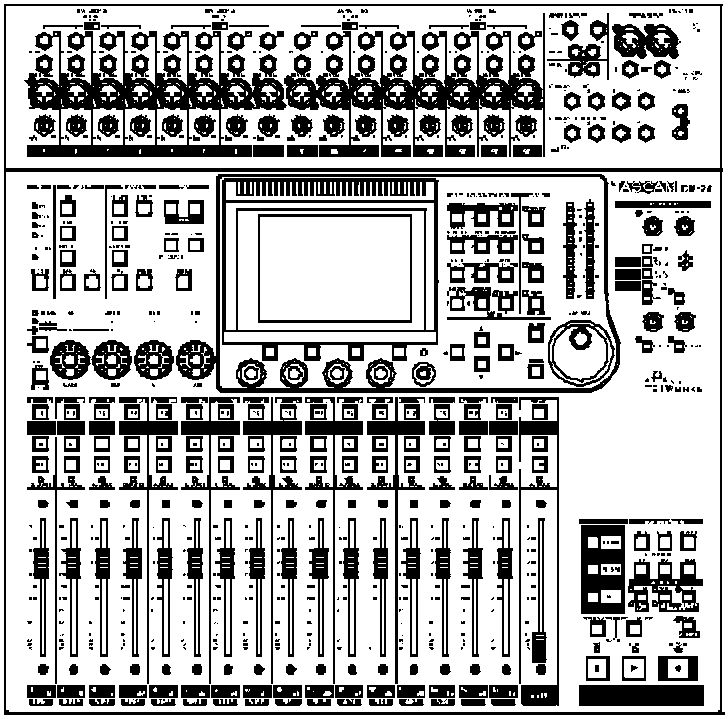
TASCAM

TEAC Professional Division

DM-24

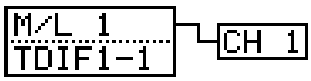
Digital Mixing console



The DM-24 Basics

DM-24 SIGNAL FLOW

The first 24 channels of the DM-24 can accept “INPUTS” or “RETURNS.” These assignments are made on the I/O page. Use the cursor keys to highlight the virtual patch cable then use the data wheel to make the proper assignment.
In this example M/L 1 is an “input” and TDIF1-1 is a “return.”



Channels 25-32 are Input-only channels. They cannot have “RETURNS” assigned to them. TDIF I/O, ADAT lightpipe I/O and any option slot I/O are not available to channels 25-32. In mixdown mode channels 25-32 would normally be used for internal effects returns and assignable returns. There is a “Mixdown” snapshot in ROM where channels 25-32 are assigned in just this manner.

INPUTS
“Inputs” include: mic/Line inputs, digital inputs 1 and 2 (2 CH. AES/EBU and S/PDIF inputs), internal effects returns and assignable returns. All of these inputs can be assigned to any of the 32 channels. For instance, mic/line input #2 can be assigned to channel 23, digital input #1 can be assigned to channel 2 and so on.

RETURNS
“Returns” include TDIF I/O, ADAT lightpipe I/O and any option slot I/O that might be added to the DM-24. “Return” is named such because it is short for “tape return.” Technically a “tape return” is an “input”, but understanding the idiosyncrasies of the DM-24 are necessary if one wishes to operate the DM-24 properly. An analog option card might be used to add more analog “inputs” to the DM-24. Even though the benefit for the user is more “inputs”, the DM-24 thinks of the option cards as “returns.” Keeping these terms clear is the key to understanding the signal flow of the DM-24.
When channels 1-24 are used for “returns”, there are options as to which “return” interfaces are to be used. There are 24 channels of TDIF I/O and 8 channels of ADAT lightpipe I/O built in, but there are also two option slots available to expand your I/O capabilities. All of these “returns” cannot be used simultaneously because there are only 24 channels available to them. “Return” interface choices must be made in the following manner:
TDIF 1 or SLOT 1
TDIF 2 or SLOT 2

TDIF 3 or ADAT
Once the preferred “return” interfaces have been selected, they can be assigned to channels 1-24 in groups of eight. For instance:
Slot 1 to channels 17-24
TDIF 2 to channels 1-8
ADAT to channels 9-16

OPTIONS

- IF-TD/DM (TDIF I/O) $249 (supported in version 2.0)
- IF-AD/DM (ADAT lightpipe I/O w/ ADAT Sync (ADAT sync will be supported in future frimware.) $249
- IF-AE/DM (AES/EBU I/O on a D-25 connection) $299
- IF-AN/DM (Analog I/O on two D-25 connections) $499
- IF-CS/DM (Cascade card w/ cascade cable) $299
- MU-24 (Meter bridge plus cable) $949

- Each of the optional interface cards has 8 channels of I/O.

- The IF-TD/DM TDIF option card will be supported with version 2.0. This card does NOT add 8 TDIF inputs. The DM-24 only supports 24 channels of digital “RETURNS.” When mixing 24 channels of TDIF “RETURNS” in 5.1 surround, the IF-TD/DM can be used to send the 6 buss outputs to a TDIF stem recorder like a DTRS machine. This is the only use for this card with a DM-24. The IF-TD/DM is also compatible with the TASCAM SX-1 and future TASCAM products.
- Mixing 24 tracks of ADAT or any other lightpipe device requires two optional IF-AD/DM ADAT I/O cards. The IF-AD/DM does NOT support 96kHz. ADAT sync is not yet functional and will be supported in a future version of firmware.
- Adding two IF-AE/DM AES/EBU cards provides a total of 20 channels of AES/EBU I/O (four channels come standard on the DM-24.) The IF-AE/DM AES/EBU card supports 4 channels of DUAL LINE or HI SPEED I/O.
- Two IF-AN/DM analog cards are necessary if 32 channels of analog input are required. This configuration requires specific settings on the DM-24. Assign SLOT 1 to channels 1-8, SLOT 2 to channels 9-16, Mic/Line inputs 1-8 to channels 17-24 and Mic/Line inputs 9-16 to channels 25-32. Many people use the DM-24 as a live mixer this way. You can also use this analog I/O for aux sends and returns, leaving your assignable sends and returns for use as assignable “inserts.” The IF-AN/DM does not offer mic preamps, only balanced analog I/O on 2 D-25 jacks. Adding one IF-AN/DM to the DM-24 does NOT allow you to record 24 tracks simultaneously. This is a bussing issue that will be addressed in a future version of firmware.

- The IF-CS/DM is a cascade card. To cascade two DM-24s, you must put one cascade card in “SLOT 1” of each DM-24. See the section on “cascading two DM-24s” for more info.
- The MU-24 has 26 meters (24 channels plus the stereo buss) and a large time code display. There is a meter menu in the DM-24 that provides access to all of the parameters for the meterbridge , such as meter ballistics and pre/post metering. The mounting brackets allow the MU-24 to be moved in front of or behind the input jacks on the DM-24. The MU-24 can also tilt backwards or forwards to achieve the best viewing angle for your needs.

OUTPUTS

Although only 3 “return” interfaces can be used to assign the tape return signal to channels 1-24, ***all*** of the TDIF, ADAT, AES/EBU, S/PDIF and Option card ***outputs*** are ***always*** active. For instance, 24 channels of TDIF can be mixed in 5.1 surround to the ADAT outputs. Those same 8 busses could also congruently be routed to the two Option Slot outputs. This is useful if the 5.1 mix must be bussed to 3 different formats (such as ADAT, DTRS and Pro Tools) simultaneously.

AUX SENDS

The DM-24 has 6 aux sends, which can be configured Pre or Post fader. Any of them may be assigned to the two internal effects processors. Aux sends can be assigned in pairs to the 2 channel AES/EBU and S/PDIF digital outputs for use with external effects processors with digital I/O. The returns of these external processors can be routed to the DM-24 via digital inputs 1 and 2 and can be assigned to any channels. Aux sends can also be used with the assignable send outputs. There are 4 assigable sends on balanced TRS jacks. “Assignable” means aux 6 can be bussed to assignable output 1 or aux 5 to assignable output 3, etc. There are also 4 balanced assignable returns on TRS jacks. These can be used as two stereo effects returns or simply as balanced inputs that can be assigned to any channel.

Assignable sends and returns can also be configured as assignable “inserts.” Route assignable send 1 to a compressor’s input. Route the compressor’s output to assignable return 1 and assign that insert to any channel. This makes it possible to use outboard dynamics processors on the tape return path. This is an extremely valuable feature!

TRACKING OPTIONS

As with any console, there are limitations to the amount of channels available as well as limitations in signal flow options. The DM-24 has 32 channels. The Direct outputs for each channel are Post fader. There are 16 mic pres. With a mic plugged into each of them, the signal goes all the way to the fader and then out to tape. The 16 tracks will then need to return to the console for monitoring. Because the first 16 channels are taken up with the microphone inputs and channels 25-32 don’t access the “return” interfaces, only channels 17-24 are

available to use as tape returns. This presents a problem. Here are a few ways to deal with this scenario:

Using AUX 1&2 as the tape return path

The DM-24 can use AUX 1&2 as the tape return path for the first 16 channels in a tracking situation for just this reason. The way to handle this is to link Aux 1 and Aux 2. This provides a level and a pan control for each tape return. On the Aux 1-2 page there is a "source" tab that would normally allow a setting of pre or post fader. The first 16 channels also provide the choice of "RETURN" specifically for this function. Faders can be used to control the aux levels making this procedure much easier. Choose Aux 1&2 in the control room section for monitoring. All of these parameters are instantly set when the "Recording" snapshot is recalled.

Recording and monitoring tracks 17-24 requires different settings than tracks 1-16. Remember that AUX 1-2 is still the tape return path for tracks 1-16. This leaves channels 1-16 available to use as inputs. For this example, use channels 1-8 as the input channels and use busses 1-8 to buss those signals to tracks 17-24. Channels 17-24 will be the tape return path for tracks 17-24; however, since AUX 1-2 is still the monitoring source it is necessary to set up pre fader aux 1-2 send levels for channels 17-24. This will allow the monitoring of all 24 tracks simultaneously. Channels 17-24 should not be assigned to the stereo buss until mixdown. Again, all of these parameters are instantly set when the "Recording" snapshot is recalled.

Using the inserts to track analog and return digital

Another way of dealing with this situation is to use the insert jacks to send an analog signal to your recorder and use the digital I/O to bring the tape returns back to the console. Realizing the insert is just before the A/D converter in the DM-24's signal chain, the following scenario is possible:

A mic can be connected to the mic input, where the mic pre's level may be adjusted. The analog signal is then sent to the analog input on the digital recorder. The output of the recorder would then return to the DM-24 digitally. This scenario is just like having 16 outboard mic pres. The benefit is that channels 1-24 are always assigned as "returns" allowing you to bypass the whole "Aux 1-2 tape return idea." This simple solution makes recording 16 simultaneous tracks VERY easy. TASCAM offers a variety of cable snakes for the job.

For an MX-2424 use ¼" to D-25 cables:

CU/SU902 6ft.
CU/SU903 10ft.
CU/SU904 13ft.
CU/SU905 16ft.
CU/SU907 23ft.

These cables are wired with the negative side shorted to ground, while the "tip" is the positive. The DM-24 will send an "unbalanced" signal from the insert jack, so

plugging this signal into the MX-2424 will register 6dB less then if a “balanced” signal were sent to it.
To use this solution with other recorders we recommend that the manufacturer is consulted as to what cable to use with their product.

For a DA-78HR or DA-38 use ¼” to RCA cables:
CU/SU302 6ft.
CU/SU303 10ft.
CU/SU304 13ft.
CU/SU305 16ft.
CU/SU307 23ft.
The DA-78HR and DA-38 have unbalanced inputs and we recommend that they are used for this solution.

Tracking with channels 25-32
If only 8 tracks of simultaneous recording are necessary, mic/line inputs 1-8 can be assigned to channels 25-32. Use busses 1-8 to buss the signal to tape digitally and use channels 1-24 as digital tape return channels. This is also a very easy way to work.

EFFECTS
The DM-24 has two internal effects processors. Processor #1 contains the TC Works reverb (over 100 presets) and the Antares Mic and Speaker modeler. TC works reverb and the Antares Speaker modeler cannot be used simultaneously.
Processor #2 contains TASCAM effects:

- Chorus
- Delay
- Pitch Shifting
- Phaser
- Flanger
- Compressor
- Guitar compressor
- Exciter
- De-esser
- Gate
- Distortion (with amp simulators)

There are two locations called “Effect 1 and Effect 2” where these algorithms can be loaded. The source of the inputs to Effects 1 and Effects 2 can be Aux sends 1-6. Effects returns can be assigned to any of the 32 channels. Effects 1 and 2 can also be routed as “inserts” on busses 1-8, Aux sends 1-6 or the stereo buss.
The internal effects can also be used with the “assignable” inserts. For instance, if a fretless bass is on channel 2 and chorus needs to be added to it, assign the chorus effect to assignable insert #1 and assign insert #1 to channel 2. Using the assignable insert saves an aux send and two return channels.
Effect 1 and Effect 2 can also be run in series. This would allow you to run a delay into a reverb, for instance.

AUTOMATION

The DM-24 features very powerful, internal automation. No computer required. The internal automation of the DM-24 is actually more powerful and easier to use then many large frame consoles used in professional studios.
The following mix controls of the DM-24 can be automated:

- Fader levels
- Mutes
- *EQ* settings:
  - Gain, Frequency, Q, EQ On/Off switching can be automated
  - Individual EQ band *TYPE* switching between High/Low Pass Filter, Peaking & Shelving
- Auxiliary send levels and Pre/Post switching
- Auxiliary master send levels
- Bus master levels
- *GATE* settings:
  - *THRESH*old
  - *RANGE*
  - *HYST*eresis
  - *ATTACK*
  - *HOLD*
  - *DECAY*
- *COMP*ressor settings:
  - *THRESH*old
  - *RATIO*
  - *ATTACK*
  - *RELEASE*
- Library recall
- Surround panning parameters

The automation is triggered by external time code. (In a later version of firmware the DM-24 will have an internal MTC generator of it's own if needed.) This time code can be SMPTE or MTC. Time code from RS-422 cannot be used to trigger automation. ADAT users will have to have a device that converts ADAT ABS to MTC or SMPTE in order to trigger automation. DA-38 and DA-88 users will have to use an SY-88 card or an MMC-38 to convert DTRS ABS code to SMPTE or MTC. All other DTRS machines can do this internally.

All automation mix files are stored internally on the DM-24. There are 8 banks that can each store up to 8,000 events. If 8,001 events are used in one mix, two banks are used for that mix. The next mix would use bank 3. Up to 32,000 events can be used in one mix. These files (as well as all library files, snapshots, EQ, Effects, etc.) can be dumped to a MIDI device (MDF-3 or sequencer) to make more room for new mixes. They can of course be reloaded at any time.

The idea behind the automation is “power without interference.” When you’re mixing, you want to be thinking about your mix not trying to remember the 28 steps it takes to make the automation function. With the DM-24, as soon as the basic mix settings are made, automation can be activated. When automation is enabled, all automatible parameters go into static mode. As soon as the DM-24 receives time code and WRITE is pressed, the DM-24 is ready to write dynamic automation. Move a fader and release it. The fader will revert back to the static position within the default revert time. Only the fader that dynamic automation has been written to is effected. All other parameters are still in static mode. The touch sensitive faders make punching in on fader automation a breeze. The rotary encoders and POD controls detect movement in order to begin writing automation, but because these controls are not touch sensitive, there is a “Control sense time out” parameter (adjustable between 0.5 seconds and 10 seconds) that will automatically punch those functions out of write mode after the specified time has passed.
All of the other expected parameters are there as well, TRIM, Write to end, Safe, Off, rehearse, etc. There is even a Multi Pass mode where WRITE will remain active when Time Code stops. This way it is not necessary to press the WRITE key every time the current loop restarts.

MACHINE CONTROL

The DM-24 can control a wide variety of external devices via RS-422 (A.K.A P2 or 9-pin), MIDI Machine Control or the DTRS remote jack. There is a list of supported devices on the machine control page.
The DM-24 can control multiple devices simultaneously. A standard example would be controlling the transports of a VTR, while arming tracks on a DTRS machine.
The IF-AD/DM option card provides lightpipe I/O and an ADAT sync jack. ADAT sync is not operational in the release version of firmware. This feature will be implemented in a future version of firmware. When ADAT sync is implemented, transports, track arming and jog/shuttle capabilities will available. ADAT ABS code cannot be used to trigger the DM-24’s internal automation. A device that converts ADAT ABS to MTC or SMPTE will be necessary. The Alesis BRC, MOTU MTP-AV and JL Cooper dataSync2 are good examples of such a device. These devices will also allow ADATs to recognize MMC commands, making ADAT sync unnecessary.

MIDI

The DM-24 features MIDI In, Out and Thru. This allows you to:

- Send MMC
- Lock to incoming MTC
- Update the firmware of the DM-24 with Standard MIDI File
- Offload and upload library and automation data
- Send and receive MIDI program changes
- Send and receive MIDI controller data

On channels 1-32 you can program a different MIDI channel and MIDI controller number for the fader, mute key and pan knob. On the master layer you can do this for faders and mutes only. This allows the DM-24 to control other devices or other devices to control the DM-24 via MIDI. Again, this uses the "audio faders."

There is also an external control page on the DM-24. This is where you can set up separate MIDI fader layers and controller pages. Any combination of fader layers and controller pages can used up to a total of 8.
With the MIDI fader layer, fader 1 is MIDI channel 1, fader 2 is MIDI channel 2, etc. A single controller number is selected for ALL faders. You can have up to 8 MIDI fader layers. Each layer would represent a different MIDI controller number.
With the controller page you have access to 19 of the most common controller numbers. These are accessed using the POD knobs and Data wheel. Each of these controller pages represents one MIDI channel. You can use a total of 8 controller pages which would give you access to 8 different MIDI channels.

CASCADING TWO DM-24s

Two DM-24s can be cascaded together to act as one large console. This requires a cascade option card in each mixer. Cascading allows the two mixers to share busses 1-8, aux sends 1-6, the solo buss and the stereo buss. Connections to the control room and stereo outputs would be made on the cascade master.
Cascading two DM-24s provides access to 4 internal effects processors (2 in each unit). When the aux sends are cascaded, ANY of the four internal effects processors can be accessed from ANY aux send. The DM-24 represents the state of the art in effects routing for digital mixing consoles.
Mutes and Solos also act as if two cascaded DM-24s are just one big console. PFL, AFL or INPLACE settings are made on the cascade master. INPLACE solo defeats can be assigned to ANY channel on the cascade master and slave. Because busses 1-8 can be shared, 5.1 surround mixing is possible with two cascaded DM-24s. An AES/EBU option card could be added to the cascade master for sending the 5.1 mix digitally to the stem recorder and an analog option card could be added to the cascade slave to send the 5.1 mix to the surround monitoring system. Cascading also works at 96kHz!
When a mix snapshot is stored on the master, a mix snapshot is also stored on the slave simultaneously. The same is true for saving automation mixes. However, when these files need to be cleared from the DM-24 to make room for new mixes, these files would have to be transferred individually from each DM-24 to an external MIDI device for storage.
The stereo buss, control room and studio outputs on the cascade slave can be used independently of the cascade master. This allows many benefits. For instance, the stereo buss on the cascade master could be output dry while a compressor could be inserted on the stereo buss of the cascade slave. With 2 AES/EBU, S/PDIF and balanced analog outputs, up to 6 stereo mixes could be

output simultaneously. The control room and studio outputs on the cascade slave could be used to feed different monitors systems. Use the cascade master for your standard near field monitors and studio speakers, while the cascade slave could feed midfield speakers and small computer speakers. It is always nice to reference wide variety of different speakers when mixing. Cascading makes this easy.

Cascading two DM-24s provides:

- 32 mic pres
- 64 channels
- 48 channels of TDIF I/O
- 16 channels of ADAT lightpipe I/O
- 4 AES/EBU 2 channel digital I/O
- 4 S/PDIF 2 channel digital I/O
- 8 Assignable sends and returns
- 4 Internal effects processors (2 in each)
- 33 Touch sensitive, motorized faders
- The ability to run a 24 track, 24-bit, 96kHz, 5.1 mixing environment!

OPERATING AT 96kHz

In Hi Sampling mode the DM-24 is a 16 channel console. There are 12 mic/line inputs or 12 return channels making channels 13-16 your input-only channels. However, only mic/line inputs 1-8 are assignable in this mode. As in normal sampling mode, you can assign the mic/line inputs to more then on channel simultaneously. Mic/line 2 can be assigned to channel 2, channel 10 and channel 12 for example. Or 12 “RETURNS” can be assigned to channels 1-12 allowing you to mix 12 96kHz tracks from an MX-2424 for example.

The outputs are configured very intelligently.
TDIF 1- Buss outs 1-4/Direct out 1-4 or Aux 1-4
TDIF 2- Buss outs 5-8/Direct out 5-8 or Aux 1-4
TDIF 3- Buss outs1-4/Direct out 1-4, Buss outs 5-8/Direct out 5-8 or Aux 1-4.
Having the ability to use the 8 busses allows you to mix in 5.1.

- There is only one 2-channel digital I/O in 96K mode. Assignment choices are: Stereo outputs, Buss 1-2, 3-4, 5-6, 7-8, Aux 1-2, 3-4 or the control room outputs.
- TC Works reverb or the Antares mic and speaker modeling are NOT available in Hi Sampling mode.
- There are only 2 assignable sends and returns available.
- The Master Compressor Insert Matrix is limited to one stereo compressor assignable to the stereo buss, buss 1-2, 3-4, 5-6, 7-8 or Aux 1-2, 3-4.
- Expander/Gates are only available on channels 1-8.
- All channel EQ and compressors are exactly the same as 48K operation.

- AES/EBU can be input or output in DUAL LINE (HI SPEED will be supported in a future version of firmware.) The IF-AE/DM AES/EBU option card supports HI SPEED in version 1.11.

HIGH SPEED can send 2 channels of data at 96K on one AES/EBU cable. The DM-24 has two AES/EBU I/Os built in. DUAL LINE requires both jacks to send two channels. Some machines only use one format or the other. Some machines do not call these modes HIGH SPEED and DUAL LINE. For instance, the MX-2424 refers to DUAL LINE as ½ SPD, 2 Line.

RECORDING AND MIXING SNAPSHOTS

As previously mentioned, there are recording and mixing snapshots built into ROM on the DM-24. The last page of the DM-24 Quick Guide lists every parameter in each snapshot. These snapshots were made from the perspective of recording and mixing 24-bit files via TDIF, mixing down to a 16-bit 2-track master. These will obviously not cover all situations. Think of them as a good starting point from which you can create your own snapshots.

This document will change and grow during the life of the DM-24.
Check the TASCAM website (www.tascam.com) for updates.
We will always label the document with the date it was last updated.