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Features

Q1-1 About Features of MPEG-4 Network CODEC

In January 2002, JVC launched DM-NE300/DM-ND300, the the MPEG-2 compliant encoder/decoder that responds to network environment. Since then JVC has achieved a great deal of delivery results, as some examples are seen below.

- Video distribution systems, including those used for relay-broadcast of sessions in municipal assembly
- Remote lecturing systems between or among universities
- Remote surveillance systems using high picture quality

And now, we are launching DM-NC40, the MPEG-4 compliant CODEC. MPEG-4 is the most advanced standard for video compression. It covers lower bit rate band than MPEG-2, which is well known as the standard used for DVD. MPEG-4 adopts state of the art coding technology, and its remarkable feature is its capacity to realize relatively high video quality in low bit rate. Accordingly, when streaming packets are forwarded into network, remains relatively low level.

DM-NC40 places its focus on Security, Teleconference and Streaming. They are its typical applications and important ones as well, both in commercial and private life. To realize such aim, DM-NC40 professionally provides customers with powerful "Three Modes."

- **[Camera]/[Monitor] mode**

This is the mode for remote surveillance, that provides MPEG-4 video stream, JPEG picture, bi-directional audio communication, and remote control of external equipment.

- **[Teleconference] mode**

This is the mode for Teleconference, which realizes multiple functions as encoder-cum-decoder-cum-echo canceller with single DM-NC40.

- **[ISMA_Server] mode**

This is the mode for Streaming(distribution of contents), which allows use of defacto standard software players of almost all types for reproduction of streams.

Also, DM-NC40 offers wide bandwidth of 54kbps to 2Mbps, so that you can select most suitable rate depending on your network requirement.

With these features, DM-NC40 will be sure to well meet ever-varying needs of customers.

Q1-2 What is "High Picture Quality Teleconference System?"

DM-NC40 is a high picture quality CODEC that has coding capacity of maximum 2Mbps under MPEG-4 standard. It can handle moving picture representation of maximum 30fps under 352x240 resolution.

In addition to encoding and decoding functions, it has built-in Echo Canceller. With these features, DM-NC40 strongly helps customers install IP network-basis teleconference systems with better video quality and lower costs.

Q1-3 You say "The product well supports construction of network-basis remote surveillance systems, but what does it mean?"

- DM-NC40 has "Path-Through" function. Path Through converts serial signals to IP packet and vice versa. It converts input signals entered through RS-232C/485 serial port of DM-NC40, to IP packet. Then, it forwards the IP packet to the network. Receiving-side DM-NS40 converts the IP packet to RS-232C/485 signals and transmits the signals through its output serial port to external equipment, camera for instance. In this way, with Path-Through, you can remotely control external CCTTV equipment, such as camera, switcher and disk recorder.
- DM-NC40 has Picture-in-Picture(PinP) function. PinP in Camera mode composites 2 video inputs to Parent-Child screen. Parent and Child are switch-able.
- Monitor mode outputs video that is sent from Camera mode. Bi-directional audio communication is possible between Camera mode and Monitor mode.
- DM-NC40 has a built-in slot for Type I compact-flash-card. The compact flash card can store JPEG images triggered by alarm inputs. You can get the JPEG files in the compact flash card via network.

Notes

*Video stream from Camera mode can be shown on PC with ISMA compliant players or JVC software player (will be available soon). To display video on video monitor, DM-NC40 must be installed at monitor's side to use it as decoder.

Q1-4 What is "ISMA Streaming?"

- ISMA(Internet Streaming Media Alliance) is the association that is working on standardization of streaming. DM-NC40 is capable to distribute streaming complied with ISMA specifications. And that means many vendors are offering ISMA-compliant software players. You have a lot of options for choice.

Q1-5 What does "JPEG Support" mean?

In Remote Surveillance system (only in [Camera] mode), image distribution under JPEG* is possible, in addition to distribution under MPEG-4. So, you can selectively use these two methods as shown below.

- Use MPEG-4, where you attach greater importance to integrity of moving pictures. In case of narrow band network, for instance.
- Use JPEG, where image quality or frame size is critical.

Notes

*DM-NC40 can distribute JPEG but has no receiving function. However, JPEG can be captured through PC's Web browser.

Q1-6 I hear "DM-NC40 supports both Unicast and Multicast distribution," and what does it mean?

DM-NC40 responds to large-scale systems because it supports not only Unicast but also Multicast distribution.

Notes

1. For Multicast distribution, you have to use network that supports IGMPv2.
2. DM-NC40 can simultaneously distributes maximum 5 streams of Unicast. However, be aware that default setting is "1 line of Unicast" for [Teleconference] and [Monitor] modes. So, to simultaneously distribute multiple streams of Unicast under either of these modes, you need to change the setting, that is , to enable [set multiconnection on] command using TelnetAPI.

Q1-7 What is "PC-Less Operations?"

After settings are completed, you can perform all operations for communication through Front Panel of DM-NC40. In other words, there is no need to operate PC, no need to operate rather bothersome keyboard, and that is the meaning of "PC-Less Operations."

Q1-8 What does it mean that "DM-NC40 has embedded HTTP server function."

It means that setups of DM-NC40 can be done through PC's Web browser. By selecting mode that has a set of preset values, you can set up DM-NC40 for your application.

Q1-9 About maintenance of DM-NC40

Version-up through compact flash card is available. When version-up is executed, all previous(current) setups are initialized to default values. Accordingly if you have changed any default setting to satisfy network's requirements, IP address, for instance, make sure to take notes of such values prior to version-up.

Q1-10 What is "Path Thorough" function?

Path Through is the function to convert serial signals to IP packet and vice versa. In transmission between two units of DM-NC40s, serial ports of the units act as Path Through terminals. Path Through works as follows. When signals are entered into DM-NC40 through its RS-232C/485 serial port, Path through converts the signals to IP packet. Then, it forwards the IP packet to the network. Receiving-side DM-NS40 converts the IP packet to RS-232C/485 signals and transmits the signals through its output serial port to external equipment, camera for instance. In this way, with Path-Through, you can remotely control external equipment.

Notes

1. To carry out remote control of external equipment, you have to additionally use ad hoc application software(the software specific to the purpose) or specific remote control hardware.
2. RM-P2200 (remote controller) and SW-2200 (switcher) are available for remote surveillance system.

*RM-P2200, SW-2200 — Available in Japanese market only.

Q1-11 About "Alarm Input Terminals" and "Output Terminals for Control"

- DM-NC40 has four alarm input terminals. JPEG recording to compact flash card can be started by those alarm inputs.
- It has eight output terminals for control use. So, with these terminals you can remotely control external equipment.

Notes

Output terminals can be controlled via WEB browser or ad hoc(specific to the purpose) application software.

Q1-12 How many Unicast and Multicast can single DM-NC40 distribute simultaneously?

5 unicast streams and 1 multicast stream. However, note that default setting is "1 Unicast" for [Teleconference] and [Monitor] modes. Accordingly, to simultaneously distribute multiple streams of Unicast under either of these modes, you need to change the setting. That is, you have to enable [set multiconnection on] command through TelnetAPI. For Multicast, it is one stream only.

Interface

Q1-13 Specifications of video input

Type of input is analog composite. DM-NC40 employs BNC x 2 (two BNC connectors) for video data entry so that it responds to two lines of entries.

Q1-14 Specifications of video output

Type of output is analog composite. DM-NC40 employs BNC x 1 (one BNC connector).

Q1-15 Specifications of audio input

- Type of input is analog, unbalanced. Connector's spec is RCA x 2(L/R). In Streaming Distribution system(that is, under [ISMA_Server] mode), the mode of entry is stereo. [Lch/Rch] responds to such stereo entry.
- In Teleconference system (that is, under [Teleconference] mode) and Remote Surveillance system ([Camera] or [Monitor] mode), the mode of entry is monaural, and in this case, [Lch] is used.

Q1-16 Specifications of audio output

- Type of output is analog, unbalanced. Connector's spec is RCA x 1 (monaural).
- Audio output is available in Teleconference system([Teleconference] mode) or Remote Surveillance system([Camera] or [Monitor] mode).
- In Streaming system([ISMA_Server] mode), DM-NC40 performs only distribution and does not receive data. So, it does not use output audio signals.
- Currently, [RESERVED] terminal does not function.

Q1-17 Network interface

It is 10BASE-T/100BASE-TX. Connector is RJ-45 x 1. In case you use switching hub that has function to setup port, set the port to [Auto Negotiation].

Q1-18 Serial interface

- DM-NC40 has 2 serial ports, RS-232C and RS-485/RS-232C. Terminal's spec is Dsub 9P x 2.
- The unit has Path Through function that connects serial port of DM-NC40 to serial port of another DM-NC40 via network. With such capability DM-NC40 allows you to control equipment located at remote area, to remotely control cameras, for instance.
- RS-232C port can be used for maintenance also.
- For details of remote control and action of Path-Through, see subsection 3.2. Also, see Q7-4 for RS-232C cable.

Q1-19 Purpose of input and output terminals

- Input terminals are for entries of alarm signals.
- With those alarm inputs, JPEG recording to compact flash card can be started.
- Output terminals are for control of external equipment.
- Specification of both input and output terminals is Dsub 15P x 1.

Q1-20 Media for local image recording

- Use compact-flash-cards (Type I). Supported cards: SanDisk Corporation
 - 128MB (SDCFH-128-xxx)
 - 256MB (SDCFH-256-xxx)
 - 512MB (SDCFH-512-xxx)
- Slot specification is CFslot x 1.
- Local recording is available on Camera mode.

Q1-21 Functions of Front Panel Buttons

They are: power-On/Off, selection of destination, start and stop of communication, switching of input video, switching of PinP(Picture-in-Picture), start/stop of JPEG recording, and hold of buttons.

Video

Q1-22 Compression standards

- DM-NC40 employs ASP/SP of MPEG-4(ISO) and JPEG(ISO).
- For MPEG-4, it works as real time CODEC. For JPEG, it works as real time encoder.

Q1-23 Frame resolution

- For MPEG-4, you can select 352 x 240, 176 x 120, 320 x 240 or 160 x 120.
- For JPEG, you can select 704 x 480 or 640 x 480.
- JPEG is available only in Remote Surveillance system(under [Camera] mode).

Q1-24 Frame rate

For MPEG-4, frame rate is maximum 30fps, and for JPEG, maximum 3fps.
Available range varies depending on setting of frame-size and bitrate.

Q1-25 Bit rate

For MPEG-4, bit rate is 54kbps to 2Mbps.

Q1-26 Delay time

- Delay time in interaction between DM-NC40s is approximately 0.3 second.
- Were there any network-cause delay, however, delay time becomes longer by the value of such additional delay.

Audio

Q1-27 Compression standards

- DM-NC40 applies G.726(monaural)/MPEG-4 AAC-LC(stereo).
- G.726(monaural) works under [Teleconference], [Camera] and [Monitor] mode.
- MPEG-4 AAC-LC works under [ISMA Server] mode.

Q1-28 Bit rate

- Under G.726, bit rate is 16kbps or 32kbps. Bit rate is constant even if there is no audio input.
- Under MPEG-4 AAC-LC, it is 96bps(maximum) or 128bps(maximum). In this case, bit rate varies depending on complexity of audio signal.

Q1-29 Sampling rate

For G.726, sampling rate is 8kHz. For MPEG-4 AAC-LC, 32kHz.

Stream output

Q1-30 Data protocol

- Audio/Video stream of DM-NC40 is RTP compliant.
- In Teleconference/Camera/Monitor mode, default values of destination port numbers for unicast are as follows.
In ISMA sever mode, destination port numbers are decided by client.
Port number for audio: 49200
Port number for video: 49300
- In multicast, default values of destination port numbers are as follows.
Port number for audio: 50000
Port number for video: 50002

Q1-31 Protocol for stream control

- For control of MPEG-4 stream, it is RTSP or TelnetAPI.
- For Multicast joining, DM-NC40 supports IGMPv2.
- Protocol for getting JPEG from DM-NC40 is HTTP.

Control of external equipment

Q1-32 Serial port

- DM-NC40 has 2 serial terminals, RS-232C and RS-232C/RS-485 for Path Through.
- "Path Through" serial data are transmitted through TCP (serial signals are converted to IP packet). (See Q1-3 and Q1-10).
- Destination port numbers of the TCP are as follows.

Port number of [SERIAL 1] terminal: 49152(fixed)
Port number of [SERIAL 2] terminal: 49153(fixed)

Set up

Q1-33 Are there any ways of setting-up, other than Web browser?

Another way is to set up through TelnetAPI.

For entry of TelnetAPI, there are two ways: through Telnet on network or terminal software on RS-232C.

Q1-34 Physical specifications

Weight	2.6kg
Standard voltage	AC 100V, 50/60Hz
Current consumption	0.3A
Action-assured temperature	0 to 40°C (Avoid freeze.)
Outer size	210(W) x 90(H) x 302(D)mm *Not including portions of terminals and protuberance. The unit can be mounted on EIA rack, using rack-mount kit(option).
Safety standard	JEIDA-37
EMC	VCCI-A

2.2 Connection and Installation

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- Q2-1** For setup of DM-NC40, what PC is required?
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- Q2-2** For pier to pier connection between DM-NC40 and PC, is cross cable connection available?
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- Q2-4** Any considerations, for implementation and operations of Teleconference system?
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- Q2-5** Any considerations, for implementation and operations of Remote Surveillance system?
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-
- Q2-7** Any hint for selection of LAN cable?
-
- Q2-8** Precaution for insertion/removal of compact flash card (CF card)?
-
- Q2-9** Is there any potential problem for connecting PC to the LAN with DM-NC40s?
-
- Q2-10** Any recommendation for selection of UTP cable?
-
- Q2-11** What components are required for those systems?
-
- Q2-12** Any considerations for establishment of connection between DM-NC40s?
-

Q2-1

For setup of DM-NC40, what PC is required?

Recommended specifications are as follows.

OS: Windows XP Home Edition, Windows XP Professional and Windows 2000
CPU: Pentium III 700 MHz or above
Memory: 256MB or above
Monitor's resolution: 640 x 480 or above

Q2-2

For pier to pier connection between DM-NC40 and PC, is cross cable connection available?

- To connect DM-NC40 to PC "1-to-1" with cross cable is itself possible
- There is, however, a rare case that some PC does not support cross cable connection. So, you should make sure beforehand whether or not your PC support cross cable connection.
- Also, cross cable connection between DM-NC40s is itself possible, but connection through switching hub that has flow control function is strongly recommended. That is, because DM-NC40 communicates by half duplex, packet loss can occur unless transmission is controlled by flow control.

Q2-3

Types of compact flash card (CF card) available for DM-NC40

Available type is limited to TYPE I only. Cards are used for recording JPEG files. Fast CF cards over 1.5 MB/s are recommended for recording JPEG files. Below is the list of cards that have passed functional test. (Products are Ultra Series from Sandisk Corporation)

- **128MB(SDCFH-128-xxx)**
The card can record up to 360 files(JPEG images). Maximum duration is approximately 120 seconds.
- **256MB(SDCFH-256-xxx)**
The card can record up to 720 files. Maximum duration is approx. 240 seconds.
- **512MB(SDCFH-512-xxx)**
The card can record up to 1,440 files. Maximum duration is approx. 480 seconds .

Q2-4

Any considerations, for implementation and operations of Teleconference system?

- Make sure not to set the same IP address to multiple devices. We recommend network with QoS for steady video and audio.
- For network equipment, use those that respond to 100BASE-TX. Where setup of port is possible, set the port to [Auto Negotiation].
- Audio's mode is monaural. For audio input to DM-NC40, use [Lch].
- In Picture-in-Picture operations image of the person whom you are talking to is displayed on the parent screen and your image is displayed on the child screen. Note that views' appearance may vary from that you see in Remote Surveillance system, where Picture-in-Picture has two video inputs to Camera mode.
- Video signals used in Teleconference system are video signals from cameras, such as cameras used in the conference. When input video is very complicated like some movies, for instance, frame rate may be reduces, or images are severely affected by block noises.

Q2-5**Any considerations, for implementation and operations of Remote Surveillance system?**

- Make sure not to set the same IP address to multiple devices.
- For steady video and audio, we recommend network with QoS.
- For network equipment, use those that respond to 100BASE-TX. Where setup of port is possible, set the port to [Auto Negotiation].
- Two-way talking is available. Audio's mode is monaural under G.726. For audio input to DM-NC40, use [Lch].
- The unit has automatic recovery function for power failure. Automatic recovery function means that, when either one of mutually connected DM-NC40s is switched off under live connection, it restores its previous connection-status after rebooting.
- Connect camera to [VIDEO IN 1] and/or [VIDEO IN 2] of DM-NC40 of Camera mode.
- Recording with CF cards is available only for the DM-NC40 at camera-side (the one operating in [Camera] mode). The unit at monitor-side (the one operating in [Monitor] mode) cannot perform recording.

Q2-6**Any considerations for implementation and operations of Streaming system?**

- Make sure not to set the same IP address to multiple devices.
- For steady streaming of audio and video, we recommend network with QoS.
- 5 ISMA compliant players can connect to DM-NC40 simultaneously for unicast streaming. In multicast streaming, more ISMA players can playback the multicast stream as far as the network allows.
- Audio's mode is stereo of MPEG-4 AAC-LC.

Q2-7**Any hint for selection of LAN cable?**

- Use LAN cables of "category 5" or above.
- For connection between DM-NC40 and switching hub, use straight cables.
- For direct connection between DM-NC40 and PC, use cross cables.
- There are some PCs that do not support cross cable connection. So, you should make sure beforehand whether or not the PC you intend to use responds to such use.

Q2-8**Precaution for insertion/removal of compact flash card (CF card)?**

- Always make sure to switch OFF the power when you insert or remove CF card. Insertion or removal under power ON may cause destruction of data in the card or the card itself.

Q2-9**Is there any potential problem for connecting PC to the LAN with DM-NC40s?**

- In case that NetBIOS of the PCs you intend to connect to the same network does not accept setting to "disabled," then, it is recommended that you do not connect such PCs to the network.
- If such PCs are connected to the network, such phenomenon may occur that they regularly disturb send/receive transmission of stream, resulting in interruption of video's flow.
- For how to set NetBIOS to "disabled," refer to the manual of each PC.

Q2-10**Any recommendation for selection of UTP cable?**

- Use UTP cables of "category 5" or above.
- Maximum length of 100BASE-TX UTP cable is 100m.

Q2-11 What components are required for those systems?

Below is the standard list of equipment. The list is just for reference purpose. Configuration varies depending on the purpose, scale or environment of the system you intend to install.

- DM-NC40
- Video/audio devices for entry to DMNC-40
- Devices for monitoring
- PCs for setup use(used for various setups of DM-NC40)
- Network devices of 100BASE-TX(Auto Negotiation)-support type
- UTP(Unshielded Twisted Pair) cables of "category 5" or above
- EIA rack and metal parts for rack mounting

Q2-12 Any considerations for establishment of connection between DM-NC40s?

For [DM-NC40 to DM-NC40] connection, it should be [Teleconference] mode to [Teleconference] mode, or [Monitor] mode to [Camera] mode. Under connection of one mode to the other that belongs to different system-usage, [Monitor] to [Teleconference], for example, normal reproduction cannot be obtained.

2.3 Settings and Operations

This subsection provides Q&A for matters concerning setting up and correlation between setup and system's actions

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- Q3-1** Considerations for setups on MODE SETUP screen
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- Q3-2** Considerations for setups on NETWORK SETUP screen
-
- Q3-3** Considerations for setups on ENCODE PARAMETERS screen
-
- Q3-4** Considerations for setups on TELEPHONE BOOK screen
-
- Q3-5** Considerations for setups on SECURITY SETUP screen
-
- Q3-6** Considerations for setups on ALARM SETUP screen
-
- Q3-7** Considerations for setups on OUTPUT PIN SETUP screen
-
- Q3-8** Considerations for setups on SERIAL PORT SETUP screen
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- Q3-9** Considerations for setups on CF CARD SETUP screen
-
- Q3-10** Considerations for setups through PC's terminal software
-
- Q3-11** Considerations for setups through PC's Telnet
-
- Q3-12** As for setting up of the time, for what purpose do they do it?
-
- Q3-13** Can I view JPEG images?
-
- Q3-14** Can I set audio to OFF?
-
- Q3-15** What points should I pay attention to, for setting up through Web browser?
-

Q3-1

Considerations for setups on MODE SETUP screen

- When you change current mode to [ISMA_Server], values that have been set through TELEPHONE BOOK screen (i.e. the existing values in "Telephone Book" table) are deleted.
- When mode change is executed, DM-NC40 reboots(restarts), so that all current setups, except some, such as those related to network, are initialized.
- If current mode is [User Mode], it cannot be deleted despite you click [Delete User Mode].
- When you execute mode change, make sure to entirely stop send/receive transmission before execution of mode change.
- While two units of DM-NC40s are under ongoing session(connection) between them, both units do not accept any mode change.
- If mode change is executed while the system is performing Multicast distribution, then, under new mode (that is, after rebooting), the system automatically starts Multicast distribution.
- As for Echo Canceller function, its factory setting is [aec on] (enabled) for[Teleconference] mode and [aec off] (disabled) for other modes. So, if you need Echo Canceller, change the setting to make the function enabled (that is, to execute [set aec on] TelnetAPI).
- Under [ISMA_Server] mode, Echo Canceller is not available.

Q3-2

Considerations for setups on NETWORK SETUP screen

- Default IP address of DM-NC40 is set to [10.0.0.1]. Change IP address according to the requirements of the network you use.
- For settings related to the network, consult network administrator of the network you use, to check that details of your setup plan is right.
- In NAT environment, select correct port number that can be used.
- If mode change is executed while the system is performing Multicast distribution, then, under new mode (that is, after rebooting), the system automatically starts Multicast distribution.

Q3-3

Considerations for setups on ENCODE PARAMETERS screen

- When you use DM-NC40 under [Teleconference] or [Monitor] mode, set values of [Video Frame Rate] and [Video Frame Size] to uniform values for all units of DM-NC40 in the system.
- Bit rates shown in this manual are averaged value under assumption that video entries are of standard nature. So, there may be a case that output bit rate becomes higher than the set value depending on the nature of input video. Momentary bit rate may vary.
- When the value of any parameter that relates to encoding is changed, DM-NC40 reboots.
- You cannot change frame size, frame rate, or bit rate while the system is working.
- When you set bit rate to high value, the phenomenon where pictures do not move smoothly may occur depending on the nature of input video, but it is not a failure. If you feel bothersome about such movement, reduce bit rate.
- Range of available bit rates varies depending on mode.

Teleconference mode	54kbps to 1.7Mbps
Camera mode	54kbps to 2.0Mbps
Monitor mode	54kbps to 2.0Mbps
ISMA_Server mode	256kbps to 2.0Mbps

- For bit rate setting of [Teleconference] mode, it is strongly recommended that you use bit rate not exceeding 1.5Mbps. Limit the use of 1.7Mbps to operations where pictures' movement is light and output bit rate is low. As already mentioned, high bit rate may cause lack of smoothness, depending on the nature of video.

Q3-4 Considerations for setups on TELEPHONE BOOK screen

- When mode is changed to [ISMA_Server], [Telephone Book] is initialized to null(empty). Data in [Telephone Book] are maintained unless mode change to [ISMA_Server] is executed. That is, any mode change other than change to [ISMA_Server] does not affect the data.
- For [Edit No.], you need not set the value sequentially from 001. You can select any number within 001 to 999, according to the requirement of the application.
- To receive Multicast packet, set the IP address of the Multicast packet you want to receive, in [Telephone Book]. Then, select(execute) the ID number that corresponds with such IP address from the Front Panel. Assuming that DM-NC40-H wants to receive Multicast-m1 packet from the sender DM-NC40-A, it is necessary that the unit-A is currently sending m1 packet, for unit-H to actually receives packet m1.
- The method to start Multicast streaming is to click START button in NETWORK SETUP screen. (As for Unicast, when you select the ID number (select means "executes") from the Front Panel, the requested DM-NC40 automatically starts sending stream. For Multicast, however, it is necessary that you manually start streaming.)

Q3-5 Considerations for setups on SECURITY SETUP screen

- When you change values, make sure to correctly fill all items shown on the screen.
- In case you change your password, take appropriate measure not to forget the new password.

Q3-6 Considerations for setups on ALARM SETUP screen

- If destination IP address is specified in this screen, alarm packet is sent to the destination when alarm-device entered alarm signal to DM-NC40. DM-NC40 does not re-send alarm packet to same destination for 30 seconds. It does not mean, however, that the unit(DM-NC40) does not perform recording of images to compact flash cards, that is, recording is performed.
- DM-NC40 to which an alarm is entered transmits preset text string(a set of characters or symbols) to the preset IP address. When the protocol setting is API, DM-NC40 is available to receive such data, and to connect to the sender automatically, though preset text string is ignored. When the protocol setting is TCP, you need an application software that receives preset text string.
- When the protocol setting is TCP, DM-NC40 cannot receive alarms transmitted from other DM-NC40. So, select API for the protocol to specify DM-NC40 as destination (the device to which alarms are sent).

Q3-7 Considerations for setups on OUTPUT PIN SETUP screen

- Output pins are not for alarm output from DM-NC40.
- Output pins can be set to High or Low (TTL level), through Web browser or TelnetAPI.

Q3-8 Considerations for setups on SERIAL PORT SETUP screen

- The purpose of this setup is to use [SERIAL PORT] as a terminal for Path Through.
- You can alternatively use [SERIAL PORT 2] as service-terminal(terminal for maintenance). When you use [SERIAL PORT 2] as service-terminal, settings are fixed as follows.

Baudrate: 115.2kbps

Data length: 8 bits

Parity: None

Stop bit: 1

Flow control: None

Q3-9**Considerations for setups on CF CARD SETUP screen**

- For format of CF cards (compact flash card), FAT32 and Ext2 are available. Ext2 is recommended. However, if you format cards in Ext2, Windows card reader does not recognize the format. So, when you use Windows card reader to read data, format cards in FAT32. Except such case, we recommend Ext2. You can get files from Ext2 CF card to Windows via FTP.
- When you execute delete function ([Del Files] button), all files in [jpeg-1] and [jpeg-2] subdirectories in each [Alarm] directory are deleted.
- DM-NC40 does not support Hot-Swap.
- Make sure that you insert/remove CF cards only when power of DM-NC40 is OFF.
- Remained size and total size of CF card are shown in [Maximum CF Card Recording Capacity]. But there is the limit for amount of files that can be recorded. When maximum files are recorded, recording is not available even if CF card has some remained area.
- Filenames stored in CF card show the date and time of recording for each file. However, when you view data in CF card through Windows PC or the like, there may be the case that file creation date/hour shown there differs by 9 hours from the date/hour shown by such filename. This is the phenomenon that occurs caused by such reason that, the operating system(OS) of Windows(or other PC, etc.) interprets time zone differently from DM-NC40. In such case, date and hour shown by filename is the correct one.
- The card slot of DM-NC40 is for dedicated use for CF cards only. Other cards, such as those that have LAN-card function, cannot be used. DO NOT use such cards, because cards may be destroyed.

Q3-10**Considerations for setups through PC's terminal software**

- Check the power of DM-NC40 is switched off. Then, connect [SERIAL 2] terminal(located at unit's rear) to PC's [COM] terminal with RS232C cross cable (9Pin). Set [SERVICE/CONTROL] Protocol select switch of Serial Port 2 to [SERVICE].
- Note that if you start up PC while DM-NC40 and the PC is connected by serial cable, some type of OS may reboot DM-NC40. So, do not connect the cable until the PC is completely started.

Q3-11**Considerations for setups through PC's Telnet**

- First, change IP address, subnet mask and default gateway address of the PC for connection with DM-NC40.
- If the amount of display-lines in Telnet's screen is not enough, increase the size of buffer through setup of Telnet software.
- When you reboot DM-NC40, Telnet is terminated. So, to continue operations through Telnet you need to connect Telnet again.
- If Telnet could not terminate correctly because of troubles related to PC or network, DM-NC40 maintains Telnet connection. As the result, such situation occurs that, if you try to establish Telnet connection again, it does not work. However, DM-NC40 has timeout function, which automatically disconnect Telnet when a few minutes pass after the trouble. So, re-connection becomes possible after a few minutes. Also, you can disconnect Telnet by rebooting DM-NC40 through Web browser.

Q3-12**As for setting up of the time, for what purpose do they do it?**

Time is used for JPEG filename recorded in CF card. So you need to set correct time. However, "second" is shown for indication purpose only. That is, you cannot enter or change second.

Q3-13 Can I view JPEG images?

- Current video input to [Camera] mode can be shown as JPEG image on Web browser.
- Maximum frame rate of JPEG is 3 per second. To update images, use [Update] button of the browser.
- For URL field of Web browser, enter as follows.
http://10.0.0.1:8009/live.jpg
(Specify IP address and port number of DM-NC40. For port number, specify it as 8009.)

Q3-14 Can I set audio to OFF?

DM-NC40 transmits audio stream even if there is no audio input. If you do not want audio, simply do not connect anything to audio input.

- If you disable Echo Canceller function, system's performance improves, so that video becomes smoother where high bit rate is set.
- Also, disable Echo Canceller function when you use audio only to one direction.
- To disable Echo Canceller, use TelnetAPI. Execute [set aec off] command to DM-NC40.

Q3-15 Any considerations for setting up through Web browser?

- Some settings require reboot of DM-NC40. While it is rebooting it does not accept connection request from Web browser. Wait until it is completely brought up.
- Web browser becomes available a while after rebooting. If you change settings immediately after the unit has become to allow you doing so, DM-NC40 takes longer time for next rebooting. This is because the unit is performing system-check operations, which regularly occurs after rebooting, and it does not accept reboot until checking is completed. Rebooting caused by execution of setting-change takes 1 or 2 minutes longer for bringing-up in comparison to usual rebooting (the one caused by reason other than setting-change),

2.4 Application

-
- Q4-1** Functions unique to DM-NC40 - Is there any?
-
- Q4-2** Automatic Recovery - How does it work?
-
- Q4-3** Echo Cancellor - We transmit audio only to one direction. Is Echo Cancellor functioning even in this case?
-
- Q4-4** Performance - Is there any way to improve performance?
-
- Q4-5** Status of bit rate - Can I monitor status?
-
- Q4-6** Commands - List of commands available for setup through PC's terminal software or Telnet
-

Q4-1

Functions unique to DM-NC40 - Is there any?

DM-NC40 has several functions that are unique to it.

1. The unit supports simultaneous distribution of five Unicast streams in maximum. So, if your requirement for simultaneous delivery to different destinations is within five, you do not need to use Multicast available network. That is, you do not need to newly install such network, for instance.
2. Simutaneous distribution of MPEG-4 and JPEG data is available.
3. Alternative use of TCP and UDP for stream transmission
There are networks that may have packet loss, such as those in wireless LAN environment. Even with such networks, DM-NC40 performs error free transmission with TCP retransmission control. You can switch UDP/TCP through TelnetAPI.

Q4-2

Automatic Recovery - How does it work?

- Automatic Recovery works in Remote Surveillance system([Camera] and [Monitor] mode).
- It works as follows. If the power of either one or both of DM-NC40 is shut down due to power failure while they are under live connection, both units resume previous session-conditions after rebooting.
- Such "resume" is guaranteed unless you push STOP button of the "alive" unit(the unit whose power is still on) before reboot of the other(the "dead" one).
- Let's assume that, multiple monitor-side DM-NC40s([Monitor] mode), Mot-1, Mot-2, Mot-3 and Mot-n, are connected to the camera-side DM-NC40("Unit-Cam," [Camera] mode) in your Remote Surveillance system. Now, suppose that Mot-2 established session(live connection) between Unit-Cam first of all monitor-side units, Mot-1 to Mot-n. In this case, Mot-2 performs two-way audio transmission between Unit-Cam (In addition to one-way video transmission from Unit-Cam to Mot-2). However, other monitor-side units that established such session after Mot-2, that is, second one, third one and so on, perform receiving only(one-way connection). In other words they are only watching and listening to the streams from Unit-Cam to Mot-2. They are "observers," so to speak. Under default setting of DM-NC40, Automatic Recovery function is not applied to these observers. However, you can establish environment where the function is applied to all DM-NC40s, including these observers, thorough TelnetAPI setup.

Q4-3

Echo Canceller - We transmit audio only to one direction. Is Echo Canceller functioning even in this case?

- For Remote Surveillance system ([Camera] or [Monitor] mode), DM-NC40's default setting for Echo Canceler is [aec off] (disabled). Where Echo Canceller is inactive, system's performance improves, so that smoother-movement-pictures can be obtained even in environment where high bit rate is set. If you are operating with one-way audio transmission, that is, you have no need for bi-directional audio transmission, set Echo Canceller disabled. There is no problem in doing so.
- If you use bi-directional audio transmission, set Echo Canceller enabled, that is, execute [set aec on] command. You can do it through TelnetAPI.

Q4-4

Performance - Is there any way to improve performance?

The following settings will help you improve system's performance.

1. If your system does not require Echo Canceller function, because the system is operating under one-way communication, for example, stop Echo Canceller function. You can do it through TelnetAPI.
2. If you do not need JPEG recording function for DM-NC40 in [Camera] mode, select [Disabled].

Q4-5**Status of bit rate - Can I monitor status?**

- You can display current output bit rate of video and audio with TelnetAPI function. However, for DM-NC40 that is operating under [Monitor] mode, you cannot do so, because such unit does not send video stream. Bit rate indication is not available unless the unit is sending video stream.
- To display bit rate, execute [.set brmon start] command of TelnetAPI.
- To stop displaying bit rate status, execute [.set brmon stop]command.
Note that, when you type stop command, typed text will be disappeared by going bitrate display.
- Another way to stop status-displaying is to press Ctrl + C. But in this case, it means that Telnet session itself is disconnected by such manipulation. So, you have to log in Telnet again.

Q4-6**Commands - List of commands available for setup through PC's terminal software or Telnet**

Below is the list of available commands. No command has argument.

stat	To obtain information for network, encoder and connection
set mode	To display available modes
set mode Camera	To set to [Camera] mode
set mode Monitor	To set to [Monitor] mode
set mode Teleconference	To set to [Teleconference] mode
set mode ISMA_Server	To set to [SMA_Server] mode
set mode User_Mode	To set to [User_Mode] mode
set aec	To display current setting of Echo Cancellor
set aec on	To enable Echo Cancellor function
set aec off	To disable Echo Cancellor function
.set brmon start	To display current output bit rate (Not usable in [Monitor] mode)
.set brmon stop	To stop displaying output bit rate (Not usable in [Monitor] mode)
set mode default	To initialize mode (to return to default)
reboot	To reboot (restart-up)
set multiconnection	To display current setting for Multiple Unicast Distribution function
set multiconnection on	To enable multiple Unicast Distribution function
set multiconnection off	To disable multiple Unicast Distribution function
.set tcp	To display current setting of streaming, UDP/TCP
.set tcp on	To switch to streaming on TCP
.set tcp off	To switch to streaming on UDP
.set store_table	To display current setting for Automatic Recovery function
.set store_table on	To enable Automatic Recovery function for observer DM-NC40
.set store_table off	To disable Automatic Recovery function for observer DM-NC40

2.5 Troubles

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- Q5-1** Web browser won't access to DM-NC40's Web page. Any hint for cause?
-
- Q5-2** Fault tolerance - Suppose network trouble occurs while DM-NC40 is streaming, would it result in hug-up?
-
- Q5-3** Automatic Recovery - As for automatic recovery action upon power failure, is there any difference between Multicast and Unicast?
-
- Q5-4** I did nothing on the DM-NC40 for start of session but its ENCODE lamp is lighting. Why is that?
-
- Q5-5** Masquerade - I set static IP Masquerade on broadband router (BB router), but DM-NC40 cannot obtain connection.
-
- Q5-6** Monitor's screen remains monochrome. What can I do?
-
- Q5-7** Multicast distribution doesn't work. Any hint for cause?
-
- Q5-8** Viewer - Software player shows some noise at beginning of play.
-
- Q5-9** Viewer - Software player won't output audio in Streaming system ([ISMA_Server] mode). Any hint for cause?
-
- Q5-10** Smoothness - Movement of pictures is not smooth in Teleconference system. What is causing?
-
- Q5-11** Monitor's screen - I specified the destination through Front Panel, but the monitor displays only blue color. Is it a failure?
-
- Q5-12** Monitor's screen - I specified the destination through Front Panel, but the monitor displays only black color. Is it a failure?
-
- Q5-13** "HHH" appears in the Connection Number Display on the Front Panel. Is the unit malfunctioning?
-
- Q5-14** Monitor's screen - I think colors of screen are not right and wonder if it is malfunction.
-

Q5-1**Web browser won't access to DM-NC40's Web page. Any hint for cause?**

Check, if IP address, Subnet Mask and Default Gateway of the PC have been set up correctly. This means whether conditions that allow the PC to connect to DM-NC40 have been established or not. If proxy server has been set in Web browser there may be a case that access cannot be obtained. In that case, remove the setting of proxy server.

Q5-2**Fault tolerance - Suppose network trouble occurs while DM-NC40 is streaming, would it result in hug-up?**

- DM-NC40 does not hang-up, but streaming session will be stopped automatically in some cases.
- In case of short time disconnection (for a few seconds or dozens) or error, such phenomenon may occur, as images become impure or pictures' motion stops, but the system restores normal conditions when the trouble is removed.
- In case some intelligent router is installed in the network, there may be a case that the router returns "destination unreachable" to DM-NC40 when network trouble occurs. If DM-NC40 receives "destination unreachable", DM-NC40 stops current session automatically. So, in this case, video will not appear even after the trouble is removed, because the session has been terminated.
- As for what would occur in software player(viewer), it depends on what extent of redundancy the player has for packet-loss.

Q5-3**Automatic Recovery - As for automatic recovery action upon power failure, is there any difference between Multicast and Unicast?**

- Speaking to Multicast, it is "session-less" communication. Accordingly, after recovery of power, the sending side DM-NC40 automatically restarts sending Multicast stream, and receiving-side units automatically restart receiving. (Only in [Camera to Monitor] relation).
- As for Unicast, whether Automatic Recovery function is applied or not depends on user's choice, namely, the setting. You can set enabled/disabled for the function through TelnetAPI "SET AUTOCONNECT". For details of setup by TelnetAPI, refer to "Telnet API Reference Manual".

Q5-4**I did nothing on the DM-NC40 for start session but its ENCODE lamp is lighting. Why is that?**

- It is thinkable that the system is distributing Multicast. ENCODE lamp keeps lighting when the unit is acting as encoder, and it means the lamp keeps lighting so long as the unit is acting as encoder irrelevant to whether the operation is under Unicast or Multicast.
DM-NC40 supports simultaneous distribution of Unicast and Multicast, and the unit resumes previous settings when power is switched on. So, probably the reason is that, you did nothing except turning on the power, but the unit resumed previous Multicast sending upon the power-on, and lighted its ENCODE lamp.
Multicast status can be checked on NETWORK SETUP screen by Web browser.
- Speaking from adverse viewpoint, you can use the lamps to confirm DM-NC40's operation status. That is, for Teleconference system ([Teleconference] mode) and Remote Surveillance system ([Camera] or [Monitor] mode), ENCODE lamp lights when you switch on the DM-NC40, provided that it was performing Multicast streaming prior to the latest power-switching-off.
- As for Streaming system ([ISMA_Server] mode), you can confirm Multicast operation by checking "Connection Number Display" on the Front Panel. That is, if the uppermost digit of the number is "1" the unit is operating Multicast.

Q5-5**Masquerade - I set static IP Masquerade(NAPT) on broadband router (BB router), but DM-NC40 cannot obtain connection.**

The following reason is thinkable.

- To select(specify) destination of connection through Front Panel of DM-NC40, it is necessary to register candidate destinations(addresses) to [Telephone Book] beforehand. However, if you register private address as such address, they cannot pass the router. So, if the opposite DM-NC40(destination) is under control of broadband router, register the global IP address of the router.
- **"Masquerade" is an alias of NAPT(Network Address Port Translation).

Q5-6 Monitor's screen remains monochrome. What can I do?

The following reason is thinkable.

- Video input signal of DM-NC40 is composite video, not YC. As for video input/output specifications, DM-NC40 deals with only analog composite, NTSC/PAL. If YC signal is converted to composite for DM-NC40 input, the conversion has some problem.

Q5-7 Multicast distribution doesn't work. Any hint for cause?

The following reasons are thinkable.

- Maybe, you forgot to push(click) [START] button for Multicast on [NETWORK SETUP] screen of the forwarder DM-NC40 (Multicast-sending-side unit) when you set the Web.
- It is necessary that the value you specify as Multicast port number is identical between the DM-NC40 that sends Multicast and the DM-NC40 that receives Multicast. So, maybe you forgot to obey this rule. Check and correct the port number through [NETWORK SETUP] screen.
- For receiving-side DM-NC40, you have to register, to [Telephone Book] through [TELEPHONE BOOK] screen, Multicast IP address for packets you want to make the unit receive.
- Also, for sending-side DM-NC40, you have to set Default Gateway on [NETWORK SETUP] screen when you perform Web setting. Even if the network is LAN, and accordingly, no gateway exists, setting of Default Gateway is required for sending multicast. So, set dummy IP address for default gateway.

Q5-8 Viewer - Software player shows some noise at beginning of play.

- MPEG-4 stream transmitted by DM-NC40 consists of I-VOP, P-VOP or B-VOP. These are a kind of video frame. I-VOP can be decoded separately. On the other hand, as for P-VOP and B-VOP frame, reproduction of original data cannot be performed without data contained in preceding and following frames because of some coding-method-related reason. And it means that normal images would not be displayed until I-VOP arrives, that is, for a while after start.

Q5-9 Viewer - Software player won't output audio in Streaming system ([ISMA_Server] mode). Any hint for cause?

- DM-NC40 handles two types of audio formats, G.726 and AAC-LC. In these two, the format that is employed by ISMA is AAC-LC. So, if you set [Compression Format] in [ENCODE PARAMETERS] screen to [MPEG-4+G726], ISMA-compliant player would not output audio. To reproduce audio by ISMA-compliant player, set [Compression Format] to [ISMA(SP)] or [ISMA(ASP)].

Q5-10 Smoothness - Movement of pictures is not smooth in Teleconference system. What is causing?

The following reasons are thinkable.

- In [Teleconference] mode, the system is executing processing of encoding and decoding concurrently, so load is heavier than in other modes. Consequently, depending on characteristics of input video, there may be a case that motion lacks smoothness.
- The higher the bit rate is, the heavier the load is. So, speaking to bit rate setting in [Teleconference] mode, operations under bit rate of 1.5 Mbps or below is strongly recommended. Limit the setting of over 1.5Mbps to such use, where input video are nearly still.

Q5-11 Monitor's screen - I specified the destination through Front Panel, but the monitor displays only blue color. Is it a failure?

There is no video input signal to the opposite DM-NC40.

Q5-12 **Monitor's screen - I specified the destination through Front Panel, but the monitor displays only black color. Is it a failure?**

- If the problem is in Multicast-receiving operation, it is thinkable that Multicast-packets are not arriving. Remember that the sending-side DM-NC40 would not start distribution unless you push(click) [START] button for Multicast in the [NETWORK SETUP] screen. So, check the setup screen.
- Multicast streaming over router needs multicast compliant network supporting IGMPv2.

Q5-13 **"HHH" appears in Connection Number Display on Front Panel. Is the unit malfunctioning?**

- "HHH" is displayed when DM-NC40 has received request for connection from the opponent that is not registered in its [Telephone Book]. To obtain right actions in displaying opponent's number, make all combinations of [ID number vs. IP address] in Telephone Book uniform among DM-NC40s. ID number means the number you specify in [Edit No.] field on TELEPHONE BOOK screen.
(See "Basic configuration of Teleconference System" in Section 3.)
- Even if "HHH" is displayed, you can nevertheless communicate by pushing [PLAY] button.

Q5-14 **Monitor's screen - I think colors of screen are not right and wonder if it is malfunction.**

The following reason is thinkable.

- Input video signal become unsteady if [LOOP THRU] switch of [VIDEO IN] terminal is set to [OPEN], and nothing is connected to the THRU terminal. If you connect nothing to [LOOP THRU], keep switch's position laid to the side of [75 ohm]. The switch is located at the rear of DM-NC40.

2.6 Network

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- Q6-1** Band - Assuming that I want to secure communication of certain bit rate, what level of network band does it require?
-
- Q6-2** Selection and setup of network equipment for DM-NC40 - Any suggestion?
-
- Q6-3** Considerations in constructing DM-NC40-basis network systems - Any hint?
-
- Q6-4** Considerations for network port setting of DM-NC40
-
- Q6-5** Setup of IGMPv2-compliant equipment - Any hint for considerations?
-
- Q6-6** About settings specific to environment where a broadband router (BB router) intervenes
-
- Q6-7** ADSL - I'm considering use of ADSL. Any hint for considerations?
-
- Q6-8** Fragment - I'm worrying a little about fragment. How much is MTU of DM-NC40?
-
- Q6-9** Selection of network equipment - What points should I take into account?
-
- Q6-10** The existing network - Can I use it without modification?
-
- Q6-11** Multicast transmission - Is it available with DM-NC40?
-
- Q6-12** Maximum destination of Multicast - How many?
-
- Q6-13** Deterioration of video/audio quality- Can it be caused because of "1 to N" Multicast distribution?
-
- Q6-14** About network protocols
-
- Q6-15** Band - What effect would happen to video and audio if necessary band cannot be secured?
-
- Q6-16** We use firewall. Any hint for considerations for setups specific to such environment?
-
- Q6-17** PIM - Does DM-NC40 support PIM, a Multicast protocol?
-
- Q6-18** Inter-LAN transmission through router - Any considerations for setup?
-
- Q6-19** Recommended Multicast IP addresses
-

Q6-1**Band - Assuming that I want to secure communication of certain bit rate, what level of network band does it require?**

- In terms of setup for DM-NC40, a bit-rate assumes that it is average value when input video is typical. Actual bit rate varies depending on characteristics of images. Taking this into consideration, the guideline would be :
[Band requirement =Maximum level of expectable bit rate x 1.5].
If you can afford it, however, secure [Max. x 2] to obtain assurance.
- Generally speaking, when they say "dedicated line(leased line) of 1.5 Mbps," it means 1.5Mbps is assured for both directions. direction. So, Even where 2 directions are used, such as the case of Teleconference system, for example, you can assume that the guideline of maximum bit rate you set to DM-NC40 is 1 Mbps.

Q6-2**Selection and setup of network equipment for DM-NC40 - Any suggestion?**

Use equipment that supports 100BASE-TX. In case the equipment allows setup of port, set it to [Auto Negotiation].

Q6-3**Considerations in constructing DM-NC40-basis network systems - Any hint?**

We recommend that, you "physically" use DM-NC40 in dedicated LAN (LAN dedicated to the network system of DM-NC40). If you use the existing LAN, construct VLAN and "logically" separate the system from the existing LAN.

Q6-4**Considerations for network port setting of DM-NC40 - Any hint?**

- When DM-NC40 has established LINK to the target network device through [Auto Negotiation], it basically executes communication between the device in "100Mbps Duplex Half" mode based on IEEE802.3 standard.
- Accordingly, if you manually setup network speed of the network device you connect to DM-NC40, you must set it to [100Base/Half]. In usual case, if the device you are connecting to DM-NC40 is the type that supports [Auto Negotiation], you must set its [Auto Negotiation] to [ON].

Q6-5**Setup of IGMPv2-compliant equipment - Any hint for considerations?**

- For those network equipment(component of network, such as router) that are capable to support IGMPv2, set [IGMPv2] to [Enable].
- For those network equipment that are capable to support IGMP Snooping, set [IGMP Snooping] to [Enable].
- These settings mean that by validating network equipment's IGMP, accurate delivery of Multicast packet sent from DM-NC40 is secured. The method works as follows. If specific client DM-NC40 wants to receive specific Multicast packet sent from server DM-NC40, it(its decoder side) sends [Join] message to the router. On the other hand, if it comes not to want to receive such packet any more, it sends [Leave] message to stop receiving. [Join] and [Leave] are messages used for Multicast-group management under IGMPv2 protocol. In this way, accurate delivery is secured. For details of IGMP, see Susection 5.3.

Q6-6**About settings specific to environment where a broadband router (BB router) intervenes**

For unicast streaming, set the router to forward the following protocols and port numbers (in default).

Telnet (TCP)	23 (Port number for TelnetAPI)
RTP (UDP)	49200 (Port number for audio)
	49300 (Port number for video)
RTCP (UDP)	49201 (Port number for audio control)
	49301 (Port number for video control)

Q6-7

ADSL - I'm considering use of ADSL. Any hint for considerations?

- ADSL is the "best effort" communication. There is no guarantee for bit rate. We strongly recommend that you perform connection tests prior to installation.
 - *As for "best effort," see attached Glossary.
- It is necessary that, for each site, you enter into ADSL agreement to obtain one(1) global IP address.
- For selection of network provider, select the same provider for all sites.
- Also, it is necessary to setup static IP Masquerade(NAPT). So, in case you connect other terminal equipment in addition to DM-NC40 under the same broadband router(BB router), make sure to avoid port-collision in selection of port. However, it is not recommended that you connect other equipment than DM-NC40 under the BB router, because the performance of the router may be limited.
 - **"Masquerade" is an alias of NAPT(Network Address Port Translation).

Q6-8

Fragment - I'm worrying a little about fragment. How much is MTU of DM-NC40?

DM-NC40' MTU is 1,418 bytes(including header of UDP and IP). MSS is 1,378 bytes. Ether frame size of DM-NC40 stream is 1,436 bytes. Maximum frame size at data link layer is 1,444 bytes in case of use of PPPoE. For almost all Ethernet routers, MTU is 1,454 bytes or above. So, basically speaking, there is no chance of IP fragments.

Q6-9

Selection of network equipment - What points should I take into account?

It depends on the scale or specification of the system you are planning, but speaking generally the following factors should be taken into consideration.

- **IEEE802.3ad(link aggregation)**
This is the method that deems multiple lines of physical cables as one line of logical cable. By doing so, broader band and better redundancy can be obtained.
- **RIP2/OSPFv2(dynamic routing protocol)**
This is the method for use in a network that has multiple sub-networks. It works as, under such environment, the system automatically select the best route, responding to change of communication load or when communication fault occurs.
- **Packet filtering function**
This is the filtering function that works as, only those packets that satisfy preset conditions can pass the filter. It reduces the risk of unjust access by crackers.
- **Mirroring function**
You can monitor packets of working port by monitoring the mirror port.
- **IGMPv2/DVMRPv2/PIM-SM**
This is the method to distribute(deliver) specific Multicast-packet to specified destination.
- **VRRP/IEEE802.1d/IEEE802.1W**
This is the function that automatically establishes alternative route. The function acts when fault occurs in network equipment or cable. Alternative route is established avoiding the place of such fault.

Q6-10

The existing network - Can I use it without modification?

- For DM-NC40-basis system, we recommend users to use the system in the network dedicated to it, where no equipment exists on the network other than those that are dedicatedly used for the system. If other equipment is connected to the network, PCs, for instance, there may be a case that broadcast-packets are transmitted from the PC, resulting in disturbance of stream transmission that is being performed by the system.
- Also the system transmits large volume of packets so that it may disturb network access of other equipment(those used for other system). In case you connect DM-NC40-basis system to the existing LAN network, pay attention to these points, and construct VLAN to logically separate the system from the LAN. In particular, if you connect the system to such network that deals with settlement of money or charging (invoicing), JVC takes no responsibility to any trouble affected by such connection. JVC hereby notifies this disclaimer.
- In case you connect DM-NC40 to the existing network, you have to set IP address of DM-NC40 in accordance with IP assignment plan employed by the network.

Q6-11 Multicast transmission - Is it available with DM-NC40?

Yes, multicast is available. DM-NC40 supports IGMPv2. In case of multicast over router, use network that supports IGMPv2.

Q6-12 Maximum destination of Multicast - How many?

Multicast sending/receiving by DM-NC40 is executed in "session-less." There is no limit for the amount of receiving-unit. Make sure to use Multicast in network that supports IGMPv2.

Q6-13 Deterioration of video/audio quality- Can it be caused because of "1 to N" Multicast distribution?

Number of receiving units has no effect on such deterioration.

Q6-14 About network protocols

For streaming and its control, DM-NC40 uses RTP/UDP/IP and RTSP/TCP/IP. Control through Telnet or HTTP is also available. For Multicast transmission, it uses IGMPv2.

Q6-15 Band - What effect would happen to video and audio if necessary band cannot be secured?

For video-image, block noise or freeze may occur. For audio, noise or no-sounds(silence) may occur.

Q6-16 We use firewall. Any hint for considerations for setups specific to such environment?

Below is the detail of the destination port number for each protocol in DM-NC40 operations. Make your setting as only those packets that have the port number in question pass the router.

- **For operations such as Start or Stop**
 - Telnet: 23 of TCP
 - In DM-NC40 to DM-NC40 connection, the protocol for control is Telnet.
 - RTSP: 554 of TCP
 - For connection between DM-NC40 and ISMA-compliant player, the protocol for control is RTSP.
- **RTP port number of Unicast stream when DM-NC40 is used under Unicast**
 - For audio: 49200 of UDP(in case DM-NC40's setup remains default)
 - For video: 49300 of UDP(in case DM-NC40's setup remains default)
- **RTP port number of Multicast stream when DM-NC40 is used under Multicast**
 - For audio: 50000 of UDP(in case DM-NC40's setup remains default)
 - For video: 50002 of UDP(in case DM-NC40's setup remains default)
- **Capture of JPEG**
 - 8009 of HTTP
 - In Remote Surveillance system, you can capture JPEG images from DM-NC40 in [Camera] mode.
 - 20 and 21 of FTP
 - This is necessary when you capture JPEG images through FTP.
- **For setup change**
 - When you change setup of DM-NC40 through Web browser
 - 80 of HTTP

Q6-17 PIM - Does DM-NC40 support PIM, a Multicast protocol?

PIM is the protocol that is used for Multicast packet routing between routers. So, there is no need that DM-NC40 by its own supports PIM. It supports IGMPv2.

Q6-18 Inter-LAN transmission through router - Any considerations for setup?

In case the system executes transmission between LANs, you have to setup default gateway for each DM-NC40.

Q6-19 Recommended Multicast IP addresses

Below is the list of recommended Multicast IP addresses.

Note that these 48 multicast IP addresses are those within [225.0.1.] range, and can be separated easily by multicast filter in network equipment.

225.0.1.1	225.0.1.69	225.0.1.130	225.0.1.141	225.0.1.200
225.0.1.2	225.0.1.70	225.0.1.131	225.0.1.142	225.0.1.201
225.0.1.3	225.0.1.71	225.0.1.132	225.0.1.143	225.0.1.202
225.0.1.4	225.0.1.72	225.0.1.133	225.0.1.192	225.0.1.203
225.0.1.7	225.0.1.73	225.0.1.134	225.0.1.193	225.0.1.204
225.0.1.8	225.0.1.74	225.0.1.135	225.0.1.195	225.0.1.205
225.0.1.9	225.0.1.76	225.0.1.136	225.0.1.196	225.0.1.206
225.0.1.25	225.0.1.79	225.0.1.137	225.0.1.197	225.0.1.207
225.0.1.65	225.0.1.128	225.0.1.139	225.0.1.198	
225.0.1.67	225.0.1.129	225.0.1.140	225.0.1.199	

2.7 General Knowledge

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- Q7-1** ISMA-compliant players available in the market
-
- Q7-2** About G.726 - Audio compression standard employed by DM-NC40
-
- Q7-3** About AAC-LC - Audio compression standard employed by DM-NC40
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- Q7-6** Echo Canceller - What purpose is it used for?
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Q7-1**ISMA-compliant players available in the market**

The following players are available as of Dec/2003.

- Apple QuickTime 6.x (PC/Mac)
- Realnetworks RealOne* player (PC only)
- * Plug-ins required for ISMA compliance.
- Philips Platform4 PC player (PC only)

Above players are confirmed in MPEG-4 SP mode.

Q7-2**About G.726 - Audio compression standard employed by DM-NC40**

- It is ADPCM. ADPCM(Adaptive Differential Pulse Code Modulation) is a method of pulse code modulation that uses "adaptive differential modulation" method for modulation. It is an algorithm (procedures of processing) used in ITU-T Recommendation - G.726. It is an international standard that realizes transmission of audio signals of telephone band at 16 to 40kbps.
- For music CDs, PCM(Pulse Code Modulation) is used. This is the method that directly encodes quantized data without any modification or processing on them. On the other hand, ADPCM reduces data volume by using such characteristics that signal waves of voice or other sounds continuously change. By using these characteristics it quantizes difference between one data and the data that has been sampled immediately before arrival of the former. Then, it varies steps(widths) of these quantizations depending on vibration amplitude of waves. Typical example of application is seen in PHS(telephone), where it is used as method for voice compression.

Q7-3**About AAC-LC - Audio compression standard employed by DM-NC40**

- AAC (Advanced Audio Coding) is, as it is formally called "MPEG-2 AAC," one of MPEG-4 audio formats for high quality audio compression. The specification is ISO/IEC 13818-7. Its maximum sampling frequency is 96kHz, and supports up to 48 channels.
- There are three profiles in AAC. They are, Main, LC (Low Complexity) and SSR (Scalable Sampling Rate). It is said that AAC performs approximately 1.4 times higher compression efficiency than MP3(MPEG-1 audio, layer 3), nevertheless maintaining nearly equal sound-quality.
- LC(Low Complexity) uses only Temporal Noise Shaping as method of compression, and does not perform prediction. Accordingly, quality of sounds is a little low, but it has the feature that it can reduce processing load for coding, particularly, for decoding.
- In Japan AAC has been employed as compression format for digital broadcasting. MPEG-2 AAC is not compatible with MPEG-1 audio. MPEG-4 audio supports various audio objects, and has multiple coding formats for various applications.

Q7-4**About RS-232C/485 - Terminals for external equipment control**

- RS-232C(Recommended Standard 232 version C) is one of standards for serial communication standardized by EIA(Electronic Industries Association). It is most popular as method for serial communication, and preinstalled in almost all PCs. Maximum length of cable is approximately 15m, and maximum baudrate is 115.2kbps. It is used for connection between PC and peripheral such as printer, modem or scanner.
- RS-485(Recommended Standard 485) is also one of standards for serial communication under EIA, and it is the upper standard of RS-422. While RS-232C supports only 1-to-1 connection, and RS-422 supports Multidrop connection of 1-to-N, RS-485 supports bus type multiple-points connection and supports N-to-N connection of up to 32 units. Other specifications are compliant with RS-422. Its maximum cable length is 1.2km, and maximum baudrate is 10Mbps. It is used for connection between PC and peripheral such as printer, modem or scanner. Most commonly, RS-485 is used for industrial computers, but there are some RS-485 interfaces for personal computer's use, in rare case though.

Q7-5 Path Through - What is it?

- Path Through works as follows. Signals enter to DM-NC40 through its RS-232C or RS485 serial port. The DM-NC40 converts the signals to IP packet, and then, transmits the packet into the network. Opposite side DM-NC40 receives the packet and converts it to RS-232C or RS-485 signals, and then, transmits the signals through its serial port. (Same processing is executed vice versa. Accordingly it is bi-directional function.)
- DM-NC40 has RS-232C/RS-485 terminals for serial control through Path Through, which is used for external equipment control.

Q7-6 Echo Cancellor - What purpose is it used for?

It removes echo and howling in two-way voice/audio communication. If Echo Cancellor is disabled in bi-directional voice communication, conversation can be impossible because of howling.

Q7-7 How to check packets in network?

- Packet monitor is available. Even free software is available. One of free software for packet monitoring is Ethereal. To capture and check specific packets, filter is available on packet monitor. Filter setting of Ethereal is similar to that in "tcpdump" which is popular packet monitor on UNIX system. So, refer to manual related to tcpdump for details.
- Examples are seen below.

<Direction>

```
src
dst
<type>
host 192.168.0.10
net 192.168/16
port 49200
<protocol>
udp
tcp
ip
arp
```

<Example>

- You receive only those packets that have 192.168.0.0 as source or destination IP address.
host 192.168.0.0
- You receive only those packets that have 192.168.0.0 as source IP address and 21 as source port number.
src host 192.168.0.0 and src port 21
- You receive only those UDP packets that have 192.168.0.0 as source IP address and 192.168.1.0 as destination IP address.
src host 192.168.0.0 and dst host 192.168.1.0 and udp
- You receive only those packets that have 192.168.0.0 as source IP address, and 21 or 80 as source or destination port number.
(port 21 or port 80) and src host 192.168.0.0

2.8 Others

Q8-1 Difference, Advantage and Disadvantage -- Between MPEG-2 Network Encoder/Decoder and MPEG-4 Network CODEC

Q8-2 Applications of streaming

Difference, Advantage and Disadvantage -- Between MPEG-2 Network Encoder/Decoder and MPEG-4 Network CODEC

<In general>

1. There is difference concerning requirement of band.

For MPEG-2 Network Encoder, 3Mbps or over is the recommendation. If the rate falls below this level, substantial block noises will be generated. On the other hand, you can use MPEG-4 Network CODEC at 2Mbps or below.

2. There is difference concerning friendliness to PCs.

In operations such as viewing, image-capturing or VOD through PC, MPEG-4 allows lower costs.

<DM-NE300/DM-ND300 vs. DM-NC40>

Below is the advantage of DM-NE300/DM-ND300* for industrial use.

(*Available in Japanese market only)

1. High quality of video and audio
2. Frame rate is the same as usual TV broadcasting. The unit guarantees 30 frames per second, and 60 fields.
3. Bit rate is always constant. It does not depend on characteristics of input video pictures, that is, whether movement is severe or light.
4. Delay time is always constant. There are [Normal] and [Low Delay Time] mode.

Below is the disadvantage of DM-NE300/DM-ND300 for industrial use.

1. Video output terminal of DM-ND300 employs RCA pin.
2. DM-ND300 does not have status information. (In other words, you cannot monitor DM-ND300 status via network).
3. It does not have terminal for Video Throughout.
4. It does not have Automatic Recovery for power failure. (You have to start again by remote controller.)
5. It does not have alarm input terminal.

Below is the advantage of DM-NC40 for industrial use.

1. The unit does not have disadvantage listed above.
2. It allows you to make good use of compact flash cards. (JPEG recording linked with alarm action, version up through card, log accumulation, etc.)
3. It allows bi-directional audio transmission.
4. You can distribute one multicast stream and five unicast streams simultaneously.

Below is the disadvantage of DM-NC40 for industrial use.

1. Quality of video and audio is lower than DM-NE300. Its maximum resolution is 352x240.
2. Frame rate may reduce depending on characteristics of input video pictures.
3. Bit rate may vary depending on characteristics of input video pictures.
4. Delay time may vary a little depending on characteristics of input video pictures.

Others

- Delay time is about 0.3 second for DM-NE300 low delay mode and DM-NC40 (excluding network delay).
- Control of external equipment by Path Through is available with DM-NE300/DM-NC40, except DM-ND300.
- Control of streaming via network is available with DM-NE300/DM-ND300/DM-NC40, such as start/stop of stream.
- DM-NE300/DM-ND300/DM-NC40 has APIs for system integration.

Bandwidth of network is becoming more and more broad. Thanks to it, distribution of moving picture and audio via network has become the reality, which was impossible several years ago.

Today, contents distributed via network are changing in dynamic manner. WEB contents were mainly text and still image, but today, audio and video are available by streaming technology. People can listen to music, preview movies, and live relay of lecture or various events, sitting at their home or office. So, such applications seem to dynamically change the whole world. They are not only used in entertainment area, but industry use such as publicity of companies, training, etc.

Network infrastructure is increasing in education area, as seen in installation of computers in every school from elementary school to university, Intranet in the school, Internet connection between schools or school and home. Distance learning with audio and video will be available in wide area using such infrastructure.

In conclusion, under such ever-varying user's needs and purposes, society is more and more demanding high-quality video transmission systems that well respond to the future.