AUTO EDIT key and press the REC key. (When the indicators are not lit, press the IN or OUT key, such that the corresponding indicators light.)

Re-executing automatic punch in/out after completing execution
Press the IN or OUT key.
The indicators of the IN and OUT keys light.
While holding down the AUTO EDIT key, press the REC key.

Positioning to the IN or OUT point

While holding down the IN or OUT key, press the LOCATE key.
The PCM-9000 supports various playback functions such as normal playback, repeat playback and variable speed playback.

For details of playing back tracks and files, see "Chapter 5 Program Editing".

4-3-1. Playing Back

Playing back

1. Press the OPR MODE key, such that the NORMAL indicator appears in the display window.
2. Press the REPRO key corresponding to the channel to be played back, such that its key indicator lights.
3. Press the PLAY key.
   Playback starts. You can monitor the sound being played back from a channel in playback signal monitoring status.
4. To stop playback, press the STOP key.

Executing repeat playback

During playback, you can execute repeat playback between two designated points by pressing the REPEAT key.

1. Press the OPR MODE key, such that the NORMAL indicator appears in the display window.
2. To start playback, press the REPRO key, such that its key indicator lights, then press the PLAY key.
3. While monitoring the playback signal, press the REPEAT key at the point where you want to start repeat playback. The repeat start point is stored, and "REPEAT 1-" flashes in the display window.
4. Press the REPEAT key again at the point where you want to end repeat playback. The repeat start and end points are stored, and the repeat indication changes to "REPEAT I-II" and lights steadily. Repeat playback between the two designated points starts.
5. To stop repeat playback, press the STOP key.
   The repeat indication in the display window disappears, and repeat playback is canceled.
4-3. Playing Back in Normal Operation Mode

4-3-2. Variable Speed Playback

You can execute variable speed playback at -12.5% to +12.5% normal playback speed in increments of 0.1% normal playback speed.

Setting the variable speed value

When not executing variable speed playback

1. Press the VARI SET key, such that its key indicator lights. The stored variable speed value appears in the display window.
2. Set the desired variable speed value by rotating the search dial, or input the speed value by using the 10 key unit.
3. Press the VARI SET key. The designated variable speed value is stored as the speed for variable speed playback. The display window indication returns to its original status.

When executing variable speed playback

1. Press the VARI SET key, such that its key indicator lights. The stored variable speed value appears in the display window.
2. Set the desired variable speed value by rotating the search dial, or input the speed value by using the 10 key unit. The playback speed changes as the displayed value changes.
3. Press the VARI SET key. The designated variable speed is stored as the speed for variable speed playback. The display window indication returns to its previous status.

Note
When using the 10 key unit, input a "+" or "-" sign after inputting the variable speed value.

Executing variable speed playback

1. Press the VARI key, such that its indicator lights.
2. Press the PLAY key. Playback starts at the stored variable speed.

Note
When you use the variable speed function, set DIP switch number 15 (clock mode) on the PCM-9000 to 1.
4-3-3. Time Code Sync Playback

During playback, you can synchronize the sync phase of the playback time code or disc time code with the sync phase of the external composite video signal. To execute this function, the optional DABK-9003 Interface Board must be installed.

**Note**
Use the normal mode when performing time code sync play.

### Setting time code sync playback

There are two time code sync playback modes, as follows.

**ONCE:** After initial synchronization with the sync phase of the external composite video signal, the unit terminates time code sync playback. The unit returns to normal playback.

**CONTINUE:** After initial synchronization with the sync phase of the external composite video signal, the unit automatically executes re-synchronizing if any discrepancy between the external and playback syncs occurs, such that synchronization of the sync phase with the external composite video signal is maintained throughout the operation.

To select time code sync playback mode, set DIP switch 4 on the PCM-9000 as necessary.

**Note**
When you record during the time code sync playing, use ONCE mode.

### Executing time code sync playback

1. Set DIP switch number 3 on the PCM-9000 to II.
2. Set DIP switch number 15 on the PCM-9000 to I.
3. Press the SYNC CLOCK key, such that the VIDEO indicator lights.
4. Press the REPRO key of the TC (time code) channel, such that its indicator lights.
5. Press the PLAY key.

While the unit is synchronizing with the external composite video sync phase, the PLAY key flashes. Once synchronization has been achieved, the PLAY key indicator lights steadily.
4-3. Playing Back in Normal Operation Mode

**Note**
You can select either the AAIP time code or recorded external time code as the playback time code, which is output from the TIME CODE OUT connector of the DABK-9003 Interface Board.

4-3-4. Insertion Function

By using the insertion function, you can process the signal, output from the INSERTION SEND connector, using an external effector or mixer. The processed signal can be returned to the INSERTION RETURN connector of the PCM-9000.

1. Press the INPUT SELECT key, such that the indicator corresponding to the desired signal lights.

2. Press the INSERTION key.
   
   The INSERTION indicator appears in the display window.

3. To cancel the insertion, press the INSERTION key again, such that the INSERTION indicator disappears.

**Notes**
- You can use only AES/EBU-format signals as the insertion send/return signal.
- You cannot record processed insertion signals on the PCM-9000 to which the insertion signal is input. To record processed insertion signals, use an external unit connected to the PCM-9000.
4-4. Searching in Normal Operation Mode

This section explains how to locate a point in normal operation mode. You can search for a specified address by using the jog/shuttle function (while monitoring the sound), by specifying a desired address, or by using registered IDs (rec IDs, track IDs or mark points). You can also locate a recording end point simply by pressing the END SEARCH key.

4-4-1. Searching with the Jog/Shuttle Dial

You can locate a point roughly in shuttle mode, then locate it precisely in jog mode.

Searching in jog mode

Press the JOG key, such that its indicator lights.

The unit enters jog mode. Subsequently, you can locate a desired point in units of WORD by rotating the search dial.

Releasing jog mode

Press the JOG key, such that its indicator goes out. Pressing any other disc transport key also releases jog mode.

Searching in shuttle mode

Press the SHUTTLE key, such that its indicator lights.

The unit enters shuttle mode. The disc is played back at a speed corresponding to the angle of rotation of the search dial. The unit displays the playback speed and current position on the disc in the level meter.

! Note

The time display or the time code output during JOG, SHUTTLE in EXT TC mode is generated from the absolute address. The time display or the time code output is indicated and is output automatically also in the parts where the time code is not recorded.
4-4. Searching in Normal Operation Mode

4-4.2. Searching for a Specified Address

You can locate a desired time code address by using the search dial or the 10 key unit.

**Searching with the search dial**

1. Press the → key.
   A flashing cursor appears at the seconds digit in the display window.
2. Press the ← or → key to move the cursor to the desired digit.
3. Rotate the search dial until the desired value appears.
4. Repeat steps 2 and 3 until you have set all the digits as required.
5. Press the LOCATE key.
   The unit locates the designated address.

**Note**
When performing time code locate, there will sometimes be a 1 or 2 frames discrepancy between the PCM-9000 and an external time code reader. This is because the time code value is calculated from the absolute address of the DISC.

**Searching with the 10 key unit**

1. Press the → key.
   A flashing cursor appears at the seconds digit in the display window.
2. Press the CLR key.
   The displayed address is reset to "00H 00M 00S 00F".
3. Press the ← or → key to move the cursor to the desired digit.
4. Input the desired value by using the 10 key unit in order of Hours, Minutes, Seconds, and frames.
5. Press the LOCATE key.
   The unit locates the designated address.
4-4-3. Searching with the Registered IDs

You can search by using the registered rec IDs, track IDs and mark points.
For details of registering the begin/end points of tracks, see "5-2-1. Registering Tracks", and for details of modifying/deleting mark points, see "5-2-2. Modifying Tracks/Marks" or "5-2-3. Deleting Tracks/Marks".

Registering mark point

1. Locate the point that you want to register as a mark point.
2. Press the ENABLE key, such that its indicator lights.
3. Press the MARK key.

The displayed time code address is stored as a mark point. Each mark point has a mark number, which is automatically assigned in order. You cannot assign a mark number arbitrarily.
For details of registering begin and end points, see "5-2-1. Registering Tracks".

Recalling a mark, begin, or end point

1. While the ENABLE key indicator is not lit, press the MARK (BEGIN, END) key, such that its indicator lights.

The mark (begin, end) point number and the last displayed time code address appear in the display window.

2. Rotate the search dial until the desired mark (begin, end) number appears. Or input the desired number by using 10 key unit. The corresponding time code address appears in the display window.

3. After recalling a mark (begin,end) point, press the MARK (BEGIN,END) key, such that its key indicator goes out.

If you do not perform any operation for a few seconds, the display window also returns to its previous status.
4-4. Searching in Normal Operation Mode

Locating a mark, begin, or end point

1. While the ENABLE key indicator is not lit, press the MARK (BEGIN, END) key, such that its indicator lights.

2. Rotate the search dial until the desired mark (begin, end) number appears. Or, input the desired number by using the 10 key unit. The corresponding time code address appears in the display window.

3. Press the LOCATE key. The LOCATE key lights, and the unit locates the designated address. After locating, the STOP key lights.

**Note**
To designate a single-digit number in step 2, enter "0" before you enter the desired number.

Locating rec IDs

**Locating the rec ID by designating a rec ID number**

1. Press the ENABLE key, such that its indicator goes out.

2. Press the key, if the REC ID indicator is not lit at the entry ID indication area in the display window.

   The cursor flashes at the entry ID indication area.

3. Rotate the search dial until the desired rec ID number appears, or input the number by using the 10 key unit. The corresponding time code address appears.

4. Press the LOCATE key. The unit locates the time code address of the designated rec ID. If you designate rec ID number "00", the unit locates "00H 00M 00S 00F".

**Locating the rec ID next/previous to the current position**

Press the or key while the ENABLE, BEGIN, END, and MARK keys are not lit.

- By pressing the key, the unit locates the previous recording in point
- By pressing the key, the unit locates the next recording in point

**Note**

 or key are not accepted during locate.
4-4-4. Locating a Recording End Point

You can locate a recording end point by using the automatically registered rec ID.

When recording ends

The following functions are possible if the locate key is pressed immediately after recording is stopped. See also the figure below.

Sync recording mode

As the unit postrolls for 3 frames after you press the STOP key (recording ends), the displayed time code is advanced for 3 frames to the real recording end point. To locate the real recording end point, press the LOCATE key, such that the displayed time code address changes to the real recording end point.

If you then start sync recording, the PCM data of the newly recorded section will have continuity with the already recorded section. The rec ID is not registered with this recording.

Monitor recording mode

As the unit postrolls for 3 frames after pressing the STOP key (recording ends), the displayed time code is advanced for 3 frames to the real recording end point. When you press the LOCATE key in this status, the unit locates to a point the 2 seconds after real recording end point.

If you then start monitor recording, the PCM data of the newly recorded section will have no continuity with the already recorded section. The rec ID is registered with this recording.

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Locating the recording end point

Locating the final recording end point on the disc
Press the END SEARCH key.
The unit locates the point 2 seconds after the final recording end point (the rec ID whose address is the largest in AAIP), regardless of the recording mode selection.
Chapter 5
Program Editing

This chapter explains the main function of the PCM-9000: program editing. The explanations of program editing include making tracks and files, saving edit data, copying files, and so on.

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5-1. What are Tracks and Files?

You can register a desired segment of audio data as a track by designating two points (the track begin and end points). A track is handled as a single unit in disc operation mode.

You can also make a file in which tracks are stored in a desired order. Making tracks and files does not affect the audio data, because the registration data for tracks and files is recorded on the edit data recording area. You can also save or delete only this edit data.

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![Diagram of Tracks and Files]

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1) You can select whether the pause time is on or off.

A pause time (about 2 seconds) can be inserted and deleted.
5-2. Making Tracks

You can edit recorded audio data, while not affecting the recorded audio data itself, by using tracks and files. This section explains how to make tracks.
You can make tracks only in normal operation mode.

5-2-1. Registering Tracks

To register a track, you must register two points: a begin (track start) and an end (track end) point.
To register a track, follow the procedure below.

1. Press the ENABLE key, such that its indicator lights.
2. Press the BEGIN key, such that its indicator lights.
The indicated time code address is registered as the begin point.
The track number flashes in the entry ID indication area of the display window. Track numbers are assigned automatically.
3. Press the END key, such that its indicator lights.
The indicated time code address is registered as the end point. The "TRACK" and "END" indicators light and track number indication lights steadily.
4. Press the ENABLE key, such that key indicator goes out.
5-2. Making Tracks

Registering a single point as both the end point of a track and the begin point of the next track

In Step 4. on the previous page, press the BEGIN key instead of the END key.

The time code address, indicated when the BEGIN key is pressed, is registered as the end point. At the same time, the indicated time code address is registered as the begin point of the next track. The track number flashes.

For details of modifying or deleting tracks, see "5-2-2. Modifying Tracks and Mark Points" and "5-2-3. Deleting Tracks and Mark Points".

Notes
The track length must be longer than 2 seconds.
You cannot register a begin point before starting recording.
You cannot register an end point after stopping recording.

Registering tracks by designating the time code address directly

While the ENABLE key is lit, follow the procedure below.

Designating the desired address by using jog/shuttle

1. Locate the desired address to be registered as the begin (or end) point.
2. Press the BEGIN (or END) key. The begin (or end) point is registered.
   Repeat steps 1 and 2 to register the corresponding end (or begin) point.
3. Press the ENABLE key, such that its key indicator goes out.

Designating the desired address by using the search dial

1. Press the → key, such that a flashing cursor appears at the seconds digit of the displayed current time code address.
2. Rotate the search dial until the desired value appears.
3. Press the ← or → key, to position the cursor to the digit you want to set.
   Repeat steps 2 and 3 until all the digits to be registered have been set.
4. Press the LOCATE key.
5 Press the BEGIN (or END) key.
The designated time code address is registered as the track begin
(or end) point.
Repeat steps 1 to 4 to register the corresponding end (or begin)
point.

6 Press the ENABLE key, such that its key indicator goes out.

Designating a desired address by using the 10 key unit
1 Press the ← key to position the cursor to the digit of seconds digit
of the displayed current time code address.
2 Input the desired value by using the 10 key unit.
3 Press the LOCATE key.
4 Press the BEGIN (or END) key.
The designated time code address is registered as the track begin
(or end) point.
Repeat steps 1 to 4 to register the corresponding end (or begin)
point.
5 Press the ENABLE key, such that key indicator goes out.

Recalling a registered begin/end point
You can recall and display a registered begin or end point time code
address in the display window.
1 While the ENABLE key indicator is not lit, press the BEGIN or
END key, such that its indicator lights.
The most recently displayed track number and its time code
address briefly appear in the display window.
2 Rotate the search dial, until the desired track number and begin or
end point appear in the display window. Or, input the desired track
number directly by using the 10 key unit.
The designated track number and its time code address briefly
appear in the display window.
3 Press the BEGIN (or END) key such that its indicator goes out.

Locating a recalled begin/end point
Press the LOCATE key while the track number appears in the display
window.
The LOCATE key lights and the unit locates the displayed begin/end
point time code address. After locating, the LOCATE key goes out.
5-2. Making Tracks

5-2-2. Modifying Tracks and Mark Points

You can modify a begin, end or mark point.

1. While the ENABLE key indicator is not lit, press the BEGIN, END or MARK key, such that its key indicator lights.

2. Rotate the search dial, such that the desired ID number and its time code address appear. Or, input the desired ID number directly by using the 10 key unit.

3. Press the LOCATE key.
   The LOCATE key lights and the unit locates the specified ID address.

4. Press the ENABLE key, such that its indicator lights.

5. Press the MODIFY key, such that its indicator lights.
   The MODIFY indicator appears in the display window, and the BEGIN, END or MARK key indicator flashes.
   To cancel modifying, press the ENABLE or MODIFY key, such that its indicator goes out.

6. Locate the desired time code address as a new ID address. Or, input the desired ID address directly by using the 10 key unit.

7. Press the BEGIN, END or MARK key.
   The begin, end or mark point is modified to the indicated time code address.

Note: When modifying both the begin and end point, note ensure that the modified begin point address is not subsequent to the end point address.
5-2-3. Deleting Tracks and Mark Points

You can delete registered tracks or mark points. Deleting a track or mark does not affect the audio data recorded on the disc.

1. While the ENABLE key indicator is not lit, press the BEGIN, END or MARK key such that its indicator lights.

2. Rotate the search dial, until the track or mark point number to be deleted appears. Or, input the track or mark point number directly by using the 10 key unit.

3. Press the ENABLE key, such that its indicator lights.

The BEGIN, END or MARK key indicator flashes.

4. Press the DELETE key.

"DELETE" appears in the display window.

5. To delete the track or mark point, press the BEGIN, END or MARK key.

The designated track is deleted.

Note
When the track to be deleted is registered as part of a file, the following appears in the display window.

```
TRACK
20US Ed1n F5
```

Track to be deleted File to which the track to be deleted belongs.

To delete the track, press the DELETE key again. The track is deleted. Otherwise, press the ENABLE key, such that its indicator goes out.
5-2. Making Tracks

5-2-4. Renumbering Tracks and Mark Points

As track or mark numbers are assigned automatically, you cannot assign an arbitrary number to a track or mark point. You can, however, renumber all the tracks or marks recorded on a disc, in the order of their AAIP addresses.

1. While the ENABLE key indicator is not lit, press the BEGIN, END or MARK key, such that its indicator lights.

2. Press the ENABLE key, such that its indicator lights. The BEGIN, END or MARK key indicator flashes.

3. Press the RENUMBER key. "RENO" appears in the display window.

4. Press the BEGIN, END or MARK key.

All tracks or marks are renumbered, in the order of their AAIP addresses from 1. If some of the tracks to be renumbered are registered in files, the track numbers of those files are also renumbered accordingly.

5-2-5. Playing Back in Disc Operation Mode

The PCM-9000 supports a variety of playback options in disc operation mode. This mode is specifically for playback. Press the OPR MODE key, such that the DISC indicator appears in the display window. While the unit is in disc operation mode, the BEGIN key indicator lights automatically, and the unit enters track playback mode.

When the unit enters disc operation mode, the unit recalls the smallest numbered track and locates its begin point time code address.

Track begin point playback

1. Press the OPR MODE key, such that the DISC indicator appears in the display window.

2. Press the BEGIN key, such that its indicator lights.

3. Rotate the search dial, until the desired track number appears. Or, input the desired track number directly by using the 10 key unit.

4. Press the LOCATE key.
   The unit locates the designated track begin point.

5. Press the PLAY key.
   Playback starts. After playing back the specified track, the unit automatically locates the same track begin point, then stops.
Track end point playback

1. Press the OPR MODE key, such that the DISC indicator appears in the display window.
2. Press the END key, such that its indicator lights.
3. Rotate the search dial, until the desired track number appears. Or, input the desired track number directly by using the 10 key unit.
4. Press the LOCATE key. The unit locates the point 8 seconds ahead of the designated track end point address.
5. Press the PLAY key. Playback starts. After playing back the specified track, the unit automatically locates the point 8 seconds ahead of the same track end point address as that now being played back, then stops.

Track mark point playback

1. Press the OPR MODE key, such that the DISC indicator appears in the display window.
2. Press the BEGIN or END key, such that its indicator lights.
3. Rotate the search dial, until the desired track number appears. Or, input the desired track number directly by using the 10 key unit.
4. Press the LOCATE key.
5. Press the MARK key.
6. Rotate the search dial, until the desired mark number appears. Or, input the desired mark number directly by using the 10 key unit. You can specify a mark point within the track specified in step 3.
7. Press the LOCATE key. The unit locates the specified mark point address.
8. Press the PLAY key. Playback starts. After playing back from the mark point to the track end point, the unit automatically locates the same mark point address, then stops.
5-2. Making Tracks

Operation of the \( \ll \) (previous) and \( \gg \) (next) keys in disc operation mode

In disc operation mode, the operation of the \( \ll \) and \( \gg \) keys differs from that in normal operation mode.

During begin point recall condition (BEGIN LED Lights)
- Upon pressing the \( \ll \) key, the unit locates the same track begin point, then starts playback.
- Upon pressing the \( \gg \) key, the unit locates the next track begin point, then starts playback.

During end point recall condition (END LED Lights)
- Upon pressing the \( \ll \) key, the unit locates the point 8 seconds ahead of the same track end point, then starts playback.
- Upon pressing the \( \gg \) key, the unit locates the point 8 seconds ahead of the next track end point, then starts playback.

During mark point recall condition (MARK LED Lights)
- Upon pressing the \( \ll \) key, the unit locates the previous mark point, then starts playback.
- Upon pressing the \( \gg \) key, the unit locates the next mark point, then starts playback.

When using the \( \ll \) and \( \gg \) keys during track mark point playback, "previous" and "next" simply means that the mark point exists at a previous or subsequent in AAIP time code.

**Note**
Key input is inhibited while the unit is locating.
By using tracks and files, you can edit recorded audio data without affecting the recorded audio data itself. This section explains how to make and delete files.

5-3. Making Files

5-3-1. Making a File

Registering a file

1. Press the OPR MODE key, such that the FILE indicator appears in the display window.

   File number 1 appears in the entry ID indication area, and the tracks registered as the contents of the corresponding file and the total number of tracks appear in the display window. If no tracks are registered for the displayed file, no track numbers are displayed.

2. Rotate the search dial until the desired file number appears, or input the desired file number directly by using the 10 key unit.

3. Press the ENABLE key, such that its indicator lights.

4. Press the ← or → key to position the cursor to the current display area.

5. Rotate the search dial until the desired track number appears, or input the value directly by using the 10 key unit.

(Continued)
5-3. Making Files

6 Press the → key to position the cursor to the next track number. To correct a previously set track number, press the ← key to position the cursor to the track number to be corrected. Repeat steps 5 and 6 until you have designated all the track numbers to be registered.

7 Press the SET key.

The designated file is registered as a new file with registered tracks.

Notes
- The total time of a file cannot exceed 24 hours.
- If you press the SET UP key or disc transport control key (PLAY, LOCATE key etc.) before pressing the SET key, the ENABLE key indicator goes out and the registered file contents are cleared.

Copying a file to another file with a different file number

You can copy a file to another file having a different file number.

1 Recall the file to be copied. *For details, see "5-3-1. Registering a File".*

2 Press the ENABLE key, such that its indicator lights.

3 Press the ← or → key, to position the cursor to the file number indication.

4 Rotate the search dial until the desired file number appears. Or, input the value directly by using the 10 key unit.

5 Press the SET key.

The file is copied to a file having the designated file number. The contents of the original file remain as is. If the specified file number is already in use, the contents of the file are re-registered to the new one.

Note
If you press the SET UP key or a disc transport control key (PLAY, LOCATE key etc.) before pressing the SET key, the ENABLE key indicator goes out and copying is canceled.
Modifying a file

The following types of file modification are supported.
• Changing a track in a file.
• Deleting a track or a pause from a file.
• Inserting a track or a pause into a file.

To modify a file, follow the procedure below:

1 Recall the file to be modified.
   For details, see "5.3.1, Registering a File".

2 Press the ENABLE key, such that its indicator lights.

3 To change a track number
   (1) Press the ← or → key to position the cursor to the track
       number that you want to change.
   (2) By rotating the search dial, or by using the 10 key unit, input a
       value for the new track number.

To delete a track or pause
   (1) Press the ← or → key to position the cursor to the track
       number or pause you want to delete.
   (2) Press the DELETE key.

To insert a pause (2 seconds)
   (1) Press the ← or → key to position the cursor to the point
       (between two tracks) where you want to insert a pause.
   (2) Press the INSERT key.

   "·" appears at the designated point.

To insert a track
   (1) Press the ← or → key to position the cursor to the point
       where you want to insert a new track.
   (2) Press the INSERT key.

   The smallest track number of all the registered tracks appears
   at the designated point. All the previously displayed tracks
   move to the right.
   (3) By rotating the search dial, or by using the 10 key unit, input a
       value for the new track number.

4 Press the SET key.

The modified file is registered.

(Continued)
To cancel inserting/deleting of a track or pause
Before pressing the SET key in step 4 above, press the ENABLE key, such that its indicator goes out.

Notes
• You cannot insert a pause where a pause already exists.
• When you have not registered a pause in a file, the no break playback between tracks can be performed by 3 ms-cross fade (linear).
• If you press the SET UP key or a disc transport control key (PLAY, LOCATE key etc.) before pressing the SET key, the ENABLE key indicator goes out and file modifying is canceled.

5-3-2. Deleting a File

You can delete a registered file. To delete a file, follow the procedure below.

1 Press the OPR MODE key, such that the FILE indicator appears in the display window. File number 1 appears in the entry ID indication area, and the tracks registered as the contents of the corresponding file, as well as the total number of tracks in the file, appear in the display window.

2 Rotate the search dial until the file number corresponding to the file to be deleted appears. Or, input the number directly by using the 10 key unit.

3 Press the ENABLE key, such that its indicator lights.

4 Press the DELETE key.

5 Press the SET key.

The designated file is deleted.

Note
If you press the SET UP key or a disc transport control key (PLAY, LOCATE key etc.) before pressing the SET key, the ENABLE key indicator goes out and deleting is canceled.
5-4. Playing Back a File

This section explains how to play back a registered file. You can also execute repeat playback and variable speed playback during file playback.

Playing back a file

1. Press the OPR MODE key, such that the FILE indicator appears in the display window.

   File number 1 appears in the entry ID indication area, and the tracks registered as the contents of the corresponding file, as well as the total number of tracks, appear in the display window.

2. Rotate the search dial until the playback file number appears, or input the number directly by using the 10 key unit.

3. Press the PLAY key.

   File playback starts.

Playing back a specified track

1. Press the OPR MODE key, such that the FILE indicator appears in the display window.

2. Rotate the search dial until the playback file number appears, or input the number directly by using the 10 key unit.

3. Press the → key, to position the cursor to the track number from which file playback is to start.

   The unit automatically locates the specified track begin point.

4. Press the PLAY key.

   Playback starts from the specified track, in the registered file order.
5-4. Playing Back a File

Function of the  l< (previous) and  >>I (next) keys during file playback

In file operation mode, the l< and  >>I keys function in basically the same way as in disc operation mode.

Although you can locate or specify any registered track in disc operation mode, you can locate or specify any track in a specified file in file operation mode.

When you press the  l< key while playing back a track in disc operation mode, the unit locates the begin point of the track that is being played back. In file operation mode, the unit locates the begin point of the previous track.

Function of the cursor keys during file playback

When the unit enters file operation mode, the cursor is positioned to the entry ID indication area. Once file playback starts, the cursor moves to the corresponding playback tracks.

To move the cursor to the entry ID display area

1 Hold down the <- key until the cursor is positioned to the first track indication of the file.

2 Release the <- key, then press the <- key again.

The cursor moves to the entry ID indication area.

Function of the jog/shuttle function during file playback

While playing back a file, you can apply the jog and shuttle function only to the track that is being played back. To apply the jog or shuttle function to other tracks, cancel jog or shuttle operation by pressing the STOP key, then press the <- or -> key to position the cursor to the desired track. You can then apply the jog and shuttle function to that track.

When you press the JOG or SHUTTLE key during pause, the unit locates the next track and enters jog or shuttle mode.
5-5. Saving the Edit Data

As edit data is merely temporarily saved in the internal RAM (Random Access Memory) of the PCM-9000, it will be lost if the power is turned off without saving the data. Be sure to save all editing data to the disc before turning off the power.

The data to be saved is as follows:
• Track data (begin and end points, track numbers)
• File data (file numbers and its contents)
• Mark point data
• Rec ID data
• Time code offset value

To save the data, follow the procedure below.

1. Press the ENABLE key, such that its indicator lights.

2. Press the DATA SAVE key on the RM-D9000, or press the EDIT DATA SAVE key on the PCM-9000. “SAVE” appears in the display window, and the DATA SAVE and EDIT DATA SAVE key indicators light. The DATA SAVE and the EDIT DATA SAVE key indicators go out once all data has been saved to the disc. When saving the data, the unit automatically locates the head of the file automatically.

Notes
• Once you start saving data to disc, you cannot cancel saving.
• The disc transport and editing keys are all disabled while data is being saved to disc.
• In disc operation mode, press the EDIT DATA SAVE key on the PCM-9000 to save the edit data.

When the REC PROTECT switch on the disc is set to MAIN/EDIT DATA.
When the REC PROTECT switch on the disc is set to MAIN/EDIT DATA, you cannot save edit data to that disc. Press the EJECT key to eject the disc, then set the REC PROTECT switch to its leftmost position (recording ready status). Then, insert the disc again and execute the data save procedure above.

For details of the write protection switch, see “3-4-4. Preventing Accidental Erasure”
Chapter 6
Time Code Chase

This chapter explains the time code chase function. An overview, as well as details of setting and executing are given.
To execute time code chase, the optional DABK-9003 Interface Board must be installed.

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  6-2-1. Selecting Chase Mode ........................................... 6-4
  6-2-2. Time Code Chase Operation Windows ....................... 6-4
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The time code chase function is a synchronization function whereby a fixed sync offset is maintained between the playback time code and an external time code. To execute time code chase, the optional DABK-9003 Interface Board must be installed.

**Chase mode**

During time code chase, the unit is locked to the external time code in units of ±1 sub-frame (1/100 frame). Both the AAIP time code and recorded external time code can be used for time code chase.

This function has the following two modes. Address mode accept INT (internal) or VIDEO as the external synchronization. Free mode accept INT (internal), EXT (external word sync), DI (AES/EBU signal), or VIDEO.

**Note**

Cancel the regeneration of the time code when executing the time code chase in EXT TC mode.

**Address mode**

After initial synchronization with an external time code is achieved, if the discrepancy between the external time code and the playback time code exceeds a predetermined amount, the signals are re-synchronized, such that synchronization with the external time code is maintained throughout the operation.

- This mode should be used when an external time code can be supplied continuously and with no defects or errors. If there is any deviation in the time code frequency (standard is 0.5–1%), you can chase using slow resync.
- This mode has three operation windows, used to specify the error range, beyond which re-synchronization is performed, the maximum variation range vari-speed playback with synchronization, and so on. For details, see “6-2-2. Time Code Chase Operation Windows”.

**Free mode**

After initial synchronization with the external time code is achieved, time code chase terminates. The unit returns to normal playback synchronizing with the reference signal.

This mode should be used when the external time code is prone to discontinuities or errors.

For example, when synchronizing the slave and master units to an external reference video signal and executing time code chase in free mode, once the slave unit and master unit time codes have been synchronized, even if the master unit time code contains discontinuities, synchronization is maintained by the reference video signal.

These two modes provide different functions, as listed in the following table.
## Differences between address and free modes

<table>
<thead>
<tr>
<th>Function</th>
<th>Address mode</th>
<th>Free mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lock window, display window and re-sync window settings ¹)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Re-synchronization</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Slow re-sync operation ²)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Variation of the time offset during time code chase operation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Variation of the time offset after time code synchronization</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Chasing a time code signal that is not synchronized with a video signal</td>
<td>Yes ³)</td>
<td>No</td>
</tr>
<tr>
<td>Synchronization with an external time code signal when you select EXT with the SYNC CLOCK key</td>
<td>No</td>
<td>Yes ³)</td>
</tr>
</tbody>
</table>

¹) For details, see "6-2-2, Time Code Chase Operation Windows".

²) After synchronizing with an external time code, the slave unit is synchronized with the word sync signal supplied from the master unit.

³) Synchronization can be achieved using the slow re-sync function.
Before executing time code chase, you must set the necessary parameters with the setting window. To enter each of the setting menus, press the SETUP key to display the corresponding menu. By repeatedly pressing the SETUP key, the setting menu cycles as follows: Normal indication → Chase mode setting menu → Lock window setting menu → Display window setting menu → Re-sync window setting menu → Sync offset time setting menu → Offset error indication → Normal indication.

6-2. Setting for Time Code Chase

6-2-1. Selecting Chase Mode

1. Press the SETUP key, such that the chase mode setting menu appears in the display window.
2. Rotate the search dial, until the desired chase mode ("ADDRESS" or "FREE") appears.
3. Press the SET key. The designated mode is set as the chase mode.

6-2-2. Time Code Chase Operation Windows

What are time code chase operation windows?

In address mode, time code chase is based on three operation windows, used to specify the error range, beyond which re-synchronization is executed, the variation range for variable speed playback synchronizing with a reference video signal, and so on. You can set each of three time code chase operation windows at any point during the operation. Note that, although you can set these windows in free mode, the settings so made have no effect. These settings are not saved by the memory back-up function.
Lock window
If the discrepancy between the playback time code and the external time code exceeds the setting made with this window, re-synchronization begins.
Setting range: 1 to 99 subframes
Default setting: 1 subframe

Display window
If the discrepancy between the playback time code and the external time code exceeds the setting made with this window, the PLAY key flashes to alert you that the unit is re-synchronizing.
You cannot set the display window value that is smaller than the value set for the lock window value.
Setting range: 1 to 99 subframes
Default setting: 2 subframes

Re-sync window
This window setting determines the range of variation in the playback speed for variable speed playback during re-synchronization.
Setting range: 0.3% to 12.5% (in 0.1% units)
Default setting: 12.5%
- When the window setting is narrow: Re-synchronization varies the playback speed only slightly during vari-sync playback. This requires a greater time to achieve synchronization, but any variation in the pitch are not so apparent. This technique is referred to as slow re-sync. This setting should be used when using an analog tape recorder as the master unit.
- When the window setting is wide: Re-synchronization applies wide variations in the playback speed for vari-sync playback. This reduces the time required to achieve synchronization, but the variations in the pitch may be noticeable. This setting should be used to chase variable speed playback when using a digital tape recorder as the master unit.

Setting lock/display/re-sync window
1. Press the SETUP key, such that the lock, display or re-sync window setting menu (“LOCK”, “DISPLAY”, or “RE-SYNC”) appears in the display window.
2. Rotate the search dial until the desired window value appears, or input the value directly by using the 10 key unit.
3. Press the SET key.
The designated value is registered as the lock, display or re-sync window value. The lock/display/re-sync window value indication appears.

Recalling the lock/display/re-sync window value
Press the SETUP key, such that the lock/display/re-sync window setting menu appears in the display window.
6-2. Setting for Time Code Chase

6-2-3. Setting the Sync Offset Time

The sync offset time value, which is the difference between the external time code and the time code of the PCM-9000, must be set before executing time code chase.

There are two ways of setting the sync offset time, as follows:

- Setting a desired value as the sync offset time
- Automatically setting the difference between the external input time code and the internal time code as the sync offset time

Setting a desired value as the sync offset time

1. Press the SETUP key, such that the sync offset time setting menu appears in the display window.

2.Press the ← or the → key to position the cursor to the digit you want to set.

As the cursor moves, the digit to which the cursor is positioned flashes.

The cursor can be positioned to the hours, minutes, seconds and frames digit by pressing the ← or → key.

3. Rotate the search dial, until that the desired sync offset time appears, or input the value directly by using the 10 key unit.

4. Press the SET key.

The sync offset time is registered.
Note
In place of steps 3 and 4, you can also hold down the SET key and rotate the search dial.

Setting the difference between the external input time code and internal time code as the sync offset time

1. Press the SETUP key, such that the sync offset time setting menu appears in the display window.

2. Press the ← or → key, to position the cursor to the "In" indication in the entry ID indication area of the display window.

   The time code value (the sync offset time), that is the difference between the external input time code and the internal time code, flashes.

3. Press the SET key.

   The sync offset time is registered, and the value instead lights steadily.

Recalling the sync offset time
Press the SETUP key, such that the sync offset time setting menu appears.

6-2-4. Setting the Mode and Parameters

Before executing time code chase, you must select the reference signal, time code format, and so on.

According to the external input signal, set the following:
- Time code format: TC FORMAT key
- Generator mode: GEN MODE key
- Reference signal: SYNC CLOCK key

For details of making these settings, see "Chapter 2 Location and Functions of Parts and Controls".
6-3. Executing Time Code Chase

Before executing time code chase, set the chase mode and parameters. See "6-2. Setting for Time Code Chase".

6-3-1. Playback with Time Code Chase

To execute playback with time code chase, follow the procedure below.

1. Start playback on the external master machine, or input the external time code signal to the PCM-9000.

2. Check that the slave PCM-9000 is stationary, then press the TC CHASE key such that its indicator lights.

Time code chase is executed, and the unit of disc time indication changes from frames to sub-frames. Once synchronization has been established, the TC CHASE indicator lights in the display window.

Note
All disc transport keys, except for STOP, PLAY and REC are disabled during time code chase.

Canceling time code chase
Press the TC CHASE key, such that its indicator goes out. Or, press the STOP key.
The disc transport stops, the TC CHASE indicator in the display window disappears, and the STOP key lights.
The minimum unit of disc time indication changes to frames.
Pausing time code chase (in address mode)
Stop playback or recording from the master machine, or stop inputting the time code to the PCM-9000.
When the master machine stops, the slave machine (PCM-9000) also stops.

Confirming the offset error
Press the SETUP key, such that the offset error indication appears in the display window. The unit of disc time indication changes to sub-frames.

Notes
• The PLAY lamp of the PCM-9000 will turn on and off. When an offset error is in effect.
• Cancel the regeneration of the time code during EXT TC mode.

6-3-2. Recording with Time Code Chase
To record the external source signal with time code chase, follow the procedure below.

Address mode
1 Start playback on the external master machine, or input the external time code signal to the PCM-9000.

2 Check that the slave PCM-9000 is stationary, then press the TC CHASE key such that its indicator lights.
   Time code chase is executed, and the unit of disc time indication changes from frames to sub-frames.
   Once synchronization has been established, the TC CHASE indicator lights in the display window.

3 While holding down the REC key, press the PLAY key.
   Recording starts, with each unit synchronized with the external time code.
   If you press the FF, REW or STOP key on the master machine during recording, recording is canceled, and the unit starts locating.
   Once the unit has established synchronization with the external time code, the unit starts playback with time code chase.

Canceling recording without pausing time code chase
Press the PLAY key while recording with time code chase.
Recording ends, and the unit starts normal playback.
If you press the STOP key, TC CHASE recording and the chasing is canceled, and TC CHASE key and TC CHASE indicator on the display window turns off.
6-3. Executing Time Code Chase

Notes
• Chase recording in Address mode is possible only when REC mode is SYNC REC MODE.
• When the lock releases during chase recording, the recording is canceled.

Free mode
1 Start playback on the external master machine, or input external time code signal to the PCM-9000.
2 Check that the slave PCM-9000 is stationary, then press the TC CHASE key such that its indicator lights. TC CHASE indicator lights in the display window.
3 Time code chase is executed, and PLAY key flashes on and off. Once synchronization has been established, the PLAY key lights on steady. TC CHASE and TC CHASE indicator turns off.
4 While the PLAY key is lit, press PLAY key and REC key.
5 Executing the Recording with Time code chase.
   Even if you press the FF, REW or STOP key on the master machine during recording, this unit continues the recording.
Chapter 7
Optimum Use of a Disc

The PCM-9000 provides some disc utility functions. The disc check function, which can check whether there is anything wrong with a disc, and an instant/full erasing function are supported. This chapter explains these functions.

7-1. Checking a Disc ........................................................... 7-2
7-2. Optimum Use of a Disc ................................................ 7-4
  7-2-1. Instant Erasing ...................................................... 7-4
  7-2-2. Full Erasing .......................................................... 7-5
Dust and stains may accumulate on discs after they have been used for a long period of time. To avoid data read/write errors, the PCM-9000 supports a disc check function which verifies the condition of the disc. You can check not only the audio data area, but also the edit data area of the disc by using this function.

Checking a disc

To check a disc, follow the procedure below.

1. Press the OPR MODE key, such that the NORMAL indicator appears in the display window.
2. Simultaneously press the DISC CHECK key and STOP key on the PCM-9000 while the unit is stationary.

   The DISC CHECK key lights steadily, and checking starts. “D-ch ON” appears in the display window.

   Once the check has been completed, the DISC CHECK key goes out. If the disc is normal, “GOOD” appears. If there is something wrong with the disc, “NEED CLEAN” appears. See the next paragraph “When a disc error is detected”.

Note
All keys, other than the STOP and EJECT keys, are disabled during disc checking.

Canceling disc checking
Press the STOP key.

Disc checking is canceled. To restart disc checking, repeat the procedure from the beginning.
When a disc error is detected

If a error is detected as a result of checking a disc, clean the disc. If, after cleaning the disc, the error is still detected, clean the lens of the PCM-9000.

For details of cleaning a disc, see "3-4-5. Cleaning a disc"
For details of cleaning the PCM-9000's lens, refer to the maintenance manual.

Check the disc again after cleaning the lens. If an error is still reported, discard the disc.
By deleting the rec ID data recorded on the disc, you can overwrite existing data with new audio and edit data. This function enables the re-use of a previously recorded disc. Note that once you apply this function, the unit cannot read the data recorded on that disc.

**1** Press the OPR MODE key, such that the NORMAL indicator appears in the display window.

**2** Press the REC READY key on the PCM-9000, such that its indicator lights.

**3** Press the INSTANT ERASE key and the STOP key on the PCM-9000, while the unit is stationary.

"ERASE ON" appears in the display window, and deleting starts. After deleting, the INSTANT ERASE key indicator goes out.

**Note**

Instant erasing takes less than one minute. You can cancel erasing by pressing the STOP key. If you insert a disc for which erasing has not been completed, "NEED ERASE" appears in the display window. In this case, complete the erasing procedure by repeating the steps described above.
7-2-2. Full Erasing

You can initialize a previously used disc by deleting all data on that disc.

1 Press the OPR MODE key, such that the NORMAL indicator appears in the display window.

2 Press the REC READY key on the PCM-9000, such that its indicator lights.

3 Press the DISC ERASE key and the STOP key on the PCM-9000, while the unit is stationary.

   “ERASE ON” appears in the display window, and deleting starts.
   It takes about 20 minutes to delete all the data on a disc.
   Once deleting has been completed, the DISC ERASE key indicator goes out.

   Canceling deleting
   Press the STOP key.

Deleting is canceled.

   Note
   If you insert a disc for which erasing has not been completed,
   “NEED ERASE” appears in the display window. In this case,
   complete the erasing procedure by repeating the steps described above
   or on the previous page.
Chapter 8
Advanced System Configurations

This chapter explains the configuration of advanced systems. You can use this chapter as a system configuration reference.

8-1. Editing System with DAE-3000 .................................... 8-2
8-2. CD Cutting System ..................................................... 8-3
8-3. Digital Copying between
      PCM-9000 and PCM-1630 System .......................... 8-4
8-4. Digital Copying to a Digital VTR ............................ 8-7
The figure below shows an example system controlled by the DAE-3000 Digital Audio Editor, using the PCM-9000 as the player.

Example system using the DAE-3000 as a controller
8-2. CD Cutting System

The figure below shows an example CD cutting system that uses the PCM-9000 as the master recorder.

---

Example CD cutting system
8-3. Digital Copying between PCM-9000 and PCM-1630 System

The PCM-1630 system consists of the following equipment:
• PCM-1630 Digital Audio Processor
• DMR-4000 Digital Master Recorder
• DABK-1631 Digital I/O Option

Digital copying from the PCM-1630 system to the PCM-9000

You can make a CD master disc by copying a master tape from the DMR-4000 to the PCM-9000.

**Master unit**

- PCM-1630 + DABK-1631
- Word sync signal
- WORD SYNC OUTPUT
- WORD SYNC INPUT
- SDIF-2 or AES/EBU signal
- DIGITAL I/O or ANALOG
- OUTPUT CH-1 (D-O)
- INPUT CH-1/CH-2 or DIGITAL I/O AES/EBU D-I

**DMR-4000**

- PQ - Cue signal
- AUX OUTPUT CH-1 (PQ - Cue signal)
- Time code signal
- AUX OUTPUT CH-2 (TIME CODE)

**PCM-9000 & DMR-9000**

- PQ - Cue CODE IN
- TIME CODE IN

**Notes on copying from the PCM-1630 system to the PCM-9000**

Set the following values:
• Sampling frequency for system: 44.1 kHz
• Time code format for system: 30 (frame/s)
• TIME CODE of the PCM-9000: EXT TC
• GEN MODE of the PCM-9000: REGEN
• DABK-9006: Switch ON only the DIP SW (S102) No. 3 on IF-438 board, or short pins 21 & 36 of the REMOTE connector on the panel of DABK-9006.

When copying the AES/EBU-format signal
• SYNC CLOCK of the PCM-9000: D-I
• DIP switch 8 on the PCM-9000: I
When copying the SDIF-2 format signal
SYNC CLOCK of the PCM-9000: EXT

Notes:
- To copy the PQ cue on the master tape, the optional DABK-9006 Interface Board must be installed.
- You can use the AES/EBU D-1 signal as the external sync signal when copying an SDIF-2 format signal. Set the same values as those set for "When copying the AES/EBU format signal", above.

Digital copying from the PCM-9000 to the PCM-1630 system

You can make a CD by using a master disc recorded on the PCM-9000.

Notes on copying from the PCM-9000 to the PCM-1630 system
Set the following values:
Make the PCM-1630 system the master unit for system synchronization.
- Sampling frequency for system: 44.1 kHz
- Time code format for system: 30 (frame/s)
- SYNC CLOCK of the PCM-9000: VIDEO

(Continued)

Chapter 8 Advanced System Configurations
When copying time code data together with audio data

(1) Press the FORMAT key of the PCM-9000, such that the 30 indicator lights.

(2) Set the time code format of the DMR-4000 to non-drop frame mode (NDF).

(3) Start time code sync playback on the PCM-9000 by pressing the PLAY key.
   For details of time code sync playback, see "4-3-3. Time Code Sync Playback".

(4) After starting playback on the PCM-9000, start recording on the DMR-4000.

Notes
- You cannot copy to the PCM-1630 system if you select a system sampling frequency other than 44.1 kHz.
- While copying, you must execute time code sync playback. Otherwise, time code data may be recorded incorrectly.
- You cannot execute digital copying while executing variable speed playback on the PCM-9000. If you want to record a signal, played back at variable speed by the PCM-9000, on the DMR-4000, copy the analog audio signal.
8-4. Digital Copying to a Digital VTR

You can copy audio data recorded on the master disc to a digital VTR in AES/EBU digital audio format.

Notes on copying to a digital VTR
Set the following values:
- Make the digital VTR the master unit for system synchronization.
- Connect the composite sync (reference video) signal to the PCM-9000 and the digital VTR.
- Sampling frequency: 48 kHz
- SYNC CLOCK of the PCM-9000: VIDEO
Appendix

Specifications ................................................................. A-2
## Specifications

### General

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>423 x 177 x 455 mm (16 7/8 x 7 x 17 3/4 inches) (w x h x d, excluding projections)</td>
</tr>
<tr>
<td>Mass</td>
<td>17 kg (37 lb 8 oz)</td>
</tr>
<tr>
<td>Power requirements</td>
<td>100 to 240 VAC, 50/60 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>130 W, 2.4-0.5 A</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>10°C to 35°C</td>
</tr>
<tr>
<td>Operating humidity</td>
<td>30% to 70%</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20°C to +55°C</td>
</tr>
<tr>
<td>Storage humidity</td>
<td>20% to 75% RH</td>
</tr>
<tr>
<td>Maximum angle from horizontal</td>
<td>-7° to +7° (to guarantee performance)</td>
</tr>
<tr>
<td></td>
<td>-10° to -10° (to guarantee operation)</td>
</tr>
</tbody>
</table>

### Format

<table>
<thead>
<tr>
<th>Recording Format</th>
<th>MS disc format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of digital audio channels</td>
<td>2</td>
</tr>
<tr>
<td>Quantization</td>
<td>16-, 20-, 24-bit</td>
</tr>
<tr>
<td>Error correction</td>
<td>Sony super strategy cross interleave</td>
</tr>
<tr>
<td>Recording time</td>
<td>80 minutes (20-bit, Fs=44.1 kHz)</td>
</tr>
<tr>
<td>Disc speed variation range</td>
<td>±12.5%</td>
</tr>
<tr>
<td>Disc used</td>
<td>MO (Magneto-Optical) disc</td>
</tr>
</tbody>
</table>

### Audio characteristics (with optional DABK-9001 Converter Board)

| Frequency response         | 20 Hz to 20 kHz ±0.5 dB (Fs=48 kHz)        |
| Dynamic range              | 104 dB typical (emphasis off)              |
| Total harmonic distortion  | 0.03% maximum                              |
| Sampling frequency         | 44.056 kHz, 44.1 kHz, 48 kHz               |
| Signal processing system delay time | 66.712 ms maximum                        |
| Delay time of A/D, D/A     | 1.8 ms                                     |

---

A-2  Appendix
## Input/Output Connectors

### PCM-9000

**REFERENCE VIDEO Connectors**
- **Format:** NTSC/PAL/SECAM composite video, or rectangular wave
- **Levels:**
  - 0.3 Vp-p (Burst signal)
  - 4.0 Vp-p (Composite sync signal)
  - 0.3 to 5 Vp-p (rectangular wave)
- **Impedance:** 75 ohm, unbalanced
- **Connector:** BNC type (2), loop-through

### WORD SYNC INPUT Connectors
- **Format:** 50% duty, with rectangular pulse leading edge
- **Level:** TTL compatible
- **Input level:** 3 Vp minimum
- **Impedance:** 75 ohm, unbalanced
- **Connector:** BNC type (2), loop-through

### WORD SYNC OUTPUT Connectors
- **Format:** 50% duty, with rectangular pulse leading edge
- **Level:** TTL compatible
- **Output level:** 3V or more
- **Impedance:** 75 ohm, unbalanced
- **Connector:** BNC type (2)

### D-1 SYNC Connector
- **Format:** AES 3-1992
- **Impedance:** 110 ohm
- **Connector:** XLR-3-31 (1)

### INSERTION RETURN Connector
- **Format:** AES 3-1992
- **Impedance:** 110 ohm
- **Transfer rate:**
  - 3.840 Mbit/s (20-bit, Fs=48 kHz)
  - 3.072 Mbit/s (16-bit, Fs=48 kHz)
- **Connector:** XLR-3-31 (1)

### INSERTION SEND Connector
- **Format:** AES 3-1992
- **Connector:** XLR-3-32 (1)

### DIGITAL I/O AES/EBU D-I Connector
- **Format:** AES 3-1992
- **Impedance:** 110 ohm
- **Connector:** XLR-3-31 (1)

### DIGITAL I/O AES/EBU D-O Connector
- **Format:** AES 3-1992
- **Connector:** XLR-3-32

### REMOTE Connector
- **Format:** Serial
- **Level:** RS-422A
- **Connector:** Round type 10-pin, female (1)

### DABK-9001 Converter Board (20-bit A/D, D/A)

---

**Appendix A-3**
Specifications

DABK-9001 Converter Board (20-bit A/D, D/A)
LINE INPUT CH-1, CH-2 connectors
Reference level +4 dBs
Maximum level +26 dBs
Impedance 20 kohm/600 ohm, balanced/unbalanced
Connector XLR-3-31 (2)
LINE OUTPUT CH-1, CH-2 connectors
Reference level +4 dBs
Maximum level +26 dBs
Impedance Less than 60 ohm, balanced/unbalanced
Connector XLR-3-32 (2)

DABK-9003 Interface Board (Time code/Remote)
TIME CODE IN connector
Format IEC 461 ( SMPTE/EBU)
Level 0.5 to 10 Vp-p (10 kohm, balanced)
Connector XLR-3-31 (1)
TIME CODE OUT connector
Format IEC 461 ( SMPTE/EBU)
Level 2.4±0.1 Vp-p (100 ohm or less, balanced)
Connector XLR-3-32 (1)
PARALLEL REMOTE connector
Format Parallel
Level TTL compatible
Connector D-SUB 50-pin (1)
REMOTE (9PIN) connector
Format Sony 9-pin
Level RS-422A
Connector D-SUB 9-pin

DABK-9004 Digital I/O Board (SDIF-2)
INPUT CH-1, CH-2 connector
Format SDIF-2, unbalanced
Level TTL compatible
Transfer rate 1.536 Mbit/s (16-bit, Fs=48 kHz)
Connector BNC type (2)
OUTPUT CH-1, CH-2 connectors
Format SDIF-2, unbalanced
Level TTL compatible
Connector BNC type (2)

DABK-9005 Interface Board (SCI)
SCSI connector
Format SCI
Connector Half-pitch 50-pin (2)
DABK-9006 Interface Board (DAQ)

CUE DATA IN connector
Format: FM
Level: 1.2 to 10 Vp-p (10 kohm)
Transfer rate: 4800 bits/s
Connector: XLR-3-31 (1)

CUE DATA OUT connector
Format: FM
Level: 2.4 ±0.5 Vp-p (10 kohm load)
Transfer rate: 4800 bits/s
Connector: XLR-3-32 (1)

REMOTE connector
Format: Parallel
Level: TTL compatible
Connector: Amphenol 36-pin (1)

STATUS OUT connector
Format: Parallel
Level: TTL compatible
Connector: D-SUB 25-pin (1)

Accessories supplied
- Ball-point L wrench B12MM (1)
- Blanking panel (1)
- Maintenance manual (1)
- Operation manual (1)
- Plug holder (1)
- Power cord (1)
- Rack angle assembly (2)
- Screw (B4 x 16) (4)
- Screw (RK5 x 16) (4)
- Trapezoid decorative washer (~5) (4)

Optional accessories
- AC-E6AM JE3
- DABK-9001
- DABK-9003
- DABK-9004
- DABK-9005
- DABK-9006
- MOA-D51
- MSD-1200

Design and specification are subject to change without notice.
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Notes when using PCM-9000 V2.0

Notes for PCM-9000 V2.0

• Notes on switching to REMOTE-2(SCSI)
  If the DABK-9005(SCSI I/F Board) is installed in the PCM-9000, it is possible to switch control to REMOTE-2(SCSI) by pressing the SYSTEM CONTROL key on the control panel.

However, it may not be possible to change to REMOTE-2(SCSI) mode if the EDIT DATA SAVE key starts to flash ON/OFF when the SYSTEM CONTROL key is pressed. This is not a fault condition. In this case, please press the EDIT DATA SAVE key. After the EDIT DATA SAVE key is pressed, its indicator will light ON steady and then go OFF. Then the system can be switched to REMOTE-2(SCSI) by pressing the SYSTEM CONTROL key.

However, if the AUX DATA area of the disc is record protected, then the EDIT DATA SAVE key will continue to flash ON/OFF even if that key is pressed. In this case, first eject the disc, set the disc to record enable, then perform the operation mentioned above.

• Notes for JOG during FILE mode
  In FILE mode with V2.0, it is possible to JOG/SHUTTLE operations between the programmed TRACKs.

However, the JOG sound may change speed or even stop when performing JOG at or near the point connecting 2 adjacent tracked. This symptom only occurs when performing JOG during FILE mode. Normal FILE mode PLAY should not have any problems.

• Notes for the RM-D9000 display
  If all TRACKs of a particular file are deleted during FILE mode, then, "COPY TO" or "0", "1" may be indicated on the SCSI display of RM-D9000. These indications have no meaning. If you want to clear those indications, then eject the disc and reset the power to the unit.

SONY corporation BC company
A/V production department 2
September 1st, 1995
DABK-9003 Version1.0について

DABK-9003 Version1.0はデジタルオーディオディスクプレーヤーとしての機能に対応しております。

タイムコード機能を単独で使用する場合は、下記のように設定してお使い下さい。

●タイムコードモードはAAIP TCモードでお使い下さい。

●タイムコードチェイス機能およびタイムコードシンク再生はオペレーションモードをNORMALモードに設定してお使い下さい。

●タイムコードチェイス機能はプライーランモードでお使い下さい。

●お使いになるタイムコードに合わせて、PCM-9000のタイムコードフォーマットスイッチを設定して下さい。

なお、タイムコードシンク再生についてはPCM-9000の取り扱い説明書4章(4-3-3)、またタイムコードチェイスについては6章をご覧ください。
DABK-9003  パネル上の切り換えスイッチをREMOTE(PPm)に設定してください。
TC-78基板上のスライドスイッチS1～5を次のように設定してください。
S1: ON S2～5: OFF

DABK-3005 (PCM-7030/7050用IFボード)を使用して下さい。
SUBメニューでマシンアサインにPCM-7030としてPCM-9000
が表示されるので、PLAYERにアサインして下さい。

PCM-9000  オペレーションモード・・・NORMAL（FILE,DISCモードに
設定しないで下さい）
TC MODE ・・・ 30Hz NDF
SYNC CLOCK・・・ EXT
REC MODE・・・ MONITOR/SYNC任意
INPUT ・・・ AES/ANALOG/SDIF-2任意
SYSTEMコントロール・・・ REMOTE-1

DAE-3000の操作

DAE-3000の取り扱い説明書をご覧下さい。
なお、DAE-3000でのPCM-9000のブリール時間は、7秒以上に設定してお使い
下さい。
サポートコマンド一覧

DABK-9003 Version1.0は、DAE-3000のプレーヤーとなる機能のみをサポートしております。下記にサポートコマンド一覧を示します。

<table>
<thead>
<tr>
<th>コマンド</th>
<th>コマンド名</th>
<th>コマンド</th>
<th>コマンド名</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 00</td>
<td>STOP</td>
<td>21 37 00</td>
<td>CHASE</td>
</tr>
<tr>
<td>20 01</td>
<td>PLAY</td>
<td>4X 30</td>
<td>EDIT RESET</td>
</tr>
<tr>
<td>20 10</td>
<td>FAST FWD</td>
<td>45 78</td>
<td>CHASE OFFSET PRESET</td>
</tr>
<tr>
<td>20 13</td>
<td>SHUTTLE FWD</td>
<td>61 0C</td>
<td>CURRENT TIME SENSE</td>
</tr>
<tr>
<td>20 20</td>
<td>REWIND</td>
<td>61 20</td>
<td>STATUS SENSE</td>
</tr>
<tr>
<td>20 23</td>
<td>SHUTTLE REV</td>
<td>74 04</td>
<td>LTC TIME DATA</td>
</tr>
</tbody>
</table>

システムコントロール

SYSTEM CONTROLのスイッチは、REMOTE-1の設定でご使用ください。
サポートコマンド一覧
下記のコマンドならびにステータスがサポートされております。

<table>
<thead>
<tr>
<th>ピン番号</th>
<th>信号名</th>
<th>ピン番号</th>
<th>信号名</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>STOP Command</td>
<td>26</td>
<td>-----</td>
</tr>
<tr>
<td>2</td>
<td>PLAY Command</td>
<td>27</td>
<td>-----</td>
</tr>
<tr>
<td>3</td>
<td>REC Command</td>
<td>28</td>
<td>-----</td>
</tr>
<tr>
<td>4</td>
<td>-----</td>
<td>29</td>
<td>-----</td>
</tr>
<tr>
<td>5</td>
<td>-----</td>
<td>30</td>
<td>STOP Status</td>
</tr>
<tr>
<td>6</td>
<td>FF Command</td>
<td>31</td>
<td>PLAY Status</td>
</tr>
<tr>
<td>7</td>
<td>REW Command</td>
<td>32</td>
<td>REC Status</td>
</tr>
<tr>
<td>8</td>
<td>NEXT Command</td>
<td>33</td>
<td>-----</td>
</tr>
<tr>
<td>9</td>
<td>PREVIOUS Command</td>
<td>34</td>
<td>-----</td>
</tr>
<tr>
<td>10</td>
<td>-----</td>
<td>35</td>
<td>FF Status</td>
</tr>
<tr>
<td>11</td>
<td>-----</td>
<td>36</td>
<td>REW Status</td>
</tr>
<tr>
<td>12</td>
<td>-----</td>
<td>37</td>
<td>-----</td>
</tr>
<tr>
<td>13</td>
<td>-----</td>
<td>38</td>
<td>-----</td>
</tr>
<tr>
<td>14</td>
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<td>39</td>
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<tr>
<td>16</td>
<td>-----</td>
<td>41</td>
<td>-----</td>
</tr>
<tr>
<td>17</td>
<td>D1 REC READY Command</td>
<td>42</td>
<td>-----</td>
</tr>
<tr>
<td>18</td>
<td>D2 REC READY Command</td>
<td>43</td>
<td>-----</td>
</tr>
<tr>
<td>19</td>
<td>-----</td>
<td>44</td>
<td>-----</td>
</tr>
<tr>
<td>20</td>
<td>-----</td>
<td>45</td>
<td>-----</td>
</tr>
<tr>
<td>21</td>
<td>-----</td>
<td>46</td>
<td>D1 REC READY Status</td>
</tr>
<tr>
<td>22</td>
<td>-----</td>
<td>47</td>
<td>D2 REC READY Status</td>
</tr>
<tr>
<td>23</td>
<td>-----</td>
<td>48</td>
<td>-----</td>
</tr>
<tr>
<td>24</td>
<td>-----</td>
<td>49</td>
<td>+5V OUT</td>
</tr>
<tr>
<td>25</td>
<td>-----</td>
<td>50</td>
<td>GND(FG)</td>
</tr>
</tbody>
</table>

システムコントロール
パラレルリモートコントロールを使用する場合PCM-9000のSYSTEM CONTROL切り換えスイッチでLOCALにして下さい。
Serial No. 10001 and Higher
The DABK-9003 Version 1.0 supports the functions of the PCM-900 as a player of the digital audio editor DAE-3000.

When using the time code functions individually, use as follows.

- Use the time code in the AAIP TC mode.
- Use the time code chase and time code sync playback functions in the NORMAL mode of the OPERATION mode.
- Use the time code chase function in the FREE mode.
- Manually set the time code format to fit using time code.

Refer to 4-3-3 of section 4 of the operation manual for the PCM-9000 for the time code sync playback function. Also refer to section 6 for the time code chase function.
Connections and switch settings of the editing system with the DAE-3000

Connect the cables as shown in Section 8.1 "Editing System with DAE-3000" of the operation manual of the PCM-9000.

Set the switches of the DABK-9000, the DAE-3000 and the PCM-9000 as follows.

- **DABK-9003**: Set the REMOTE(9PIN)/RS232 switch on the panel of the DABK-9003 to REMOTE (9PIN). Set the switches (S1-S5) on the TC-78 board as follows:
  - S1: ON
  - S2-S5: OFF

- **DAE-3000**: Use with the DABK-3005 (PCM-7030/7050 I/F board). Assign the PCM-9000 as PLAYER on the machine assignment screen. On this screen, the PCM-9000 is shown as a "PCM-7030" instead of a "PCM-9000".

- **PCM-9000**: Operation mode: NORMAL (never set to FILE or DISC mode)
  - TC FORMAT: 30Hz NDF
  - SYNC CLOCK: EXT
  - REC MODE: MONITOR or SYNC
  - INPUT: AES, ANALOG or SDIF-2
  - SYSTEM CONTROL: REMOTE-1(9PIN)

Operations of the DAE-3000

Refer to the operation manual of the DAE-3000.

Set the preroll time for the PCM-9000 as PLAYER to 7 seconds or more.
Supported commands

The 9pin serial remote control of DABK-9003 supports the commands as follows.

<table>
<thead>
<tr>
<th>Codes</th>
<th>Commands</th>
<th>Codes</th>
<th>Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 00</td>
<td>STOP</td>
<td>21 37 00</td>
<td>CHASE</td>
</tr>
<tr>
<td>20 01</td>
<td>PLAY</td>
<td>4X 30</td>
<td>EDIT RESET</td>
</tr>
<tr>
<td>20 10</td>
<td>FAST FWD</td>
<td>45 78</td>
<td>CHASE OFFSET PRESET</td>
</tr>
<tr>
<td>20 13</td>
<td>SHUTTLE FWD</td>
<td>61 0C</td>
<td>CURRENT TIME SENSE</td>
</tr>
<tr>
<td>20 20</td>
<td>REWIND</td>
<td>61 20</td>
<td>STATUS SENSE</td>
</tr>
<tr>
<td>20 23</td>
<td>SHUTTLE REV</td>
<td>74 04</td>
<td>LTC TIME DATA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7X 20</td>
<td>STATUS DATA</td>
</tr>
</tbody>
</table>

Setting of SYSTEM CONTROL switch

When using the 9pin serial remote control with the DAE-3000, changeover the SYSTEM CONTROL on the front panel of the PCM-9000 to REMOTE-1 position.
When using parallel remote control, change the SYSTEM CONTROL switch on the front panel of the PCM-9000 to LOCAL.

Supported commands and status

The commands and status are supported as follows.

<table>
<thead>
<tr>
<th>pin No.</th>
<th>Descriptions</th>
<th>pin No.</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>STOP Command</td>
<td>26</td>
<td>---</td>
</tr>
<tr>
<td>2</td>
<td>PLAY Command</td>
<td>27</td>
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<tr>
<td>3</td>
<td>REC Command</td>
<td>28</td>
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<tr>
<td>4</td>
<td>FF Command</td>
<td>29</td>
<td>---</td>
</tr>
<tr>
<td>5</td>
<td>REW Command</td>
<td>30</td>
<td>STOP Status</td>
</tr>
<tr>
<td>6</td>
<td>NEXT Command</td>
<td>31</td>
<td>PLAY Status</td>
</tr>
<tr>
<td>7</td>
<td>PREvious Command</td>
<td>32</td>
<td>REC Status</td>
</tr>
<tr>
<td>8</td>
<td>D1 REC READY Command</td>
<td>33</td>
<td>---</td>
</tr>
<tr>
<td>9</td>
<td>D2 REC READY Command</td>
<td>34</td>
<td>---</td>
</tr>
<tr>
<td>10</td>
<td>D1 REC READY Status</td>
<td>35</td>
<td>FF Status</td>
</tr>
<tr>
<td>11</td>
<td>D2 REC READY Status</td>
<td>36</td>
<td>REW Status</td>
</tr>
<tr>
<td>12</td>
<td>---</td>
<td>37</td>
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<td>13</td>
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<td>21</td>
<td>---</td>
<td>46</td>
<td>D1 REC READY Status</td>
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<td>22</td>
<td>---</td>
<td>47</td>
<td>D2 REC READY Status</td>
</tr>
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<td>23</td>
<td>---</td>
<td>48</td>
<td>---</td>
</tr>
<tr>
<td>24</td>
<td>---</td>
<td>49</td>
<td>+5V OUT</td>
</tr>
<tr>
<td>25</td>
<td>---</td>
<td>50</td>
<td>GND(FG)</td>
</tr>
</tbody>
</table>
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4.2.2 記録、モニターチャンネルの選択
   EXT TC(外部タイムコード)には対応しておりません。

4.2.3 シンクロナシ設定時の設定
   "任意のシンクロナシ値を設定するには......" でのマイナス値の設定は付
   属のカキマールで入力して下さい。

4.2.4 タイムコードの記録
   EXT TC(外部タイムコード)には対応しておりません。

4-3-3 タイムコードシング再転
   NORMALモードのみで使う物が良い。FILE、DISCモードでは動作致しませ
   ん。

6-1 タイムコードチェース機能の概要
   ファイル用モードで使えない。アドレスモードには対応しておりません。

6-3-1 タイムコードチェース再生
   タイムコードチェースモードの解除を行った時に、RM-D9000の表示にはその直
   前までのものが表示されます。

6-3-2 タイムコードチェイス記録
   アドレスモードでのみ行えますが、アドレスモードのTCチェイスに対応して
   おりません。

6-3-3 タイムコードチェース中のオートパンチインアウト
   この機能は動作致しません。
DABK-9003のパネル説明

TIMECODE IN端子 (XLR-3-31)
SMPTE/EBUタイムコードを入力します。

TIMECODE OUT端子 (XLR-3-32)
SMPTE/EBUタイムコードを出力します。

PARALLEL REMOTE端子
50ピンパラレル信号で外部機器からコントロールする際に使用します。

REMOTE(9PIN)/RS-232端子 (D-SUB9ピン)
9ピンリモート信号で外部機器からコントロールする際に使用します。
DAE-3000と接続する場合はこの端子に接続します。また、REMOTE(9PIN)/RS-232スイッチによりRS-232C信号と9ピンリモート信号を切り換えることができます。

REMOTE(9PIN)/RS-232スイッチ
D-SUB 9ピンの機能を9ピンリモートとRS-232Cとに切り換えるスイッチです。
For the DABK-9003, Version 1.0 supports the functions as the PLAYER of the digital audio editor DAE-3000. There are differences in the functions of the PCM-9000 which has the DABK-9003 Version 1.0 installed from what are explained in the original operation manual of the PCM-9000.

4-2-2 Selecting Record/Monitor Channels
EXT TC (External Time Code) function does not work.

4-2-4 Recording External Time Code
EXT TC (External Time Code) function does not work.

4-3-3 Time Code Sync Playback
Use the time code sync playback in the NORMAL mode of the operation mode.

6-1 Overview of Time Code Chase
Use the time code Chase in the FREE mode.
The ADDRESS mode Chase function does not work.

6-2-3 Setting the Sync Offset Time
When setting minus values, use the 10 key unit.

6-3-1 Playback with Time Code Chase
When canceling time code Chase, the display of the RM-D9000 shows the same value before canceling.

6-3-2 Recording with Time Code Chase
The time code Chase function in address mode does not work.

6-3-3 Automatic Punch-In/Out during Time Code Chase
This function does not work.
Panel of DABK-9003

**TIMECODE IN (XLR-3-31)**
Inputs the SMPTE/EBU-format time code signals.

**TIMECODE OUT (XLR-3-32)**
Outputs SMPTE/EBU-format time code signals.

**PARALLEL REMOTE (D-SUB 50pin, female)**
Used when controlling the PCM-9000 with 50pin parallel remote control signals.

**REMOTE(9PIN)/RS-232 (D-SUB 9pin, female)**
Used when controlling the PCM-9000 with 9pin remote control signals. Use this connector to connect the DAE-3000 digital audio editor. This connector can also be connected with RS-232C by changing REMOTE(9PIN)/RS-232 Switch.

**REMOTE(9PIN)/RS-232 Switch**
Changes the function of the D-SUB 9pin connector. Either 9pin remote or RS-232C is selectable.
Instructions about Operation, Installation and Maintenance

Refer to the PCM-9000 OPERATION MANUAL for operating instructions and the MAINTENANCE MANUAL for instructions about installation and maintenance of this equipment.

Note

Turn the PCM-9000's POWER switch off before installing this equipment.

Zur Bedienung, Installation und Wartung

Zur Bedienung, Installation und Wartung des PCM-9000 siehe das OPERATION MANUAL bzw. das MAINTENANCE MANUAL.

Hinweis

Vor der Installation schalten Sie den POWER-Schalter des PCM-9000 aus.
For customers in the USA

WARNING
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of the FCC Rules.

For customers in Canada
This apparatus complies with the Class A limits for radio noise emissions set out in Radio Interference Regulations.

Pour les utilisateurs au Canada
Cet appareil est conforme aux normes Classe A pour bruits radioélectriques, spécifiées dans le Règlement sur le brouillage radioélectrique.

Bescheinigung des Herstellers

Sony Deutschland GmbH
Hugo Eckener Str. 20
D-5000 Köln 30

Hinweis
Instructions about Operation, Installation and Maintenance

Refer to the PCM-9000 OPERATION MANUAL for operating instructions and the MAINTENANCE MANUAL for instructions about installation and maintenance of this equipment.

**Note**

Turn the PCM-9000's POWER switch off before installing this equipment.

---

**Instructions d'utilisation, d'installation et de maintenance**

Reportez-vous au OPERATION MANUAL du PCM-9000 pour les instructions d'utilisation, et au MAINTENANCE MANUAL pour les instructions concernant l'installation et la maintenance de ce matériel.

**Remarque**

Mettez le PCM-9000 hors tension par l'interrupteur POWER avant d'installer cette carte.

---

**Zur Bedienung, Installation und Wartung**

Zur Bedienung, Installation und Wartung des PCM-9000 siehe das OPERATION MANUAL bzw. das MAINTENANCE MANUAL.

**Hinweis**

Vor der Installation schalten Sie den POWER-Schalter des PCM-9000 aus.

---

**OPERATION GUIDE**

1st Edition

Japanese/English/French/German

Serial No. 10001 and Higher

Sony Corporation

Broadcast Products Group

Printed in Japan

1993. 07. 13

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Published by Broadcast Products Group
For customers in the USA

WARNING
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of the FCC Rules.

For customers in Canada
This apparatus complies with the Class A limits for radio noise emissions set out in Radio Interference Regulations.

Pour les utilisateurs au Canada
Cel appareil est conforme aux normes Classe A pour bruits radioélectriques, spécifiées dans le Réglement sur le brouillage radioélectrique.

Bescheinigung des Herstellers

Sony Deutschland GmbH
Hugo Eckener Str. 20
D-5000 Köln 30

Hinweis
Instructions about Operation, Installation and Maintenance

Refer to the PCM-9000 OPERATION MANUAL for operating instructions and the MAINTENANCE MANUAL for instructions about installation and maintenance of this equipment.

Note

Turn the PCM-9000's POWER switch off before installing this equipment.

OPERATION GUIDE

1st Edition

Serial No. 10001 and Higher

Sony Corporation
Broadcast Products Group

Printed in Japan
1993. 07. 13
©1993
Published by Broadcast Products Group
For customers in the USA

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**Instructions about Operation, Installation and Maintenance**

Refer to the PCM-9000 OPERATION MANUAL for operating instructions and the MAINTENANCE MANUAL for instructions about installation and maintenance of this equipment.

**Note**

Turn the PCM-9000's POWER switch off before installing this equipment.

---

**Instructions d'utilisation, d'installation et de maintenance**

Reportez-vous au OPERATION MANUAL du PCM-9000 pour les instructions d'utilisation, et au MAINTENANCE MANUAL pour les instructions concernant l'installation et la maintenance de ce matériel.

**Remarque**

Mettez le PCM-9000 hors tension par l'interrupteur POWER avant d'installer cette carte.

---

**Zur Bedienung, Installation und Wartung**

Zur Bedienung, Installation und Wartung des PCM-9000 siehe das OPERATION MANUAL bzw. das MAINTENANCE MANUAL.

**Hinweis**

Vor der installation schalten Sie den POWER-Schalter des PCM-9000 aus.

---

**OPERATION GUIDE**

**Japanese/English/French/German**

1st Edition

Serial No. 10001 and Higher

RM-D9000, DABK-9001/9002/9003/9004/9005/9006/9007

(J, C, E, K, 和, 繁, 简)

3-757-475-01

Sony Corporation

Broadcast Products Group

Printed in Japan

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Bescheinigung des Herstellers

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Hinweis
SONY

DIGITAL MASTER DISC RECORDER

PCM-9000

REMOTE CONTROLLER

RM-D9000

CONVERTER BOARD
DABK-9001

INTERFACE BOARD
DABK-9003

DIGITAL I/O BOARD
DABK-9004

INTERFACE BOARD
DABK-9005

INTERFACE BOARD
DABK-9006

MEMORY BOARD
DABK-9007

MAINTENANCE MANUAL Part 1
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CAUTION
As the laser beam used in this Master Disc Recorder is harmful to the eyes, do not attempt to disassemble the cabinet. Refer servicing to qualified personnel only.

Laser Diode Properties
- Material: GaAlAs
- Wave length: 785 nm
- Emission duration: Continuous
- Laser output power: 35 mW (max)
- Beam divergence: (H) 12° ± 1.5'
  (V) 24° ± 1.5'

This label is located on the top of the unit.

CLASS 1
LASER PRODUCT TO IEC 825
LASER KLASSE 1
PRODUKT NACH IEC 825

This Master Disc Recorder is classified as a CLASS 1 LASER PRODUCT. The CLASS 1 LASER PRODUCT label is located on the top panel.

PCM-9000
SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

Check the metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 3.5 mA. Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.

2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.

3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The 'limit' indication is 5.25V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 20V AC range are suitable. (See Fig. A)

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Fig. A. Using an AC voltmeter to check AC leakage.
```
このマニュアルについて

本書の目的
本書はデジタルマスターディスクレコーダーPCM-9000とその別売アクセサリーのRM-D9000、DABK-9001、DABK-9003-9007のメンテナンスマニュアルパート1です。本書はシステム/サービスエンジニアの方々にご使用していただくことを想定し、本機の保守に関する情報と主なブロックおよび基板交換によるサービスを前提とした情報を記載しています。

構成
本書の構成を把握していただくために、全章の概要を以下に説明します。

第1章 設置
本機の設置に関する情報を記載しています。

第2章 サービスインフォメーション
本機のサービス時に必要な情報を記載しています。

第3章 自己診断
自己診断の方法、エラーメッセージが表示された場合の対処方法を記載しています。

第4章 主要部品の交換および調整
主要部品のうち、サービス対象の部品の交換方法及び交換後の調整を記載しています。

第5章 電気調整
プリント基板を交換した場合などで、基板を調整する必要が生じた場合の調整方法を説明しています。

SEC. 6 BLOCK DIAGRAMS AND FRAME WIRINGS
本機全体および、プリント基板ごとの機能構成をまとめて掲載しています。

SEC. 7 SPARE PARTS
使用部品のうち、サービス対象に指定されている部品（電気部品を除く）を掲載しています。

MANUAL STRUCTURE

PURPOSE OF THIS MANUAL
This is a maintenance manual part1 of the digital master disc recorder PCM-9000, their optional accessories RM-D9000, DABK-9001 and DABK-9003 through 9007.
This manual describes the maintenance information of this unit, and the information on primary services such as the replacement of main blocks and circuit boards.

CONTENTS
The outlines of all the section is explained as follows for understanding of these composition.

SEC. 1 INSTALLATION
Describes the informations for the installation of the PCM-9000.

SEC. 2 SERVICE OVERVIEW
Describes necessary service informations for the PCM-9000.

SEC. 3 DIAGNOSTICS
Describes the methods of diagnostics and coping in case of the error message is indicated.

SEC. 4 REPLACEMENT OF MAJOR PARTS & ALIGNMENT
Describes the methods of service parts replacement and alignment after their replacement.

SEC. 5 ELECTRICAL ALIGNMENT
Explains the methods of the adjustment in case of the board adjustment has developed by parts replacement.

SEC. 6 BLOCK DIAGRAMS AND FRAME WIRINGS
Explains the composition of the system overall block diagrams and every boards function.

SEC. 7 SPARE PARTS
Explains the subject parts to service (except for the electrical parts) of the original parts.
RELATIVE MANUAL
It is prepared besides this "maintenance manual part1" as follows.

• Operation Manual (Supplied with the PCM-9000.)
• Quick Reference (Supplied with the PCM-9000.)
  This is necessary manual for the operation and, application.
• Maintenance Manual Part2
  (Not supplied with the PCM-9000.)
  This manual describes the information items (adjustments, board layouts, schematic diagrams, detailed parts list, etc.) that premise the service based on parts. If this manual is required, please contact to Sony's service organization.
• Protocol Manual (Not supplied with the PCM-9000.)
  9 pin PROTOCOL
  This manual explains the protocol for controlling the PCM-9000 via the RS-422A (9-pin serial remote). If this manual is required, please contact to Sony's service organization.
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セッタ動作温度 : 10℃～35℃
セッタ保蔵温度 : -20℃～55℃
セッタの質量 (重量) : 17 kg

設置禁止場所
・太陽光線または強力ライトが直接当たる場所
・ほこりや振動の多い場所
・強電界や強磁界の場所
・熱源のそば
・電気的なノイズの多い場所
・静電ノイズの発生しやすい場所

設置時の注意
・セッタの後方は、換気およびサービス性の点から、壁などから最低40 cm離すこと。
・セッタの左側面は換気口があるため、最低10 cm離すこと。
・機の上などに置いて使用する時は、セッタ上部はプリント基板のサービス性の点から最低40 cm離けること。ただし、ラックマウントした時には、セッタを引き出すことにより、プリント基板のメンテナンスができるようにになっているので、この必要はない。
・本機は、水平位置で使用するように設計されている。従って、本機を垂直にしたり、傾けての使用は避けること。

換気/放熱
・本機では2個のファンを使用している。
① 電源部のファンは、換気部として使用している。後方の換気部がふさがれたり、ファンが停止すると電源が故障するおそれがある。点検時等、ファンの風が確保されない状態では、負荷を長時間かけないようにすること。
② M/Oディスクドライブ用のファンは、換気用として使用している。また、本機内の圧力変化を外気圧に対して高く保ち、エアフィルタと共に、外気からのほこり等の侵入を防ぎ、M/OディスクドライブおよびM/O Discの信頼性を確保している。
エアフィルタは、M/Oディスクドライブへの空気流入口であり、かつ、ほこり等の侵入を防ぐために使用されている。エアフィルタが、目づまりすると、M/O Discの信頼性の確保が図らされないため、エアフィルタの交換、掃除は定期的に行うことを推奨する。(毎1〜2回)
エアフィルタの交換方法については、*42項 ファンモータ/エアフィルタの交換*を参照。
1-2. 電源

1-2-1. AC電源の容量

PCM-9000は、スイッチング電源を使用しており、切り換えなしで使用することができる。

電源電圧：AC 100 V-120 V またはAC 220 V-240 V
電源周波数：50/60 Hz
消費電力：130 W

1-2-2. 電源コード

(J) 使用部品
① 電源コード
② ブラックコード (黒)

(UC) 使用部品
① 電源コード
② ブラックコード (黒)

(EK) 使用部品
① 電源コード
② ブラックコード (グレー)

LIVE (BROWN)
SAFETY EARTH
(GREEN / YELLOW)
NEUTRAL (BLUE)
1-3. 設置スペース

(1) 外形寸法

(RM-D9000装着時)

単位：mm
(1U = 44 mm)

(2) 作業寸法

(RM-D9000装着時)

単位：mm

PCM-9000
1-3 (J)
1-4. 標準付属品

PCM-9000
電源コード : 1
プラグホルダー : 1
ボールポイントLレンチ BL2MM : 1
ラックアングルAss'y (4U) : 2
ネジ (B 4x16) : 4
(ラックアングル取付用)
ネジ (RK 5x16) : 4
ネジ (B 4x8) : 4
(ラックマウント用)
台形かざりワッシャ(使用) : 4
オペレーションマニュアル : 1
メンテナンスマニュアル パート1: 1
クイックリファレンス : 1

RM-D9000
接続コード 0.8 m : 1
接続コード 10 m : 1

1-5. 別売アクセサリ

RM-D9000 Sony Remote Control Unit
DABK-9001 Sony Converter Board (20 bit A/D, D/A)
DABK-9003 Sony Interface Board (Remote/TC interface)
DABK-9004 Sony Digital I/O Board (SDIF-2 interface)
DABK-9005 Sony Interface Board (SCSI interface)
DABK-9006 Sony Interface Board (DAQ-1000 interface)
DABK-9007 Sony Memory Board (Memory)
MSD-1200 Sony Digital Audio Master Disc (For UC)
MSD-1200 Sony Digital Audio Master Disc (For J, EK)

1-6. ラックマウント方法

PCM-9000はEIA規格19インチ標準ラックに組み込んで使用することができる。

ラックマウント手順
(1) PCM-9000の底 (4本) を外す
(2) 側板 (左) (右) を止めているネジ (4x6 Sタイ tất 左右各4本) を外す。

(3) ラックアングルAss’y (4U) をPCM-9000に取り付ける。
注意：取り付けには必ず付属のネジ (B 4x16) を使用すること。

(4) 19インチラックに、付属の台形かざりワッシャ (使用) とネジ (RK 5x16) 各4本で取り付ける。
オプション基板の取り付け（DABK9001/9003/9004/9005/9006/9007）

注意：取り付けは、PCM-9000の電源（POWER）スイッチをOFFにした状態で行うこと。

1-7-1．DABK-9001/9003/9004/9005/9006の取り付け

- DABK-9001の構成
  ADA-28基板：1

- DABK-9003の構成
  TC-77/78基板：1

- DABK-9004の構成
  DIO-28基板：1

- DABK-9005の構成
  IF-436/437基板：1
  ケーブル：1

- DABK-9006の構成
  IF-438基板：1

オプションラックの装着箇所

注意：各オプション基板は、下記装着箇所以外には、装着しないこと。

<table>
<thead>
<tr>
<th>スロットNo.</th>
<th>DABK-9001</th>
<th>DABK-9003</th>
<th>DABK-9004</th>
<th>DABK-9005</th>
<th>DABK-9006</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>X</td>
<td></td>
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<td></td>
<td>X</td>
</tr>
<tr>
<td>3</td>
<td>X</td>
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<td></td>
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<td>X</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

注意：○…装着可能スロットを示す。
手順
(1) ネジ (M3, CASE) 2本を外し、装着するオプション基板の該当するスロットのプランクパネルを取り外す。

(2) プランクパネルを取り外した箇所にオプション基板をスロットの奥まで確実に差し込む。
(3) 取り付けたオプション基板をプランクパネルを取り付けていたネジ (M3, CASE) 2本で固定する。

1-7-2. DABK-9007の取り付け

構成
MEM-58基板 : 1
取り付けネジ (PTTWH 3×5) : 2

手順
(1) 天板を外す。 (2-3. 項参照)
(2) DABK-9007を図の装着スロットに差し込む。
(3) イジェクトレバーを閉じて、ネジ (PTTWH 3×5) 2本で固定する。

(4) 天板を取り付ける。

注意: イラストはDABK-9005の装着例
1-8. 入/出力インターフェース
1-8-1. 適合コネクタ/ケーブル

コネクタパネルにあるコネクタに接続するコネクタ/ケーブルは次に記すコネクタ/ケーブルまたはその同等品を使用すること。

1. PCM-9000

<table>
<thead>
<tr>
<th>使用先</th>
<th>名称</th>
<th>適合コネクタ/ケーブル</th>
<th>名称</th>
<th>ソニー部品番号</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSERTION RETURN</td>
<td>XLR, 3 PIN, 雌</td>
<td>XLR, 3 PIN, 雌</td>
<td>1-508-084-11</td>
<td>(CANNON</td>
</tr>
<tr>
<td>DIGITAL I/O AES/EBU D-1</td>
<td></td>
<td></td>
<td>XLR-3-12Cまたは相当品）</td>
<td>別売アクセサリ</td>
</tr>
<tr>
<td>D-1 SYNC</td>
<td></td>
<td></td>
<td>ECD-3C (3 m)/10C (10 m) /15C (15 m)</td>
<td></td>
</tr>
<tr>
<td>INSERTION SEND</td>
<td>XLR, 3 PIN, 雌</td>
<td>XLR, 3 PIN, 雌</td>
<td>1-508-083-11</td>
<td>(CANNON</td>
</tr>
<tr>
<td>DIGITAL I/O AES/EBU D-0</td>
<td></td>
<td></td>
<td>XLR-3-11Cまたは相当品）</td>
<td>別売アクセサリ</td>
</tr>
<tr>
<td>REFERENCE VIDEO INPUT</td>
<td>BNC</td>
<td>BNC</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>WORD SYNC INPUT/OUTPUT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REMOTE</td>
<td>丸型, 10 PIN, 雌</td>
<td>接続コード 0.8 m /10 m</td>
<td>(RM-D9000の付属品)</td>
<td></td>
</tr>
</tbody>
</table>

2. RM-D9000

<table>
<thead>
<tr>
<th>使用先</th>
<th>名称</th>
<th>適合コネクタ/ケーブル</th>
<th>名称</th>
<th>ソニー部品番号</th>
</tr>
</thead>
<tbody>
<tr>
<td>RM-D9000</td>
<td>丸型, 10 PIN, 雌</td>
<td>接続コード 0.8 m /10 m</td>
<td>(RM-D9000の付属品)</td>
<td></td>
</tr>
</tbody>
</table>

3. DABK-9001

<table>
<thead>
<tr>
<th>使用先</th>
<th>名称</th>
<th>適合コネクタ/ケーブル</th>
<th>名称</th>
<th>ソニー部品番号</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE INPUT CH1, CH2</td>
<td>XLR, 3 PIN, 雌</td>
<td>XLR, 3 PIN, 雌</td>
<td>1-508-084-11</td>
<td>(CANNON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>XLR-3-12Cまたは相当品）</td>
<td>別売アクセサリ</td>
</tr>
<tr>
<td>LINE OUTPUT CH1, CH2</td>
<td>XLR, 3 PIN, 雌</td>
<td>XLR, 3 PIN, 雌</td>
<td>1-508-083-11</td>
<td>(CANNON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>XLR-3-11Cまたは相当品）</td>
<td>別売アクセサリ</td>
</tr>
</tbody>
</table>
### 4. DABK-9003

<table>
<thead>
<tr>
<th>使用先</th>
<th>名称</th>
<th>適合コネクタ/ケーブル</th>
<th>ソニー部品番号</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME CODE IN</td>
<td>XLR, 3PIN, 雄</td>
<td>XLR, 3PIN, 雄</td>
<td>1-508-084-11 (CANNON XLR-3-12Cまたは相当品)</td>
</tr>
<tr>
<td>TIME CODE OUT</td>
<td>XLR, 3PIN, 雄</td>
<td>XLR, 3PIN, 雄</td>
<td>1-508-083-11 (CANNON XLR-3-11Cまたは相当品)</td>
</tr>
<tr>
<td>PARALLEL REMOTE</td>
<td>D-sub, 50 PIN, 雄</td>
<td>D-sub, 50 PIN, 雄</td>
<td>1-566-358-11</td>
</tr>
<tr>
<td>REMOTE (9 PIN) / RS232</td>
<td>D-sub, 9 PIN, 雄</td>
<td>D-sub, 9 PIN, 雄</td>
<td>別売アクセサリ, RCC 5 G (5 m) /10 G (10 m) /15 G (15 m) または1-560-651-00 (コネクタ), 1-561-749-00 (ケーブル)</td>
</tr>
</tbody>
</table>

### 5. DABK-9004

<table>
<thead>
<tr>
<th>使用先</th>
<th>名称</th>
<th>適合コネクタ/ケーブル</th>
<th>ソニー部品番号</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPUT CH-1/CH-2</td>
<td>BNC</td>
<td>BNC</td>
<td></td>
</tr>
<tr>
<td>OUTPUT CH-1/CH-2</td>
<td>BNC</td>
<td>BNC</td>
<td></td>
</tr>
</tbody>
</table>

### 6. DABK-9005

<table>
<thead>
<tr>
<th>使用先</th>
<th>名称</th>
<th>適合コネクタ/ケーブル</th>
<th>ソニー部品番号</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCSI I/F</td>
<td>ハーフビッチ, アンフェノール, 50 PIN, 雄</td>
<td>接続コード, 1m</td>
<td>1-696-776-11 (DABK-9006の付属品)</td>
</tr>
</tbody>
</table>

### 7. DABK-9006

<table>
<thead>
<tr>
<th>使用先</th>
<th>名称</th>
<th>適合コネクタ/ケーブル</th>
<th>ソニー部品番号</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUE DATA IN</td>
<td>XLR, 3PIN, 雄</td>
<td>XLR, 3PIN, 雄</td>
<td>1-508-084-11 (CANNON XLR-3-12Cまたは相当品)</td>
</tr>
<tr>
<td>CUE DATA OUT</td>
<td>XLR, 3PIN, 雄</td>
<td>XLR, 3PIN, 雄</td>
<td>1-508-083-11 (CANNON XLR-3-11Cまたは相当品)</td>
</tr>
<tr>
<td>REMOTE</td>
<td>アンフェノール, 36 PIN, 雄</td>
<td>アンフェノール, 36 PIN, 雄</td>
<td>別売アクセサリ, RCC 5 D (5 m) /10 D (10 m) または1-557-482-00 (ケーブル)</td>
</tr>
<tr>
<td>STATUS OUT</td>
<td>D-sub, 25 PIN, 雄</td>
<td>D-sub, 25 PIN, 雄</td>
<td>1-558-116-00 (ケーブル)</td>
</tr>
</tbody>
</table>

1 - 8 (J) PCM-9000
1-8-2. コネクタの入/出力信号

コネクタパネル部の入/出力信号は、以下のようにになっている。

1. PCM-9000

### 入力

- **REFERENCE VIDEO INPUT**: Composite Video, Composite Sync信号, 短形状, インピーダンス75Ω, 75Ω終端スイッチ
- **WORD SYNC INPUT**: 3V以上, インピーダンス75Ω (不平衡型), 75Ω終端スイッチ
- **INSERTION RETURN**: AES3-1992, デジタルオーディオインタフェース (AES/EBU)
- **DIGITAL I/O AES/EBU D-I**: AES3-1992, デジタルオーディオインタフェース (AES/EBU)
- **D-I SYNC**: AES3-1992, デジタルオーディオインタフェース (AES/EBU)

### 出力

- **WORD SYNC OUTPUT**: TTLレベル, インピーダンス75Ω (不平衡型)
- **INSERTION SEND**: AES3-1992, デジタルオーディオインタフェース (AES/EBU)
- **DIGITAL I/O AES/EBU D-O**: AES3-1992, デジタルオーディオインタフェース (AES/EBU)

REMOTE: Round, 10 Pin, Female

---

### OUTSIDE VIEW

#### ピン番号 | 信号名 | 信号レベル | 内容
--- | --- | --- | ---
1 | RAES- | RS-422A | DIGITAL AUDIO出力
2 | SR-RX+ | RS-422A | リモートコマンド入力
3 | +12Vdc | — | —
4 | +12Vdc | — | —
5 | SR-RX- | RS-422A | リモートコマンド入力
6 | GND | — | —
7 | GND | — | —
8 | SR-TX- | RS-422A | コマンド出力
9 | RAES+ | RS-422A | DIGITAL AUDIO出力
10 | SR-TX+ | RS-422A | コマンド出力
2. RM-D9000

REMOTE: Round, 10 Pin, Female

- OUTSIDE VIEW -

<table>
<thead>
<tr>
<th>ピン番号</th>
<th>信号名</th>
<th>信号レベル</th>
<th>内容</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RAES-</td>
<td>RS-422A</td>
<td>DIGITAL AUDIO入力</td>
</tr>
<tr>
<td>2</td>
<td>SR-RX+</td>
<td>RS-422A</td>
<td>リモートコマンド出力</td>
</tr>
<tr>
<td>3</td>
<td>+12 Vdc</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>+12 Vdc</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5</td>
<td>SR-RX-</td>
<td>RS-422A</td>
<td>リモートコマンド出力</td>
</tr>
<tr>
<td>6</td>
<td>GND</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>8</td>
<td>SR-TX-</td>
<td>RS-422A</td>
<td>コマンド入力</td>
</tr>
<tr>
<td>9</td>
<td>RAES+</td>
<td>RS-422A</td>
<td>DIGITAL AUDIO入力</td>
</tr>
<tr>
<td>10</td>
<td>SR-TX+</td>
<td>RS-422A</td>
<td>コマンド入力</td>
</tr>
</tbody>
</table>

3. DABK-9001

LINE INPUT CH-1/CH2 : 基準レベル +4 dBu, 最大レベル +26 dBu, インピーダンス 10 kΩ/600 Ω (基板内SWで設定), 平衡
LINE OUTPUT CH-1/CH2 : 基準レベル +4 dBu, 最大レベル +26 dBu, インピーダンス 50 Ω以下, 平衡
4. DABK-9003

**TIME CODE IN**: IEC461 (SMPT/EBU), 0.5-10 Vp-p (10 kΩ, 半衡)

**TIME CODE OUT**: IEC461 (SMPT/EBU), 2.4 ±0.1 Vp-p (100 Ω以下, 半衡)

**PARALLEL REMOTE**: パラレル, TTLコンパチブル

**REMOTE (9 Pin) / RS232**: RS-422A または RS-232C (SW切換式)

**PARALLEL REMOTE**: D-sub, 50 Pin, Female

---

### OUTSIDE VIEW

---

<table>
<thead>
<tr>
<th>ピン番号</th>
<th>信号名</th>
<th>ピン番号</th>
<th>信号名</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>STOP COMMAND</td>
<td>26</td>
<td>SPEED B COMMAND</td>
</tr>
<tr>
<td>2</td>
<td>PLAY COMMAND</td>
<td>27</td>
<td>SPEED C COMMAND</td>
</tr>
<tr>
<td>3</td>
<td>REC COMMAND</td>
<td>28</td>
<td>(Reserved)</td>
</tr>
<tr>
<td>4</td>
<td>REH COMMAND</td>
<td>29</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>REH-ST COMMAND</td>
<td>30</td>
<td>STOP STATUS</td>
</tr>
<tr>
<td>6</td>
<td>FF COMMAND</td>
<td>31</td>
<td>PLAY STATUS</td>
</tr>
<tr>
<td>7</td>
<td>REW COMMAND</td>
<td>32</td>
<td>REC STATUS</td>
</tr>
<tr>
<td>8</td>
<td>NEXT COMMAND</td>
<td>33</td>
<td>REH STATUS</td>
</tr>
<tr>
<td>9</td>
<td>PREV COMMAND</td>
<td>34</td>
<td>(Reserved)</td>
</tr>
<tr>
<td>10</td>
<td>(Reserved)</td>
<td>35</td>
<td>FF STATUS</td>
</tr>
<tr>
<td>11</td>
<td>(Reserved)</td>
<td>36</td>
<td>REW STATUS</td>
</tr>
<tr>
<td>12</td>
<td>(Reserved)</td>
<td>37</td>
<td>(Reserved)</td>
</tr>
<tr>
<td>13</td>
<td>(Reserved)</td>
<td>38</td>
<td>(Reserved)</td>
</tr>
<tr>
<td>14</td>
<td>(Reserved)</td>
<td>39</td>
<td>(Reserved)</td>
</tr>
<tr>
<td>15</td>
<td>(Reserved)</td>
<td>40</td>
<td>(Reserved)</td>
</tr>
<tr>
<td>16</td>
<td>TC REC READY COMMAND</td>
<td>41</td>
<td>(Reserved)</td>
</tr>
<tr>
<td>17</td>
<td>D1 REC READY COMMAND</td>
<td>42</td>
<td>(Reserved)</td>
</tr>
<tr>
<td>18</td>
<td>D2 REC READY COMMAND</td>
<td>43</td>
<td>(Reserved)</td>
</tr>
<tr>
<td>19</td>
<td>(Reserved)</td>
<td>44</td>
<td>(Reserved)</td>
</tr>
<tr>
<td>20</td>
<td>(Reserved)</td>
<td>45</td>
<td>TC REC READY STATUS</td>
</tr>
<tr>
<td>21</td>
<td>(Reserved)</td>
<td>46</td>
<td>D1 REC READY STATUS</td>
</tr>
<tr>
<td>22</td>
<td>EXT SOURCE COMMAND</td>
<td>47</td>
<td>D2 REC READY STATUS</td>
</tr>
<tr>
<td>23</td>
<td>EXT SOURCE (9.6 K) INPUT</td>
<td>48</td>
<td>(Reserved)</td>
</tr>
<tr>
<td>24</td>
<td>REVERSE COMMAND</td>
<td>49</td>
<td>+5 V OUT</td>
</tr>
<tr>
<td>25</td>
<td>SPEED A COMMAND</td>
<td>50</td>
<td>GND (FG)</td>
</tr>
</tbody>
</table>

注) Reservedの罫子はオープンにして何も接続しないこと。
6. DABK-9005

SCSI: Half pitch unphenol, 50 Pin, Female

5. DABK-9004

INPUT CH-1/CH-2: SDIF-2 不平衡, TTLコンパチブル, 1.536 M bit/s (48 kHz, 16 bit)

OUTPUT CH-1/CH-2: SDIF-2 不平衡, TTLコンパチブル

5. DABK-9004
7. DABK-9006

CUE DATA IN: FM, 0.5~10 Vp-p (10 kΩ), 4800 bit/s
CUE DATA OUT: FM, 2±0.5 Vp-p (600 Ω), 4800 bit/s
REMOTE: Unphenol, 36 Pin, Female
STATUS OUT: D-sub, 25 Pin, Female

REMOTE: Unphenol, 36 Pin, Female

- OUTSIDE VIEW -

<table>
<thead>
<tr>
<th>ピン番号</th>
<th>信号名</th>
<th>内容</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+5 V. OUT</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>FF. IN</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>FWD. IN</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>REW. IN</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>EJECT. IN</td>
<td>未使用</td>
</tr>
<tr>
<td>6</td>
<td>STOP. IN</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>PAUSE. IN</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>REC. IN</td>
<td>未使用</td>
</tr>
<tr>
<td>9</td>
<td>CUT-IN. IN</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>EDIT. IN</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>CUT-OUT. IN</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>FF. OUT</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>FWD. OUT</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>REW. OUT</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>STNBY. OUT</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>STOP. OUT</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>PAUSE-1. OUT</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>REC. OUT</td>
<td>常時 H (OFF)</td>
</tr>
<tr>
<td>19</td>
<td>INS. OUT</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>V-INS. IN</td>
<td>未使用</td>
</tr>
<tr>
<td>21</td>
<td>A1-INS. IN</td>
<td>未使用</td>
</tr>
<tr>
<td>22</td>
<td>A2-INS. IN</td>
<td>未使用</td>
</tr>
<tr>
<td>23</td>
<td>REV. IN</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>SPEED-A. IN</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>SPEED-B. IN</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>CTL. OUT</td>
<td>未使用</td>
</tr>
<tr>
<td>27</td>
<td>TACH. OUT</td>
<td>未使用</td>
</tr>
<tr>
<td>28</td>
<td>CAPSTAIN. OUT</td>
<td>未使用</td>
</tr>
<tr>
<td>29</td>
<td>SYNC. IN</td>
<td>未使用</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>N. C.</td>
</tr>
<tr>
<td>31</td>
<td></td>
<td>N. C.</td>
</tr>
<tr>
<td>32</td>
<td></td>
<td>N. C.</td>
</tr>
<tr>
<td>33</td>
<td></td>
<td>N. C.</td>
</tr>
<tr>
<td>34</td>
<td></td>
<td>N. C.</td>
</tr>
<tr>
<td>35</td>
<td></td>
<td>N. C.</td>
</tr>
<tr>
<td>36</td>
<td></td>
<td>N. C.</td>
</tr>
</tbody>
</table>

注: RS-422以外は、全てオープン・コレクタ出力

PCM-9000
1. PCM-9000

MC-41基板

スイッチ
SW1/2 : 本体動作モード設定スイッチ
（詳細はオペレーションマニュアル参照）
工場出荷時の設定: SW1:1〜SW1:8すべて "1"
SW2:1〜SW2:8すべて "1"

SW2 : 本体テストモード設定スイッチ
（詳細はオペレーションマニュアル参照）
工場出荷時の設定: 0

SW3 : CPUリセットスイッチ

LEDインジケータ
D1 : MEM-58基板 実装時点灯
D2 : ED-37基板 実装時点灯
D3 : CK-41基板 実装時点灯
D4 : DIO-27基板 実装時点灯
D5 : OPTION SLOT1に基板実装時点灯
D6 : OPTION SLOT2に基板実装時点灯
D7 : OPTION SLOT3に基板実装時点灯
D8 : OPTION SLOT4に基板実装時点灯
D10 : CPU RESET時点灯
D11 : CPU停止時点灯
D12 : CPU BUS ERROR時点灯

1 - 14 (J)
GPM-11基板

CV1: ギャップアクチュエーターの0点調整
調整方法の詳細は、「4.4. 項 調整」参照

SV-144基板

ボリューム
L201 : PLL調整
L202 : PLL調整
RV401 : PULL INオフセット調整
RV402 : フォーカスバイアス調整
RV403 : フォーカスゲイン調整
RV404 : テラスングオフセット調整
RV405 : テラスングゲイン調整
RV501 : スピンドルオフセット調整
RV901 : 磁界ヘッドギャップオフセット調整
調整方法の詳細は、「4.4. 項 調整」参照

スイッチ
S801 : サーボCPUリセットスイッチ
S802 : サーボ制御モード設定スイッチ

### スイッチの設定

<table>
<thead>
<tr>
<th>S801-1</th>
<th>S802-2</th>
<th>説 明</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>トラックジャンプ発送モード</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
<td>締結アドレスアクセス</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>締結アドレスアクセス</td>
</tr>
<tr>
<td>ON</td>
<td>ON</td>
<td>締結アドレスアクセス</td>
</tr>
</tbody>
</table>

工場出荷時の設定
S801-1, 2: OFF (通常動作時)

2. RM-D9000

KC-32基板

スイッチ
S101 : RESETスイッチ
S102 : モード設定スイッチ
(詳細はオペレーションマニュアル参照)
工場出荷時の設定
S102-1, 4 : ON
S102-2, 3, 5, 6, 7, 8 : OFF
S103 : RM-D9000電源オン/オフスイッチ

3. DABK-9001

ADA-28基板

ボリューム
RV101 : 入力CMR調整用 (CH1)
RV102 : ADコンバーターOFF SET調整 (CH1)
RV103 : 出力平衛ジャンプバランス調整 (CH1)
RV201 : 入力CMR調整用 (CH2)
RV202 : ADコンバーターOFF SET調整 (CH2)
RV203 : 出力平衛ジャンプバランス調整 (CH2)
調整方法の詳細は「5章 電気調整」参照

PCM-9000

1-15 (J)
スイッチ
S101 (S101-1～S101-4): ANALOG INPUT CH1コネクターに入力するアナログオーディオ信号のHOT、COLD切り換え。
S201 (S201-1～S201-4): ANALOG INPUT CH2コネクターに入力するアナログオーディオ信号のHOT、COLD切り換え。

S101, S201スイッチの設定により、下表のように、CH1, CH2コネクターのピン配置が変わる。

<table>
<thead>
<tr>
<th>スイッチの設定</th>
<th>ANALOG AUDIO INPUT CH1 およびCH2コネクターのピン配置</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>-2</td>
</tr>
<tr>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>GND</td>
<td>HOT</td>
</tr>
</tbody>
</table>

S103 (S103-1～S103-4),
S203 (S203-1～S203-4): AD変換FULL BIT入力切り替え

S103, S203スイッチの設定により、下表のように、入力レベルが変わることがある。

<table>
<thead>
<tr>
<th>スイッチの設定</th>
<th>内容</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>-2</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>+24 dBs入力時、Full Bit</td>
<td></td>
</tr>
<tr>
<td>+21 dBs入力時、Full Bit</td>
<td></td>
</tr>
<tr>
<td>+18 dBs入力時、Full Bit</td>
<td></td>
</tr>
<tr>
<td>+15 dBs入力時、Full Bit</td>
<td></td>
</tr>
</tbody>
</table>

S104 (S104-1～S104-4),
S204 (S204-1～S204-4): DA変換FULL BIT入力時、LINE OUT出力レベル切り替え

<table>
<thead>
<tr>
<th>スイッチの設定</th>
<th>LINE OUT出力レベル</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>-2</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Full Bit時に+24 dBs出力</td>
<td></td>
</tr>
<tr>
<td>Full Bit時に+21 dBs出力</td>
<td></td>
</tr>
<tr>
<td>Full Bit時に+18 dBs出力</td>
<td></td>
</tr>
<tr>
<td>Full Bit時に+15 dBs出力</td>
<td></td>
</tr>
</tbody>
</table>

S105 (S105-1～S105-4): ANALOG OUTPUT CH1コネクターから出力されるアナログオーディオ信号のHOT、COLD切り換え。
S205 (S205-1～S205-4): ANALOG OUTPUT CH2コネクターから出力されるアナログオーディオ信号のHOT、COLD切り換え。

S105, S205スイッチの設定により、下表のように、CH1, CH2コネクターのピン配置が切り換わる。

<table>
<thead>
<tr>
<th>スイッチの設定</th>
<th>ANALOG AUDIO OUTPUT CH1 およびCH2コネクターのピン配置</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>-2</td>
</tr>
<tr>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>GND</td>
<td>HOT</td>
</tr>
</tbody>
</table>

1 - 16 (J)  PCM-9000
S102, S202: AUDIO INPUT端子CH1, CH2に入力されるアナログオーディオ信号の入力インピーダンスを設定する。

<table>
<thead>
<tr>
<th>スイッチの設定</th>
<th>CH1の入力インピーダンス</th>
<th>CH2の入力インピーダンス</th>
</tr>
</thead>
<tbody>
<tr>
<td>S102 ON</td>
<td>600Ω</td>
<td>600Ω</td>
</tr>
<tr>
<td>S102 OFF</td>
<td>20kΩ</td>
<td>20kΩ</td>
</tr>
<tr>
<td>S202 ON</td>
<td>600Ω</td>
<td>600Ω</td>
</tr>
<tr>
<td>S202 OFF</td>
<td>20kΩ</td>
<td>20kΩ</td>
</tr>
</tbody>
</table>

工場出荷時の設定: S102, S202ともOFFに設定

4. DABK-9007
MEM-56基板

S1: インサーションモードでの外部接続機器処理ディーレーの補正

インサーションモードで使用する時は、接続する機器の処理ディーレー量を設定する。

各ビットの重みつけは、下表のようなになっている。目的のディーレー量になるように、各ビットを組み合わせて設定する。

<table>
<thead>
<tr>
<th>S1の設定</th>
<th>ディーレー量</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1-1 ON</td>
<td>0</td>
</tr>
<tr>
<td>S1-1 OFF</td>
<td>128</td>
</tr>
<tr>
<td>S1-2 ON</td>
<td>0</td>
</tr>
<tr>
<td>S1-2 OFF</td>
<td>64</td>
</tr>
<tr>
<td>S1-3 ON</td>
<td>0</td>
</tr>
<tr>
<td>S1-3 OFF</td>
<td>32</td>
</tr>
<tr>
<td>S1-4 ON</td>
<td>0</td>
</tr>
<tr>
<td>S1-4 OFF</td>
<td>16</td>
</tr>
<tr>
<td>S1-5 ON</td>
<td>0</td>
</tr>
<tr>
<td>S1-5 OFF</td>
<td>8</td>
</tr>
<tr>
<td>S1-6 ON</td>
<td>0</td>
</tr>
<tr>
<td>S1-6 OFF</td>
<td>4</td>
</tr>
<tr>
<td>S1-7 ON</td>
<td>0</td>
</tr>
<tr>
<td>S1-7 OFF</td>
<td>2</td>
</tr>
<tr>
<td>S1-8 ON</td>
<td>0</td>
</tr>
<tr>
<td>S1-8 OFF</td>
<td>1</td>
</tr>
</tbody>
</table>

（単位: WORD数）

工場出荷時の設定
S1-1〜S1-8: すべてON
例: 100 WORDディーレーの場合
100 = 64 + 32 + 4
S1の設定
S1-2, 3, 6: OFF
S1-1, 4, 5, 7, 8: ON

PCM-9000
### 回路構成

<table>
<thead>
<tr>
<th>機種名</th>
<th>基板名</th>
<th>機能</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCM-9000</td>
<td>CK-41</td>
<td>CLOCK BOARD</td>
</tr>
<tr>
<td></td>
<td>CN-902</td>
<td>CONNECTOR BOARD</td>
</tr>
<tr>
<td></td>
<td>CN-915</td>
<td>CONNECTOR BOARD</td>
</tr>
<tr>
<td></td>
<td>DIO-27</td>
<td>AES/EBU DIGITAL I/O, HEADPHONES BOARD</td>
</tr>
<tr>
<td></td>
<td>ED-37</td>
<td>EDIT BOARD</td>
</tr>
<tr>
<td></td>
<td>GPM-11</td>
<td>GAP SENSOR BOARD</td>
</tr>
<tr>
<td></td>
<td>JK-42</td>
<td>HEADPHONES BOARD</td>
</tr>
<tr>
<td></td>
<td>KY-264</td>
<td>KEY SWITCH BOARD</td>
</tr>
<tr>
<td></td>
<td>KY-265</td>
<td>KEY SWITCH BOARD</td>
</tr>
<tr>
<td></td>
<td>MB-490</td>
<td>MOTHER BOARD</td>
</tr>
<tr>
<td></td>
<td>MB-491</td>
<td>MOTHER BOARD</td>
</tr>
<tr>
<td></td>
<td>MC-41</td>
<td>MAIN CPU BOARD</td>
</tr>
<tr>
<td></td>
<td>MD-87</td>
<td>MAGNETIC HEAD DRIVE BOARD</td>
</tr>
<tr>
<td></td>
<td>PS-345</td>
<td>D/C CONVERTER BOARD</td>
</tr>
<tr>
<td></td>
<td>PS-354</td>
<td>SWITCHING BOARD</td>
</tr>
<tr>
<td></td>
<td>SE-209</td>
<td>SENSOR BOARD</td>
</tr>
<tr>
<td></td>
<td>SV-144</td>
<td>SERVO BOARD</td>
</tr>
<tr>
<td></td>
<td>SVD-9</td>
<td>SERVO DRIVER BOARD</td>
</tr>
<tr>
<td></td>
<td>TR-82</td>
<td>RF BOARD</td>
</tr>
<tr>
<td></td>
<td>VR-168</td>
<td>VR BOARD</td>
</tr>
<tr>
<td></td>
<td>VR-169</td>
<td>VR BOARD</td>
</tr>
<tr>
<td></td>
<td>RM-D9000</td>
<td>CN-883</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DP-195</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KC-32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KY-267</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KY-269</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LE-120</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KY-297</td>
</tr>
<tr>
<td></td>
<td>DABK-9001</td>
<td>ADA-28</td>
</tr>
<tr>
<td></td>
<td>DABK-9003</td>
<td>TC-77, TC-78</td>
</tr>
<tr>
<td></td>
<td>DABK-9004</td>
<td>DIO-28</td>
</tr>
<tr>
<td></td>
<td>DABK-9005</td>
<td>IF-436, IF-437</td>
</tr>
<tr>
<td></td>
<td>DABK-9006</td>
<td>IF-438</td>
</tr>
<tr>
<td></td>
<td>DABK-9007</td>
<td>MEM-58</td>
</tr>
</tbody>
</table>
2-3. 外装の取り外し

2-3-1. 天板、側板（左/右）、底板の取り外し

天板
固定しているネジA（4×6 Sタイト）4本を外し、天板を取り外す。

側板
固定しているネジB（4×6 Sタイト）6本を外し、側板（右または左）を取り外す。

注意：側板（右）には吸気用の穴があいている。側板（左）には穴はない。取り付けの際、（左）（右）の側板を間違えないようにする。

底板
左右の側板を緩めるか、取り外してから固定しているネジC（PTTWH 3×5）7本を外し、底板を取り外す。
2-3-2. フロントパネル Assyの取り外し

(1) 天板を外す。 (2-3. 項 参照)
(2) プラグイン基板を全て引き抜く。 (2-4. 項 参照)
(3) ネジ (PTTWH 3×5) 6本を外す。
(4) MB-490基板のコネクターCN113, CN114, CN115よりハーネスを外す。
(5) フロントパネル Assyを矢印方向に外す。

2-3-3. スイッチ座の取り外し

(1) フロントパネルを取り外す。 (2-3. 項 参照)
(2) フロントパネルの裏側から、図のようにスイッチ座を取り外す。

2-4. プラグイン基板の引き抜き/挿入

下記プラグイン基板の引き抜きは以下のように行う。

• MC-41基板
• DIO-27基板
• CK-41基板
• ED-37基板
• MEM-58基板 (DABK-9007装着時)

注意：基板の離脱は、PCM-9000の電源 (POWER) スイッチをOFFにした状態で行うこと。

準備
天板を外す。 (2-3. 項 参照)

1. プラグイン基板の引き抜き
   (1) 固定ネジ (PTTWH 3×5) 2本を外す。
   (2) イジェクトレバーを矢印方向Aに起こし、プラグイン基板を矢印方向Aに引き抜く。

2. プラグイン基板の挿入
   (1) イジェクトレバーを矢印方向Bに戻す。
   (2) プラグイン基板を、スロットに差し込む。
   (3) ニジ (PTTWH 3×5) 2本でプラグイン基板を固定する。

2-4 (J) PCM-9000
2-5. 延長基板の使用方法

注意: 基板の戴脱は、PCM-9000の電源 (POWER) スイッチをOFFにした状態で行うこと。

2-5-1. 延長基板EX-396の使用方法

延長基板EX-396は下記基板を点検等で延長する際に使用する。
* MC-41基板
* DIO-37基板
* CK-41基板
* ED-37基板
* MEM-58基板（DABK-9007装着時）

手順
(1) 天板を外す。（23 項 参照）
(2) 延長する基板のネジ2本を外す。
   左右のイジェクトレバを開き、基板を本体より引き抜く。（24 項 参照）
(3) 基板を抜いた後に、延長基板EX-396のイジェクトレバを開じ、基板レールに合わせ矢印方向に差し込む。
(4) 延長基板EX-396のコネクターに取り外した基板を差し込む。

2-5-2. 延長基板EX-397の使用方法

延長基板EX-397は下記オプション基板を点検等で延長する際に使用する。
* DABK-9001 (ADA-28基板)
* DABK-9003 (TC-77/78基板)
* DABK-9004 (DIO-28基板)
* DABK-9005 (IF-436/437基板)
* DABK-9006 (IF-438基板）

手順
(1) 延長するオプション基板のネジ2本を外す。
   基板パネル両面の取っ手を持ち、オプション基板を矢印方向に本体より引き抜く。
(2) オプション基板を抜いた後に、延長基板EX-397を基板スロットに合わせ、矢印方向に差し込む。
(3) 延長基板EX-397のコネクターに取り外したオプション基板を差し込む。
2-6. 緊急時のディスクの取り出し方法

ユニットの故障等でディスクが取り出せないときは、以下のようにしてディスクを取り出すことができる。

用意する部品
ボールポイントレンチ BL2MM (付属品)

手順
(1) 電源 (POWER) スイッチを切る。
(2) 図のボールポイントレンチを緊急用ビン排入口に差し込み、まっすぐに強く押す。
ディスクがイジェクトされ、取り出すことができる。

注意: 緊急イジェクト後、初めてディスクを挿入したとき、ディスクを排出するが、異状ではない。
2度目の挿入からは、通常にローディングを行うことができる。

![タイムコード切り替えスイッチの図]

2-6 (J)
### 使用機器

<table>
<thead>
<tr>
<th>名称</th>
<th>仕様 (minimum)</th>
<th>機器名</th>
</tr>
</thead>
<tbody>
<tr>
<td>オシロスコープ</td>
<td>周波数帯域: DC~20 MHz以上, 結線時間: 20 ns/divまで可能</td>
<td>Tektronix 2445, 475または相当品</td>
</tr>
<tr>
<td>2時計レベルメータ</td>
<td>分解能: 0.1 dB以上</td>
<td>Leader LMV1815, LMV189ARまたは相当品</td>
</tr>
<tr>
<td>DC電圧計</td>
<td>分解能: 1 mV以上</td>
<td>Advantest TR-6855または相当品</td>
</tr>
<tr>
<td>周波数カウンタ</td>
<td>有効桁数: 8桁以上, 周波数: 20 MHzまで測定可能</td>
<td>Advantest TR-5822または相当品</td>
</tr>
<tr>
<td>ピデオモニタ</td>
<td>ビデオ入力端子 (BNC) 付のモニタ</td>
<td></td>
</tr>
<tr>
<td>BNCケーブル</td>
<td>使用ケーブル: 單軸ケーブル3C-2V, SONY UGC -0.5 (0.5 m), SONY UGC -1 (1 m)または相当品</td>
<td></td>
</tr>
</tbody>
</table>

### 治具

<table>
<thead>
<tr>
<th>名称</th>
<th>部品番号</th>
<th>備考</th>
</tr>
</thead>
<tbody>
<tr>
<td>簡易MC治具</td>
<td>J-6400-850-A</td>
<td>調整用ROM付属</td>
</tr>
<tr>
<td>サーボゲイン調整治具</td>
<td>J-6400-890-A</td>
<td>磁界ヘッドギャップ調整ディスク</td>
</tr>
<tr>
<td>磁界ヘッドギャップ調整ディスク</td>
<td>J-6405-010-A</td>
<td></td>
</tr>
<tr>
<td>ヘッドポジション調整治具 (NTSC)</td>
<td>J-6405-020-A</td>
<td>CCDカメラ, レンズ, カメラアダプタ,カメラケーブル, カメラホルダ付属</td>
</tr>
<tr>
<td>ヘッドポジション調整治具 (PAL)</td>
<td>J-6405-350-A</td>
<td>CCDカメラ, レンズ, カメラアダプタ,カメラケーブル, カメラホルダ付属</td>
</tr>
<tr>
<td>ヘッドポジション調整用カートリッジ</td>
<td>J-6405-320-A</td>
<td></td>
</tr>
<tr>
<td>偏芯ドライバ (2-4)</td>
<td>3-702-390-01</td>
<td></td>
</tr>
<tr>
<td>延長基板 EX-396</td>
<td>J-6400-860-A</td>
<td>メイン基板用</td>
</tr>
<tr>
<td>延長基板 EX-397</td>
<td>J-6400-870-A</td>
<td>オプション基板用</td>
</tr>
<tr>
<td>テストディスク (3T-熱イレース)</td>
<td>J-6401-060-A</td>
<td></td>
</tr>
<tr>
<td>ブロックエラーレートチェッカー</td>
<td>J-6400-880-A</td>
<td></td>
</tr>
<tr>
<td>AAPエラーレートチェッカー</td>
<td>J-6400-840-A</td>
<td></td>
</tr>
<tr>
<td>ローバスフィルター治具</td>
<td>J-6401-070-A</td>
<td></td>
</tr>
</tbody>
</table>
第４章
主要部品の交換および調整

4-1．電源の交換

4-1-1．スイッチングレギュレータの交換

注意：必ず電源コードをコンセントから外した状態にして行う。

(1) 天板および側板 (右) を取り外す。（23．項参照）
(2) ネジ (PTTWH 3×5) 1本を外し、電源カバーを取り外す。
(3) ネジ (PSW 4×8) 2本を外す。スイッチングレギュレータのコネクタ3個 (CN1, CN4, CN6) よりハーネスを外す。

(4) PS-354基板のコネクタ (CN2) よりハーネスを外し、スイッチングレギュレータを取り外す。

(5) PS-354基板のコネクタ (CN1) よりハーネスを外す。ネジ (PSW 4×8) 2本を外し、PS-354取付板をスイッチングレギュレータから取り外す。

(6) 新しいスイッチングレギュレータを (1)〜(5) の逆の順で取り付ける。
(7) スイッチングレギュレータを交換後は、"4-4．調整" を行う。

PCM-9000

4-1 (J)
4-2. ファンモータ/エアフィルタの交換

4-2-1. ファンモータ (大) の交換
(1) セットの底板側を上にして置く。
(2) 底板を取り外す。 (2-3 項 参照)
(3) ファンモータ (大) のハーネスを MB-490基板のコネクタ (CN130) より外す。
(4) ネジ (PSW 3x30) 2本を外し、ファンモータ (大) を取り外す。
(5) 新しいファンモータ (大) を (1)～(4) の逆の手順で取り付ける。取り付け時には、ファンモータ (大) のハーネスがたるまないように配慮して固定する。

4-2-2. エアフィルタの交換
(1) セットの底板側を上にして置く。
(2) 底板を取り外す。 (2-3 項 参照)
(3) 図に示すノブをAの方向に押して、エアフィルタを取り外す。
(4) (1)～(3) の逆の手順で取り付ける。

4-2-3. ファンモータ (小) の交換
(1) PS-345基板のハーネスをコネクタ (CN101～CN104) から外す。ネジ (PTTWH 3x5) 4本を外し、PS-345基板を取り外す。
(2) ファンモータ (小) のハーネスを MB-490基板のコネクタ (CN131) より外す。
(3) 樋ナット2個、ネジ (B 3x30) 4本を外してファンモータ (小) を取り外す。
(4) 新しいファンモータおよび PS-345基板を (1)～(3) の逆の手順で取り付ける。
4-3. M/Oディスクドライブの交換

この項では、M/Oディスクドライブの下記部品の交換方法を説明する。

注意：1. M/Oディスクドライブの部品の交換/修理/調整は、
ソニーのサービスセンターより依頼すること。
2. 作業は必ず電源スイッチをOFFにして行う。

4-3-1. OWH Ass'yの交換
4-3-2. ローディングAss'yの交換
4-3-3. スピンドルモータの交換
4-3-4. 光学ピックアップの交換
4-3-5. ギアードモータの交換

準備

M/Oディスクドライブの取り外し

(1) 天板を取り外す。 (23. 項 参照)
ネジ (PTTWH 3-5) 6本を外して、SV-144基板を開く。

① SVD-9基板のハーネスを図1に示すクランパから外し、SVD-9基板のコネクタ (CN1) から外す。
② ネジ (PTTWH 3-5) 1本を外して、SVD-9基板を取り外す。

(2) M/OディスクドライブのハーネスをSV-144基板のコネクタ8個 (CN104〜CN111)、およびMD-87基板のコネクタ (CN5) より外す。
(3) SV-144基板のCN110、CN111から外したハーネスをワイヤーホルダから外す。
(4) 端子付リードを外す。
(5) ネジ (PTTWH 3-5) 4本を外して、M/Oディスクドライブのリア側を先に持ち上げながら取り外し、TR-82基板のコネクタ (CN108) よりハーネスを外す。

(6) (1)〜(5) の逆の手順でM/Oディスクドライブを取り付ける。
注意：M/Oディスクドライブを取り付ける際、ダンバーホルダのダボとファンプレートの穴を合わせること。

図1

PCM-9000

4・3 (J)
4-3-1. OWH Ass'yの交換

(1) 図に示すクランパからハーネスを外し、OWH Ass'yの コネクタ (CN101)、MD-87基板のコネクタ (CN1) より ハーネスを外す。

(2) メカシャーシホルダ上のクランパからOWH Ass'y の ハーネスを外す。

(3) ネジ (PSW 2.6x6) 2本を外し、マグネルダーからOWH Ass'yを取り外す。

(4) (1)～(3) の逆の手順で新しいOWH Ass'yを取り付ける。

注意：OWH Ass'yのフレキシブルカード電線を折り曲げないように注意する。

(5) M/Oディスクライトを本体に取り付け後、 "4-4. 調整" を行う。
4-3-2. ローディングAss'yの交換

(1) OWH Ass'yのコンテクタ (CN101, MD-87基板のコンテクタ (CN1) よりハーネスを外す。(4-3-1 項 参照)

(2) ダンパーホルダの穴からドライバを差し込み、ネジ (PSW 3x6), 2本を外してブリッジを取り外す。
注意: ダンパーホルダの穴とネジの位置が合っていない場合には、TR-82基板を外し (4-3-3 項 参照),
メカシャーシホルダをダンパーホルダごとメカ
シャーシから取り外してから上記の作業を行う。

(3) ネジ (PTTW3 3x5) 1本を外し、MD-87基板を取り外す。

(4) TR-82基板のコンテクタ (CN103, CN104) からハーネスを
外す。

(5) 図示4ヶ所の穴からドライバを差し込み、ネジ
P (3x6) 4本を外してローディングAss'yを取り外す。

(6) (1)～(5) の逆の手順で新しいローディングAss'yをM/O
ディスクドライブに取り付ける。
注意: 1. メカシャーシのダボ2ヶ所とローディング
Ass'yの穴を合わせてネジとめする。
2. ブリッジを取り付ける時は、連結板からの浮き
が無いようにブリッジを連結板に押さえつけ
ながらネジとめする。

(7) M/Oディスクドライブを本体に取り付け後、"4-A.調整"
を行う。
4-2. スピンドルモータの交換

(1) "3-2. ローディングAss'yの交換"を参照してローディングAss'yを取り外す。
(2) 下図→部(2ヶ所)のネジを締める。
注: ネジを外さないこと。
(3) M/Oディスクドライブの底面を上にして置く。
注: この時ターンテーブル、光学ピックアップに負担がかかるないように図の位置に長いネジ等を立てること。

(4) TR-82基板のコネクタ(CN105)からスピンドルモーターハーネスを外す。

(5) 六角支柱4本をTR-82基板から外す。
(6) TR-82基板を矢印方向に聞く。

(7) コネクタ2個(CN101, CN102)からフレキシブルカード電線を外す。
注: フレキシブルカード電線は、折れに対し著しく寿命を短くするので取扱には十分注意すること。
（8）スビンドルモーターとモーターホルダーの間のスペーサー（2枚）を取り外す。
注意：スペーサーは光学ビックアップの対物レンズの傾きに合わせてスビンドルモーターを傾けるために使用しているもので、（4-3-4、光学ビックアップの交換参照）その厚さはM/Oディスクドライブ毎に異なる。また2枚のスペーサーの厚さも異なるため、スペーサーを取り外す時はどの位置に、どのスペーサーが取り付けていたか記録しておき、スピンドルモーター取付時には、元通りに戻すこと。尚、光学ビックアップの対物レンズの傾きがないものについてはスペーサーは使われていない。

スペーサーを使用している場合には図のAとB、またはBとCの位置のスビンドルモーターとモーターホルダーの間にさされている。2枚のスペーサーの厚さには必ず次のような関係がある。
A>B, C>B

（9）M/Oディスクドライブの底面を下して置き（3）で取り外したネジ（P3x25）3本を外し、スビンドルモーター及びモーターホルダーを取り外してからコネクタ付コードを取り外す。

（10）（1）～（9）の逆の手順で新しいスビンドルモーターを取り付け、M/Oディスクドライブを本体に取付ける。スペーサーの取付けはネジ（P3x25）をゆるめるために止めた状態で、スビンドルモーターとモーターホルダーの間からスペーサーをネジ（P3x25）に差し込むこと。取付後"4-4.調整"を行う。
注意：スペーサーを取付ける際、取付位置及び厚さを絶対に間違えない様、注意すること。
4-3-4、光学ビックアップの交換
光学ビックアップ交換時には、光学ビックアップの対物レンズの傾きに合わせてスピンドルモータの傾きを、スベーサーを用いて再調整する必要がある。
(1) "4-3-2、ローディングAss'yの交換" を参照してローディングAss'yを取り外す。
(2) 下図→部品(3ヶ所)のネジをゆるめる。
注意: ネジを外さないこと。
(3) M/Oディスクドライブの底面を上にして置く。
注意: この時、ターンテーブル、光学ビックアップに負担がかからないように下図の位置に長いネジ等を立てること。
(4) "4-3-3、スピンドルモータの交換" の手順(4)から(7)を行い、TR82基板を取り外す。
(5) ネジ①(B 2.6×4)3本を外し、連結板を取り外す。
ネジ②(P 3×6)2本を外し、OPロックAss'yを取り外す。
(6) ドライプフレキシブル基板のコネクタよりハーネスおよびフレキシブルカード電線を外す。
(7) ドライプコイルを図のように動かして、ネジ(P 3×6)2本を外す。
(8) ネジ (P 3×6) 4本を外し、リニアモータ Assyを取り外す。

(9) ネジ (P 3×6) 1本、六角支柱、ワッシャ (W3) を外し、ドライプフレキシブル基板を開く。
注意: フレキシブルカード電線を折り曲げないように注意する。

(10) ネジ (P 3×6) 3本を外し、Sマグネット Assyを取り外す。

(11) ネジ1 (P 3×6) 3本、ネジ2 (K 3×5) 1本を外し、シャフト押さえ4個を外す。光学ピックアップを取り外し、シャフトを引き抜く。
注意: シャフトを抜く時は、防錶の為にシャフトの端を持つこと。
(12) スピンドルモーターとモーターホルダーの間のスペーサー2枚を取外す。（スペーサーを使用していない場合もある。）新しい光学ピックアップに同様されたT．SKEWの値を基に図のA, B, Cのうちの2ケ所に厚さ0.04 mm, 0.08 mm, 0.16 mmうちいずれか2枚のスペーサーを取付ける。（スペーサーを使用しない場合もある）T．SKEWのデータとスペーサーの厚さ、取付位置の関係は下表による。

<table>
<thead>
<tr>
<th>T. SKEW</th>
<th>スペーサー厚さ [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>θ [°]</td>
<td>A</td>
</tr>
<tr>
<td>+0.2 ≤ θ ≤ +0.3</td>
<td>0.16</td>
</tr>
<tr>
<td>+0.05 &lt; θ &lt; +0.2</td>
<td>0.08</td>
</tr>
<tr>
<td>-0.05 ≤ θ ≤ +0.05</td>
<td>—</td>
</tr>
<tr>
<td>-0.2 &lt; θ &lt; -0.05</td>
<td>—</td>
</tr>
<tr>
<td>-0.3 ≤ θ ≤ -0.2</td>
<td>—</td>
</tr>
</tbody>
</table>

スペーサー部品番号 厚さ [mm]
3-183-914-01 0.04
3-183-914-11 0.08
3-183-914-21 0.16

(13) 光学ピックアップ交換後、(1)～(11) の逆の手順でM/Oディスクドライブを組み立てること。

注意: 1. シャフト押さえを取り付ける時、ネジ1 (P 3x6) とネジ2 (K 3x5) の位置を間違えないようにする。また、シャフト押さえ (大) とシャフト押さえ (小) の位置にも注意すること。

2. ブリッジを取り付ける時、連結板からの浮きが無いようにブリッジを連結板に押さえつけながらネジを締める。

(14) M/Oディスクドライブを本体に取り付ける。取り付け後、「4.4.調整」を実行。
4-3-5. ギアードモータの交換
(1) ローディングAss'yを取り外す。(4-3-2項参照)
(2) ネジ (K2.6x4) 2本を外す。図のローディングAss'yの両端を矢印A方向に開くようにしてモーターシャーシAss'yを取り外す。
(3) シャフトのキャップを外し、アームAss'yを取り外す。
(4) ネジ (PSW 2.6x6) 2本を外し、ギアードモータを取り外す。

(5) (1)〜(4)の逆の手順で新しいギアードモータを取り付ける。
注意: アームAss'yを取り付ける時、アームAss'yの穴にギアードモータのピンを挿入しキャップを留めること。

(6) M/Oディスクドライブを本体に取り付け後、"4-4. 調整"を行う。
4-4. 調整

ここでは、下記部品を交換した際に必要な調整について述べる。全ての調整は、簡易MC治具を使用して行う。

注意: M/Oディスクドライブ部品の交換および調整はソニーサービスセンターに依頼すること。

1. M/Oディスクドライブ
   (1) 光学ピックアップ
   (2) スピンドルモータ
   (3) OWH Assy
   (4) TR-82基板およびTR-82基板上の部品
       (Q201—Q205, DL201, IC208, IC209)
   (5) ブリッジの取り外しを必要とする部品
       (ローディングAssyの交換時等)

2. PS-345基板およびPS-345基板上の部品
3. スイッチングレギュレータ
4. SV-144基板およびSV-144基板上の部品

上記部品を交換した際に必要な調整/確認項目を以下に示す。

部品交換時の調整項目
   (1) 光学ピックアップ

   4-4-1.SV-144 基板調整
   4-4-1.SV-144 基板調整
   4-4-1.SV-144 基板調整
   4-4-1.SV-144 基板調整
   4-4-1.SV-144 基板調整
   4-4-1.SV-144 基板調整
   4-4-1.SV-144 基板調整
   4-4-1.SV-144 基板調整
   4-4-1.SV-144 基板調整
   4-4-1.SV-144 基板調整
   4-4-1.SV-144 基板調整

   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整

   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整
   4-4-1. SV-144 基板調整

4 - 12 (J)  PCM-9000
(2) スピンドルモータ
4-4-1.SV-144 基板調整
  4. スピンドル位相調整 → 4-4-3. 磁界ヘッドポジション調整 → 4-4-2. 磁界ヘッドギャップ調整
  4-4-1.SV-144 基板調整
  10. RFレベル確認 → 4-4-1.SV-144 基板調整
  11. トラックイングオフセット確認 (スレッドキックでの確認) → 4-4-1.SV-144 基板調整
  12. フォーカスオフセット確認 (ブロックエラーレート測定)

(3) OWH Ass'y
  4-4-3. 磁界ヘッドポジション調整 → 4-4-2. 磁界ヘッドギャップ調整
  12. フォーカスオフセット確認 (ブロックエラーレート測定)

(4) • TR-82基板およびTR-82基板上のQ201～Q205,DL201,IC208,IC209
• PS345基板およびPS345基板上の部品
• スイッチングレギュレータ
  4-4-1.SV-144 基板調整
  11. トラックイングオフセット確認 (スレッドキックでの確認) → 4-4-1.SV-144 基板調整
  12. フォーカスオフセット確認 (ブロックエラーレート測定)

(5) ローディングAss'y等ブラジッジの取り外しを必要とする部品
  4-4-3. 磁界ヘッドポジション調整 → 4-4-2. 磁界ヘッドギャップ調整
  12. フォーカスオフセット確認 (ブロックエラーレート測定)

(6) SV-144基板
  4-4-1.SV-144 基板調整
  1. ブルインオフセット調整 → 4-4-1.SV-144 基板調整
  2. フォーカスゲイン調整
  3. フォーカスオフセット調整
  4-4-1.SV-144 基板調整
  4. スピンドル位相調整 → 4-4-1.SV-144 基板調整
  5. トラックイングゲイン調整
  6. トラックイングオフセット調整
  4-4-1.SV-144 基板調整
  7. PLLオフセット調整 → 4-4-1.SV-144 基板調整
  8. PLL調整
  9. データ抜き取りディレイ量調整
  4-4-1.SV-144 基板調整
  10. RFレベル確認
  11. トラックイングオフセット確認 (スレッドキックでの確認)
  12. フォーカスオフセット確認 (ブロックエラーレート測定)

PCM-9000
(7) GAP SERVOブロック/SV-144基板の部品

4-4-1.SV-144 基板調整
→ 4-4-2. 磁界ヘッドギャップ調整
→ 12. フォーカスオフセット確認
(ロックエラーレート測定)

(8) PLLブロック/SV-144基板の部品

4-4-1.SV-144 基板調整
→ 7. PLLオフセット調整
→ 8. PLL調整
→ 9. データ抜け取りディレイ量調整

(9) SERVOブロック/SV-144基板の部品

4-4-1.SV-144 基板調整
→ 1. ブルインオフセット調整
→ 2. フォーカスゲイン調整
→ 3. フォーカスオフセット調整
→ 4-4-1.SV-144 基板調整
→ 5. トラッキングゲイン調整
→ 6. トラッキングオフセット調整
→ 11. トラッキングオフセット確認
(スレッドキックでの確認)
→ 12. フォーカスオフセット確認
(ロックエラーレート測定)

(10) SPINDLEブロック/SV-144基板の部品

4-4-1.SV-144 基板調整
→ 4. スピンドル相相調整
→ 12. フォーカスオフセット確認
(ロックエラーレート測定)
### 準備

使用機器

<table>
<thead>
<tr>
<th>名称</th>
<th>仕様 (minimum)</th>
<th>機器名</th>
</tr>
</thead>
<tbody>
<tr>
<td>オシロスコープ</td>
<td>周波数帯域：DC-20 MHz以上 撮引時間：20 ns/divまで可能</td>
<td>TEKTRONIX 2445または相当品</td>
</tr>
<tr>
<td>2針式レベルメータ</td>
<td>分解能：0.1 dB以上</td>
<td>LEADER LMV1815, LMV189ARまたは相当品</td>
</tr>
<tr>
<td>DC電圧計</td>
<td>分解能：1 mV以上</td>
<td>ADVANCE TR-6855または相当品</td>
</tr>
<tr>
<td>周波数カウンタ</td>
<td>有効桁数：6桁以上 周波数：20 MHzまで測定可能</td>
<td>ADVANCE TR-5822または相当品</td>
</tr>
<tr>
<td>ビデオモニタ</td>
<td>ビデオ入力端子 (BNC) 付のモニター</td>
<td></td>
</tr>
<tr>
<td>BNCケーブル</td>
<td>使用ケーブル：同軸ケーブル3C-2V SONY UGC -0.5 (0.5 m) SONY UGC -1 (1 m) SONY UGC -2 (2 m)</td>
<td>または相当品</td>
</tr>
</tbody>
</table>

### 治工具

<table>
<thead>
<tr>
<th>名称</th>
<th>部品番号</th>
<th>備考</th>
</tr>
</thead>
<tbody>
<tr>
<td>電極MC治具</td>
<td>J-6400-350-A</td>
<td>調整用ROM付属</td>
</tr>
<tr>
<td>サーボゲイン調整治具</td>
<td>J-6400-890-A</td>
<td></td>
</tr>
<tr>
<td>磁界ヘッダギャップ調整用ディスク</td>
<td>J-6405-010-A</td>
<td></td>
</tr>
<tr>
<td>ヘッドボジョン調整治具 (NTSC)</td>
<td>J-6405-020-A</td>
<td>CCDカメラ、レンズ、カメラアダプタ、カメラケーブル、カメラホルダ付属</td>
</tr>
<tr>
<td>ヘッドボジョン調整治具 (PAL)</td>
<td>J-6405-350-A</td>
<td>CCDカメラ、レンズ、カメラアダプタ、カメラケーブル、カメラホルダ付属</td>
</tr>
<tr>
<td>ヘッドボジョン調整用カートリッジ</td>
<td>J-6405-320-A</td>
<td></td>
</tr>
<tr>
<td>備芯ドライバ (2-4)</td>
<td>3-702-390-01</td>
<td></td>
</tr>
<tr>
<td>テストディスク</td>
<td>J-6401-060-A</td>
<td></td>
</tr>
<tr>
<td>ローバスフィルタ治具</td>
<td>J-6401-070-A</td>
<td></td>
</tr>
<tr>
<td>ブロックエラーレートチェッカー</td>
<td>J-6400-880-A</td>
<td></td>
</tr>
<tr>
<td>AAPIエラーレートチェッカー</td>
<td>J-6400-840-A</td>
<td></td>
</tr>
<tr>
<td>EX-396エクステンションボード</td>
<td>J-6400-860-A</td>
<td></td>
</tr>
<tr>
<td>EX-397エクステンションボード</td>
<td>J-6400-870-A</td>
<td></td>
</tr>
</tbody>
</table>

PCM-9000 4 - 15 (J)
スイッチ

CPU RESETスイッチ：
簡易MC治具のCPUをリセットする。

7 SEG表示切り替えスイッチ：
7 SEG LEDの表示（下記1，2）を切り換える。
1 ディスク上のAJPのアドレス表示
2 10キー入力の表示

キースイッチ
注意：各キーはディスクが挿入されているとき有効となる。
各キーがONのとき，それぞれのキーのLEDが点灯する。

TESTキー：テストモードの設定，信号ヘッドポジション調整時に使用。
EJECTキー：ディスクをイジェクト。
RECキー：RECモードの設定。
PLAYキー：PLAYモード（PLAYキー：ON）時に有効。
STOPキー：STOPモードの設定。
GAPキー：GAP TRIM ON/OFFの切り替え。
TRKキー：TRK ON/OFFの切り替え。
LDキー：LD ON/OFF切り替え。

注意：GAP，TRK，LDキーはそれぞれ独立して働く。ただし，STOPキーは押すと，イニシャル状態（全てOFF）に戻る。

FWD JMPキー：10キーにて入力したアドレスの絶対アドレスジャンプ処理を行う。このキーは，PLAYモード時に有効。

CPUリセットスイッチ

TOPパネル

コネクタ（Rear Panel）
D-sub，14 PIN コネクタ：付属の接続コードを接続する。

付属品
- 接続コード : 1
- 調整用ROM : 1
- 電源コード : 1

接続/使用方法
注意：簡易MC治具を本体（PCM-9000）に接続する際は，PCM-9000および簡易MC治具の電源をOFFにする。

(1) SV-144基板を開く。
(2) PCM-9000のCN103/SV-144基板より接続されているケーブルを外す。
(3) CN103/SV-144基板に簡易MC治具の接続コード（26ピンコネクタ）を接続する。
(4) SV-144基板のROM（IC814）を外し，調整用ROM（簡易MC治具の付属品）を差し込む。
(5) 簡易MC治具，本体（PCM-9000）の順に電源をONにする。
(6) ディスクを挿入（ローディング）する。ディスクのローディング後，EJECT，PLAY，STOP，GAP，TRK，TEST，LDキーが有効になる。
(7) RECキーは，PLAYモード時のみ有効となる。
(7) 各調整項目を手順に従って行う。

キーサイズの初期設定
7 SEG表示切り替えスイッチ：右側
REC，PLAY，STOP，GAP，TRK，LD，FWD JMP，TEST，EJECT：OFF（LED点灯）

注意：各調整項目において簡易MC治具のキー，スイッチ設定は，この初期設定から変更される設定のみ記載している。
4-4-1. SV-144基板調整 (サポート調整)

### 使用機器
- オシロスコープ
- DC電圧計
- 2針式レベルメータ
- 周波数カウンタ

### 準備
1. 簡易MC治具をCN103/SV-144基板に接続する。
   (接続は4-16ページ、簡易MC治具の "接続/使用方法" 参照)
2. SV-144基板のROM (IC814) を調整用ROMと交換する。
3. テストディスクまたはノーマルディスクを必要に応じて挿入する。

### スイッチ設定
- SV-144基板
  - S802-1: OFF
  - S802-2: OFF

### 調整箇所

#### SV-144 BOARD (A SIDE)

### 1. ブリンジオフセット調整

<table>
<thead>
<tr>
<th>調整時の状態</th>
<th>規格</th>
<th>調整箇所</th>
<th>使用ディスク</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 簡易MC治具の設定</td>
<td>TP417/SV-144基板 (N2) のレベル</td>
<td>0 ± 2 mV</td>
<td>RV401/SV-144基板 (M3)</td>
</tr>
<tr>
<td>• STOPモード (STOPキーを押す)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• TP417/SV-144基板にローバスフィルタ治具を介して、DC電圧計を接続する。</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![SV-144基板調整図](SV-144ボード(A SIDE).png)

PCM-9000

4 - 17 (J)
### 2. フォーカスゲイン調整

<table>
<thead>
<tr>
<th>調整時の状態</th>
<th>調整方法／規格</th>
<th>調整箇所</th>
<th>使用ディスク</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 簡易MC治具の設定</td>
<td>• STOPモード (STOPキーを押す)</td>
<td></td>
<td>RV403/SV-144基板 (L1)</td>
</tr>
<tr>
<td></td>
<td>• サーボゲイン調整治具をCN114/ SV-144基板に接続する。（サーボゲ イン調整治具の電源OFF）</td>
<td></td>
<td>テストディス クの指定箇所 1:90:00番地</td>
</tr>
<tr>
<td></td>
<td>• 接続後、サーボゲイン調整治具の 電源をONにする。</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. サーボゲイン調整治具のTRACKING /FOCUS切替スイッチ</td>
<td>- FOUCB側に設定</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. 簡易MC治具のトグルスイッチを左 側 (入力データ表示) に設定し、10 キーで下記指定番地を入力する。 指定番地:1 90:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. 簡易MC治具の[PLAY]キー、 JUMP FWDキーを押して指定番地 にロケートする。トグルスイッチ を右側に戻す。</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![サーボゲイン調整治具の図](image)

### 3. フォーカスオフセット調整

<table>
<thead>
<tr>
<th>調整時の状態</th>
<th>調整方法／規格</th>
<th>調整箇所</th>
<th>使用ディスク</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. TP403/SV-144基板にローバスフィ ルタ治具を介して、DC電圧計を接 続する。</td>
<td>• オシロスコープの波形で振幅が最大 になるようにRVを調整する。 その時のDC電圧計の値をFpo mVと する。</td>
<td>RV402/SV-144基板 (L1)</td>
<td>指定なし</td>
</tr>
<tr>
<td>2. TP408/SV-144基板とE7 (GND) 間 にオシロスコープのCH-2を接続す る。</td>
<td>• RVを回しFpの値が規格に入るように 調整する。</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 簡易MC治具の操作</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• PLAYを(PLAYキーを押す)で ）TRKキーを押し、トラッキングを オフにする。</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. 簡易MC治具のTRKキーを押し、 プラッキングをオンにする。</td>
<td>• ステップ2の時DC電圧計の値が規格 入っていること。</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![オシロスコープの図](image)
4. スピンドル位相調整

<table>
<thead>
<tr>
<th>調整時の状態</th>
<th>調整方法／规格</th>
<th>調整箇所</th>
<th>使用ディスク</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP504/SV-144基板にオシロスコープを接続する。</td>
<td>TP504/SV-144基板 (M7) の出力波形</td>
<td>RV501/SV-144基板 (M7)</td>
<td>指定なし</td>
</tr>
</tbody>
</table>

*簡易MC治具の操作*
PLAYキーを押してPLAYモードにし、TRKキーを押し、トラッキングをオンにする。+1.6V 0V 10μs ±5μs

5. トラッキングゲイン調整

<table>
<thead>
<tr>
<th>調整時の状態</th>
<th>調整方法／规格</th>
<th>調整箇所</th>
<th>使用ディスク</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.簡易MC治具の設定</td>
<td>2針式レベルメーターの2つの指示が重なるように調整する。</td>
<td>RV405/SV-144基板 (L1)</td>
<td>テストディスクの指定箇所</td>
</tr>
<tr>
<td>STOPモード(STOPキーを押す)</td>
<td>規格: 0±0.1dB</td>
<td>1:90:00番地</td>
<td></td>
</tr>
<tr>
<td>サーボゲイン調整治具をCN114/SV-144基板に接続する。(サーボゲイン調整治具の電源OFF)</td>
<td>接続</td>
<td>サーボゲイン調整治具</td>
<td></td>
</tr>
<tr>
<td>接続後、サーボゲイン調整治具の電源をONにする。</td>
<td>サーボゲイン調整治具に2針式レベルメーターを接続する。</td>
<td>サーボゲイン調整治具</td>
<td></td>
</tr>
<tr>
<td>2.サーボゲイン調整治具のTRACKING/FOCUSスイッチ: TRACKING側に設定する。</td>
<td>接続</td>
<td>サーボゲイン調整治具</td>
<td></td>
</tr>
<tr>
<td>3.簡易MC治具のトグルスイッチを左側に倒し10キーで指定番地を入力し、PLAYキーJUMPキーを押しとロケートする。トグルスイッチを右側に戻す。</td>
<td>2針式レベルメーター</td>
<td></td>
<td></td>
</tr>
<tr>
<td>指定番地: 1:90:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.簡易MC治具のTRKキーを押してトラッキングONモードにする。</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6. トラックイングオフセット調整

<table>
<thead>
<tr>
<th>調整時の状態</th>
<th>調整方法／規格</th>
<th>調整箇所</th>
<th>使用ディスク</th>
</tr>
</thead>
<tbody>
<tr>
<td>• TP404/SV-144基板にローバスフィルタ治具を介して、DC電圧計を接続する。</td>
<td>• DC電圧計の指示が0 mVを中心に振れるように調整する。</td>
<td>RV404/SV-144基板 (M2)</td>
<td>指定なし</td>
</tr>
<tr>
<td>• 隠密MC治具のPLAYキーを押してPLAYモードにし、TRKキーを押してトラッキングをオフにする。</td>
<td>• DC電圧計の値を確認する。</td>
<td>规格: ±100 mV</td>
<td></td>
</tr>
<tr>
<td>• 隠密MC治具のTRKキーを押してトラッキングをオンにする。</td>
<td>规格: ±25 mV</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. PLLオフセット調整

<table>
<thead>
<tr>
<th>調整時の状態</th>
<th>調整方法／規格</th>
<th>調整箇所</th>
<th>使用ディスク</th>
</tr>
</thead>
<tbody>
<tr>
<td>• TP203にDC電圧計を接続する。</td>
<td>• DC電圧計の値が規格内になるようRVを調整する。</td>
<td>IC203上に追加されたRV (基板 No. 1-647-007-11)</td>
<td></td>
</tr>
<tr>
<td>• 8. PLLの調整と同様の設定を行い、テストディスクの指定番地へロケートし、PLAYキーを押してPLAYモードにする。</td>
<td>规格: ±50 mV</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![説明図](#)
### 8. PLL調整

<table>
<thead>
<tr>
<th>ステップ1</th>
<th>調整時の状態</th>
<th>規格</th>
<th>調整箇所</th>
<th>使用ディスク</th>
</tr>
</thead>
<tbody>
<tr>
<td>• TP207/SV-144基板にオシロスコープ（CH-2）を介して周波数カウンターを接続する。</td>
<td>周波数カウンターの値が下記の値になるようにL202を調整する。</td>
<td>19.60～19.69 MHz</td>
<td>L202/SV-144基板 (G5)</td>
<td>テストディスクの熱インパクスされている所10:00番地</td>
</tr>
<tr>
<td>• テストディスクを取り込みする。</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 簡易MC治具の操作</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>トグルスイッチを左側に側し、10キーキーから指定箇所に入力し、PLAYキー、JUMPキーを押してロデインし、トグルスイッチを右側に戻す。PLAYキーを押してPLAYモードにする。</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ステップ2 (確認)</td>
<td>• TP203とE5/SV-144基板にローパスフィルター治具を介してDC電圧計を接続する。</td>
<td>DC電圧計の値が+200 [mV]になるようにL202を調整する。</td>
<td>L202/SV-144基板 (G5)</td>
<td>テストディスクのランダム信号が記録されている所10:00番地</td>
</tr>
<tr>
<td>• ステップ1と同様にテストディスクをローディングし、指定箇所へロデイントする。</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 簡易MC治具のSTOPキー、PLAYキーの間に押した時、周波数カウンターの値が規格内である事を確認する。</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ステップ3 (確認)</td>
<td>• TP203とE5/SV-144基板にローパスフィルター治具を介してDC電圧計を接続する。</td>
<td>DC電圧計の値が-200 [mV]になるようにL202を調整する。</td>
<td>L202/SV-144基板 (G5)</td>
<td>テストディスクのランダム信号が記録されている所10:00番地</td>
</tr>
<tr>
<td>• ステップ1と同様にテストディスクをローディングし、指定箇所へロデイントする。</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 簡易MC治具のSTOPキー、PLAYキーの間に押した時、周波数カウンターの値が規格内である事を確認する。</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ステップ4 (確認)</td>
<td>• TP203とE5/SV-144基板にローパスフィルター治具を介してDC電圧計を接続する。</td>
<td>DC電圧計の値が[mV]になるようにL202を調整する。</td>
<td>L202/SV-144基板 (G5)</td>
<td>テストディスクのランダム信号が記録されている所10:00番地</td>
</tr>
<tr>
<td>• ステップ1と同様にテストディスクをローディングし、指定箇所へロデイントする。</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 簡易MC治具のSTOPキー、PLAYキーの間に押した時、周波数カウンターの値が規格内である事を確認する。</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[PCM-9000\]
9. データ挿取ディレイ量の調整

<table>
<thead>
<tr>
<th>調整時の状態</th>
<th>調整方法</th>
<th>調整箇所</th>
<th>使用ディスク</th>
</tr>
</thead>
<tbody>
<tr>
<td>*簡易MC治具の設定 &quot;B. PLL調整&quot;のステップ1の設定と同様</td>
<td>オシロスコープのCH1 (データ) の中心にCH2 (挿取クロック) の立ち上がりがくるようにする。</td>
<td>ジャンバービンをCOR201/ SV-144基板 (G6) のいずれかに差し込む。</td>
<td>テストディスクのランダム信号が記録されている所</td>
</tr>
<tr>
<td>*オシロスコープの接続 CN-1:TP202/SV-144基板 (G7) GND/SV-144基板 CN-2:TP205/SV-144基板 (トリガー) レンジ20 ns/div</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

接続

<table>
<thead>
<tr>
<th>調整時の状態</th>
<th>調整方法</th>
<th>調整箇所</th>
<th>使用ディスク</th>
</tr>
</thead>
<tbody>
<tr>
<td>*簡易MC治具</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. RFレベルの確認

<table>
<thead>
<tr>
<th>調整時の状態</th>
<th>調整方法</th>
<th>調整箇所</th>
<th>使用ディスク</th>
</tr>
</thead>
<tbody>
<tr>
<td>*TP201/TR-82基板にオシロスコープを接続する。</td>
<td>RFのレベルが規格以上であることを確認する。</td>
<td></td>
<td>テストディスクの指定箇所ランダム信号が記録されている箇所</td>
</tr>
<tr>
<td>*簡易MC治具のトグルスイッチを左側に設定し10キーで指定番地を入力する。</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*PLAY/キーキーJUMP FWDキーや押し合せてロケートさせる。トグルスイッチを右側に戻す。</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

規格: RF level≥2.8 Vp-p
### 11. トラックオフセットの確認（スレッドキックでの確認）

<table>
<thead>
<tr>
<th>確認時の状態</th>
<th>確認方法</th>
<th>調整箇所</th>
<th>使用ディスク</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 簡易MC治具を取り外す。</td>
<td>• ファイル通りに再生されること。</td>
<td>---</td>
<td>指定なし</td>
</tr>
<tr>
<td>• ROMを通常のものに戻す。</td>
<td></td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>• ハーネス類を全てもとどおりに接続する。</td>
<td></td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>• 下記に示したサンプルのようなファイルを作りそれを再生する。</td>
<td></td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>番号:</td>
<td></td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>下記Track 1とTrack 2を2〜3回くらい往復した(登録した)ファイルを作成する。</td>
<td></td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Track 1 Begin: 1:00</td>
<td></td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>End: 1:10</td>
<td></td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Track 2 Begin: 1:00:00</td>
<td></td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>End: 1:00:10</td>
<td></td>
<td>---</td>
<td></td>
</tr>
</tbody>
</table>

### 12. フォーカスオフセットの確認（ブロックエラーチェック/B.E.Rの測定）

<table>
<thead>
<tr>
<th>調整時の状態</th>
<th>確認方法</th>
<th>調整箇所</th>
<th>使用ディスク</th>
</tr>
</thead>
<tbody>
<tr>
<td>ステップ1</td>
<td></td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>• 簡易MC治具を取り外す。</td>
<td></td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>• ROMを通常のものに戻す。</td>
<td></td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>• ハーネス類を全て元通りに接続する。</td>
<td></td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>• ブロックエラーチェッカーをCN3/ED-37基板に接続する。</td>
<td></td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>ステップ2</td>
<td></td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>• ディスクをローティングし、Monitor Recモードで記録、再生する。</td>
<td>• 各測定箇所でB.E.Rが5回平均で规格内であること。</td>
<td>---</td>
<td>優、はこり等がない通常の</td>
</tr>
<tr>
<td>• ディスクの内周（03 H: 05 M: 00 S）付近、中間（00 H: 40 M: 00 S）付近、および外周（01 H: 15 M: 00 S）付近で、ブロックエラーチェックを測定する。</td>
<td>規格 100/10000以下</td>
<td>---</td>
<td>ディスク</td>
</tr>
</tbody>
</table>

PCM-9000 4 - 23 (J)
4-4-2 磁界ヘッドギャップ調整 (GPM-11基板/OWH Ass'y)

使用機器
- オシロスコープ

治工具
- 簡易MC治具
- 調整用ROM (簡易MC治具の付属品)
- 磁界ヘッドギャップ調整用ディスク
- 調整ドライバ

準備
1. SV-144基板を開いて、簡易MC治具をCN103/SV-144基板に接続する。
   （接続は、4-16ページ、簡易MC治具の "接続/使用方法" 参照）
2. SV-144基板のROM (IC814) を調整用ROMと交換する。
3. 磁界ヘッドギャップ調整用ディスクを挿入 (ローディング) する。

<table>
<thead>
<tr>
<th>調整時の状態</th>
<th>規格</th>
<th>調整箇所</th>
</tr>
</thead>
<tbody>
<tr>
<td>ステップ1</td>
<td>TP901/SV-144基板にオシロスコープを接続する。</td>
<td>TP901/SV-144基板 (オシロスコープ) の出力</td>
</tr>
<tr>
<td></td>
<td>RV901/SV-144基板を反時計方向に回し</td>
<td>0 ± 10 mV</td>
</tr>
<tr>
<td></td>
<td>る。</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ドレッドをディスクの外周側に手で動かす。（簡易MC治具の設定STOPモードにして行う。）</td>
<td></td>
</tr>
<tr>
<td></td>
<td>外周側位置の目安OWH Ass'yがスペーサーから20 mm以上離れる位置まで手で動かす。</td>
<td></td>
</tr>
<tr>
<td></td>
<td>アクチュエータ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ヘッド</td>
<td></td>
</tr>
<tr>
<td></td>
<td>スペーサ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ディスク</td>
<td></td>
</tr>
<tr>
<td></td>
<td>簡易MC治具の設定</td>
<td></td>
</tr>
</tbody>
</table>
| | ① STOPモード | }
| | ② GAPキーを押してGAP ONモードにする | (磁界ヘッドギャップ調整モード) |
ステップ2
・スレッドをディスクの最内周に手で動かす。（簡易MC治具の設定をSTOPモードにして行う。）
・オシロスコープおよびDC電圧計をTP901/SV-144基板、GND/SV-144基板に接続する。
・RV901/SV-144を反時計方向に回さない。

簡易MC治具の設定
① STOPモード
② [GAP]キーを押してGAP ONモードにする。

(縫界ヘッドギャップ調整モード)

1. オシロスコープの出力波形を見ながらRV901/SV-144基板を時計方向にゆっくり回す。
この操作でアクチュエータはゆっくりディスクのスペーサに当たって止まる。
(図3)この時オシロスコープの波形はマイナスの値から次第に大きくなり、図3
の③状態のところで上昇が急に止まる。

① ② ③
アクチュエータ
スペーサー ディスク

オシロスコープ出力波形
図3

2. オシロスコープの出力波形が動かなくななる点までRV901/SV-144基板を
ゆっくり回す。

3. この状態でDC電圧計で0 VになるようにCV1/GPM-11基板を調整する。

オシロスコープ出力波形
規格：0 ± 1 mV

4. 簡易MC治具の[GAP]キーを押して調整モードを解除する。（GAP OFFモード）

5. 簡易MC治具の[EJECT]キーを押してディスクを取り出す。

6. 調整後、簡易MC治具の[EJECT]キーを押して縫界ヘッドギャップ調整用ディ
スクを取り出す。
4-4-3. 磁界ヘッド位置調整

使用機器
ビデオモニタ
BNCケーブル

治工具
簡易MC治具
調整用ROM（簡易MC治具の付属品）
ヘッド位置調整治具（CCDカメラ、レンズ、カメラアダプタ、カメラケーブル、カメラホルダ付属）
偏芯ドライバー（2-4）
ヘッド位置調整用カートリッジ

1. 調整準備
(1) 簡易MC治具をCN103/SV-144基板に接続する。
IC814/SV-144基板を調整用ROMと交換する。
(2) ロックプレートを取り付っているネジ（PSW 2.6x6）1本を外し、ブラッシングからロックプレートを取り外す。
(3) 本体および簡易MC治具のパワースイッチをONにし、
ヘッド位置調整用カートリッジを挿入してローディングさせる。

(4) ヘッド位置調整治具のCCDカメラをカメラホルダに取り付け、図を参照して本体フレーム上にセットする。

(5) CCDカメラのレンズとブラッシングの間隔が目視にて約5mmになるよう、カメラホルダのノブを緩めてカメラの高さを調節する。

(6) CCDカメラとカメラアダプタ、カメラアダプタとビデオモニタを接続し、電源をONにする。
(7) 簡易MC治具のTESTスイッチを押し次にINDIスイッチを押して、ビデオモニタ画面を観察する。
2. 磁界ヘッド調整
ビデオモニタ画面を観ながら、レーザースポットと磁界ヘッドコアの中心の位置ずれが規格を満たすように、以下の手順で調整を行う。
規格:
レーザースポットの位置がヘッドコアの中心から0.2mm以下のこと。ヘッドコアの直径が0.9mmであることから判断する。

3. 調整後の作業
(1) TEST スイッチを押して、テストモードを解除する。
(2) CCDカメラをカメラホルダごと取り出す。
(3) 簡易MC治具のEJECT スイッチを押し、ヘッドポジション調整用カートリッジを取り出す。
注意: 調整用カートリッジのローティングイジェクトは、必ずCCDカメラ及びカメラホルダがセットされていない状態で行うこと。
(4) 本体および簡易MC治具のパワースイッチをOFFにする。
(5) ネジ(PSW 2,6x6)1本で、ロックプレートをブリッジに取り付ける。
(6) CN103/SV-144より簡易MC治具の接続ハーネスを外し、外れていた本体ハーネスを接続する。
(7) 調整用ROMをIC814/SV-144より外し、元のROMを差し込む。
第5章
電気調整

本章では、下記基板の修理および保守を行う際に必要な電気調整について述べている。
CK-41基板
ADA-28基板

5-1. 準備

使用機器

<table>
<thead>
<tr>
<th>名称</th>
<th>仕様 (minimum)</th>
<th>機械名</th>
</tr>
</thead>
<tbody>
<tr>
<td>オーディオアナライザー</td>
<td>•オシレーター</td>
<td>TEKTRONIX</td>
</tr>
<tr>
<td></td>
<td>•周波計</td>
<td>SG505, SG5010,</td>
</tr>
<tr>
<td></td>
<td>•レベルメーター</td>
<td>AA501, AA5001</td>
</tr>
<tr>
<td></td>
<td>バランス入出力型</td>
<td></td>
</tr>
<tr>
<td>オシロスコープ</td>
<td>•周波数レンジ:</td>
<td>TEKTRONIX</td>
</tr>
<tr>
<td></td>
<td>DC to 100 MHz</td>
<td>475, 465</td>
</tr>
<tr>
<td></td>
<td>•2現象</td>
<td>または相当品</td>
</tr>
<tr>
<td></td>
<td>•感度: 5 mV/div</td>
<td></td>
</tr>
<tr>
<td>ビデオ信号発生器</td>
<td>———</td>
<td>TEKTRONIX</td>
</tr>
<tr>
<td></td>
<td>収束数値: 8桁以上</td>
<td>1410</td>
</tr>
<tr>
<td>周波数カウンター</td>
<td>収束数値: 8桁以上</td>
<td>または相当品</td>
</tr>
<tr>
<td>周波数カウンター</td>
<td>収束数値: 8桁以上</td>
<td>ADVANTEST</td>
</tr>
<tr>
<td></td>
<td>TR5822</td>
<td></td>
</tr>
</tbody>
</table>

治具

<table>
<thead>
<tr>
<th>名称</th>
<th>部品番号</th>
<th>備考</th>
</tr>
</thead>
<tbody>
<tr>
<td>延長基板EX-396</td>
<td>J-6400-860-A</td>
<td>メイン基板用</td>
</tr>
<tr>
<td>延長基板EX-397</td>
<td>J-6400-870-A</td>
<td>オプション基板用</td>
</tr>
</tbody>
</table>

スイッチ、コントロールの初期設定
下記以外の設定は任意。

コントロールパネル

<table>
<thead>
<tr>
<th>名称</th>
<th>値</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAMPLING FREQ</td>
<td>48 kHz</td>
</tr>
<tr>
<td>WORD LENGTH</td>
<td>20 BIT</td>
</tr>
<tr>
<td>SYNC CLOCK</td>
<td>INT</td>
</tr>
</tbody>
</table>

コネクタパネル

<table>
<thead>
<tr>
<th>名称</th>
<th>値</th>
</tr>
</thead>
<tbody>
<tr>
<td>REFERENCE VIDEO INPUT 75 Ω</td>
<td>ON</td>
</tr>
<tr>
<td>WORD SYNC INPUT 75 Ω</td>
<td>ON</td>
</tr>
</tbody>
</table>

MC-41基板

<table>
<thead>
<tr>
<th>名称</th>
<th>値</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW1-1〜SW1-8</td>
<td>すべて &quot;1&quot;</td>
</tr>
<tr>
<td>SW2-1〜SW2-8</td>
<td>すべて &quot;1&quot;</td>
</tr>
<tr>
<td>SW3</td>
<td>&quot;0&quot;</td>
</tr>
<tr>
<td>SW4</td>
<td>OFF</td>
</tr>
</tbody>
</table>

SV-144基板

<table>
<thead>
<tr>
<th>名称</th>
<th>値</th>
</tr>
</thead>
<tbody>
<tr>
<td>S801</td>
<td>OFF</td>
</tr>
</tbody>
</table>

DIO-27基板

<table>
<thead>
<tr>
<th>名称</th>
<th>値</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1-1〜S1-8</td>
<td>すべて OFF</td>
</tr>
</tbody>
</table>

PCM-9000

5-1 (J)
5-2. CK-41基板調整
この調整はCK-41基板を交換した際に行う。

使用機器、治工具
オシロスコープ
周波数カウンタ
ビデオ信号発生器
延長基板EX-396

準備
CK-41基板を延長基板EX-396で延長する。

5-2-1. VARI PITCH調整
スイッチ、コントロール設定
下記以外はスイッチ、コントロールの初期設定に同じ。
SAMPLING FREQ：48 kHz

接続:

<table>
<thead>
<tr>
<th>調整手順</th>
<th>調整時の状態</th>
<th>規格</th>
<th>調整箇所</th>
</tr>
</thead>
<tbody>
<tr>
<td>・オシロスコープをTP12/CK-41 (P6), E8/CK-41 (GND) (S9) に接続する。</td>
<td>TP12/CK-41 = +4.0 ± 0.1 V</td>
<td>T1/CK-41 (S6)</td>
<td></td>
</tr>
<tr>
<td>・オシロスコープをTP21/CK-41 (P8), E8/CK-41 (GND) (S9) に接続する。</td>
<td>TP21/CK-41 = +2.0 ± 0.1 V</td>
<td>T2/CK-41 (S8)</td>
<td></td>
</tr>
</tbody>
</table>

5-2 (J) PCM-9000
5-2-2. VIDEO PLLフリーラン調整

スイッチの設定:
下記設定以外はスイッチ、コントロールの初期設定に同じ。

コントロールパネル部

| SYNC_CLOCK | VIDEO |

接続:

- 周波数カウンタ
- CK-41基板
- TP28
- PCM-9000

調整:

(1) 周波数カウンタをTP28/CK-41 (B4), E3/CK-41 (B7) (GND) に接続する。

(2) SAMPLING FREQ を (48 kHz, 44.1 kHz, 44.056 kHz) に切り替えSAMPLING FREQ におけるTP28/CK-41 (B7) の周波数が下表の規格になるようにRV3/2/1 とそれぞれ調整する。

<table>
<thead>
<tr>
<th>SAMPLING FREQ</th>
<th>規格</th>
<th>調整箇所</th>
</tr>
</thead>
<tbody>
<tr>
<td>48 kHz</td>
<td>4.800000 MHz ±10Hz</td>
<td>RV3/CK-41 (E1)</td>
</tr>
<tr>
<td>44.1 kHz</td>
<td>4.410000 MHz ±10Hz</td>
<td>RV2/CK-41 (E1)</td>
</tr>
<tr>
<td>44.056 kHz</td>
<td>4.405600 MHz ±10Hz</td>
<td>RV1/CK-41 (E1)</td>
</tr>
</tbody>
</table>

(3) VIDEO信号発生器よりREFERENCE VIDEO INPUT 端子にビデオ信号を入力し、各SAMPLING FREQ (サンプリング周波数) においてロックすることを確認する。

5-3. ADA-28基板 (DABK-9001) 調整

この調整は、ADA-28基板 (DABK-9001) を交換した際に行う。
調整はADA-28基板 (DABK-9001) を延長基板EX-397で延長して、PCM-9000に装着した状態で行う。

使用機器、治工具
- オーディオアナライザー
- オシロスコープ
- 延長基板EX-397

準備
ADA-28基板を延長基板EX-397で延長する。

スイッチ、コントロール設定
下記以外はスイッチ、コントロールの初期設定に同じ。

RM-D9000: INPUTモード

- [INPUT] キーを押すと、インジケータCH-1/CH-2 が点灯する。

ADA-28基板

<table>
<thead>
<tr>
<th>S101/201/105/205</th>
<th>bit-1, 2がON, bit-3, 4がOFF またはbit-1, 2がOFF, bit-3, 4がON</th>
</tr>
</thead>
<tbody>
<tr>
<td>S102/202</td>
<td>OFF</td>
</tr>
<tr>
<td>S103/104/203/204</td>
<td>bit-1, 2, 3がOFF, bit-4がON</td>
</tr>
<tr>
<td>RV101/201</td>
<td>任意 (CMR調整用)</td>
</tr>
<tr>
<td>RV102/202</td>
<td>任意 (ADオフセット調整用)</td>
</tr>
<tr>
<td>RV103/203</td>
<td>任意 (DAラインアウトアンプBAL調整用)</td>
</tr>
</tbody>
</table>
RM-D9000

オーディオアナライザー
オシレーター
バランス出力
ディストーション
アナライザー
600Ω
バランス入力

接続:

PCM-9000 [リアパネル]

soundo
DABK-9001
(ADA-28基板)
コネクタパネル

調整箇所:

AD-28 BOARD [A SIDE]

<table>
<thead>
<tr>
<th>ステップ</th>
<th>調整時の状態</th>
<th>規格</th>
<th>調整箇所</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LINE INPUT 端子 CH-1, CH-2 を OPEN にして無信号入力とする。</td>
<td>RM-D9000のレベルメーターが CH-1/CH-2: -∞のみ点灯</td>
<td>CH-1: RV102/ADA-28 (B3)</td>
</tr>
<tr>
<td></td>
<td>RM-D9000 CH-1/CH-2: INPUT</td>
<td>CH1</td>
<td>-∞</td>
</tr>
<tr>
<td></td>
<td>LINE INPUT 端子 CH-1に1kHz、+24dBsの信号を入力する。信号はコネクターのHOT,COLD (2ピンと3ピンにパラレル入力)と GND間に入力する。</td>
<td>LINE OUTPUT CH-1の出力レベル最小</td>
<td>RV101/ADA-28 (A8)</td>
</tr>
<tr>
<td></td>
<td>LINE OUTPUT CH-1端子にディストーションアナライザーを接続する。</td>
<td>RV201/ADA-28 (D8)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>LINE INPUT 端子 CH-2に1kHz、+24dBsの信号を入力する。信号はコネクターのHOT,COLD (2ピンと3ピンにパラレル入力)と GND間に入力する。</td>
<td>LINE OUTPUT CH-2の出力レベル最小</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LINE OUTPUT CH-2端子にディストーションアナライザーを接続する。</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5 - 4 (J)
### ステップ | 調整時の状態 | 規格 | 調整箇所
---|---|---|---
4 | • LINE INPUT 端子 CH-1に1 kHz, +20 dBsの信号を入力する。 | LINE OUTPUT CH-1のHOT,COLDの出力信号の振幅を同じにする。 | RV103/ADA-28 (J6)  
| | • LINE OUTPUT端子 CH-1のHOT, COLD (2ピン-1ピン, 3ピン-1ピン) の信号をオシロスコープに接続する。 | | |
5 | • LINE INPUT 端子 CH-2に1 kHz, +20 dBsの信号を入力する。 | LINE OUTPUT CH-2のHOT,COLDの出力信号の振幅を同じにする。 | RV203/ADA-28 (H6)  
| | • LINE OUTPUT端子 CH-2のHOT, COLD (2ピン-1ピン, 3ピン-1ピン) の信号をオシロスコープに接続する。 | | |

参考: ADA-28基板は基板内に利得可変用ディップスイッチ (S103, 104, 203, 204) がある。ADA-28基板を装着するPCM-9000 のフロントパネル部のANALOG LEVEL ADJUSTボリュームと組み合わせて+14 dBs〜+26 dBsの最大入出力レベルの設定が可能となっている。基板内ディップスイッチは33.0 dBステップの切り替え、フロントパネル部のボリュームは+2 dB以上の可変幅がある。AD側の利得可変用ディップスイッチ (S103, 203) とDA側の利得可変用ディップスイッチ (S104, 204) の設定に対する最大入力出力レベルの可変範囲は以下のようになる。

<table>
<thead>
<tr>
<th>スイッチの設定 (S102/103/203/204)</th>
<th>ボリュームセンターの設定</th>
<th>ボリューム可変幅</th>
</tr>
</thead>
<tbody>
<tr>
<td>bit-4 のみ ON</td>
<td>+24 dBs</td>
<td>+22〜+26 dBs</td>
</tr>
<tr>
<td>bit-3 のみ ON</td>
<td>+21 dBs</td>
<td>+19〜+23 dBs</td>
</tr>
<tr>
<td>bit-2 のみ ON</td>
<td>+18 dBs</td>
<td>+16〜+20 dBs</td>
</tr>
<tr>
<td>bit-1 のみ ON</td>
<td>+15 dBs</td>
<td>+13〜+17 dBs</td>
</tr>
</tbody>
</table>

PCM-9000 5 - 5 (J)
SECTION 1
INSTALLATION

1-1. OPERATING ENVIRONMENT

Equipment operating temperature: 10 °C to 35 °C
Equipment preserving temperature: -20 °C to 55 °C
Equipment Mass (weight): 17 kg

Prohibitive Space for Installation
- Places exposed directly to sunlight or powerful light
- Dusty places
- Places exposed to strong electric or magnetic fields
- Areas near heat source
- Places Subjected to vibration
- Places a lot of electrical noise
- Places generated static noise

Note on installation
- The back of the PCM-9000 should be at least 40 cm from the wall to aid ventilation and allow access for servicing.
- There must be at least 10 cm of clearance from the left side of the PCM-9000 for the air intake.
- When using the PCM-9000 on a desk, the above of the PCM-9000 should be at least 40 cm from the wall to allow access for servicing. The PCM-9000 can also be mounted in a rack, and can be pulled out for print board maintenance.
- The disc drive is built to be used when it is in a horizontal position, so do not use it in a vertical or tilted position.

Ventilation/Radiation
- The PCM-9000 has two fans.
  1. The fan at the power source is an exhaust fan. If the rear exhaust vent becomes blocked, the fan will stop and the power source may be damaged. During checks, do not leave the power on for a long period of time without cooling from the fan.
  2. The fan at the M/O Disc Drive is an intake fan. The air pressure inside the disc drive is kept higher than the pressure outside. Together with the air filter, this pressure keeps dust out to maintain M/O disc and M/O Disc Drive reliability.

The air filter at the air intake of the M/O Disc Drive prevents dust from getting inside. When the filter becomes clogged, the reliability of the M/O Disc will decline. The filter should be replaced or cleaned periodically (once or twice a year). For replacement of air filter, refer to "4-2. fan motor /air filter replacement.

![Diagram of PCM-9000](attachment://pcm-9000-diagram.png)
1-2. POWER SUPPLY

1-2-1. Capacity of AC Power Supply

A switching regulator is used as the power source for the PCM-9000. There is thus no need to change over the mains voltage setting for difficult mains voltages.

**Power supply Voltage:** AC 100 V to 120 V or AC 220 V to 240 V

**Power supply Frequency:** 50/60 Hz

**Power Consumption:** 130 W

1-2-2. Power Cord

**Required Parts**

(J) Power Cord

1. Power Cord
2. Plug Holder (Black)

(U) Required Parts

1. Power Cord
2. Plug Holder (Black)

(EK) Required Parts

1. Power Cord
2. Plug Holder (Gray)

---

PCM-9000
1-3. INSTALLATION SPACE

(1) Outside dimensions

(When the RM-D9000 is installed.)

(Unit: mm
(1U = 44 mm)

(2) Operating dimensions

(When the RM-D9000 is installed.)

(Unit: mm

PCM-9000 1 - 3 (E)
1-4. SUPPLIED ACCESSORIES

**PCM-9000**
- Power Cord : 1
- Plug Holder : 1
- Ball Point L Wrench BL2MM : 1
- Rack Ungle Assembly (4U) : 2
- screw (B 4x16) : 4
- (For Rack Ungle Assembly)
- screw (RK 5x16) : 4
- screw (B 4x8) : 4
- (For Rack Mount Rail)
- Trapezoid ornamental washer (#5) : 4
- Operation Manual : 1
- Maintenance Manual Part I : 1
- Quick Reference : 1
- RM-D9000
- connection cord 0.8 m : 1
- connection cord 10 m : 1

1-5. OPTIONAL ACCESSORIES

- RM-D9000 Sony Remote Control Unit
- DABK-9001 Sony Converter Board (20 bit A/D, D/A)
- DABK-9003 Sony Interface Board (Remote TC Interface)
- DABK-9004 Sony Digital I/O Board (SDIF-2 interface)
- DABK-9005 Sony Interface Board (SCSI interface)
- DABK-9006 Sony Interface Board (DAQ-1000 interface)
- DABK-9007 Sony Memory Board (Memory)
- MSD-1200 Sony Digital Audio Master Disc (For UC)
- MSD-1200 Sony Digital Audio Master Disc (For J. EK)

1-6. RACK MOUNTING

This unit can be mounted on an EIA Standard 19 inch rack.

**Rack Mounting Procedure**
(1) Remove the four feet from the bottom of the unit.
(2) Remove eight fixing screws (4x6 S Tight four each) on the side panel (left and right).
(3) Install the rack ungle assembly (4U) (supplied accessory) to the PCM-9000.
**Note:** Use the screws (B 4x16) (supplied accessory) attached to rack ungle.
(4) Install the PCM-9000 to 19 inch rack with four trapezoid ornamental washers (#5) and screws (RK 5x16).
1-7. INSTALLATION OF THE OPTIONAL BOARDS (DABK-9001/9003/9004/9005/9006/9007)

Note: Be sure to turn the POWER switch of PCM-9000 off before installing of the optional boards.

1-7-1. Installation of DABK9001/9003/9004/9005/9006

- Configuration of DABK-9001
  ADA-28 board : 1

- Configuration of DABK-9003
  TC-77/78 board : 1

- Configuration of DABK-9004
  DIO-28 board : 1

- Configuration of DABK-9005
  IF-436/437 board : 1
  Cable : 1

- Configuration of DABK-9006
  IF-438 board : 1

The Slot of the Various Optional Components

Note: The various optional components should only be installed in the positions that are listed below.

<table>
<thead>
<tr>
<th>Slot No.</th>
<th>DABK-9001</th>
<th>DABK-9003</th>
<th>DABK-9004</th>
<th>DABK-9005</th>
<th>DABK-9006</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td>O</td>
</tr>
<tr>
<td>3</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td>O</td>
</tr>
<tr>
<td>4</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Note: O marks slot is possible to install.
Procedure

(1) For installation of the option boards, remove two fixing screws (M3, CASE) and the blank panel from the appropriate slot.

(2) Firmly insert the option board into the position formerly occupied by the blank panel.

(3) Use the two screws (M3, CASE) from the blank panel to fix the option board in place.

1-7-2. Installation of DABK-9007

Configuration
MEM-58 board: 1
Fixing screw (PTTWH 3x5): 2

Procedure

(1) Remove the top panel. (See section 2-3.)

(2) Insert the DABK-9007 (MEM-58 board) into the board slot as a figure.

(3) Turn the eject lever, then fasten the DABK-9007 with two screws (PTTWH 3x5).

(4) Install the top panel.
### 1-8. INPUT/OUTPUT INTERFACE

#### 1-8-1. Matching Connectors and Cables

When connecting cables to the connectors on the connector panel, use the connectors/cables or equivalent with each other as listed below.

<table>
<thead>
<tr>
<th>1. PCM-9000</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PCM-9000 side connector</strong></td>
<td><strong>Matching connector/cable</strong></td>
</tr>
<tr>
<td><strong>Used for</strong></td>
<td><strong>Type</strong></td>
</tr>
<tr>
<td>INSERTION RETURN DIGITAL I/O AES/EBU D-I D-I SYNC</td>
<td>XLR, 3 PIN, female</td>
</tr>
<tr>
<td>INSERTION SEND DIGITAL I/O AES/EBU D-O</td>
<td>XLR, 3 PIN, male</td>
</tr>
<tr>
<td>REFERENCE VIDEO INPUT WORD SYNC INPUT/OUTPUT</td>
<td>BNC</td>
</tr>
<tr>
<td>REMOTE</td>
<td>Round, 10 PIN, female</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. RM-D9000</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RM-D9000 side connector</strong></td>
<td><strong>Matching connector/cable</strong></td>
</tr>
<tr>
<td><strong>Used for</strong></td>
<td><strong>Type</strong></td>
</tr>
<tr>
<td>PCM-9000</td>
<td>Round, 10 PIN, female</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. DABK-9001</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DABK-9001 side connector</strong></td>
<td><strong>Matching connector/cable</strong></td>
</tr>
<tr>
<td><strong>Used for</strong></td>
<td><strong>Type</strong></td>
</tr>
<tr>
<td>LINE INPUT CH1, CH2</td>
<td>XLR, 3 PIN, female</td>
</tr>
<tr>
<td>LINE OUTPUT CH1, CH2</td>
<td>XLR, 3 PIN, male</td>
</tr>
</tbody>
</table>
### DABK-9003 Side Connector

<table>
<thead>
<tr>
<th>Used for</th>
<th>Type</th>
<th>Matching connector/cable</th>
<th>Sony Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME CODE IN</td>
<td>XLR, 3 PIN, female</td>
<td>XLR, 3 PIN, male</td>
<td>1-508-084-11 (CANNON XLR-3-12C or equivalent)</td>
</tr>
<tr>
<td>TIME CODE OUT</td>
<td>XLR, 3 PIN, male</td>
<td>XLR, 3 PIN, female</td>
<td>1-508-083-11 (CANNON XLR-3-11C or equivalent)</td>
</tr>
<tr>
<td>PARALLEL REMOTE</td>
<td>D-sub, 50 PIN, female</td>
<td>D-sub, 50 PIN, male</td>
<td>1-566-358-11</td>
</tr>
<tr>
<td>REMOTE (9 PIN) / RS232</td>
<td>D-sub, 9 PIN, female</td>
<td>D-sub, 9 PIN, male</td>
<td>Optional accessory RCD-5G (5m) / 10 G (10m) or 15 G (15m) or 1-560-651-00 (connector) / 1-561-749-00 (shell)</td>
</tr>
</tbody>
</table>

### DABK-9004 Side Connector

<table>
<thead>
<tr>
<th>Used for</th>
<th>Type</th>
<th>Matching connector/cable</th>
<th>Sony Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPUT CH-1/CH-2</td>
<td>BNC</td>
<td>BNC</td>
<td></td>
</tr>
<tr>
<td>OUTPUT CH-1/CH-2</td>
<td>BNC</td>
<td>BNC</td>
<td></td>
</tr>
</tbody>
</table>

### DABK-9005 Side Connector

<table>
<thead>
<tr>
<th>Used for</th>
<th>Type</th>
<th>Matching connector/cable</th>
<th>Sony Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCSI IF</td>
<td>Half pitch unphenol, 50 PIN, female</td>
<td>Connect Coad, 1m</td>
<td>1-696-776-11 (Supplied with DABK-9005)</td>
</tr>
</tbody>
</table>

### DABK-9006 Side Connector

<table>
<thead>
<tr>
<th>Used for</th>
<th>Type</th>
<th>Matching connector/cable</th>
<th>Sony Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUE DATA IN</td>
<td>XLR, 3 PIN, female</td>
<td>XLR, 3 PIN, male</td>
<td>1-508-084-11 (CANNON XLR-3-12C or equivalent)</td>
</tr>
<tr>
<td>CUE DATA OUT</td>
<td>XLR, 3 PIN, male</td>
<td>XLR, 3 PIN, female</td>
<td>1-508-083-11 (CANNON XLR-3-11C or equivalent)</td>
</tr>
<tr>
<td>REMOTE</td>
<td>Unphenol, 36 PIN, female</td>
<td>Unphenol, 36 PIN, male</td>
<td>Optional accessory RCD-5D (5m) / 10D (10m) or 1-557-482-00 (cable)</td>
</tr>
<tr>
<td>STATUS OUT</td>
<td>D-sub, 25 PIN, female</td>
<td>D-sub, 25 PIN, male</td>
<td>1-558-116-00 (cable)</td>
</tr>
</tbody>
</table>
1-8-2. Input/Output Signals of Connectors

The input and output signals of the connectors on the connector panel are as follows.

1. PCM-9000

Input
REFERENCE VIDEO INPUT: Composite Video, Composite Sync signal, Square wave, Impedance 75 ohms, terminated in 75 ohms
WORD SYNC INPUT: 3 V min., Impedance 75 ohms (unbalanced), terminated in 75 ohms
INSERTION RETURN: AES-1992, Digital audio interface (AES/EBU)

Output
WORD SYNC OUTPUT: TTL Level, Impedance 75 ohms (unbalanced)
INSERTION SEND: AES-1992, Digital audio interface (AES/EBU)

REMOTE: Round, 10 Pin, Female

- OUTSIDE VIEW -

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal Name</th>
<th>Signal Level</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RAES-</td>
<td>RS-422A</td>
<td>DIGITAL AUDIO OUTPUT</td>
</tr>
<tr>
<td>2</td>
<td>SR-RX+</td>
<td>RS-422A</td>
<td>REMOTE COMMAND INPUT</td>
</tr>
<tr>
<td>3</td>
<td>+12 Vdc</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>+12 Vdc</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>SR-RX-</td>
<td>RS-422A</td>
<td>REMOTE COMMAND INPUT</td>
</tr>
<tr>
<td>6</td>
<td>GND</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>SR-TX-</td>
<td>RS-422A</td>
<td>COMMAND OUTPUT</td>
</tr>
<tr>
<td>9</td>
<td>RAES+</td>
<td>RS-422A</td>
<td>DIGITAL AUDIO OUTPUT</td>
</tr>
<tr>
<td>10</td>
<td>SR-TX+</td>
<td>RS-422A</td>
<td>COMMAND OUTPUT</td>
</tr>
</tbody>
</table>
2. RM-D9000

REMOTE: Round, 10 Pin, Female

- OUTSIDE VIEW -

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal Name</th>
<th>Signal Level</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RAES-</td>
<td>RS-422A</td>
<td>DIGITAL AUDIO OUTPUT</td>
</tr>
<tr>
<td>2</td>
<td>SR-RX+</td>
<td>RS-422A</td>
<td>REMOTE COMMAND OUTPUT</td>
</tr>
<tr>
<td>3</td>
<td>+12 Vdc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>+12 Vdc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>SR-RX-</td>
<td>RS-422A</td>
<td>REMOTE COMMAND OUTPUT</td>
</tr>
<tr>
<td>6</td>
<td>GND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>SR-TX-</td>
<td>RS-422A</td>
<td>COMMAND INPUT</td>
</tr>
<tr>
<td>9</td>
<td>RAES+</td>
<td>RS-422A</td>
<td>DIGITAL AUDIO INPUT</td>
</tr>
<tr>
<td>10</td>
<td>SR-TX+</td>
<td>RS-422A</td>
<td>COMMAND INPUT</td>
</tr>
</tbody>
</table>

3. DABK-9001

LINE INPUT CH-1/CH2: Reference level +4 dBs, max. +26 dBs. Impedance 10 k ohms/600 ohms (Set up at the switch on the board), balanced

LINE OUTPUT CH-1/CH-2: Reference level +4 dBs, max. +26 dBs. Impedance 50 ohms max., balanced
**4. DABK-9003**

TIME CODE IN : IEC461 (SMPT'E/EBU). 0.5 to 10 Vp-p (10 k ohms, balanced)

TIME CODE OUT : IEC461 (SMPT'E/EBU), 2.4 ±0.1 Vp-p (100 ohms max., balanced)

PARALLEL REMOTE : Parallel, TTL Compatible

REMOTE (9 PIN) /RS-232 : RS-422A or RS-232C (SW change-over)

PARALLEL REMOTE : D-sub, 50 Pin, Female

---

**Pin No.** | **Signal name** | **Pin No.** | **Signal name**
---|---|---|---
1 | STOP COMMAND | 26 | SPEED B COMMAND
2 | PLAY COMMAND | 27 | SPEED C COMMAND
3 | REC COMMAND | 28 | (Reserved)
4 | REH COMMAND | 29 | GND
5 | REH-ST COMMAND | 30 | STOP STATUS
6 | FF COMMAND | 31 | PLAY STATUS
7 | REW COMMAND | 32 | REC STATUS
8 | NEXT COMMAND | 33 | REH STATUS
9 | PREV COMMAND | 34 | (Reserved)
Note) 10 | (Reserved) | 35 | FF STATUS
Note) 11 | (Reserved) | 36 | REW STATUS
Note) 12 | (Reserved) | 37 | (Reserved)
Note) 13 | (Reserved) | 38 | (Reserved)
Note) 14 | (Reserved) | 39 | (Reserved)
Note) 15 | (Reserved) | 40 | (Reserved)
16 | TC REC READY COMMAND | 41 | (Reserved)
17 | D1 REC READY COMMAND | 42 | (Reserved)
18 | D2 REC READY COMMAND | 43 | (Reserved)
Note) 19 | (Reserved) | 44 | (Reserved)
Note) 20 | (Reserved) | 45 | TC REC READY STATUS
Note) 21 | (Reserved) | 46 | D1 REC READY STATUS
22 | EXT SOURCE COMMAND | 47 | D2 REC READY STATUS
Note) 23 | EXT SOURCE (9.6 K) INPUT | 48 | (Reserved)
24 | REVERSE COMMAND | 49 | +5 V OUT
25 | SPEED A COMMAND | 50 | GND (FG)

**Note:** Make sure the "Reserved" terminal is open and not contacting anything.
## REMOTE (9 PIN) / RS-232: D-sub, 9 Pin, Female

### OUTSIDE VIEW

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FG</td>
</tr>
<tr>
<td>2</td>
<td>TX–</td>
</tr>
<tr>
<td>3</td>
<td>RX+</td>
</tr>
<tr>
<td>4</td>
<td>RX GND</td>
</tr>
<tr>
<td>5</td>
<td>DG</td>
</tr>
<tr>
<td>6</td>
<td>TX GND</td>
</tr>
<tr>
<td>7</td>
<td>TX+</td>
</tr>
<tr>
<td>8</td>
<td>RX–</td>
</tr>
<tr>
<td>9</td>
<td>FG</td>
</tr>
</tbody>
</table>

### Pin No. Signal name

- Using as SONY 9 Pin serial mode

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D.G.</td>
</tr>
<tr>
<td>2</td>
<td>RXD</td>
</tr>
<tr>
<td>3</td>
<td>TXD</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
</tr>
<tr>
<td>5</td>
<td>DG</td>
</tr>
<tr>
<td>6</td>
<td>DSR</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
</tr>
<tr>
<td>9</td>
<td>FG</td>
</tr>
</tbody>
</table>

### Pin No. Signal name

- Using as RS-232

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCD</td>
</tr>
<tr>
<td>2</td>
<td>RXD</td>
</tr>
<tr>
<td>3</td>
<td>TXD</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
</tr>
<tr>
<td>5</td>
<td>DG</td>
</tr>
<tr>
<td>6</td>
<td>DSR</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
</tr>
<tr>
<td>9</td>
<td>FG</td>
</tr>
</tbody>
</table>

## 5. DABK-9004

INPUT CH-1/CH-2 : SDIF-2 unbalanced, TTL compatible.
1.536 M bit/s (48 kHz, 16 bit)

INPUT CH-1/CH-2 : SDIF-2 unbalanced, TTL compatible

## 6. DABK-9005

SCSI: Half pitch unphenol, 50 Pin, Female

### OUTSIDE VIEW

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D.G.</td>
</tr>
<tr>
<td>2</td>
<td>RXD</td>
</tr>
<tr>
<td>3</td>
<td>TXD</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
</tr>
<tr>
<td>5</td>
<td>DG</td>
</tr>
<tr>
<td>6</td>
<td>DSR</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
</tr>
<tr>
<td>9</td>
<td>FG</td>
</tr>
</tbody>
</table>

### Pin No. Signal name

- Using as RS-232

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D.G.</td>
</tr>
<tr>
<td>2</td>
<td>RXD</td>
</tr>
<tr>
<td>3</td>
<td>TXD</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
</tr>
<tr>
<td>5</td>
<td>DG</td>
</tr>
<tr>
<td>6</td>
<td>DSR</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
</tr>
<tr>
<td>9</td>
<td>FG</td>
</tr>
</tbody>
</table>

### Pin No. Signal name

- Using as SONY 9 Pin serial mode

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D.G.</td>
</tr>
<tr>
<td>2</td>
<td>RXD</td>
</tr>
<tr>
<td>3</td>
<td>TXD</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
</tr>
<tr>
<td>5</td>
<td>DG</td>
</tr>
<tr>
<td>6</td>
<td>DSR</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
</tr>
<tr>
<td>9</td>
<td>FG</td>
</tr>
</tbody>
</table>

### Pin No. Signal name

- TTL compatible.
1.536 M bit/s (48 kHz, 16 bit)

## PCM-9000

1 - 12 (E)
### 7. DABK-9006

**CUE DATA IN**: FM, 0.5 to 10 Vp-p (10 kΩ), 4800 bit/s

**CUE DATA OUT**: FM, 2 ±0.5 Vp-p (600 Ω), 4800 bit/s

**REMOTE**: Parallel, TTL compatible

**STATUS OUT**: Parallel, TTL compatible

**STATUS OUT**: D-sub, 25 Pin, Female

---

**Pin No.** | **Signal name** | **Function**
--- | --- | ---
1 | D. G. | Always H
2 | STS A/B | Not used
3 | REC/PB SW | Not used
4 | F. G. | FRAME GROUND
5 | STS HOLD | HOLD
6 | D. G. | N. G.
7 | D. G. | AVERAGE
8 | STS AVE | CRITICAL ERROR
9 | STS CRC | CRC ERROR
10 | STS FS ID | H: 48 or 44.056 kHz, L: 44.1 kHz
11 | STS EMP | EMPHASIS (H: ON, L: OFF)
12 | D. G. | MUTING
13 | WCK+ | WORD CLOCK (RS-422)
14 | BCK+ | BIT CLOCK (RS-422)
15 | DT1+ | Ch-1 DATA (RS-422)
16 | DT2+ | Ch-2 DATA (RS-422)
17 | STS PAR | PARITY ERROR

**REMOTE**: unphenol, 36 Pin, Female - OUTSIDE VIEW -

---

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+5 V. OUT</td>
<td>Always H</td>
</tr>
<tr>
<td>2</td>
<td>FF. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>3</td>
<td>FWD. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>4</td>
<td>REW. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>5</td>
<td>EJECT. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>6</td>
<td>STOP. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>7</td>
<td>PAUSE. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>8</td>
<td>REC. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>9</td>
<td>CUT-IN. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>10</td>
<td>EDIT. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>11</td>
<td>CUT-OUT. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>12</td>
<td>FF. OUT</td>
<td>Not used</td>
</tr>
<tr>
<td>13</td>
<td>FWD. OUT</td>
<td>Not used</td>
</tr>
<tr>
<td>14</td>
<td>REW. OUT</td>
<td>Not used</td>
</tr>
<tr>
<td>15</td>
<td>STSBY. OUT</td>
<td>Not used</td>
</tr>
<tr>
<td>16</td>
<td>STOP. OUT</td>
<td>Not used</td>
</tr>
<tr>
<td>17</td>
<td>PAUSE-1. OUT</td>
<td>Not used</td>
</tr>
<tr>
<td>18</td>
<td>REC. OUT</td>
<td>Always H (OFF)</td>
</tr>
<tr>
<td>19</td>
<td>INS. OUT</td>
<td>Not used</td>
</tr>
<tr>
<td>20</td>
<td>V-INS. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>21</td>
<td>A1-INS. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>22</td>
<td>A2-INS. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>23</td>
<td>REV. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>24</td>
<td>SPEED-A. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>25</td>
<td>SPEED-B. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>26</td>
<td>CTL. OUT</td>
<td>Not used</td>
</tr>
<tr>
<td>27</td>
<td>TACH. OUT</td>
<td>Not used</td>
</tr>
<tr>
<td>28</td>
<td>CHN. OUT</td>
<td>Not used</td>
</tr>
<tr>
<td>29</td>
<td>SYNCH. OUT</td>
<td>Not used</td>
</tr>
<tr>
<td>30</td>
<td>N. C.</td>
<td>Not used</td>
</tr>
<tr>
<td>31</td>
<td>H-NORM-FWD. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>32</td>
<td>PAUSE-2. OUT</td>
<td>Not used</td>
</tr>
<tr>
<td>33</td>
<td>SEARCH. IN</td>
<td>Not used</td>
</tr>
<tr>
<td>34</td>
<td>N. C.</td>
<td>Not used</td>
</tr>
<tr>
<td>35</td>
<td>D. G.</td>
<td>Not used</td>
</tr>
<tr>
<td>36</td>
<td>D. G.</td>
<td>Not used</td>
</tr>
</tbody>
</table>

© OPEN COLLECTOR OUTPUT (Except for RS-422)
1-9. SWITCHES/LED/JUMPERS SETTING

1. PCM-9000

MC-41 board

Switch
SW1/2: Setting the unit operation mode
(For details, refer to OPERATION MANUAL.)
Factory setting: SW1-1 to SW1-8 all "1"
SW2-1 to SW2-8 all "1"

SW3: Setting the unit test mode
(For details, refer to OPERATION MANUAL.)
Factory setting: "0"

SW4: CPU RESET switch

LED indicator
D1: MEM-58 board mounting: Light on (green)
D2: ED-37 board mounting: Light on (green)
D3: CK-41 board mounting: Light on (green)
D4: DIO-27 board mounting: Light on (green)
D5: The board mounting to the OPTION SLOT 1: Light on (green)
D6: The board mounting to the OPTION SLOT 2: Light on (green)
D7: The board mounting to the OPTION SLOT 3: Light on (green)
D8: The board mounting to the OPTION SLOT 4: Light on (green)
D10: CPU RESET: Light on (red)
D11: CPU stopped: Light on (red)
D12: CPU BUS ERROR: Light on (red)

Volume
RV1: Video PLL FREE-RUN adjustment (44.056 k)
RV2: Video PLL FREE-RUN adjustment (44.1 k)
RV3: Video PLL FREE-RUN adjustment (48 k)
T1: VARI PLL adjustment
T2: 256Fs PLL adjustment
For details of adjustment, refer to "5. ELECTRICAL ALIGNMENT".

DIO-27 board

Switch
S1: Source origin data setting switch
(the last two figures)
The Data is BCD code.
S1-1 to S1-4...the second digit
S1-5 to S1-8...the first digit
Each digits are set by binary. (ON = 1, OFF = 0)
Factory setting: all OFF

Example) Data (the last two figures): 39

1 2 3 4 5 6 7 8

the second digit the first digit

S1-1 → OFF S1-5 → ON
S1-2 → OFF S1-6 → OFF
S1-3 → ON S1-7 → OFF
S1-4 → ON S1-8 → ON
CV1: Gap actuator zero point adjustment
For details, refer to section "4-4. ALIGNMENT".

SW-144 board

Volume
L201/L202: PLL adjustment
RV401: PULL IN OFF SET adjustment
RV402: FOCUS BIAS adjustment
RV403: FOCUS GAIN adjustment
RV404: TRACKING OFF SET adjustment
RV405: TRACKING GAIN adjustment
RV501: SPINDLE OFF SET adjustment
RV901: MAGNETIC HEAD GAP OFF SET adjustment
For details, refer to section "4-4. ALIGNMENT".

Switch
S801: SERVO CPU reset switch
S802: CPU tool Mode setting switch

Switch setting | Explanation
--- | ---
S801-1 | S802-1  | Track jump single mode
OFF | OFF |
ON | OFF |
OFF | ON  | Absolute address access
ON  | ON  | Relative address access

Factory setting
S802-1, 2: OFF (normal)

ADA-28 board

Volume
RV101: INPUT CMR adjustment (CH1)
RV102: AD CONVERTER OFF SET adjustment (CH1)
RV103: OUTPUT BALANCE AMP Balance adjustment (CH1)
RV201: INPUT CMR adjustment (CH2)
RV202: AD CONVERTER OFF SET adjustment (CH2)
RV203: OUTPUT BALANCE AMP Balance adjustment (CH2)
For details of adjustment, refer to "5. ELECTRICAL ALIGNMENT".

PCM-9000 1 - 15 (E)
Switch
S101 (S101-1 to S101-4): Change over the analog audio signal HOT/COLD to be input to CH1 ANALOG INPUT connector.
S201 (S201-1 to S201-4): Change over the analog audio signal HOT/COLD to be input to CH2 ANALOG INPUT connector.

The pin assignment of the CH1/CH2 connectors change as follows depending on the switch setting.

<table>
<thead>
<tr>
<th>Switch setting</th>
<th>ANALOG AUDIO INPUT CH1/CH2 connector Pin assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>S101 S201</td>
<td>Pin No.</td>
</tr>
<tr>
<td>-1 -2 -3 -4</td>
<td>GND</td>
</tr>
<tr>
<td>ON ON OFF OFF</td>
<td></td>
</tr>
<tr>
<td>OFF OFF ON ON</td>
<td></td>
</tr>
</tbody>
</table>

Factory setting

S103 (S103-1 to S103-4), S203 (S203-1 to S203-4): AD CONVERTER FULL BIT input selector

<table>
<thead>
<tr>
<th>Switch setting</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>S103 S203</td>
<td></td>
</tr>
<tr>
<td>-1 -2 -3 -4</td>
<td>+24 dBs Input: Full Bit</td>
</tr>
<tr>
<td>OFF OFF ON ON</td>
<td>Full Bit: +24 dBs output</td>
</tr>
<tr>
<td>OFF OFF ON ON</td>
<td>Full Bit: +21 dBs output</td>
</tr>
<tr>
<td>OFF OFF ON ON</td>
<td>Full Bit: +18 dBs output</td>
</tr>
<tr>
<td>OFF OFF ON ON</td>
<td>Full Bit: +15 dBs output</td>
</tr>
</tbody>
</table>

Factory setting

S104 (S104-1 to S104-4), S204 (S204-1 to S204-4): LINE OUT output level selector (When the DA CONVERTER FULL BIT to be input.)

<table>
<thead>
<tr>
<th>Switch setting</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>S104 S204</td>
<td>LINE OUT Output level</td>
</tr>
<tr>
<td>-1 -2 -3 -4</td>
<td>Full Bit: +24 dBs output</td>
</tr>
<tr>
<td>OFF OFF ON ON</td>
<td>Full Bit: +21 dBs output</td>
</tr>
<tr>
<td>OFF OFF ON ON</td>
<td>Full Bit: +18 dBs output</td>
</tr>
<tr>
<td>ON OFF OFF OFF</td>
<td>Full Bit: +15 dBs output</td>
</tr>
</tbody>
</table>

Factory setting

S105 (S105-1 to S105-4): Change over the analog audio signal HOT/COLD to be output to CH1 ANALOG OUTPUT connector.
S205 (S205-1 to S205-4): Change over the analog audio signal HOT/COLD to be output to CH2 ANALOG OUTPUT connector.

The pin assignment of the CH1/CH2 connectors change as follows depending on the switch setting.

<table>
<thead>
<tr>
<th>Switch setting</th>
<th>ANALOG AUDIO OUTPUT CH1/CH2 connector pin assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>S105 S205</td>
<td>Pin No.</td>
</tr>
<tr>
<td>-1 -2 -3 -4</td>
<td>GND</td>
</tr>
<tr>
<td>ON ON OFF OFF</td>
<td></td>
</tr>
<tr>
<td>OFF OFF ON ON</td>
<td></td>
</tr>
</tbody>
</table>

Factory setting

1 - 16 (E)
S102, S202: Set the input impedance of the analog audio signal to be input to the CH1 and CH2 AUDIO INPUT connectors.

<table>
<thead>
<tr>
<th>Switch setting</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>S102</td>
<td>CH1 input impedance: 600Ω</td>
</tr>
<tr>
<td></td>
<td>CH1 input impedance: 20kΩ</td>
</tr>
<tr>
<td>S202</td>
<td>CH2 input impedance: 600Ω</td>
</tr>
<tr>
<td></td>
<td>CH2 input impedance: 20kΩ</td>
</tr>
</tbody>
</table>

**Factory settings**: S102 and S202 are both set to OFF

4. **DABK-9007**

MEM-SS board

<table>
<thead>
<tr>
<th>Switch</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>Correction for the disposal delay of the external equipment connection as the insertion mode.</td>
</tr>
</tbody>
</table>

In case of using as the insertion mode, sets the processing delay value of the external equipment connection.

Significance value of each switches (S1-1 to S1-8) is as follows:

<table>
<thead>
<tr>
<th>S1 setting</th>
<th>Delay value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1-1</td>
<td>ON: 0, OFF: 128</td>
</tr>
<tr>
<td>S1-2</td>
<td>ON: 0, OFF: 64</td>
</tr>
<tr>
<td>S1-3</td>
<td>ON: 0, OFF: 32</td>
</tr>
<tr>
<td>S1-4</td>
<td>ON: 0, OFF: 16</td>
</tr>
<tr>
<td>S1-5</td>
<td>ON: 0, OFF: 8</td>
</tr>
<tr>
<td>S1-6</td>
<td>ON: 0, OFF: 4</td>
</tr>
<tr>
<td>S1-7</td>
<td>ON: 0, OFF: 2</td>
</tr>
<tr>
<td>S1-8</td>
<td>ON: 0, OFF: 1</td>
</tr>
</tbody>
</table>

(Unit: WORD)

Set the combination of each switches (S1-1 to S1-8) so as to become satisfactory delay value.

**Factory setting**: S1-1 to S1-8: all ON

**EX**: In case of 100 (WORD) delay value setting

100 = 64 + 32 + 4 (WORD)

S1 setting

S1-2, 3, 6: OFF
S1-1, 4, 5, 7, 8: ON

PCM-9000
SECTION 2
SERVICE OVERVIEW

2-1. LOCATION OF MAIN PARTS

PCM-9000
1. ED-37
2. CK-41
3. DIO-27
4. MC-41
5. VR-169
6. VR-168
7. KY-264
8. JK-42
9. KY-265
10. MB-491
11. MO Disc Drive
12. MD-87
13. TR-82
14. GPM-11 (OWH Assy)
15. SE-209

RM-D9000
1. SV-144
2. CN-915
3. CN-902
4. PS-345
5. MB-490
6. PS-354
7. SVD-9
8. MO Disc Drive
9. MD-87
10. TR-82
11. GPM-11 (OWH Assy)
12. SE-209

DABK-9001
1. LE-120
2. CK-41
3. DIO-27
4. MC-41
5. VR-169
6. VR-168
7. KY-264
8. JK-42
9. KY-265
10. MB-491
11. MO Disc Drive
12. MD-87
13. TR-82
14. GPM-11 (OWH Assy)
15. SE-209

DABK-9005
1. LE-120
2. CK-41
3. DIO-27
4. MC-41
5. VR-169
6. VR-168
7. KY-264
8. JK-42
9. KY-265
10. MB-491
11. MO Disc Drive
12. MD-87
13. TR-82
14. GPM-11 (OWH Assy)
15. SE-209
## 2-2. CIRCUIT CONFIGURATION

<table>
<thead>
<tr>
<th>Model Name</th>
<th>Board Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCM-9000</td>
<td>CK-41</td>
<td>CLOCK BOARD</td>
</tr>
<tr>
<td></td>
<td>CN-902</td>
<td>CONNECTOR BOARD</td>
</tr>
<tr>
<td></td>
<td>CN-915</td>
<td>CONNECTOR BOARD</td>
</tr>
<tr>
<td></td>
<td>DIO-27</td>
<td>AES/EBU DIGITAL I/O, HEADPHONES BOARD</td>
</tr>
<tr>
<td></td>
<td>ED-37</td>
<td>EDIT BOARD</td>
</tr>
<tr>
<td></td>
<td>GPM-11</td>
<td>GAP SENSOR BOARD</td>
</tr>
<tr>
<td></td>
<td>JK-42</td>
<td>HEADPHONES BOARD</td>
</tr>
<tr>
<td></td>
<td>KY-264</td>
<td>KEY SWITCH BOARD</td>
</tr>
<tr>
<td></td>
<td>KY-265</td>
<td>KEY SWITCH BOARD</td>
</tr>
<tr>
<td></td>
<td>MB-490</td>
<td>MOTHER BOARD</td>
</tr>
<tr>
<td></td>
<td>MB-491</td>
<td>MOTHER BOARD</td>
</tr>
<tr>
<td></td>
<td>MC-41</td>
<td>MAIN CPU BOARD</td>
</tr>
<tr>
<td></td>
<td>MD-87</td>
<td>MAGNETIC HEAD DRIVE BOARD</td>
</tr>
<tr>
<td></td>
<td>PS-345</td>
<td>D/C CONVERTER BOARD</td>
</tr>
<tr>
<td></td>
<td>PS-354</td>
<td>SWITCHING BOARD</td>
</tr>
<tr>
<td></td>
<td>SE-209</td>
<td>SENSOR BOARD</td>
</tr>
<tr>
<td></td>
<td>SV-144</td>
<td>SERVO BOARD</td>
</tr>
<tr>
<td></td>
<td>SVD-9</td>
<td>SERVO DRIVER BOARD</td>
</tr>
<tr>
<td></td>
<td>TR-82</td>
<td>RF BOARD</td>
</tr>
<tr>
<td></td>
<td>VR-168</td>
<td>VR BOARD</td>
</tr>
<tr>
<td></td>
<td>VR-169</td>
<td>VR BOARD</td>
</tr>
</tbody>
</table>

| RM-D9000   | CN-883     | CONNECTOR BOARD |
|            | DP-195     | FL DRIVER BOARD |
|            | KC-32      | KEY CONTROL BOARD |
|            | KY-267     | KEY BOARD |
|            | KY-269     | KEY BOARD |
|            | LE-120     | LED BOARD |
|            | KY-297     | TEN KEY BOARD |

| DABK-9001  | ADA-28     | AD/DA CONVERTER BOARD |
| DABK-9003  | TC-77, TC-78 | REMOTE/TC I/F BOARD |
| DABK-9004  | DIO-28     | SDIF-2 I/F BOARD |
| DABK-9005  | IF-436, IF-437 | SCSI I/F BOARD |
| DABK-9006  | IF-438     | DAQ-1000 I/F BOARD |
| DABK-9007  | MEM-58     | MEMORY BOARD |
2-3. CABINET REMOVAL

2-3-1. Top Panel, Side Panels and Bottom Panel Removal

Top panel
Remove the four screws (4x6 S Tight) which secure the top panel, and remove the top panel.

Side panels
Remove the six screws (4x6 S Tight) which secure the side panel, and remove the side panels (left or right).
Note: There is air vent on the left side panel, but none on the right side panel. When installing these panels, be careful not to mix them up.

Bottom panel
Either loosen the left and right side panels or remove them. Remove the seven screws (PTTWH 3x5) C and remove the bottom panel.
2-3-2. Front Panel Ass’y Removal

1. Remove the top panel. (See section 2-3.)
2. Remove all plug-in boards. (See section 2-4.)
3. Remove the six screws (PTTW3x5).
4. Disconnect the harness from the connector (CN113, CN114 and CN115) on MB-490 board.
5. Remove the front panel Ass’y out in the direction of the arrow.

2-3-3. Switch Cover Removal

1. Remove the front panel. (See section 2-3.)
2. Remove the switch cover by the back of the front panel as shown in the figure.

2-4. REMOVING/INSERTING PLUG-IN BOARDS

Removing and installing procedures of the plug-in board are as follows.
- MC-41 board
- DIO-27 board
- CK-41 board
- ED-37 board
- MEM-58 board (When the optional DABK-9007 is installed.)

Note: Be sure to turn the POWER switch of PCM-9000 off before removing and installing of the plug-in board.

Preparations
Remove the top panel. (See section 2-3.)

1. Removing procedure of Plug-in board.
   1. Remove the two screws (PTTW3x5) which secure the plug-in board.
   2. Pull the eject levers in the direction of arrow A and pull the plug-in board out in the direction of arrow A.

2. Inserting procedure of Plug-in board.
   1. Push the eject levers in the direction of arrow B.
   2. Insert the plug-in board along the board slot.
   3. Fasten the plug-in board with two screws (PTTW3x5).
2-5. USING THE EXTENSION BOARD

Note: Be sure to turn the POWER switch of PCM-9000 off before removing, and installing the plug-in board.

2-5-1. Using the Extension Board EX-396

Use to extend for maintenance of the following boards:
- MC-41 board
- DIO-27 board
- CK-41 board
- ED-37 board
- MEM-58 board (When the DABK-9007 is installed.)

Procedure:
1. Remove the top panel. (See section 2-3.)
2. Remove two screws of the plug-in board to extended.
   Open the eject levers of the plug-in board, then pull out the plug-in board from the unit. (See section 2-4.)
3. After the plug-in board removed, push the eject levers of the extension board EX-396. Then insert the EX-396 board along the guide rail.
4. Insert the plug-in board to end of the extension board to EX-396 extend it.

2-5-2. Using the Extension Board EX-397

Used to extend for maintenance of the following optional boards:
- DABK-9001 (ADA-28 board)
- DABK-9003 (TC-77/78 board)
- DABK-9004 (DIO-28 board)
- DABK-9005 (F-436/437 board)
- DABK-9006 (F-438 board)

Procedure:
1. Remove the two screws of the board to extended.
2. After the option board removed, insert the extension board EX-397 to direction of arrow along the board slot.
3. Insert the option board to end of the extension board to extend it.
2-6. REMOVING THE DISC IN EMERGENCIES

If the M/O disc drive unit is damaged and the disc will not come out even when you press the eject button, take the following steps to remove the disc.

Required Tool
Ball point L wrench BL2MM (Supplied accessories)

Procedure
(1) Turn off the POWER switch.
(2) Insert a ball-point L wrench into the emergency ejector access hole, and push it straight with quiet force. The disc will be ejected and can be removed.

Note: Although the disc eject at first inserting after the emergency eject, nothing unusual has happened. After next inserting, the disc get back on its normal loading.
### 2-7. TOOLS AND EQUIPMENT

#### Equipment:

<table>
<thead>
<tr>
<th>Name</th>
<th>Minimum specifications</th>
<th>Name of instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oscilloscope</td>
<td>Frequency bandwidth: DC–20 MHz or more</td>
<td>Tektronix 2445, 475 or equivalent</td>
</tr>
<tr>
<td>Two channel Level meter</td>
<td>Resolution: 0.1 B or more</td>
<td>Leader LMV1815, LMV189AR or equivalent</td>
</tr>
<tr>
<td>DC voltmeter</td>
<td>Resolution: 1 mV or more</td>
<td>Advantest TR-6855 or equivalent</td>
</tr>
<tr>
<td>Frequency counter</td>
<td>Effective: 8 digits or more, Frequency measurement capacity: 20 MHz</td>
<td>Advantest TR-5822 or equivalent</td>
</tr>
<tr>
<td>Video monitor</td>
<td>With video input terminal (BNC)</td>
<td></td>
</tr>
<tr>
<td>BNC cable</td>
<td>Using cable: Coaxial cable 3C-2V</td>
<td>SONY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>UGC -0.5 (0.5 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>UGC -1 (1 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>UGC -2 (2 m)</td>
</tr>
</tbody>
</table>

#### Tools:

<table>
<thead>
<tr>
<th>Name</th>
<th>Part number</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple MC tool</td>
<td>J-6400-850-A</td>
<td>Adjustable ROM (supplied)</td>
</tr>
<tr>
<td>Servo Gain adjustment tool</td>
<td>J-6400-890-A</td>
<td></td>
</tr>
<tr>
<td>Magnetic head gap adjustment disc</td>
<td>J-6405-010-A</td>
<td></td>
</tr>
<tr>
<td>Head position adjustment tool (NTSC)</td>
<td>J-6405-020-A</td>
<td>CCD camera, Lens, Camera adaptor, Camera cable, Camera holder (supplied)</td>
</tr>
<tr>
<td>Head position adjustment tool (PAL)</td>
<td>J-6405-350-A</td>
<td>CCD camera, Lens, Camera adaptor, Camera cable, Camera holder (supplied)</td>
</tr>
<tr>
<td>Head position adjustment cartridge</td>
<td>J-6405-320-A</td>
<td></td>
</tr>
<tr>
<td>Eccentricity driver (2-4)</td>
<td>3-702-390-01</td>
<td></td>
</tr>
<tr>
<td>Test disc</td>
<td>J-6401-060-A</td>
<td></td>
</tr>
<tr>
<td>Low pass filter tool</td>
<td>J-6401-070-A</td>
<td></td>
</tr>
<tr>
<td>Block error rate checker</td>
<td>J-6400-880-A</td>
<td></td>
</tr>
<tr>
<td>AAIP error rate checker</td>
<td>J-6400-840-A</td>
<td></td>
</tr>
<tr>
<td>EX-396 Extension board</td>
<td>J-6400-860-A</td>
<td></td>
</tr>
<tr>
<td>EX-397 Extension board</td>
<td>J-6400-870-A</td>
<td></td>
</tr>
</tbody>
</table>
SECTION 4
REPLACEMENT OF MAJOR PARTS & ALIGNMENT

4-1. POWER UNIT REPLACEMENT

4-1-1. Switching Regulator Replacement

Note: Always unplug the power plug from the socket.

(1) Remove the top and side (right) panel.
(2) Remove the screw (PTTWH 3x5), then remove the power unit cover.

(3) Remove the two screws (PSW 4x8). Disconnect the harness from three connectors (CN1, CN4, CN6) of the switching regulator.

(4) Disconnect the harness from the connector (CN2) on the PS-354 board, then remove the switching regulator.

(5) Disconnect the harness from the connector (CN1) on the PS-354 board.
Remove the two screws (PSW 4x8), then remove the PS-354 Attaching plate from the switching regulator.

(6) Install new switching regulator in the reverse order of steps 1 to 5.
(7) After this replacement, perform "4-4. ALIGNMENT".
4-2. FAN MOTOR/AIR FILTER REPLACEMENT

4-2-1. Fan Motor (Large) Replacement
(1) Turn the PCM-9000 upside down.
(2) Remove the bottom panel. (See section 2-3.)
(3) Disconnect the harness of the fan motor (large) from the connector (CN130) on the MB-490 board.
(4) Remove the two screws (PSW 3x30), then remove the fan motor (large).
(5) Install new fan motor (large) in the reverse order of steps 1 to 4. During installation, fix the fan motor harness with a wire holder to prevent it from working loose.

Air Filter Replacement
(1) Turn the PCM-9000 upside down.
(2) Remove the bottom panel. (See section 2-3.)
(3) Push the knob toward (A) as illustrated, and remove the air filter.
(4) Install new air filter in the reverse order of steps 1 to 3.

4-2-3. Fan Motor (Small) Replacement
(1) Disconnect the harness of the PS-345 board from the connectors (CN101 to CN104). Remove the four screws (PTTHW 3x5), then remove the PS-345 board.
(2) Disconnect the harness of the fan motor (small) from the connector (CN131) on the MB-490 board.
(3) Remove the two plate nut and the four screws (B3x30), then remove the fan motor (small).
(4) Install new fan motor (small) and the PS-345 board in the reverse order of steps 1 to 3.
4-3. M/O DISC DRIVE REPLACEMENT

This section describes the component parts replacement procedure of M/O Disc Drive as below.

Note:
1. For replacement and adjustment of M/O Disc Drive parts, contact a SONY service center.
2. Be sure turn the POWER switch off.

4-3-1. OWH Ass'y Replacement
4-3-2. Loading Ass'y Replacement
4-3-3. Spindle Motor Replacement
4-3-4. Optical pick-up Replacement
4-3-5. Geared Motor Replacement

Prepalation

Removal of M/O Disc Drive

(1) Remove the top panel. (See section 2-3.) Remove the six screws (PTTWH 3x5), then remove the SV-144 board.

(2) Disconnect the harness of the M/O Disc Drive from eight connectors (CN104 to CN111) on the SV-144 board and the connector (CN5) on the MD-87 board.

(3) Remove the harness from the wire holder that disconnected by the two connectors (CN110, CN111) on the SV-144 board.

(4) Remove the lead with terminal.

(5) Remove the four screws (PTTWH 3x5), then remove the M/O Disc Drive while lifting the rear side of the PCM-9000. And disconnect the harness from the connector (CN108) on the TR-82 board.

(6) Install the M/O Disc Drive in the reverse order of steps 1 to 5.

Note: When installing the M/O Disc Drive, line up the projection on the dumper holder with the hole in the fan plate.
4-3-1. OWH Ass'y Replacement

(1) Remove the harness from the clamp as illustrated, then disconnect it from the connector (CN101) of the OWH Ass'y and the connector (CN1) on the MD-87 board.

Slide out in the direction indicated by the arrow. Remove the clamp.

(2) Remove the harness of the OWH Ass'y from the clamp on the mechanical chassis holder.

(3) Remove the two screws (PSW 2.6x6), then remove the OWH Ass'y from Mag holder.

(4) Install new OWH Ass'y in the reverse order of step 1 to 3.

Note: Do not bend the OWH Ass'y flexible card wire.

(5) Install the M/O disc drive into the PCM-9000, perform "4-4. ALIGNMENT".

(4) Install new OWH Ass'y in the reverse order of step 1 to 3.

Note: Do not bend the OWH Ass'y flexible card wire.

(5) Install the M/O disc drive into the PCM-9000, perform "4-4. ALIGNMENT".
4-3-2. Loading Assy Replacement

(1) Disconnect the harness from the connector (CN101) of the OWH Assy and the connector (CN1) on the MD-87 board. (See section 4-3-1.)

(2) Insert a screwdriver through the damper holder hole slot, remove the two screws (PSW 3x6) and take out the bridge.
   **Note:** If the positioning of the screws and the holes in the damper holder and out of alignment, remove the TR-82 board (See section 4-3-3.) and remove both the mechanical chassis holder and the damper holder from the mechanical chassis before carrying out the previous adjustment mentioned above.

(3) Remove the screw (PTTWH 3x5), then remove the MD-87 board.

(4) Disconnect the harness from the connectors (CN103, CN104) on the TR-82 board.

(5) Insert a screwdriver through four holes as illustrated, remove the four screws (P 3x6) and take out the Loading Assy.

(6) Install new Loading Assy into the M/O Disc Drive in the reverse order of steps 1 to 5.
   **Note:**
   1. Line up the two projections on the mechanical chassis with the holes in the loading assy and fasten the screws.
   2. When installing the bridge, press the bridge onto the joint plate and fasten the screws so the surface of the two will firmly come together.

(7) Install the M/O Disc Drive into the PCM-9000, and then perform "4-4. ALIGNMENT".
4-3-3. Spindle Motor Replacement

(1) Remove the loading assembly by referring to "4-3-2. Loading Assy Replacement".

(2) Loosen the (three) screws indicated by arrows.

   Note: Do not take out the screws.

(3) Put down the M/O disc drive unit with the bottom up.

   Note: Stand a long screw, etc. at the position indicated in the illustration to protect the optical pick-up of the turntable from a load.

(4) Disconnect the harness of the spindle motor from the connector (CN105) of the TR-82 board.

(5) Remove the four hexagon supports.

(6) Open the TR-82 board in the direction of the arrow.

(7) Disconnect the flexible card wire from two connectors (CN101, CN102).

   Note: When handling the cable, be very careful not to bend it because it will markedly reduce its life.
(8) Remove the (two) spacers between the spindle motor and the motor holder.

**Note:** Spacers are inserted to tilt the spindle motor according to the inclination of the objective lens of the optical pick-up. Their thickness depends on each M/O disc drive unit. (Refer to "4-3-4. Optical Pick-up Replacement"). Since the two spacers do not have the same thickness, write down the original position of each spacer, and mount them in the original position in mounting the spindle motor again. No spacer is used when the objective lens of the optical pick-up is not inclined.

When spacers are used, they are inserted between the spindle motor and the motor holder at A and B, or at B and C in the illustration. The two spacers always have following thickness relationship:

\[ A > B, \quad C > B \]

(9) Put down the M/O disc drive unit with the bottom up. Take out the three screws (+P3x25) that were loosened in step (2). Remove the spindle motor and the motor holder. Then, disconnect the cord with connector.

(10) Install a new spindle motor, and mount the M/O disc drive unit on the main unit by reversing the steps (1) through (9). To mount the spacers, set the screws (+P3x25) rather loosely, and insert the spacers to the screws (+P3x25) from the clearance between the spindle motor and the motor holder. After install them, perform "4-4. ALIGNMENT".

**Note:** Be sure to mount spacers of correct thickness in correct positions.
4-3-4. Optical Pick-up Replacement

When the optical pick-up is replaced, the inclination of the spindle motor must be readjusted using spacers according to the inclination of the objective lens of the optical pick-up.

1. Remove the loading Ass'y by referring to "4-3-2. Loading Ass'y Replacement".

2. Loosen the (three) screws indicated by arrows.
   **Note:** Do not take out the screws.

3. Put down the M/O disc drive unit with the bottom up.
   **Note:** Stand a long screw, etc. at the position indicated in the illustration to protect the optical pick-up of the turn table from a load.

4. Remove the TR-82 board by taking steps (4) through (7) of "4-3-3. Spindle Motor Replacement".

5. Remove the three screws (B 2.6x4), then remove the joint plate.
   Remove the two screws (P 3x6), then remove the Op Lock Ass'y.

6. Disconnect the harness and the flexible card wire from the connector on the drive flexible board.

7. Move the drive coil as shown in the illustration, and remove the two screws (P 3x6).
(8) Remove the four screws (P 3x6), then remove the Linear Motor Assy.

(9) Remove the screw (P 3x6), hexagon support and washer (W3), then move the drive flexible board in the direction of the arrow. **Note:** Do not bend the OWH Assy flexible card wire.

(10) Remove the three screws (P 3x6), then remove the S Magnet Assy.

(11) Remove the three screws 1 (P 3x6) and the screw 2 (K 3x5) and four shaft holders. Remove the Optical Pick-up and take out the shaft. **Note:** Hold the end of the shaft when you remove it, to avoid tarnishing it.
(12) Remove the two spacers between the spindle motor and the motor holder. (No spacer is mounted in some cases.) Mount two of the 0.04 mm, 0.08 mm, and 0.16 mm spacers at two of the three positions (A, B, C) shown in the illustration based on the value of the T.SKEW that is found in the package of a new optical pick-up. (No spacer is necessary in some cases.) The following table shows the relationship between the T.SKEW data, spacer thickness, and positions.

<table>
<thead>
<tr>
<th>T.SKEW (°)</th>
<th>Spacerr Thickness [mm]</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>+0.2 ≤ θ ≤ +0.3</td>
<td>0.16</td>
<td>0.08</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>+0.05 &lt; θ &lt; +0.2</td>
<td>0.08</td>
<td>0.04</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>-0.05 ≤ θ ≤ +0.05</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>-0.2 &lt; θ &lt; -0.05</td>
<td>-</td>
<td>0.04</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>-0.3 ≤ θ ≤ -0.2</td>
<td>-</td>
<td>0.08</td>
<td>0.16</td>
<td></td>
</tr>
</tbody>
</table>

Part No. of Spacer | Thickness [mm] |
-------------------|----------------|
3-183-914-01       | 0.04           |
3-183-914-11       | 0.08           |
3-183-814-21       | 0.16           |

(13) After the Optical Pick-up replacement, install the M/O Disc Drive in the reverse order of Steps 1 to 11.

Note: 1. When installing the shaft holder, do not put screw 1 (P 3x6) and screw 2 (K 3x5) into the wrong positions. But do not put the shaft holder (large) and shaft holder (small) into the wrong positions, too.
2. When installing joint plate, press the bridge onto the joint plate and fasten the screws so the surface of the two will firmly come together.

(14) Install the M/O disc drive into the PCM-9000, and then perform "4-4. ALIGNMENT".
4-3-5. Geared Motor Replacement

(1) Remove the Loading Assy. (See section 4-3-2.)
(2) Remove the two screws (K 2.6x4). Open both ends of the Loading Assy in the direction of the arrow (A) and remove the Motor Chassis Assy.
(3) Remove the cap of the shaft, then remove the Arm Assy.
(4) Remove the two screws (PSW 2.6x6), then remove the Geared Motor.
(5) Install new Geared Motor in the reverse order of steps 1 to 4.
Note: When installing the arm ass'y, insert the Geared Motor pin into the hole in the arm ass'y and seal the cap.
(6) Install the M/O disc drive into the PCM-9000, and then perform "4-4. ALIGNMENT".

PCM-9000 4 - 11 (E)
4-4. ALIGNMENT

This section describes the adjustment necessary to do after the parts replacement as below. All alignment use the simple MC tool.

**Note:** For replacement and adjustment of MIO Disc Drive parts, contact a Sony service center.

1. M/O Disc Drive
   1. Optical Pick-up
   2. Spindle Motor
   3. OWH Ass'y
   4. TR-82 board and parts on the TR-82 board (Q201 to Q205, DL201, IC208, IC209)
   5. The parts necessary to remove the bridge (Loading Ass'y replaced so on)

2. PS-345 board and parts on the PS-345 board
3. Switching regulator
4. SV-144 board and parts on the SV-144 board

The adjustment/confirmation item necessary the above parts replacement as follows.

**Adjustment Item when The Parts Replacement**

(1) Optical Pick-up

- **4-4-1. SV-144 board Adjustment**
  - 1. Pull In Offset Adjustment
  - 2. Focus Gain Adjustment
  - 3. Focus Offset Adjustment

- **4-4-1. SV-144 board Adjustment**
  - 4. Spindle Phase Adjustment
  - 5. Tracking Gain Adjustment
  - 6. Tracking Offset Adjustment

- **4-4-1. SV-144 board Adjustment**
  - 7. PLL Offset Adjustment
  - 8. PLL Adjustment
  - 9. Data Sampling Delay Quantity Adjustment

- **4-4-1. SV-144 board Adjustment**
  - 10. RF Level Confirmation
  - 11. Tracking Offset Confirmation (Checking Thread kick)
  - 12. Focus Offset Confirmation (Block Error Rate Measurement)

- **4-4-2. Magnetic Head Gap Adjustment**
- **4-4-3. Magnetic Head Position Adjustment**

---

4 - 12 (E)  

PCM-9000
### (2) Spindle Motor

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-4-1</td>
<td>SV-144 board Adjustment</td>
</tr>
<tr>
<td>4-4-2</td>
<td>Magnetic Head Gap Adjustment</td>
</tr>
<tr>
<td>4-4-3</td>
<td>Magnetic Head Position Adjustment</td>
</tr>
<tr>
<td>4-4-4</td>
<td>Spindle Phase Adjustment</td>
</tr>
<tr>
<td>4-4-5</td>
<td>RF Level Adjustment</td>
</tr>
<tr>
<td>4-4-6</td>
<td>Tracking Offset Confirmation (Checking Thread kick)</td>
</tr>
<tr>
<td>4-4-7</td>
<td>Focus Offset Confirmation (Block Error Rate Measurement)</td>
</tr>
</tbody>
</table>

### (3) OWH Assy

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-4-1</td>
<td>Magnetic Head Position Adjustment</td>
</tr>
<tr>
<td>4-4-2</td>
<td>Magnetic Head Gap Adjustment (GPM-11/OWH Assy)</td>
</tr>
<tr>
<td>4-4-3</td>
<td>SV-144 board Adjustment</td>
</tr>
<tr>
<td>4-4-4</td>
<td>RF Level Adjustment</td>
</tr>
<tr>
<td>4-4-5</td>
<td>Tracking Offset Confirmation (Block Error Rate Measurement)</td>
</tr>
</tbody>
</table>

### (4) TR-82 board and Q201 to Q205, DL201, IC208, IC209 on the TR-82 board

- PS-345 board and parts on the PS-345 board
- Switching regulator

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-4-1</td>
<td>SV-144 board Adjustment</td>
</tr>
<tr>
<td>4-4-2</td>
<td>Focus Offset Confirmation (Block Error Rate Measurement)</td>
</tr>
<tr>
<td>4-4-3</td>
<td>Tracking Offset Confirmation (Block Error Rate Measurement)</td>
</tr>
</tbody>
</table>

### (5) The parts necessary to remove the Loading Assy and bridge

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-4-1</td>
<td>SV-144 board Adjustment</td>
</tr>
<tr>
<td>4-4-2</td>
<td>Magnetic Head Gap Adjustment (GPM-11/OWH Assy)</td>
</tr>
<tr>
<td>4-4-3</td>
<td>Magnetic Head Position Adjustment</td>
</tr>
<tr>
<td>4-4-4</td>
<td>Tracking Offset Confirmation (Block Error Rate Measurement)</td>
</tr>
</tbody>
</table>

### (6) SV-144 board

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-4-1</td>
<td>Pull In Offset Adjustment</td>
</tr>
<tr>
<td>4-4-2</td>
<td>Focus Gain Adjustment</td>
</tr>
<tr>
<td>4-4-3</td>
<td>Focus Offset Adjustment</td>
</tr>
<tr>
<td>4-4-4</td>
<td>Spindle Phase Adjustment</td>
</tr>
<tr>
<td>4-4-5</td>
<td>Tracking Gain Adjustment</td>
</tr>
<tr>
<td>4-4-6</td>
<td>Tracking Offset Adjustment</td>
</tr>
<tr>
<td>4-4-7</td>
<td>PLL Offset Adjustment</td>
</tr>
<tr>
<td>4-4-8</td>
<td>PLL Adjustment</td>
</tr>
<tr>
<td>4-4-9</td>
<td>Data Sampling Delay Quantity Adjustment</td>
</tr>
<tr>
<td>4-4-10</td>
<td>RF Level Adjustment</td>
</tr>
<tr>
<td>4-4-11</td>
<td>Tracking Offset Confirmation (Checking Thread kick)</td>
</tr>
<tr>
<td>4-4-12</td>
<td>Focus Offset Confirmation (Block Error Rate Measurement)</td>
</tr>
</tbody>
</table>
(7) GAP SERVO block/SV-144 board

- 4-4-2. Magnetic Head Gap Adjustment
  - 4-4-1.SV-144 board Adjustment
  - 12. Focus Offset Confirmation (Block Error Rate Measurement)

(8) PLL block/SV-144 board

- 4-4-1.SV-144 board Adjustment
  - 7. PLL Offset Adjustment
  - 8. PLL Adjustment
  - 9. Data Sampling Delay Quantity Adjustment
  - 12. Focus Offset Confirmation (Block Error Rate Measurement)

(9) SERVO block/SV-144 board

- 4-4-1.SV-144 board Adjustment
  - 1. Pull In Offset Adjustment
  - 2. Focus Gain Adjustment
  - 3. Focus Offset Adjustment
  - 5. Tracking Gain Adjustment
  - 6. Tracking Offset Adjustment
  - 11. Tracking Offset Confirmation (Checking Thread kick)
  - 12. Focus Offset Confirmation (Block Error Rate Measurement)

(10) SPINDLE block/SV-144 board

- 4-4-1.SV-144 board Adjustment
  - 4. Spindle Phase Adjustment
  - 12. Focus Offset Confirmation (Block Error Rate Measurement)
### Preparation

**Equipment Required:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Minimum Specifications</th>
<th>Name of instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oscilloscope</td>
<td>Frequency bandwidth: DC-20MHz or more</td>
<td>TEKTRONIX 2445 or equivalent</td>
</tr>
<tr>
<td></td>
<td>Sweep time: Possible to 20 ns/div</td>
<td></td>
</tr>
<tr>
<td>2-channel Level meter</td>
<td>Resolution: 0.1 dB or more</td>
<td>LEADER LMV1815, LMV189AR or equivalent</td>
</tr>
<tr>
<td>DC Voltmeter</td>
<td>Resolution: 1 mV or more</td>
<td>ADVANCE TR-6855 or equivalent</td>
</tr>
<tr>
<td>Frequency counter</td>
<td>Effective digits: 6 digits or more</td>
<td>ADVANCE TR-5822 or equivalent</td>
</tr>
<tr>
<td></td>
<td>Frequency measurement capacity: 20 MHz</td>
<td></td>
</tr>
<tr>
<td>Video monitor</td>
<td>with video input terminal (BNC)</td>
<td></td>
</tr>
<tr>
<td>BNC cable</td>
<td>Using cable: Coaxial cable 3C-2V</td>
<td>SONY UGC-0.5 (0.5 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SONY UGC-1 (1 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SONY UGC-2 (2 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or equivalent</td>
</tr>
</tbody>
</table>

**Tools Required:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Part number</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple MC tool</td>
<td>J-6400-850-A</td>
<td>Adjustable ROM (supplied)</td>
</tr>
<tr>
<td>Servo Gain adjustment tool</td>
<td>J-6400-890-A</td>
<td></td>
</tr>
<tr>
<td>Magnetic head gap adjustment disc</td>
<td>J-6405-010-A</td>
<td></td>
</tr>
<tr>
<td>Head position adjustment tool (NTSC)</td>
<td>J-6405-020-A</td>
<td>CCD camera, Lens, Camera adaptor, Camera cable, Camera holder (supplied)</td>
</tr>
<tr>
<td>Head position adjustment tool (PAL)</td>
<td>J-6405-350-A</td>
<td>CCD camera, Lens, Camera adaptor, Camera cable, Camera holder (supplied)</td>
</tr>
<tr>
<td>Head position adjustment cartridge</td>
<td>J-6405-320-A</td>
<td></td>
</tr>
<tr>
<td>Eccentricity driver (2-4)</td>
<td>3-702-390-01</td>
<td></td>
</tr>
<tr>
<td>Test disc</td>
<td>J-6401-060-A</td>
<td></td>
</tr>
<tr>
<td>Low pass filter tool</td>
<td>J-6401-070-A</td>
<td></td>
</tr>
<tr>
<td>Block error rate checker</td>
<td>J-6400-880-A</td>
<td></td>
</tr>
<tr>
<td>AAIP error rate checker</td>
<td>J-6400-840-A</td>
<td></td>
</tr>
<tr>
<td>EX-396 Extension board</td>
<td>J-6400-860-A</td>
<td></td>
</tr>
<tr>
<td>EX-397 Extension board</td>
<td>J-6400-870-A</td>
<td></td>
</tr>
</tbody>
</table>
Using for Simple MC Tool

Simple MC Tool

Switch

CPU RESET switch:
- Simple MC tool CPU reset

7 SEGMENT indicator select switch:
- 7 SEGMENT LED indicator select (as follows)
  1. AAIP address on the disc
  2. 10-key indicator on the disc

Key switch

Note: Valid for installing the disc.
When keys are ON, the key LEDs light up.

- **TEST** key: Set to TEST mode. Used when magnetic head position adjustment.
- **EJECT** key: Eject to disc.
- **REC** key: Set to REC mode. Set up to REC mode Valid for the PLAY mode ([PLAY] key: ON) only.
- **PLAY** key: Set to PLAY mode. The disc becomes the continuous PLAY mode.
- **STOP** key: Set to STOP mode. Stop the disc revolving. Laser OFF.
- **GAP** key: Select to GAP TRIM ON/OFF.
- **TRK** key: Select to TRK ON/OFF.
- **LD** key: Select to LD ON/OFF.

Note: **GAP**, **TRK**, **LD** keys are self operating respectively. But press the **STOP** key, they return the initial conditions (All OFF).

- **FWD JMP** key: Controls the absolute address jump for the address input via the 10-key. Valid for the PLAY mode only.

Connector (Rear Panel)

D-sub, 14 pin: Connect the connecting cord supplied.

Accessory

- Connecting cord: 1
- Adjustable ROM: 1
- Power cord: 1

Connection/Using

Note: Make sure the power to the PCM-9000 and the simple MC tool is OFF when making connections.

(1) Open the SV-144 board.
(2) Disconnect the PCM-9000 harness from the CN103/SV144 board connector.
(3) Connect the simple MC tool connecting cord (26 Pin connector) to CN103/SV144 board.
(4) Replace the ROM (IC814)/SV-144 board with the adjustable ROM (Supplied with simple MC tool).
(5) Turn on the power to the simple MC tools and then to the PCM-9000.
(6) Load the disc. Then **EJECT**, **PLAY**, **STOP**, **GAP**, **TRK**, **TEST**, **LD** keys are valid. **REC** key is valid for PLAY mode only.
(7) Perform the adjustment items in each order.

Key and Switch Initial Settings

7 SEGMENT indicator select switch: Right side

- **REC**, **PLAY**, **STOP**, **GAP**, **TRK**, **LD**, **FWD JMP**, **TEST**, **EJECT** key: OFF (LED turn off)

Note: The every adjustment items describes the simple MC tool key and switch settings at only case of modifying the initial setting.
4-4-1. SV-144 Board Adjustment (SERVO Adjustment)

**Equipment required**
- Oscilloscope
- DC voltage meter
- 2-channel Level meter
- Frequency counter

**Tools**
- Simple MC tool
- Adjustable ROM (Supplied with simple MC tool)
- Test disc (Thermal erase / random)
- Magnetic head gap adjustment disc
- Low pass filter tool
- Block error rate checker

**Adjustment location**

**Preparation**
1. Connect the simple MC tool to the CN103/SV-144 board. (For the connection, see 4-16 page, "Connection/Using" of simple MC tool.)
2. Replace the ROM (IC81-4)/SV-144 board with the adjustable ROM (Supplied with simple MC tool).
3. Insert a normal disc or a test disc when necessary.

**Switch setting (SV-144 board)**
- S802-1: OFF
- S802-2: OFF

**1. Pull-in offset adjustment**

**Adjustment conditions**
- STOP mode (Press the STOP key)
- Connect the DC voltmeter to the TP417/SV-144 board via the low pass filter tool.

**Procedure/Specifications**
- TP417/SV-144 board (N2) level
  - 0±2 mV
- RV401/SV-144 board (M3)
- Not specified

**Connection**

<table>
<thead>
<tr>
<th>Adjustment conditions</th>
<th>Procedure/Specifications</th>
<th>Adjustment point</th>
<th>Disc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple MC tool setting</td>
<td>TP417/SV-144 board (N2) level</td>
<td>RV401/SV-144 board (M3)</td>
<td>Not specified</td>
</tr>
</tbody>
</table>
2. Focus gain adjustment

<table>
<thead>
<tr>
<th>Adjustment conditions</th>
<th>Procedure/Specifications</th>
<th>Adjustment point</th>
<th>Disc</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Simple MC tool setting</td>
<td>• Adjust RV403 so that the 2-channel level meter indicator level difference of CH1 and CH2 is within the specification mentioned below. Specification: (-2\pm0.1) dB</td>
<td>RV403/SV-144 board (L1)</td>
<td>Specified position on test disc Address 1: 90: 00</td>
</tr>
</tbody>
</table>

- Connect the servo gain adjusting tool to the CN114/SV-144 board. (Make sure that the servo gain adjusting tool is turned off.)
- Connect the 2-channel level meter to the servo gain adjusting tool.
- After connecting, turn Power of the servo adjusting tool ON.

2. Set the TRACKING/FOCUS select switch of the servo gain adjusting tool to FOCUS mode.

3. Operation of simple MC tool
   1. Set the display selector switch (toggle switch) to the left side (input data display mode).
   2. Set the following specified address on the test disc by pressing the numeric keys.
      Specified address 1: 90: 00
   3. Locate to the specified address on the test disc by pressing the [PLAY] and [JUMP FWD] keys.
   4. Set the display selector switch (toggle switch) to the right side, and select the PLAY mode by pressing the [PLAY] key.
3. Focus offset adjustment

<table>
<thead>
<tr>
<th>Adjustment conditions</th>
<th>Procedure/Specifications</th>
<th>Adjustment point</th>
<th>Disc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>• Connect the DC voltmeter to the TP403/SV-144 board via the low pass filter tool.</td>
<td>RV402/SV-144 board (L1)</td>
<td>Not specified</td>
</tr>
<tr>
<td></td>
<td>• Connect the oscilloscope (CH1) to the TP408 and E7 (GND)/SV-144 board.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Operation of the simple MC tool set the tracing mode to OFF by pressing the [TRK] key after selecting the PLAY mode (press the [PLAY] key).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Adjust the RV402 until the waveform (amplitude) of oscilloscope becomes the maximum. At this time, note down the value of the DC voltmeter as Fpo mV.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Adjust GRV402 so that the value (Fp) of the DC voltmeter satisfies the specification below.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specification: Fp=(Fpo+20)±20 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>• Set the tracking mode to ON by pressing the [TRK] key.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Check that the value of the DC voltmeter is within the specification mentioned below in the condition of Step 2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specification: −5.5 mV to +30 mV</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Spindle phase adjustment

<table>
<thead>
<tr>
<th>Adjustment conditions</th>
<th>Procedure/Specifications</th>
<th>Adjustment point</th>
<th>Disc</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Connect the oscilloscope to the TP504/SV-144 board.</td>
<td>RV501/SV-144 board (M7)</td>
<td>Not specified</td>
</tr>
<tr>
<td></td>
<td>• Operation of simple MC tool Set the tracking function to OFF by pressing the [TRK] key after selecting the PLAY mode (press the [PLAY] key).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• TP504/SV-144 board (M7) output waveform duty.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>=1.8 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 μs ±5 μs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Connection diagrams for 3. Focus offset adjustment and 4. Spindle phase adjustment are included in the document, showing the connections between components such as simple MC tool, oscilloscope, low pass filter tool, DC voltmeter, and various boards.
5. Tracking gain adjustment

<table>
<thead>
<tr>
<th>Adjustment conditions</th>
<th>Procedure/Specifications</th>
<th>Adjustment point</th>
<th>Disc</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Simple MC tool setting.</td>
<td>• Adjust so that ch1 and ch2 indication level of the 2-channel level meter is within the specification mentioned below. (ch1 and ch2 indication level become equally level.)</td>
<td>RVR405/SV-144 board (L1)</td>
<td>Specified position on test disc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Address 1: 90: 00</td>
</tr>
<tr>
<td></td>
<td>Specification: 0±0.1 dB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Set the TRACKING/FOCUS selector switch of the servo gain adjusting tool to TRACKING.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Operation of simple MC tool</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Locate to the specified address on the test disc by pressing the and keys. Set the display selector switch (toggle switch) to the right side. Select the tracking function to ON by pressing the key.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Connection

![Diagram of the connection between Simple MC tool, Servo Gain adjustment tool, RVR405, CN114, CN103, and SV-144 Board]
### 6. Tracking offset adjustment

<table>
<thead>
<tr>
<th>Adjustment conditions</th>
<th>Procedure/Specifications</th>
<th>Adjustment point</th>
<th>Disc</th>
</tr>
</thead>
</table>
| **Step 1** | • Connect the DC voltmeter to the TP404/SV-144 board via the low pass filter tool.  
• Operation of simple MC tool set the tracking function to OFF by pressing the TRK key after selecting the PLAY mode (press the PLAY key) | **Adjust QRV405/SV-144 board so that the indication of the DC voltmeter swings around 0 V within the specification mentioned below.**  
**Specification:** $0 \pm 100$ mV | **QRV404/SV-144 board (M2)**  
Not specified |
| **Step 2** | • Set the tracking function to ON by pressing the TRK key. | **Check that the indication of the DC voltmeter is within the specification mentioned below.**  
**Specification:** within $-25$ to $+25$ mV | |

**Connection**

- **Simple MC tool**
- **Low pass filter tool**
- **DC voltmeter**
- **TP404 (L3)**
- **CN103**
- **SV-144 Board**

### 7. PLL offset adjustment

<table>
<thead>
<tr>
<th>Adjustment conditions</th>
<th>Procedure/Specifications</th>
<th>Adjustment point</th>
<th>Disc</th>
</tr>
</thead>
</table>
| **1.** | Connect the DC voltmeter to the TP203/SV-144 board. | **Adjust RV201 so that the indicator of DC voltmeter is within the specification mentioned below.**  
**Specification:** $0 \pm 50$ mV | **RV** (Added) on the IC203/  
SV-144 board (G5)  
(board No. 1-647-007-12 and higher)  
Specified position on test disc: Address 10: 00 |
| **2.** | Load a test disc.  
**3.** Operation of simple MC tool.  
① Set the display selector switch (toggle switch) to the left side.  
(input data display mode)  
② Set the following specified address on the test disc by pressing the numeric keys.  
Specified address 10: 00  
③ Locate to the specified address on the test disc by pressing the PLAY and JMP_FWD keys.  
④ Set the display selector switch (toggle switch) to the right side, and select the PLAY mode by pressing the PLAY key. | | |

**Connection**

- **Simple MC tool**
- **TP203 (G4)**
- **CN103**
- **SV-144 Board**
- **DC voltmeter**

PCM-9000

4 - 21 (E)
8. PLL adjustment

Connection

<table>
<thead>
<tr>
<th>Adjustment conditions</th>
<th>Procedure/Specifications</th>
<th>Adjustment point</th>
<th>Disc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td>L202/SV-144 board (G5)</td>
<td>Specified position on test disc: Thermally erased position Address 10: 00</td>
</tr>
<tr>
<td>1. Connect the frequency counter to the TP207/SV-144 board via the oscilloscope (CH2).</td>
<td>• Adjust L202 so that the indicator of the frequency counter is within the specification mentioned below.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Load the test disc.</td>
<td>Specification: 19.60 to 19.69 MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>① Set the display selector switch (toggle switch) to the left side (input data display mode).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>② Set the following specified address on the test disc by pressing the numeric keys.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specified address 10: 00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>③ Locate to the specified address on the test disc by pressing the PLAY and FF keys.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>④ Set the display selector switch (toggle switch) to the right side, and select the PLAY mode by pressing the PLAY key.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2 (Confirmation)</td>
<td></td>
<td>L202/SV-144 board (G5)</td>
<td>Specified position on test disc: Random signals recorded position Address 10: 00</td>
</tr>
<tr>
<td>1. Connect the frequency counter and DC voltmeter to the TP203 and GND/SV-144 board via the low pass filter tool.</td>
<td>• Read the indicator of the DC voltmeter when pressing the STOP key (STOP mode). Write down the value of the DC voltmeter at this time. This value will be called [mV]. • Adjust the L202 so that the value of the DC voltmeter becomes [i+200 mV].</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Load the test disc.</td>
<td>Specification: Frequency counter 19.60 to 19.69 MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>① Locate to the specified address on the test disc as in the case of Step 1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specified address 10: 00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>② Press the STOP and PLAY keys in the order STOP → PLAY. At this time, check that the indicator of the frequency counter satisfies the specification.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>③ Perform above ① three times.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Step 3 (Confirmation)

1. Connect the frequency counter and DC voltmeter to the TP203 and GND/SV-144 board via the low pass filter tool.
2. Load the test disc.
   ① Locate to the specified address on the test disc as in the case of Step 1.
   ② Press the [STOP] and [PLAY] keys in the order [STOP → PLAY].
   At this time, check that the indicator of the frequency counter satisfies the specification.
   ③ Perform above ② three times.

Step 4 (Confirmation)

1. Connect the frequency counter and DC voltmeter to the TP203 and GND/SV-144 board via the low pass filter tool.
2. Load the test disc.
   ① Locate to the specified address on the test disc as in the case of Step 1.
   ② Press the [STOP] and [PLAY] keys in the order [STOP → PLAY].
   At this time, check that the indicator of the frequency counter satisfies the specification.
   ③ Perform above ② three times.
9. Data sampling delay adjustment

<table>
<thead>
<tr>
<th>Adjustment Conditions</th>
<th>Checking method</th>
<th>Adjustment point</th>
<th>Disc</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Simple MC tool setting</td>
<td>The leading edge of CH-2 signal (sampling clock) becomes in the middle of the CH-1 signal (data).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same as setting of “8. PLL adjustment” step 1.</td>
<td>Insert the jumper pin to either COR201/SV-144 board (G6).</td>
<td>Position on test disc where random signals are recorded</td>
<td></td>
</tr>
<tr>
<td>• Connect the oscilloscope</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CH-1: TP202/SV-144 board (G7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GND/SV-144 board (G7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CH-2: TP205/SV-144 board (G6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GND/SV-144 board (G6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Trigger)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range: 20 ns/div</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. RF level confirmation

Connection

<table>
<thead>
<tr>
<th>Adjustment Conditions</th>
<th>Checking method</th>
<th>Adjustment point</th>
<th>Disc</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Connect the oscilloscope to the TP201/TR-82 board.</td>
<td>• Check that the RF level (TP201/TR-82 board) satisfies the specification.</td>
<td>Specified position on test disc: Random signals recorded position Address 10: 00</td>
<td></td>
</tr>
<tr>
<td>2. Load a test disc.</td>
<td>Specification: RF level=2.8 Vp-p (2.8 Vp-p or more)</td>
<td>Specified position on test disc: Random signals recorded position Address 10: 00</td>
<td></td>
</tr>
<tr>
<td>① Set the display selector switch (toggle switch) to the left side (input data display).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>② Set the following specified address on the test disc by pressing the numeric keys.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specified address 10: 00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>③ Locate to the specified address on the test disc by pressing the PLAY and JUMP FWD keys.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>④ Set the display selector switch (toggle switch) to the right side.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
11. Tracking offset confirmation (Checking thread kick)

<table>
<thead>
<tr>
<th>Adjustment Conditions</th>
<th>Checking method</th>
<th>Adjustment point</th>
<th>Disc</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Remove the simple MC tool.</td>
<td>Play back the sample file. Check that the playback is performed according to the sample file.</td>
<td>——</td>
<td>Not specified. Making sample file</td>
</tr>
<tr>
<td>• Replace the adjustable ROM with the original ROM.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Make the following sample.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• File on the disc, and play back the file.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create a file in which the following Track 1 and Track 2 are repeated (registered) two or three times.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Track 1 Begin point 1: 00 End point 1: 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Track 2 Begin point 1: 00: 00 End point 1: 00: 00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12. Focus offset confirmation (Measuring block error rate (B.E.R))

<table>
<thead>
<tr>
<th>Adjustment Conditions</th>
<th>Checking method</th>
<th>Adjustment point</th>
<th>Disc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Remove the simple MC tool.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Replace the adjustable ROM with the original ROM.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Connect the harness of the PCM-9000 back where they were.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Connect the block error rate checker to the CN3/ED-37 board.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Load a disc, record and reproduce in the Monitor Rec mode.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Measure the block error rate near the inner circumference (00 H : 05 M : 00 s), the middle (00 H : 40 M : 00 s), and the outer circumference (01 H : 15 M : 00 s).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Check that the B.E.R. meets the specifications at all the measured positions. Specification: Less than or equal 100/10000</td>
<td></td>
<td></td>
<td>Normal undamaged disc without dust</td>
</tr>
</tbody>
</table>
4-4-2. Magnetic head gap adjustment (GPM-11 board/OWH Ass’y)

Equipment required
- Oscilloscope
- Tools
  - Simple MC tool
  - Adjustable ROM (Supplied with simple MC tool)
  - Magnetic head gap adjustment disc
  - Adjustable driver

Preparation
1. Open the SV-144 board, then connect the simple MC tool to CN103/SV-144 board.
   (For the connection, see 4-16 page, “Connection/Using” of simple MC tool.)
2. Replace the ROM (IC814)/SV-144 board with the adjustable ROM (Supplied with simple MC tool).
3. Load the magnetic head gap adjustment disc.

<table>
<thead>
<tr>
<th>Adjustment conditions</th>
<th>Procedure/Specifications</th>
<th>Adjustment point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Connect the TP-901/SV-144 board to the oscilloscope.</td>
<td>TP901/SV-144 board output (oscilloscope):</td>
<td>GRV901/SV-144 board (K6)</td>
</tr>
<tr>
<td>• Turn the GRV901/SV-144 board in a counterclockwise direction.</td>
<td>0±10 mV</td>
<td></td>
</tr>
<tr>
<td>• Move the sled by hand to the outer side of the magnetic head gap adjustment disc. (Make the simple MC tool setting to STOP mode.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Standard OWH Ass’y positioning**
Move the OWH Ass’y by hand to position at least 20 mm away from center.

- Actuator
- Head
- Spacer
- Disc

- Simple MC tool settings
  1. STOP mode
  2. Press the [GAP] key to enter GAP ON mode.
     (Magnetic head gap adjustment mode)
Step 2

- Move the sled by hand to the center of the magnetic head gap adjustment disc.
- Connect the oscilloscope and DC voltmeter to the TP901/SV-144 board and the GND/SV-144 board.
- Turn the ORV901/SV-144 board in a clockwise direction.

Simple MC tool settings

1. STOP mode
2. Press the GAP key to enter GAP ON mode.
   (Magnetic head gap adjustment mode)

1. While watching the oscilloscope output waveform, slowly turn the ORV901/SV-144 board in a clockwise direction. This will cause the actuator to slowly touch the spacer and come to a halt (Fig. 3). When this happens, the oscilloscope waveform values will gradually move from minus to positive. At 3 of Fig. 3, the rise will suddenly cease.

   ![Diagram](image)

2. Slowly turn the ORV901/SV-144 board until the point where the oscilloscope output waveform stops moving.

3. Tune the OCV1/GPM-11 board so that the indicator of DC voltmeter becomes to 0 V.

   ![Diagram](image)

4. Press the GAP key on the simple MC tool to cancel the adjustment mode.
   (GAP OFF mode)

5. Press the EJECT key on the simple MC tool and remove the disc.

6. After adjustment, press the EJECT key of the simple MC tool and remove the magnetic head gap adjustment disk.
4-4-3. Magnetic Head Position Adjustment

Equipments Required
Video monitor
BNC cable

Tools
Simple MC tool
Adjustable ROM (Supplied with simple MC tool)
Head position adjustment tool (Supplied with CCD camera, Lens, Camera adaptor, Camera cable, Camera holder)
Eccentricity driver (2-4)
Head position adjustment cartridge

1. Preparation
(1) Connect the simple MC tool to CN103/SV-144 board. Replace the ROM (IC814/SV-144 board) with the adjustable ROM.
(2) Remove the screw (PSW 2.6x6) which secure the lock plate, then remove the lock plate from the bridge.
(3) Turn the POWER switch of the PCM-9000 and the simple MC tool on. Insert and load the head position adjustment cartridge.
(4) Install the supplied CCD camera the head position adjustment tool in the camera holder and mount it above the PCM-9000 frame, as illustrated.
(5) Sight the gap between the CCD camera lens and bridge and set to about 5 mm by turning the knob on the camera holder to adjust the camera height.
(6) Connect the CCD camera to the camera adaptor, and the camera adaptor to the video monitor and turn on the power.
(7) Press the TEST key (TEST mode ON) of the simple MC tool.
(8) Press the 1 key of the simple MC tool, and check the video monitor screen.
If the laser spot and magnetic head core are hard to see on the monitor, adjust either focus or diaphragm.

**Focus adjustment:**
Loosen the knob on the camera holder and move the CCD camera up or down. If the focus is still poor, then loosen the focus adjustment ring and raise or lower the camera lens.

**Diaphragm adjustment:**
Rotate the diaphragm adjustment ring at the end of the lens.

---

2. Magnetic Head Adjustment

While watching the video monitor screen, make adjustments in the following order until the laser spot is properly aligned in the center of the magnetic head core.

**Specification:**
No greater than 0.2 mm at the laser spot between the center of the head core. (Judging from what the diameter of the head core is 0.9 mm.)

---

3. Operation After the Adjustment

1. Press the [TEST] key of the simple MC tool so as to cancel the test mode.
2. Remove the CCD camera and camera holder.
3. Press the [EJECT] switch of the simple MC tool and take out the head position adjustment cartridge.
   **Note:** Never load or unload the adjusting cartridge while the CCD camera or the camera holder is attached.
4. Turn the POWER switch of the PCM-9000 and simple MC tool off.
5. Install the lock plate with the screw (PSW 2.6x6) to the bridge.
6. Disconnect the simple MC tool from CN103/SV-144 board, then put the harness of the PCM-9000 back where they were.
7. Replace the adjustable ROM with the original ROM of IC814/SV-144 board.
This section explains the electrical adjustments required when following board is repaired or maintained: CK-41 Board ADA-28 Board

### 5-1. PREPARATION

#### Equipment Required

<table>
<thead>
<tr>
<th>Name</th>
<th>Specifications (minimum)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio analyzer</td>
<td>• Oscillator</td>
<td>TEKTRONIX SG505, SG5010, AA501, AA5001 or equivalent</td>
</tr>
<tr>
<td></td>
<td>• Distortion meter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Level meter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Balance input/output type</td>
<td></td>
</tr>
<tr>
<td>Oscilloscope</td>
<td>• Frequency range; DC to 100 MHz</td>
<td>TEKTRONIX 475, 465 or equivalent</td>
</tr>
<tr>
<td></td>
<td>• 2 develop</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sensitivity; 5 mV/div</td>
<td></td>
</tr>
<tr>
<td>Video signal generator</td>
<td>—</td>
<td>TEKTRONIX 1410 or equivalent</td>
</tr>
<tr>
<td>Frequency counter</td>
<td>• Effective digits; more than 8 digits</td>
<td>ADVANTEEST TRS822 or equivalent</td>
</tr>
</tbody>
</table>

#### Tool

<table>
<thead>
<tr>
<th>Name</th>
<th>Part number</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension board EX-396</td>
<td>J-6400-860-A</td>
<td>For main boards</td>
</tr>
<tr>
<td>Extension board EX-397</td>
<td>J-6400-870-A</td>
<td>For option boards</td>
</tr>
</tbody>
</table>

### Switch and Control initial Settings

Following except switch to option.

#### Control panel

- **Sampling Freq:** 48 kHz
- **Word Length:** 20 Bit
- **Sync Clock:** INT

#### Connector panel

- **Reference Video Input:** 75 Ω : ON
- **Word Sync Input:** 75 Ω : ON

#### MC-41 board

- SW1-1 to SW1-8 switch: All "1"
- SW2-1 to SW2-8 switch: All "1"
- SW3 switch: "0"
- SW4 switch: OFF

#### SV-144 board

- S801 switch: OFF

#### DIO-27 board

- S1-1 to S1-8 switch: All OFF
5-2. CK-41 BOARD ADJUSTMENT
This adjustment is performed when replacing CK-41 board.

Equipment and Tools Required
- Oscilloscope
- Frequency counter
- Video Signal generator
- Extension board EX-396

Preparation
Extend the CK-41 board with the extension board EX-396.

5-2-1. VARI PITCH ADJUSTMENT

Switch and Control settings
Settings other than those listed below are as per Section Switch and Control initial Settings.
SAMPLING FREQ: 48 KHZ

Connection:

<table>
<thead>
<tr>
<th>Adjustment conditions</th>
<th>Specification</th>
<th>Adjustment location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connect the Oscilloscope to TP12/CK-41 (P6), E8/CK-41 (GND) (S9).</td>
<td>TP12/CK-41 = +4.0 ± 0.1 V</td>
<td>T1/CK-41 (S6)</td>
</tr>
<tr>
<td>Connect the Oscilloscope to TP21/CK-41 (P8), E8/CK-41 (GND) (S9).</td>
<td>TP21/CK-41 = +2.0 ± 0.1 V</td>
<td>T2/CK-41 (S8)</td>
</tr>
</tbody>
</table>

5 - 2 (E)
5-2-2. VIDEO PLL FREE-RUN ADJUSTMENT

Switch settings:
Settings other than those listed below are as per Section Switch and Control initial Settings.

Control panel

SYNC CLOCK : VIDEO

Connection:

Adjustment:
1. Connect the frequency counter to TP28/CK-41 (B4) and E3/CK-41 (GND) (B7).
2. Set the sampling frequency 48, 44.1 and 44.056 kHz, and adjust RV3/RV2/RV1 on the CK-41 board respectively so that the TP28 frequency meets the specification given in the table below.

<table>
<thead>
<tr>
<th>SAMPLING FREQ.</th>
<th>Specification</th>
<th>Adjustment location</th>
</tr>
</thead>
<tbody>
<tr>
<td>48 kHz</td>
<td>4.800000 MHz</td>
<td>RV3/CK-41 (E1)</td>
</tr>
<tr>
<td></td>
<td>±10Hz</td>
<td></td>
</tr>
<tr>
<td>44 kHz</td>
<td>4.410000 MHz</td>
<td>RV2/CK-41 (E1)</td>
</tr>
<tr>
<td></td>
<td>±10Hz</td>
<td></td>
</tr>
<tr>
<td>44.056 kHz</td>
<td>4.405600 MHz</td>
<td>RV1/CK-41 (E1)</td>
</tr>
<tr>
<td></td>
<td>±10Hz</td>
<td></td>
</tr>
</tbody>
</table>

3. Input a video signal from the VIDEO signal generator to the REFERENCE VIDEO INPUT connector. Check that locking occurs at each sampling frequency.

5-3. ADA-28 BOARD (DABK-9001) ADJUSTMENT

This adjustment is performed when replacing ADA-28 board (DABK-9001).
Adjustments are made to a PCM-9000 containing an ADA-28 board (DABK-9001) that has been extended with an extension board EX-397.

Equipment and Tools Required
Audio analyzer
Oscilloscope
Extension board EX-397

Preparation
Extend the ADA-28 board with the extension board EX-397.

Switch and Control Settings
Settings other than those listed below are as per Section Switch and Control initial Settings.

Preparation
Press the [INPUT] key, the CH-1/CH-2 indicator will light up.

ADA-28 board
S101/201/105/205 switches: bit-1, 2: ON bit-3, 4: OFF or bit-1, 2: OFF bit-3, 4: ON
S102/202 switches: OFF
S103/104/203/204 switches: bit-1, 2, 3: OFF bit-4: ON RV101/201: any position (for CMR adjustment) RV102/202: any position (for AD offset adjustment) RV103/203: any position (for DA line output amp BAL adjustment)
### Adjustment Procedures:

<table>
<thead>
<tr>
<th>Step</th>
<th>Adjustment conditions</th>
<th>Specification</th>
<th>Adjustment location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• LINE INPUT CH1, CH2 connector: Open (No input signal)</td>
<td>RM-D9000 at level meter CH-1/CH-2: =&lt; 0 light only</td>
<td>CH-1: RV102/ADA-28 (B3)</td>
</tr>
<tr>
<td></td>
<td>• RM-D9000 CH-1/CH-2: INPUT</td>
<td>CH1: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CH2: 0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>• Input a 1 kHz, +24dBs signal to the LINE INPUT CH-1 connector. Input the signal between GROUND and the connector's HOT, COLD (parallel inputs to pin 2 and pin 3).</td>
<td>LINE OUTPUT CH-1 output level = minimum</td>
<td>RV101/ADA-28 (AB)</td>
</tr>
<tr>
<td></td>
<td>• Connect the distortion analyzer to LINE OUTPUT CH-1 connector.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>• Input a 1 kHz, +24dBs signal to the LINE INPUT CH-2 connector. Input the signal between GROUND and the connector's HOT, COLD (parallel inputs to pin 2 and pin 3).</td>
<td>LINE OUTPUT CH-2 output level = minimum</td>
<td>RV201/ADA-28 (D8)</td>
</tr>
<tr>
<td></td>
<td>• Connect the distortion analyzer to LINE OUTPUT CH-2 connector.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Connection:**

- RM-D9000
- PCM-9000 (Rear Panel)
- DABK-9001 (ADA-28 Board) Connector Panel

**Audio analyzer**

- Oscillator
- Balance Output
- Distortion analyzer

**Adjustment Location:**

- ADA-28 BOARD (A SIDE)
Step | Adjustment conditions | Specification | Adjustment location
---|---|---|---
4 | • Input a 1 kHz, +20dBs signal to the LINE INPUT CH-1 connector.  
   • Connect the oscilloscope to LINE OUTPUT CH-1 connector's HOT, COLD (pin 2-pin 1, pin 3-pin 1) | Adjustment amplitude of LINE OUTPUT CH-1's HOT and COLD output signals so that they are identical. | RV103/ADA-28 (J6)
5 | • Input a 1 kHz, +20dBs signal to the LINE INPUT CH-2 connector.  
   • Connect the oscilloscope to LINE OUTPUT CH-2 connector's HOT, COLD (pin 2-pin 1, pin 3-pin 1) | Adjustment amplitude of LINE OUTPUT CH-2's HOT and COLD output signals so that they are identical. | RV203/ADA-28 (H6)

Reference: The ADA-28 board has dip switches (S103, 104, 203, 204) which allow changes to be made in the board's performance. These switches can be set, together with the ANALOG LEVEL ADJUST volume on the front panel of a PCM-9000 (fitted with an ADA-28 board), to give a maximum input/output level of +14 to +26 dBs. The dip switches are arranged in 3.0 dBs steps and the front panel volume can be varied over a range exceeding ±2 dBs. The maximum ranges in input/output volume levels made by altering the settings of the AD adjustment dip switches (S103, 203) and the DA adjustment dip switches (S104, 204) are listed below.

<table>
<thead>
<tr>
<th>Switch settings (S102/103/203/204)</th>
<th>Volume center standard</th>
<th>Volume adjustable range</th>
</tr>
</thead>
<tbody>
<tr>
<td>bit-4 switch only: ON</td>
<td>+24 dBs</td>
<td>+22~+26 dBs</td>
</tr>
<tr>
<td>bit-3 switch only: ON</td>
<td>+21 dBs</td>
<td>+19~+23 dBs</td>
</tr>
<tr>
<td>bit-2 switch only: ON</td>
<td>+18 dBs</td>
<td>+16~+20 dBs</td>
</tr>
<tr>
<td>bit-1 switch only: ON</td>
<td>+15 dBs</td>
<td>+13~+17 dBs</td>
</tr>
</tbody>
</table>
# SECTION 6
## BLOCK DIAGRAMS AND FRAME WIRINGS

### 6-1. BLOCK DIAGRAMS

<table>
<thead>
<tr>
<th>Board</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCM-9000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CK-41</td>
<td>Clock Board</td>
<td>6-2</td>
</tr>
<tr>
<td>DIO-27</td>
<td>AES/EBU Digital I/O Headphone Board</td>
<td>6-4</td>
</tr>
<tr>
<td>ED-37</td>
<td>Edit Board</td>
<td>6-6</td>
</tr>
<tr>
<td>MC-41</td>
<td>Main CPU Board</td>
<td>6-8</td>
</tr>
<tr>
<td>SV-144</td>
<td>Servo Board</td>
<td>6-10</td>
</tr>
<tr>
<td>GPM-11</td>
<td>Gap Senser Board</td>
<td>6-12, 19</td>
</tr>
<tr>
<td>MD-87</td>
<td>Magnetic Head Drive Board</td>
<td>6-12</td>
</tr>
<tr>
<td>TR-82</td>
<td>RF Board</td>
<td>6-12</td>
</tr>
<tr>
<td>SE-209</td>
<td>Sensor Board</td>
<td>6-12, 18</td>
</tr>
<tr>
<td>PS-345</td>
<td>DC Converter Board</td>
<td>6-17</td>
</tr>
<tr>
<td>PS-354</td>
<td>Switching Board</td>
<td>6-17</td>
</tr>
<tr>
<td>CN-902</td>
<td>Connector Board</td>
<td>6-18</td>
</tr>
<tr>
<td>CN-915</td>
<td>Connector Board</td>
<td>6-18</td>
</tr>
<tr>
<td>JK-42</td>
<td>Headphone Board</td>
<td>6-18</td>
</tr>
<tr>
<td>KY-264</td>
<td>Key Switch Board</td>
<td>6-18</td>
</tr>
<tr>
<td>KY-265</td>
<td>Key Switch Board</td>
<td>6-18</td>
</tr>
<tr>
<td>VR-168</td>
<td>VR Board</td>
<td>6-18</td>
</tr>
<tr>
<td>VR-169</td>
<td>VR Board</td>
<td>6-18</td>
</tr>
<tr>
<td>RM-D9000</td>
<td>Key Control Board</td>
<td>6-14</td>
</tr>
<tr>
<td>DP-195</td>
<td>FL Driver Board</td>
<td>6-14</td>
</tr>
<tr>
<td>KY-267</td>
<td>Key Board</td>
<td>6-14, 20</td>
</tr>
<tr>
<td>KY-269</td>
<td>Key Board</td>
<td>6-14, 20</td>
</tr>
<tr>
<td>LE-120</td>
<td>LED Board</td>
<td>6-14, 20</td>
</tr>
<tr>
<td>CN-883</td>
<td>Connector Board</td>
<td>6-14, 20</td>
</tr>
<tr>
<td>DABK-9001</td>
<td>AD/DA Coverter Board</td>
<td>6-22</td>
</tr>
<tr>
<td>ADA-28</td>
<td>AD/DA Coverter Board</td>
<td>6-22</td>
</tr>
<tr>
<td>DABK-9004</td>
<td>SDIF-2 I/F Board</td>
<td>6-24</td>
</tr>
<tr>
<td>DIO-28</td>
<td>SDIF-2 I/F Board</td>
<td>6-24</td>
</tr>
<tr>
<td>DABK-9007</td>
<td>MEMORY Board</td>
<td>6-26</td>
</tr>
<tr>
<td>MEM-58</td>
<td>MEMORY Board</td>
<td>6-26</td>
</tr>
</tbody>
</table>
CK-41 BOARD

Outline
The CK-41 board generates a series of clock and sync signals that are distributed to respective board to be used as the reference of PCM-9000 operation. Selection of the sampling frequency, the word length and the sync clock are executed by the data set which is supplied from the MC-41 board.

1. INTERNAL SYNC MODE (INTERNAL)

The master clock and various sync signals are generated depending upon the sampling frequency (either 48 kHz, 44.1 kHz or 44.056 kHz) that is selected.

The master clock and the sync signals can be generated within the variable pitch range of ±12.5% for respective sampling frequency. The internal sync signals are output to the external equipment enabling synchronous operation with external equipment.

The standard speed and the double speed operations are possible. During the double speed operation, each FS and sync signal are doubled of the frequency. But the 256FS is not doubled.

2. EXTERNAL SYNC MODE (EXTERNAL)

The operation of the unit can be locked to either video sync signal or to the word sync (EXT word, DI (AES/EBU), DI sync signal. The synchronous operation is within the range of ±50 ppm in the video sync lock operation and, the range from -12.5% of FS 44.056 kHz to +12.5% of FS 48 kHz in the word sync lock operation.

This system has the NARROW and WIDE selection. The word sync system operates only on WIDE mode and the video sync system operates only on the NARROW mode.

3. DOUBLE SPEED MODE

PCM-9000 has the function of double-speed dubbing. In this mode, the clock signals must operate in the two times the normal frequency.

The 768FS is frequency divided (1/2) by the gate array built-in divider in the normal speed mode, and its output is sent to the clock and sync generator circuit. In the double speed mode, the frequency division (1/2) circuit is not used so that the 768FS is directly sent to the clock and sync generator circuit. It means that the 192FS, 64FS, Wck and WSync signals have the doubled frequency. However, the 256FS is not doubled to 512FS but is sent to output as 256FS.

4. QUICK START

Disc is played back using the BSYNC signal as the reference.

When the mode of operation is changed from STOP to PLAY, the BSYNC ENB signal is supplied from ED board to CK-41 board where the BSYNC signal is generated. The BSYNC signal is output one word later.
DIO-27 Board

Outline
The DIO-27 board consists of the interface block, input select block, timecode block and headphone monitor block. The interface block is the AES/EBU format 2-channel D IN/D OUT interface of PCM-9000.

Description
1. D OUT BLOCK
The serial audio data that is supplied from the ED-37 board is sent to the TX LSI (ICL1). But during the double speed mode, the data which is frequency divided by 1/2 is input to the TX LSI. The validity signal and the channel status signal are added to the input data. Format of the added data is converted to the AES/EBU digital audio signal. The CRC code, parity and preamble data of the channel status information is automatically generated inside the IC and are added to the output signal. The output signal is converted to the balanced type output and sent to the external equipment.

2. D IN BLOCK
The balanced type input signal is converted to the unbalanced type signal and sent to the RX LSI (ICM1). As the AES/EBU signal is the self-sync data, the clock is extracted using PLL. The extracted clock signal is sent to the CKAI board. Format of the input data is converted inside the LSI using the clock that is supplied from CKAI board, so that the serial data is output. The channel status data (FSID, EMPHASIS FLAG) which are extracted from the input data, are read by the MC data bus.

3. INPUT SELECT BLOCK
The input digital audio signal that is sent to the ED-37 board is selected from the ADA output, DI (AES/EBU) SDIF signal and SCSI signal.

4. TIME CODE BLOCK
The data that is supplied from the MC-41 board, and the BSYNC signal that is supplied from the CK-41 board are input to the frequency counter block of ICL1. This counter is used as the down-counter. The SYNC output is obtained at any desired position by changing the setting value of the counter. The generated sync and clock signals are sent to the MC board and timecode board. Here, the phase difference between the external TC and internal TC is measured. Measurement is based upon the internal TC that is used as the reference. Phase error of the external TC is measured with reference to the internal TC. The result of measurement is read by the MC data bus.
CK-41 Board
ED-37 Board

Description

1. MC IfF BLOCK (IC11, 12, 64 to 67, 69, 70, 73, 74)
The MC 1/F (main CPU interface) block consists of three blocks: (1) the address decoder generating the chip select signal enabling the main CPU to access the respective circuit block of ED-37 board, (2) the board ID generator enabling the main CPU to identify the existence of ED-37 board, and (3) the port enabling the main CPU to control the hardware of ED-37 board.

2. ENCODER BLOCK (IC49, 75, 76, 78)
The encoder block generates the recording signals by interleaving the audio data and TC signal, adding the ECC (Error Correction Code), and (2, 7) modulating them so that the signals is ready to be recorded on disc.

3. DECODER BLOCK (IC15, 51, 80, 82 to 85, 87, 135)
The Decoder block receives the disc playback signal which is supplied from SV-144 board, and decodes the disc playback signal into the audio data and TC signal by (2, 7) demodulating, error corrections and de-interleaving processing.

4. DEC FLAG BLOCK (IC2, 6, 7, 9, 50, 71, 101, 126, 132, 134)
The DEC FLAG block receives the flag and other information from the DECODER block and generates the timing control signals that are required in the SUB DSP block. It also interfaces these flags with the SUB DSP block.

5. DECODER IfF BLOCK (IC17 to 33)
The decoder interface block receives the playback serial data from the DECODER block and converts it from serial-to-parallel data with the specified word length. It interfaces the parallel data with the SUB DSP.

6. AUX IfF BLOCK (IC16, 52, 109 to 121, 127 to 131)
The AUX interface block receives the parallel Aux data from the SUB DSP, converts the signal from parallel-to-serial data and generates the playback TC signal. It also switches the monitor output of the Aux data, and enables the REC READY control.

7. SUB DSP BLOCK (IC38, 79, 81, 86, 91, 94, 125, 133, 136)
The sub DSP block consists of the DSP56001 and external data memory (8k words). It corrects errors of the disc playback audio signal that could not be corrected by the DECODER block. The error corrections are AVERAGE, HOLD, and MUTE. It also applies TBC (Time Base Correction). It then interface the corrected playback signal with the main DSP block.

8. MAIN DSP BLOCK (IC92, 93, 122 to 124)
The main DSP block consists of the DSP56001 and external Program memory (8k words). This block receives the PB data from the SUB DSP block, the DI data from the DI 1/F block, and the JE data from the MEM-58 board, and applies various audio data processing in the order of MC command. It sends the output audio data to the DO 1/F block to be supplied to the monitor or to the ENCODER block.

9. DI IfF BLOCK (IC34 to 37, 39 to 41, 72, 88)
This block receives the DI data from the DIO-27 board, and the JE data from the MEM-58 board. It converts them from serial-to-parallel and interfaces them with the main DSP.

10. DO IfF BLOCK (IC4, 8, 42 to 48)
This block receives the audio data from the main DSP and converts them from parallel-to-serial. It generates the serial data to be sent to the monitor, the ENCODER, and also generates the block sync pause signal used in quick start function.

11. TOC BUFFER BLOCK (IC5, 14, 95 to 97, 99, 100, 102 to 108)
The TOC buffer block consists of the 64k*8bit buffer memory and the address counter. The 64k*8bit buffer memory is used for Edit data save and load, enabling read and write data from either MC (main CPU) and main DSP. The address counter sets the order of access so that the TOC buffer block is accessed in the specified order.
MC-41 Board

Outline
The MC-41 board consists of the main CPU and its peripheral circuit. The main CPU has the function as the main controller of PCM-9000.

Description
1. CPU BLOCK (IC3 to 6, 8, 9, and X1)
The CPU block consists of the CPU (TMP68301), clock generator (12.288 MHz) and reset circuit. The reset circuit watches the +5V power line. The CPU has the function to control the various devices of MC-41 board, the main boards and option boards.

2. ADD. DEC. BLOCK (IC10 to 14, 36, 37, 87)
Addresses are decoded to generate the select signal so that the CPU accesses the devices of MC-41 board, the main boards and the option boards. It also generates the DTACK signal depending upon the number of wait of each board and device. The DTACK* signal is returned to the CPU.

3. ROM/RAM BLOCK (IC15 to 29, O12)
The ROM/RAM block consists of the EP-ROM (128 kbyte: max. 4 pieces) for the main CPU software and the SRAM (total: 1 Mbyte) for the work area. The SRAM has the power backup circuit.

4. INTERRUPT BLOCK (IC7, 10, 30 to 35, 37 to 42, 51, 88)
The interrupt block consists of the interrupt controller TMP92C59A and the read/write signal generator circuit. It accepts the interrupt requests from the devices of MC-41 board, the main boards and the option boards in accordance with the priority of interrupt request.

5. FRONT PANEL BLOCK (IC7, 33, 37, 72 to 76, 78 to 81, and Q3 to 21)
The front panel block consists of the key input/display interface (TMP92C79) and the read/write signal generator circuit. It has the function of the key data processing and LED display. When any new key data is input, an interrupt request requiring the front panel data processing is generated.

As receiving the interrupt request, the CPU executes the key input processing and the front panel LED display processing.

6. SC IF BLOCK (IC51 to 72)
This is the interface block to establish communication with the servo CPU. The 8-byte serial data is sent/received per each communication.

7. REMOTE IF BLOCK (IC43)
The front and rear remote controllers are interfaced with this block that has the Ballance/Unbalance conversion function. This block is connected to the serial controller which is built-in in the main CPU enabling the serial data transmission and reception with the CPU of the remote controllers.

8. AD/DA PORT BLOCK (IC13, 82, 83)
This is the port enabling setting of emphasis on/off, muting etc., of the AD/DA board.

9. SWITCH BLOCK (IC84 to 86, S2 to 4)
The switch block consists of the two pieces of DIP switch and the rotary switch. The setting status of various modes are acknowledged when the CPU reads the switch data.

10. BUFFER BLOCK (IC45 to 50)
This is the buffer block enabling input and output of the address bus, data bus and control signals with the main boards and the option boards.
SV-144 Board

Outline
The SV-144 board has various servo control functions of the M/O disc drive.

Description

1. PLL BLOCK (IC201 to 209)
The RF data is supplied from TR-82 to the PLL block where approximately 19.6MHz CLK is extracted and sent to the PB RAM control block.

2. PB RAM BLOCK (IC601 to 604, IC607 to 612, IC701 to 724)
The PB RAM block consists of the PB FIFO RAM and the RAM control circuit. The playback RF data is written into the PB FIFO RAM using PLL CLK and is read from it using DEC CLK which is supplied from the DEC circuit (ED-37 board). The address control on disc is executed by the CPU. The playback RF data is picked up from the disc in several block units (monitor REC mode) starting from a specified address. The playback RF data is transferred from the TR-82 board to the PB FIFO RAM. This operation is synchronized with the AAPI block sync signal.

3. REC RAM BLOCK (IC601 to 606, IC609 to 612, IC701 to 724)
The REC RAM block consists of the REC FIFO RAM and the RAM control circuit. The (2. 7) modulated data which is supplied from ENC circuit (ED-37 board) is written into the REC FIFO RAM. The data that is read out from the REC FIFO RAM is transferred to the MGDR control block. The data write and read are accomplished using approximately 19.6MHz master clock. The address control on disc is executed by the CPU. This data is recorded on the disc in several block units (monitor REC mode) starting from a specified address. The record data is transferred from the REC FIFO RAM to the MGDR control block and then recorded on the disc. This operation is synchronized with the AAPI block sync signal.

4. MGDR CONTROL BLOCK (IC403, IC901 to 908)
The MGDR control block receives the record data from the REC RAM block and converts the data format suited for magnetic field modulation to be recorded on disc.

5. GAP SERVO BLOCK (IC403, IC901 to 908)
The gap servo circuit has the function to maintain a constant distance (about 200 µm) between the disc and coil during recording. The gap sensor generates the error signal which controls the gap servo that drives the head actuator.

6. LASER CTRL BLOCK (IC301 to 306)
This block has the function of maintaining the laser output power constant during PB and REC modes as it receives the laser power monitor output. The laser output power is temperature characteristics compensated during record mode so that the power is decreased during high ambient temperature and increased during low temperature.

7. AAPI BLOCK (IC417, IC801 to 810)
This block reads the absolute address (which is called AAPI, the abbreviation of Absolute Address In Pre Groove) that have been pre-striped on disc beforehand. The address information has already been FM-modulated and inscribed after wobbling on the track of disc. The wobble signal is extracted from the disc. FM-demodulated to extract the address information which is sent to the CPU.

8. SPINDL SERVO BLOCK (IC501 to 509, IC511)
The spindle servo controls the disc rotation so that the constant linear velocity (CLV) is established. The spindle rotation is controlled so that the frequency and phase of the wobble signal from the disc and those of reference CLK agree. The FG servo is also employed at the same time to enable the quick lock-in time.

9. DUAL-AXIS SERVO AND SLED SERVO BLOCK (IC401 to 427)
This block consists of the focus servo which focuses the laser beam spot on the disc, the tracking servo which enables tracking of the beam and the sled servo which controls the sled motor to move the optical block in radial direction of the disc so that the dual-axis servo has the widest operating range.

10. CPU BLOCK (IC811 to 817)
This block controls operation of all the above described blocks. It locks the focus servo, rotates the spindle motor, establishes the tracking servo, reads the disc address, controls the laser power, enables the gap servo, controls the MGDR, and controls the PB RAM block and record RAM block. It also drives the disc loading, transfers command and status between the main CPU, and performs the abnormality detection and processing by monitoring these above conditions.
GPM-11 Board (OWH ASSY)

Structure
The GPM-11 board consists of the followings.
1. Gap detector
2. Head coil current, actuator coil current bypass

Description
1. GAP DETECTOR BLOCK
The gap detector block consists of the crystal (X2) and the peripheral circuit (IC1, R1, CV1, etc.). An output of the crystal oscillator is sent to the gap sensor via C1. The oscillating frequency of the oscillator is determined by the capacitance of the gap sensor. At the same time, a separate oscillator consisting of the crystal (X1) is prepared. These two oscillators form a PLL circuit using one oscillator as the reference which is connected to the gap sensor. The output of the PLL circuit is passed through a low-pass filter (feedback signal) and then sent to the external circuit as the GAP ERROR signal. (The low-pass filter output of the PLL circuit has 2.5V offset when the gap is 0.3mm. The offset is canceled by IC8 (2/2) so that the 0V output is supplied when the gap is 0.3mm.) IC7 and TH1 form a temperature characteristics compensation circuit.

2. HEAD COIL CURRENT, ACTUATOR COIL CURRENT BYPASS BLOCK
The head coil current is generated by the MD-87 board and is supplied to this block. The actuator coil current is generated by the SV-144 board and supplied to this block via the MD-87 board. Both of these signals passes through the GPM-11 board and sent to the head actuator coil via the flexible cable (FR-62) that is attached to the GPM-11 with adhesive agent.

MD-87 Board

Structure
The MD-87 board consists of the followings.
1. Over write head coil current driver
2. Gap servo signal bypass block

Description
1. OVER WRITE HEAD COIL CURRENT DRIVER BLOCK
This block consists of the main switch (Q1 to Q6) and the buffer amplifier (Q7 to Q16). The main switch is driven by the control signal which is supplied from the SV-144 board.

As the main switch (Q1 to Q6) is switched ON/OFF by the control signal, the current to flow through the overwrite head is generated. The output current is sent to the GPM-11 board via CN1.

2. GAP SERVO SIGNAL BYPASS BLOCK
The gap signal that is supplied from the SV-144 board to be sent to the GPM-11 board is bypassed by this block.

TR-82 Board

Structure
The TR-82 board consists of the following blocks.
1. Voltage regulator block
2. RF equalizer amplifier and comparator block
3. Signal bypass block

Description
1. VOLTAGE REGULATOR BLOCK
The TR-82 board receives +12V, GND, -15V, +5V, GND and -5V from the PS-345 board. It generates +7V from +12V supply, and -5V from -15V supply using three terminal regulator device. These powers are sent to the RF equalizer amplifier block and the optical pickup as analog power supplies.

2. RF EQUALIZER AMPLIFIER AND COMPARATOR BLOCK
The RFD signal is supplied from the optical pickup which is amplified by the front end amplifier IC201 (1/2) and sent to the subsequent equalizer circuit. Output of the equalizer circuit is converted to the "0 to 5V" signal by the comparator (IC205), and is further converted to the unbalanced-type signal by IC204. The output signal is sent to the SV-144 board.

3. SIGNAL BYPASS BLOCK
The geared motor related signal, the loading related signals, the sled motor signal, the spindle motor signal and focus/tracking signals are supplied from the optical pickup. They bypass the TR-82 board active circuit and are sent to the SV-144 board.
RM-D9000

The remote control unit RM-D9000 consists of the following.

1. KC-32 Board
2. DP-195 Board
3. KY-267 Board
4. KY-269 Board
5. LE-120 Board
6. CN-883 Board

Descriptions

1. **KC-32 Board**
   - **RESET BLOCK (IC F6,F8)**
     It generates the reset signal when power is turned on.
   - **CPU BLOCK (IC C4)**
     This is the one-chip CPU having the core equivalent to Z80 CPU core, with the built-in serial and parallel I/O interface.
   - **ROM/RAM BLOCK (IC E2,E6)**
     32k byte ROM (IC E2) for storing program, and 8k byte RAM (IC E6).
   - **ADDRESS DECODER BLOCK (IC B1,C3)**
     The address decoder enabling CPU to access the peripheral circuit.
   - **SERIAL I/O BLOCK (IC B2)**
     The buffer for serial communication with PCM-9000 unit.
   - **METER I/F BLOCK (IC B2,C2,C5,C6,D5,D6,E5,E6,F4)**
     The meter drive signal is supplied from PCM-9000 unit in the AES/EBU format. This block detects the peak data and the bit-mode data. The detected data are read by the CPU.
   - **PULSE COUNTER BLOCK (IC B3,B6,F6)**
     It counts the pulse output of the JOG dial rotation. The CPU reads the counter output.
   - **DC/DC CONVERTER BLOCK (IC C8, C9, Q101-165)**
     It receives the supply voltages from PCM-9000 or from the external power supply, and generates the exclusive supply voltages required in the RM-D9000.

2. **DP-195 Board**
   - **I/O EXPANDER BLOCK (IC B2, B3)**
     The I/O expander to send the fluorescent tube display data from the CPU.
   - **FL DRIVER BLOCK (Q201 to 280)**
     It converts the I/O expander output to the signal voltages that can drive the fluorescent tube.
   - **FL HEATER DRIVER BLOCK (IC C2, Q281 to 284)**
     The current driver supplying the fluorescent tube display data. This data is originally supplied from the CPU.

3. **KY-267 Board**
   - **I/O EXPANDER BLOCK (IC A1)**
     The I/O expander enabling input and output of the LED drive data and the key scan signal.
   - **LED DRIVER BLOCK (Q301 to 319)**
     The current driver for the display LED.
   - **KEY & LED DISPLAY BLOCK (S301 to 332, S401 to 406)**
     The matrix for the display LED and operation key.

4. **KY-269 Board (S501 to 507)**
   - **LED DRIVER BLOCK (Q401 to 409)**
     The current driver for the display LED.

5. **LE-120 Board (D601 to 603)**
   - **LED DRIVER BLOCK (Q501 to 507)**
     The LED board for displaying the JOG dial rotating direction.

6. **CN-883 Board (RE701)**
   - The rotary encoder board for the JOG dial.
The remote control unit RM-D9000 consists of the followings.

1. **KC-32 Board**
   - **RESET BLOCK (IC F6,F8)**: It generates the reset signal when power is turned on.
   - **CPU BLOCK (IC C4)**: This is the one-chip CPU having the core equivalent to Z80 CPU core, with the built-in serial and parallel I/O interface.
   - **ROM/RAM BLOCK (IC E2,E6)**: 32k byte ROM (IC E2) for storing program and 8k byte RAM (IC E6).
   - **ADDRESS DECODER BLOCK (IC B1,C3)**: The address decoder enabling CPU to access the peripheral circuit.
   - **SERIAL I/O BLOCK (IC B2)**: The buffer for serial communication with PCM-9000 unit.
   - **METER I/F BLOCK (IC B2,C2,C5,C6,D5,D6,E5,E6,F4)**: The meter drive signal is supplied from PCM-9000 unit in the AES/EBU format. This block detects the peak data and the bit-mode data. The detected data are read by the CPU.
   - **PULSE COUNTER BLOCK (IC B3,B6,F6)**: It counts the pulse output of the JOG dial rotation. The CPU reads the counter output.

2. **DP-195 Board**
   - **I/O EXPANDER BLOCK (IC B2, B3)**: The I/O expander to send the fluorescent tube display data from the CPU.
   - **FL DRIVER BLOCK (Q201 to 280)**: It converts the I/O expander output to the signal voltages that can drive the fluorescent tube.
   - **FL HEATER DRIVER BLOCK (IC C2, Q281 to 284)**: The current driver supplying the fluorescent tube display data. This data is originally supplied from the CPU.

3. **KY-267 Board**
   - **I/O EXPANDER BLOCK (IC A1)**: The I/O expander enabling input and output of the LED drive data and the key scan signal.
   - **LED DRIVER BLOCK (Q301 to 319)**: The current driver for the display LED.
   - **KEY & LED DISPLAY BLOCK (S301 to 332, S401 to 406)**: The matrix for the display LED and operation key.

4. **KY-269 Board (S501 to 507)**
   - The operation key and display LED board.

5. **LE-120 Board (D601 to 603)**
   - The LED board for displaying the JOG dial rotating direction.

6. **CN-883 Board (RE701)**
   - The rotary encoder board for the JOG dial.
ADA-28 Board (DABK-9001: Option)

Description
The ADA-28 board comprises of the DABK-9001 and is inserted into the option slot of PCM-9000 rear panel. It consists of 2-channel 20-bit A/D converter, D/A converter and the timing control circuit. The 2-channel analog input signal is converted by the A/D converter to digital signal which is sent to the DIO-27 board. The 2-channel digital signal that is supplied from the DIO-27 board is converted by the D/A converter to the analog signal.

1. A/D CONVERTER BLOCK
The A/D converter consists of the input polarity selection circuit (S101, S201), LINE IN amplifier (IC101, IC201), 5 dB step attenuator circuit (S103, S203) and A/D converter (IC102, IC103, IC106, IC202, IC203, IC206). The offset compensation circuit (IC104, IC105, IC204, IC205, RV102, RV202) enables the offset adjustment of A/D converter. The input level adjustment is possible within the range of ± 2 dB using the front panel control VR of PCM-9000. When combined by S103 and S203, the maximum range of input level adjustment is from +14 dBs to +26 dBs.

The A/D converter output digital data is converted from the 20-bit parallel data to the 2-channel serial 20-bit data by IC107, IC108, IC109, IC110, IC207, IC208, IC209. The output data is sent to the DIO-27 board via the line driver IC13.

2. D/A CONVERTER BLOCK
The D/A converter consists of the digital filter (IC116), 20-bit D/A converter (IC110, IC210), low-pass filter with amplifier (IC111, IC112, IC113, IC211, IC212, IC213), 3 dB step attenuator (S104, S204) and LINE OUT amplifier (IC115, IC116, Q101-Q108, IC215, IC216, Q201-Q208). As the digital filter generates the 20-bit data of 8 times the sampling frequency, the low-pass filter having a good linear phase characteristics within the audible range is used. The output level adjustment is possible within the range of ± 2 dB using the front panel control VR of PCM-9000. When combined by S105 and S205, the maximum range of output level (full bit data) adjustment is from +14 dBs to +26 dBs.

3. TIMING CONTROL BLOCK (IC4, IC5, IC6, IC7, IC9)
The timing control block receives the various timing clocks from the CK-41 board, and the REPRO D0 data from the DIO-27 board. Using these input signals, it generates the various timing signals (256FS, 64FS, FS) that are required for A/D and D/A conversion.
DIO-28 Board (DABK-9004: Option)

Description

1. SDIF OUTPUT BLOCK (IC2)
DIO-28 board receives the digital output signal (DODATA) at the balanced-type input buffer (IC1) in the form of serial data. This data is sent to the SDIF-2 transmit LSI (IC2) where the data is converted to the SDIF format and sent to the external units via 75 ohm driver (IC9). The emphasis flag for the output data passes through the CPU I/F block so that the emphasis flag is set by the main CPU.

2. SDIF INPUT BLOCK (IC5)
DIO-28 board receives the SDIF format input signal at the 75 ohm receiver (IC8) where the input signal is converted to the TTL level. The signal then passes through the multiplexer (IC7) where either the SDIF signal or the loop-test signal is selected. The selected signal is sent to the SDIF receive LSI (IC5) where the signal is converted to the 64-bit slot serial signal. The converted signal is sent to the DIO-27 board via the output buffer (IC6). The emphasis flag of the SDIF input signal and the DIN active signal are latched once by the flag latch block (IC15-17) and passed through the CPU I/F block so that the main CPU reads these signals.

3. TIMING GENERATOR BLOCK (IC4, 10, 11, 12, 13, 14)
This block generates the timing signals required for internal operation using the clock signal that is supplied from the PCM-9000.

4. POWER ON MUTE BLOCK (IC3, 23, 27)
It generates the muting signal which inhibits signal output for about five seconds when the power is turned on. It prevents generation of noise in the externally connected equipment.

5. CPU I/F BLOCK (IC18 to 26)
The CPU I/F consists of the address decoder enabling CPU access, the board ID signal generator, and the latches for writing and reading the flag signal.
MEM-58 Board (DABK-9007: Option)

Outline
The MEM-58 board mainly exchanges data and control signals between the EDIT board and the MC board. The MEM-58 board stores the data decoded by the EDIT board in the memory and outputs JOG data, in which X'fade and FADER processing are conducted on the stored data and the data is interpolated with the internally divided value, to the EDIT board.

The input data is once stored in the large capacity DRAM (approximately 10 seconds of stereo signal). The functions of JOG playback, FILE playback, etc. are enabled using this memory and DSPs. The DIO of AES/EBU format is prepared in the MEM-58 board for insertion which enables the result of playback to be input and output with external equipment directly.

Description
Main function blocks
MEM-58 board has the following six function blocks:
1. Error data interpolation process block
2. Memory block
3. Memory control block
4. Signal process block
5. AES/EBU format interface block for insertion
6. Main CPU interface block

1. Error data interpolation process block (IC62)
The DEC input data is supplied from ED-37 board. This data can include errors depending upon the playback condition. The error flags which is supplied together with the input data are checked to activate the interpolation process for the data including errors. Occurrence of strange sound is thus prevented.

2. Memory block (IC153 to IC159, IC183 to IC189)
The DEC input and SCSI input are stored in either memory A or B as the main CPU controls the INPUT SELECTOR (IC120, IC122). Seven DRAMs of 4-bit x 1M words are used in parallel connection. Six DRAMs are used for audio data, and one DRAM is used for timecode data.

3. Memory control block (IC120, IC214, IC122, IC232)
The DECODE input data are stored in either memory A or B as controlled by the main CPU. The data read and write can be carried out freely as the result of arbitration. The read is synchronized with the word clock enabling time base correction of the data.

4. Signal process block (IC130)
The data output from the memory receives the signal processes such as level control, JOG interpolation, X'fade, etc., in accordance with the operating mode. All these signal processes are carried out by DSPs. The data after processes are output to ED-37 board as the DATA-A.

5. AES/EBU format interface block for insertion (IC250, IC257)
The DIO of AES/EBU format is prepared which enables connection of external effecter, etc. so that the playback signal can be once output to external equipment. Switching is performed by the INSERTION key on the remote controller.

6. Main CPU interface block (IC22 to IC29)
This is the address decoder for the main CPU bus, and generates various timings.
SECTION 7  
SPARE PARTS  

7-1. NOTES ON SPARE PARTS  

(1) Safety Related Components Warning  
Components marked with \( \Delta \) on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

(2) Standardization of Parts  
Repair parts supplied from Sony Parts Center may not always be identical with the parts which actually are in use due to “accommodating the improved parts and/or engineering changes” or “standardization of genuine parts”. This manual’s exploded views and electrical spare parts list are indicating the part numbers of “the standardized genuine parts at present”.

(3) Stock of Parts  
Parts marked with ‘0’ SP (Supply Code) column of the spare parts list are not normally required for routine service work. Orders for parts marked with ‘0’ will be processed, but allow for additional delivery time.

(4) Units for Capacitors, Inductors and Resistors  
The following units are assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified.  
- Capacitors : \( \mu \text{F} \)  
- Inductors : \( \mu \text{H} \)  
- Resistors : \( \Omega \)
### 7-2. EXPLODED VIEWS

- Exploded views are composed of the following blocks:
  (1) Ornamental Block
  (2) Chassis Block
  (3) Disc Drive Block
  (4) Rear Panel Block
  (5) Remote Control Panel RM-D9000 (Option)

#### ORNAMENTAL BLOCK

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<th>SP Description</th>
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* 注意："4-3-3. スピンドルモーターの交換" 及び"4-3-4. 光学ピッタの交換"参照。
* Note: Refer to section "4-3-3. Spindle Motor Replacement" and "4-3-4. Optical Pick-up Replacement".
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**Ten Key Ass'y**

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**PCM-9000**
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### Supplied Accessories

#### PCM-9000

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