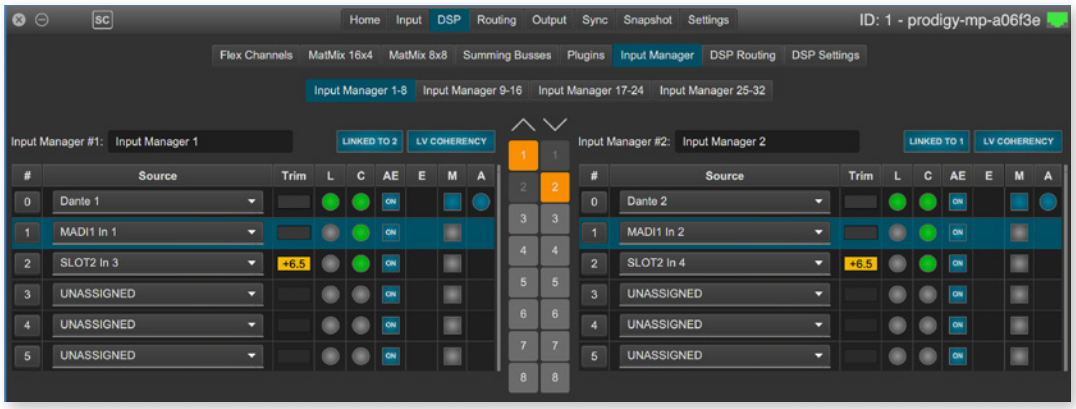
PRODIGY.MP - System Build 9

System Build 9 introduces several new features:

- Input Managers, with Signal Lock and selectable Level Coherence detection
- MIDI-Matrix (incl. support for MIDI-over-MADI)
- LTC to MTC converter
- Sine wave, Pink noise and white noise generators
- FastSRC™ for MADI and audio network I/Os
- EARS™ (Enhanced Automatic Redundancy Switching)
- Levelmeter

Input Managers

An input manager is used to define a signal source following a priority list of up to six different physical inputs. This signal source can be patched inside the DSP Routing. Once a physical input fails the next one in the priority list is used as signal source.



- 32 Input Managers are available.
- 2 input managers can be linked to stereo pairs.
- Sources can be moved to change the order of the priority

- Criteria to switch to the 'next' source:
  - loss of lock state (L)
  - mismatch of level coherency (C)

- Auto enable (AE) allows to revert to that signal source after a failure automatically.
- Enable (E) requires manual interaction to revert.
- Manual selection (M) overrides the automatic switch-over.
- The active source is indicated by a blue circle (A).

Level Coherency (LV)

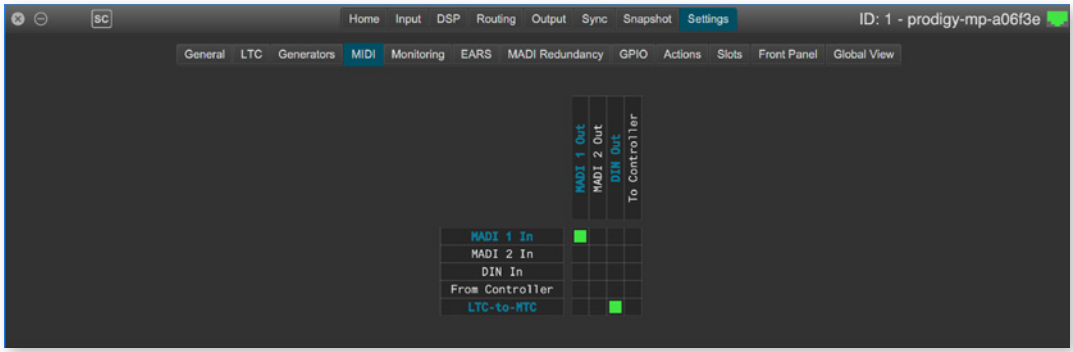
An algorithm monitors the signal level of each physical source. It's level is compared to the rest of sources over a certain period of time. If the level matches the source is considered as 'valid'.

- Levels can be trimmed (Trim) to match coherency and to ensure a proper switch-over.
- Auto-Trim adapts all 'lower' sources referencing the top priority source (#1).
- Manual selections allows to check every source while trimming.

MIDI Matrix

The MIDI matrix allows to route MIDI data across different interfaces. It also enables ‚MIDI-over-MADI' (embedded into a MADI signal, user bit of channel 56) which is used for remote control of legacy devices such as the DirectOut ANDIAMO series.

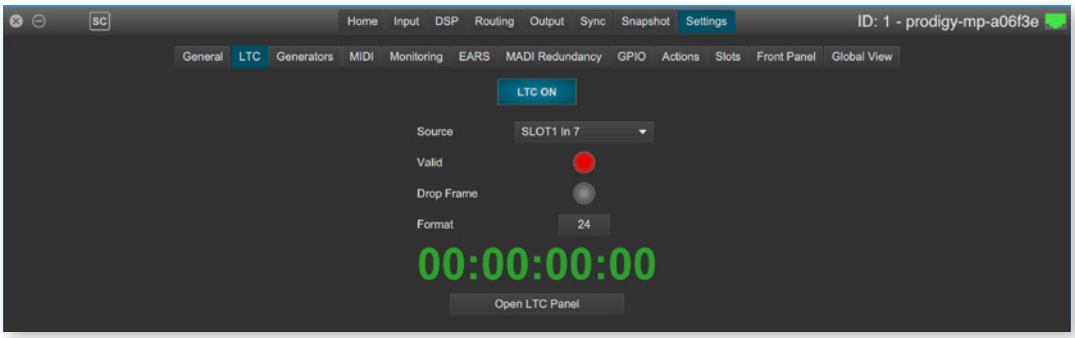
An 'LTC to MTC' converter offers the chance to synchronize external equipment over MTC (MIDI Timecode) with an LTC source (Linear Timecode).



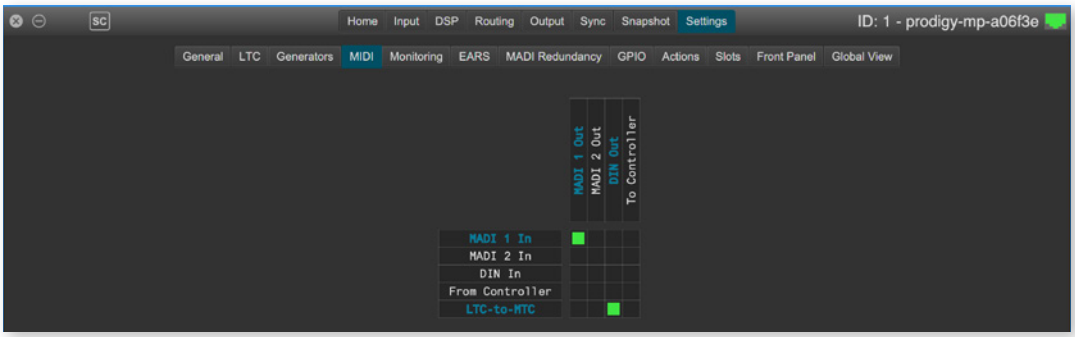
DIN is the local connector at the rear panel
Controller is the globcon instance connected via network.

LTC to MTC Converter

PRODIGY.MP can read incoming LTC (Linear TimeCode) from any physical input to trigger events, for display or synchronization.



The LTC-to-MTC converter now offers the chance to output the incoming LTC to a device expecting MTC (MIDI TimeCode).



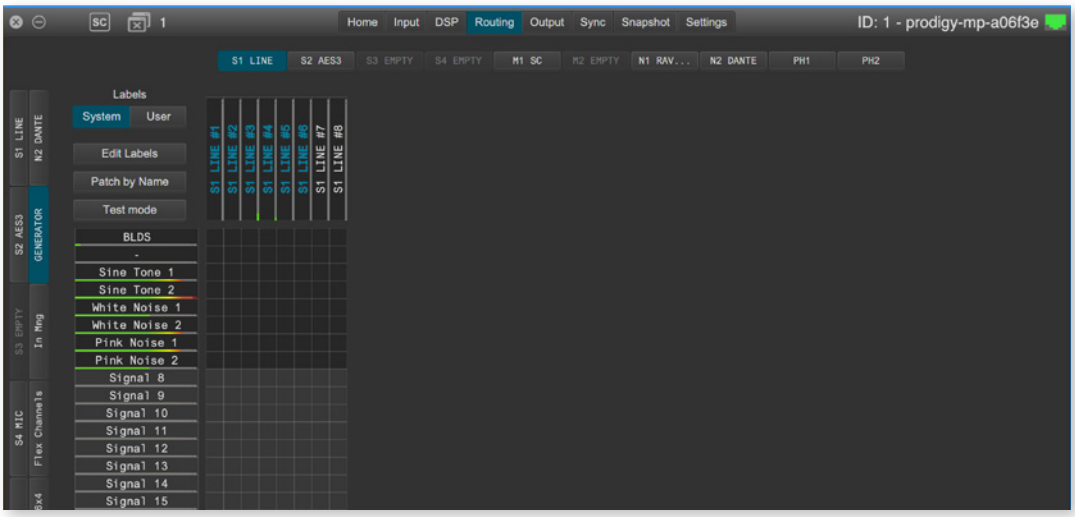
In this example LTC is read from SLOT1 Input channel 7.
The LTC is output as MTC at the local MIDI I/O on the rear panel of the device and embedded MIDI signal from MADI 1 input is routed to MADI 1 output.

Generator

Integrated signal generators are offered as sources in the tabs ‚Routing' and ‚DSP Routing'.

Types:

- BLDS™ - Buffer Loop Detection Signal
- Sine Tone (2)
- White Noise (2)
- Pink Noise (2)



BLDS™ may be used to trigger remote devices deploying EARS™ (Enhanced Automatic Redundancy Switching).

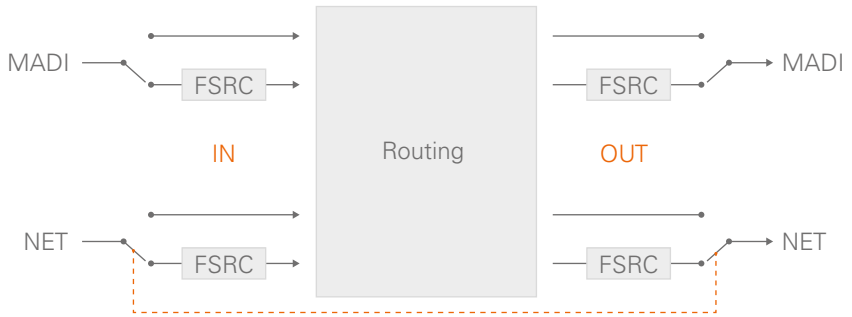
The generators for sine tones, white noise and pink noise are adustable (level & mute) in the tab ‚Settings'. The sine tone generators can be tuned individually.

NOTE

The generators are offered in pairs and their signals are uncorellated.

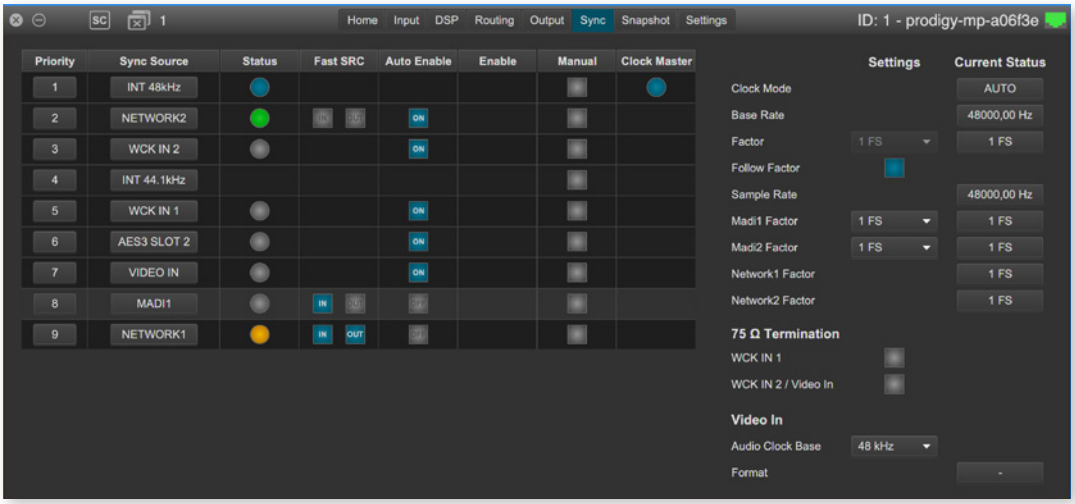
FastSRC™

The FastSRC™ is a low latency sample rate converter that is available for the MADI I/Os and the audio network I/Os.



For the audio network I/Os the FastSRC™ may be activated for input and output together only.

The settings for the FastSRC™ are in the tab 'Sync' or accessible on the front display of the device ('CLOCK') or via browser control.



NOTE

If an input is used as clock source for the device it is neither necessary nor recommended to activate the FastSRC™.

NOTE

Since the trigger signal for EARS™ is monitored before the FastSRC™ the use of BLDS™ is possible with the FastSRC™ activated.

Channel Counts

The number of available hardware input & output channels depends on the internal sample rate of the device.

Device at 1FS

Input	Max I/O	1FS	2FS*	4FS*
MADI	64	64	32	16
DANTE.IO	64	64	32	16
RAV.IO	128	128	64	32

Device at 2 FS

Input	Max I/O	1FS*	2FS	4FS*
MADI	32	32	32	16
DANTE.IO	64	64	32	16
RAV.IO	64	64	64	32

Device at 4 FS

Input	Max I/O	1FS*	2FS*	4FS
MADI	16	16	16	16
DANTE.IO	32	32	32	16
RAV.IO	32	32	32	32

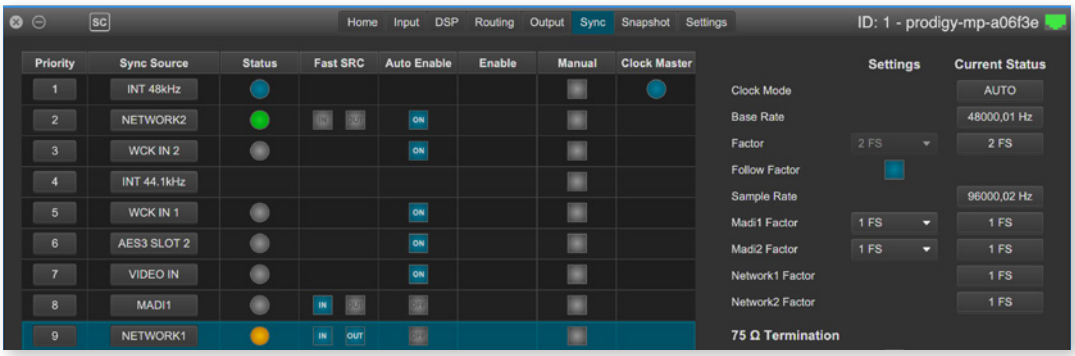
* FastSRC™ active

TIP

The I/O channel count of converter slots (analog / AES3) is independent from the sample rate of the device and the state of the sample rate converter (AES4.SRC.IO) and therefore always at full-channel count.

Scaling Factors - MADI at higher sample rates

The input of a MADI signal will switch to 2 FS operation automatically when a 96k Frame signal has been detected. With 48k Frame signals no distinction is possible between 1 FS or 2 FS or 4 FS - so the scaling factor has to be set manually.



In this example the device operates at 2 FS (96 kHz) and MADI 1 input is receiving a 48k Frame signal. The input scaling factor is set to 1 FS and the FastSRC™ is active for MADI 1 input and inactive for the MADI 1 output.

Result:

- channels 1- 32 of the MADI input are sample rate converted to 96 kHz
- 32 channels at 96 kHz are output at MADI 1 output

About FastSRC™

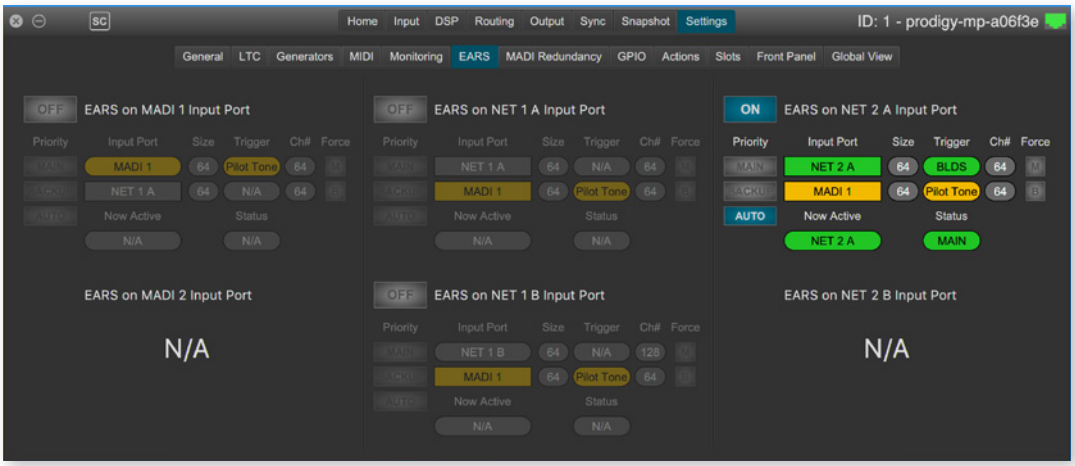
DirectOut's FastSRC™ (FSRC) is a low latency sample rate converter for when two digital interfaces of a device must work in different clock domains.

FastSRC™ combines good sound quality with very low latency of less than 0.15 msecs and is invaluable in live sound applications and a "life-saver" in critical situations.

High-end sample rate conversion requires noticeable processing time, so for the very best audio quality we recommend DirectOut's dedicated SRC products such as the RAV.SRC.IO, DANTE.SRC.IO or MADI.SRC.

EARS™ - Enhanced Automatic Redundancy Switching

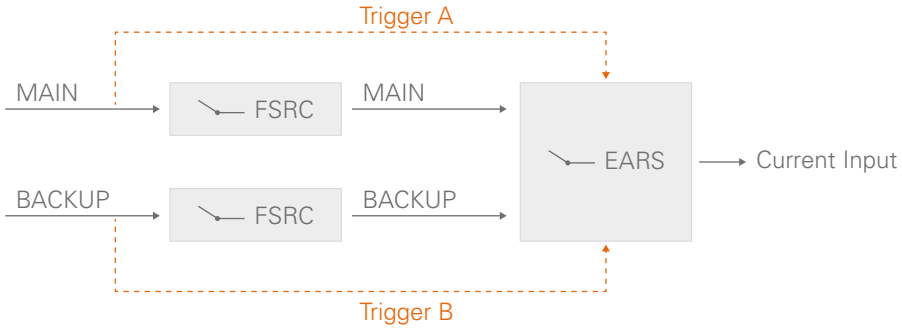
EARS™ is a combination of DirectOut's successful BLDS™ technology and pilot-tone based switching. A logic monitors a trigger signal contained in certain audio channels of the audio network and MADI inputs.



Two kinds of trigger signals are supported:

- BLDS™ (generated by the BLDS™ Generator)
- Pilot tone (audio signal with a level higher than-40 dBFS).

The trigger signal is monitored at dedicated channels ('Ch#') of the native signal - i.e. at the original sample rate - before the FastSRC™. The EARS™ logic acts before the routing. Thus the result is used for all subsequent patches in the routing matrix.



Switching by BLDS™ trigger is immediate (between two samples). The Pilot tone is evaluated for 10 ms before switching is triggered.

NOTE

Using different trigger signals for the same EARS™ logic is not recommended.

Priorities & Priority Modes

To decide which input source is used as output signal there are some choices.
Ranking:

- BLDS™ > pilot tone > no trigger signal

Three modes define the revert behavior, when a trigger signal ‚returns' after failure.

Mode	Behaviour *
AUTO	Switch-over occurs only when a trigger failure is detected and a valid trigger signal is detected on the other port.
MAIN	MAIN is always selected if the trigger signal is detected on both ports.
BACKUP	BACKUP is always selected if the trigger signal is detected on both ports.

* required condition: identical trigger signals, otherwise a BLDS™ will override a pilot tone.

Force Mode

To override automatic switching temporarily, the source for the output can be forced to MAIN or BACKUP. The selection becomes available once EARS is activated.

Force Mode can be helpful if you want to stay with one system as a source while testing the second one.

Input Modes

EARS is operating in chunks of 64 channels at 1 FS.
Audio network modules dealing with 128 channels, such as the RAV.IO, are split into two logical units NET #A and NET #B.

Two input modes are offered for the MAIN port of audio network modules:

- MODE 1 - Different ports
- MODE 2 - First half / Second Half

Input Mode 2 divides the first 64 channels of a audio network module into two chunks of 32 channels each of, independent of the channel capacity of the particular module.

NOTE

MADI ports are not available for EARS™ if MADI Redundancy is active.

Example - 1 FS, NET 1 = DANTE.IO, NET 2 = RAV.IO

Module	MODE	MAIN	BACKUP
DANTE.IO	1	Dante (ch 1 - 64)	MADI 1 (ch 1 - 64) MADI 2 (ch 1 - 64) NET 1A (ch 1 - 64) NET 2B (ch 1 - 64)
DANTE.IO	2	Dante (ch 1 - 32)	Dante (ch 33 - 64)
RAV.IO [A]	1	RAVENNA (ch 1 - 64)	MADI 1 (ch 1 - 64) MADI 2 (ch 1 - 64) NET 1A (ch 1 - 64) NET 2B (ch 1 - 64)
RAV.IO [B]	1	RAVENNA (ch 65 - 128)	MADI 1 (ch 1 - 64) MADI 2 (ch 1 - 64) NET 1A (ch 1 - 64) NET 2A (ch 1 - 64)
RAV.IO [A]	2	RAVENNA (ch 1 - 32)	RAVENNA (ch 33 - 64)
RAV.IO [B]	2	n.a.	n.a.

Example - Device operating at 1 FS

Input	Factor	trigger signal ('Ch x')	signals available ('Size')
MADI	1FS	ch 64	ch 1 - 64
MADI	2FS	ch 32*	ch 1 - 32
MADI	4FS	ch 16*	ch 1 - 16
DANTE.IO	1FS	ch 64	ch 1 - 64
DANTE.IO	2FS	ch 32*	ch 1 - 32
DANTE.IO	4FS	ch 16*	ch 1 - 16
RAV.IO	1FS	ch 64 / 128	ch 1 - 64 / ch 65 - 128
RAV.IO	2FS	ch 32 / 64*	ch 1 - 32 / ch 33 - 64
RAV.IO	4FS	ch 16 / 32*	ch 1 - 16 / ch 17 - 32

Example - Device operating at 2 FS

Input	Factor	trigger signal ('Ch x')	signals available ('Size')
MADI	1FS	ch 64*	ch 1 - 32
MADI	2FS	ch 32	ch 1 - 32
MADI	4FS	ch 16*	ch 1 - 16
DANTE.IO	1FS	ch 64*	ch 1 - 32
DANTE.IO	2FS	ch 32	ch 1 - 32
DANTE.IO	4FS	ch 16*	ch 1 - 16
RAV.IO	1FS	ch 64 / 128*	ch 1 - 32 / ch 33 - 64
RAV.IO	2FS	ch 32 / 64	ch 1 - 32 / ch 33 - 64
RAV.IO	4FS	ch 16 / 32*	ch 1 - 16 / ch 17 - 32

* FastSRC™ active

Levelmeter

The refresh rate of the level metering can be adjusted to save valuable bandwidth when this is necessary (e.g. remote operation over WAN).