



**SX-20**  
**Service Manual**  
10 September 2008  
Version 1.2

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## Contents

<b>INTRODUCTION.....</b>	<b>8</b>
Operation .....	8
Faceplate.....	8
Backplate.....	8
Backplate.....	9
Default Setup.....	9
<b>APPLICATION NOTE.....</b>	<b>11</b>
Background.....	11
Connections.....	11
<b>SX20 CONNECTION GUIDE.....</b>	<b>13</b>
Introduction.....	13
Front Panel.....	13
Rear Panel.....	13
SX-20 Analog Balanced Jack Connectors.....	14
SX-20 "RS-422" 9-pin control ports.....	14
Initial test.....	16
Power Shorts Test.....	16
Power up Test.....	16
Programming a new SX-20 (P/N BIOS101B) card.....	18
Before launching SX20 Flash.....	18
SX20 Flash Error Messages.....	20
<b>TESTING.....</b>	<b>21</b>
Hello.....	21
Request Software Version.....	22
Request Firmware Version.....	22
Bad Clock/ Video/ Progressive.....	22
Relays / Relays closed.....	22
Sync/ Codec1/ Codec2/ Audio.....	22
Seeking/ Phase L / Word L.....	23
Video/ Word.....	23
LTC.....	23
48k/ 96k/ 44k1 /192k/.....	23
PAL u/ PAL d/ NTSC u/ NTSC d.....	23
RS422 / Midi.....	24
Patch bay.....	24
Tech Tip #1.....	24
<b>ECN #1048.....</b>	<b>26</b>
SX20 LTC modification.....	26
Cause:.....	26
Symptom:.....	26
Reason:.....	26
Solution:.....	26
Other notes.....	26
Modification:.....	26
For the field:.....	26
Important Note on SPDIF.....	28

# Introduction

The SX-20 interface provides a wide variety of audio, synchronization and control interfaces. When connected to Fairlight's CC-1 card, the SX-20 becomes the natural hub of today's studio.

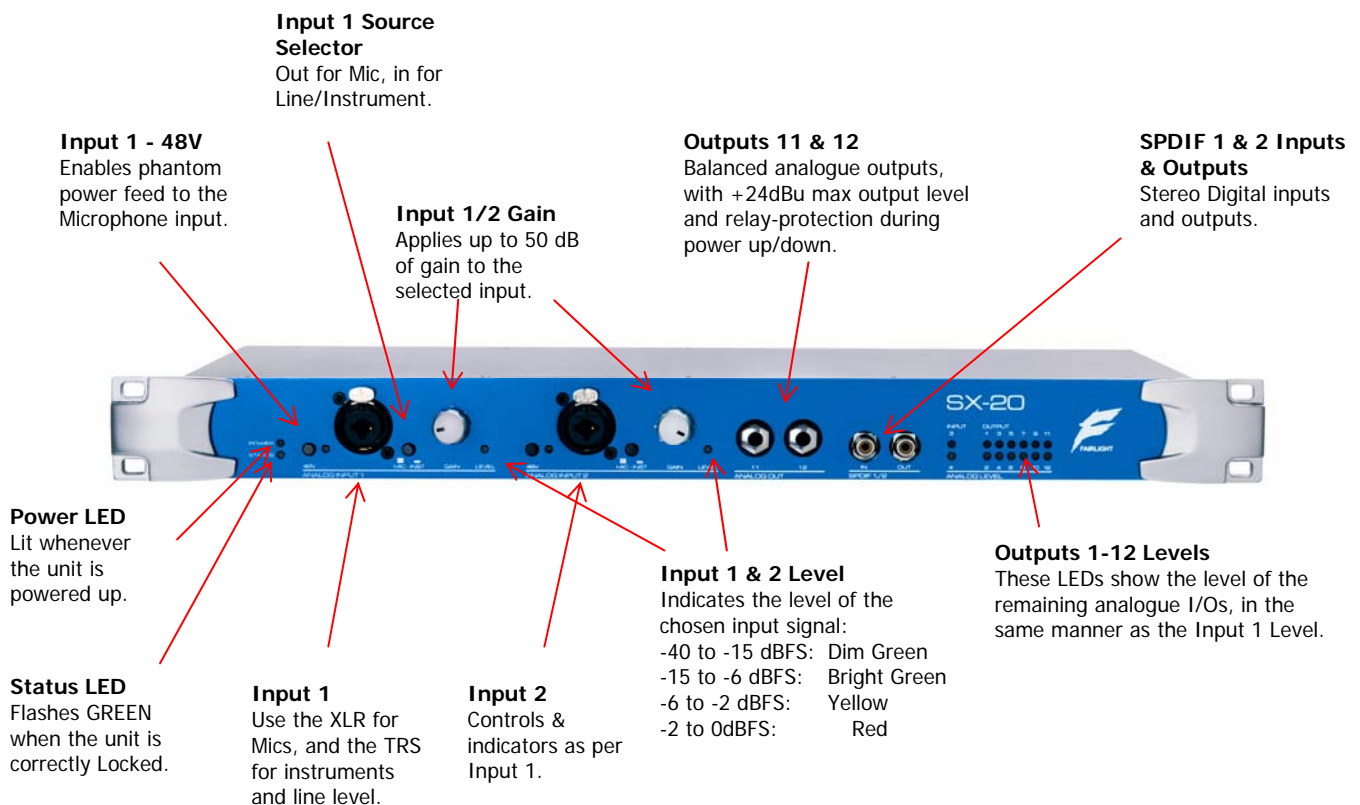
Fully integrated into and controlled by the DREAM II system, all I/Os can be freely deployed for many different purposes, including monitoring, ingest and layback, and inserts.

## Operation

The SX-20 connects to the CC-1 card using the supplied DVI-I dual link cable, and to mains supply using a standard IEC lead. Ensure that both the PC and the SX-20 are turned OFF before fitting the DVI cable.

Once the primary mains switch on the back of the unit is switched on, the SX-20 automatically switches on and off in tandem with the PC/CC-1 that it is connected to.

## Faceplate



## Backplate

Intended for more permanent connections, the backplate houses further digital and analogue connections, as well as synchronization and control ports:

**Video Sync Input**  
Accepts both bi- and tri-level video sources.

**SPDIF Inputs 3 & 4**  
Stereo Digital input.

**Dual 9-PIN ports**  
Pinout-configuration for one master and one slave.

**MTC In/Out**  
MIDI TimeCode input and output.

**Inputs 3 & 4**  
Balanced analogue inputs with max +24dBu input level.



**WordClock Input**  
Used when synchronizing to external sources.

**SPDIF Outputs 3-8**  
Stereo Digital outputs.

**LTC In/Out**  
Linear TimeCode input and output.

**CC-1 Connection**  
Provides all audio and sync connections to the CC-1 card.


**Outputs 1-10.**  
Balanced analogue outputs, with +24dBu max output level and relay-protection during power up/down.

## Default Setup

After the initial installation of the DREAM II software, the system is preset with the following allocation of I/O:

- |                 |                                   |
|-----------------|-----------------------------------|
| 1. Analogue Out | 1 & 2: Main monitors.             |
| 2. Analogue Out | 3 & 4: Nearfield Monitors.        |
| 3. Analogue In  | 3 & 4: External Monitor Source 1. |
| 4. Digital In   | 3 & 4: External Monitor Source 2. |

Please refer to the DREAM II user manual for details on how to modify this setup.

4. Specifications A/D	D/A
<b>Sample rate:</b> 44.1, 48, 96, 192 kHz (+4.1667%, +0.1%, -0.1%, -4%)	<b>Sample rate:</b> As per A/D
<b>Max Input:</b> Inputs 1-2 (mic) : +0 dBu Inputs 1-2 (instrument) : +24 dBu Inputs 3-4 (line) : +24 dBu	<b>Max Output:</b> Outputs 1-12: +24 dBu
<b>Gain Range:</b> Inputs 1-2: mic setting: 50dB gain range (0dBu to -50dBu max input) Inputs 1-2: Instrument setting: 50dB gain range (+24 dBu to -26dBu max input)	<b>Dynamic range:</b> Outputs 1-12: 109 dB (unweighted)
<b>Mic E.I.N (unweighted):</b> Inputs 1-2: -125dBu @ max gain: 150 ohm source, 20Hz – 20kHz	<b>THD+N:</b> Outputs 1-10: 0.0010% @ 1kHz, -1dBFS Outputs 11-12: 0.0013% @ 1kHz, -1dBFS
<b>Dynamic Range:</b> Inputs 1-2: 101 dB @ minimum gain (unweighted) Inputs 3-4: 109 dB (unweighted)	<b>Frequency Response:</b> +0.05 / -0.5 dB, 20 Hz – 20kHz
<b>THD+N mic input:</b> Inputs 1-2: 0.001% @ 1kHz, -1dBFS after 0 dB gain Inputs 1-2: 0.002% @ 1kHz, -1dBFS after 25 dB gain	<b>Output Impedance:</b> Outputs 1-12: < 150 ohms
<b>THD+N line input:</b> Inputs 1-4: 0.001% @ 1kHz, -1dBFS	
<b>Frequency Response:</b> +0.05 / -0.15 dB, 20 Hz – 20kHz	
<b>Input Impedance:</b> Inputs 1-2 (mic): 2k ohm Inputs 1-2 (instrument): >1M ohm Inputs 3-4: 15k ohm	



# Application Note

This explains how to electrically interface AES audio signals with the S/PDIF inputs and outputs on the SX-20.

## Background

AES-3 is an electrically balanced signal carried on a dual core with earth screen, which may be transformer coupled at the input or output. It commonly uses an XLR connector.

S/PDIF is an electrically unbalanced signal carried on a single core with earth screen. It commonly uses an RCA connector.

Both signal types carry an interleaved stereo pair of PCM digital audio at standard sample rates.

The SX-20 interface box carries two pairs of S/PDIF inputs and four pairs of outputs. The device containing AES inputs and outputs shall be referred to here as "the AES device".

## Connections

AES signals are carried on two active lines, called Hot and Cold, plus an earth. Fairlight equipment places the Hot signal on pin 2 of XLR connectors, but this varies according to the country of manufacture.

S/PDIF signals are carried on a single active line, called Hot, plus an earth (ground).

When connecting AES and S/PDIF, the respective Hot signals must be connected together, and the respective earth signals must also be connected together.

Connection of the AES Cold signal depends on the following system attributes:

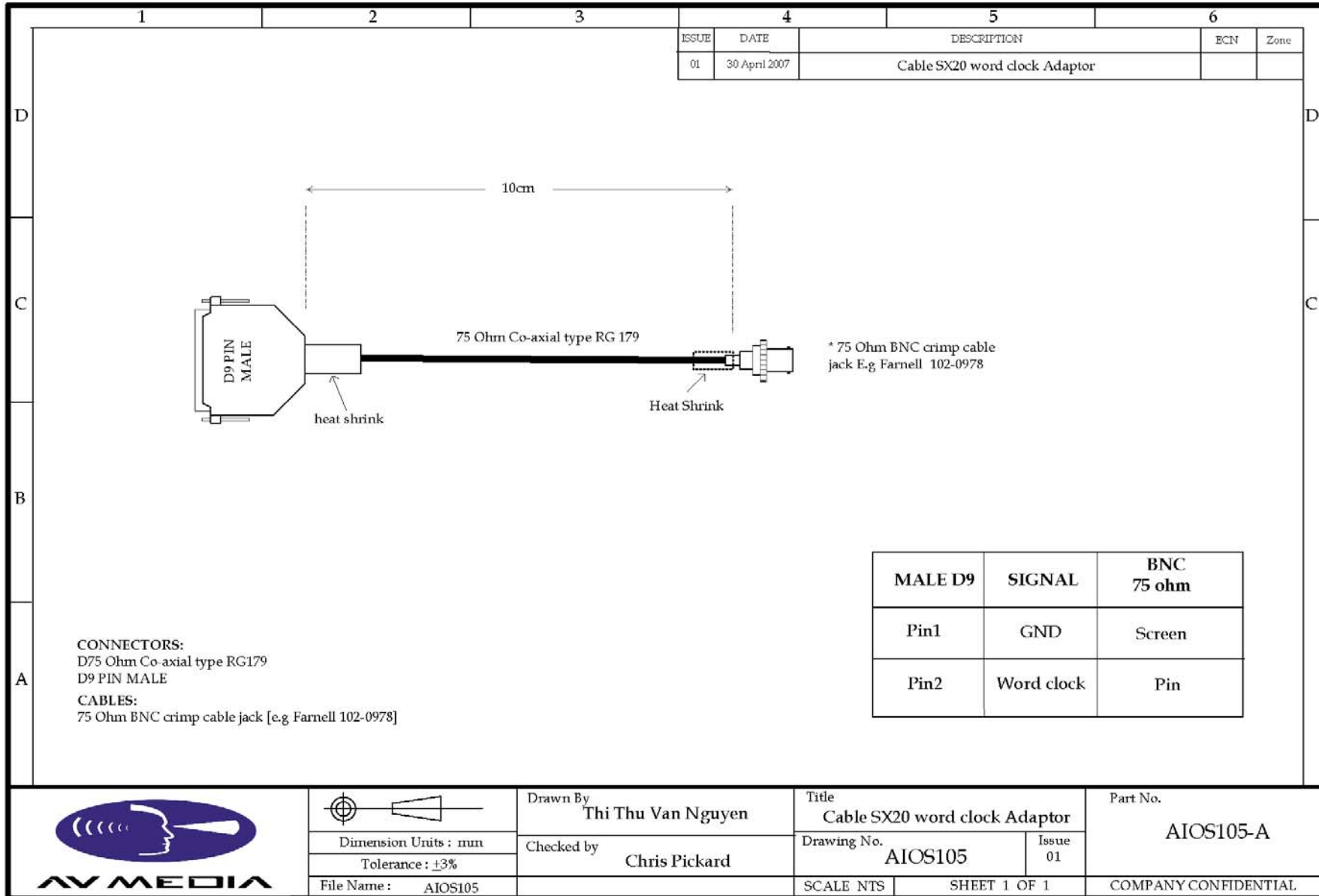
If the AES input or output is transformer balanced and floating, the AES Cold must be connected to earth.

If the AES input or output is not floating (but is referenced to earth), the AES Cold must be left unconnected.

## Notes:

- RS422 ports can be configured to act "in reverse" to their nominated roles, using a "cross-over" cable
- "Slave" RS422 output can be used to provide "WordClk Out" with appropriate cable (AIOS105-A)

All Analog outputs are balanced, and have relay mute protection.



# SX20 Connection Guide

## Introduction

The following document sets out the physical connections available on the SX-20 interface box, their locations, and related cable specifications.

## Front Panel

The front panel of the SX-20 has connections allowing “quick access” to both analog and digital audio Inputs and Outputs. The front panel also hosts the SX-20’s only Microphone Preamp inputs.



From Left to Right:

Analog Ch1 Combo female XLR Mic/6.35mm Balanced female Jack Line input socket

Analog Ch2 Combo female XLR Mic/6.35mm Balanced female Jack Line input socket

Analog Out Ch12 (Balanced Jack)

Analog Out Ch13 (Balanced Jack)

SPDIF Ch1/2 Input (female RCA)

SPDIF Ch1/2 Output (female RCA)

## Rear Panel



The rear panel of the SX-20 has analog and digital connections more suitable for permanently patched equipment. For example, connections to fixed configuration speaker monitors, and rack mounted equipment. The SX-20 rear panel also provides sync and external deck control connections.

From Left to Right:

Mains power switch and IEC connector

Video (BlackBurst) Sync Input (female BNC connector)

WordClock Sync Input (female BNC connector)

SPDIF Ch3/4 Input (female RCA)

SPDIF Ch5/6 Output (female RCA)

SPDIF Ch3/4 Output (female RCA)

SPDIF Ch7/8 Output (female RCA)

SMPTE Sync Input (female RCA)  
SMPTE Sync Output (female RCA)  
RS422 "9 pin" Sync/Control Port 1 (Master)  
RS422 "9 pin" Sync/Control Port 2 (Slave)  
"Host" DVI-D connector (to Host PC CC-1 card)  
MIDI In (female 5 pin DIN)  
MIDI Out (female 5 pin DIN)  
Analog Ch1 Line Output (Balanced Jack)  
Analog Ch2 Line Output (Balanced Jack)  
Analog Ch3 Line Output (Balanced Jack)  
Analog Ch4 Line Output (Balanced Jack)  
Analog Ch5 Line Output (Balanced Jack)  
Analog Ch6 Line Output (Balanced Jack)  
Analog Ch7 Line Output (Balanced Jack)  
Analog Ch8 Line Output (Balanced Jack)  
Analog Ch9 Line Output (Balanced Jack)  
Analog Ch10 Line Output (Balanced Jack)  
Analog Ch3 Line Input (Balanced Jack)  
Analog Ch4 Line Input (Balanced Jack)

## SX-20 Analog Balanced Jack Connectors

All analog Line level connectors on the SX-20 are presented as 6.35mm (1/4 Inch) female Jack sockets. All of these connectors are balanced, for noise rejection and signal clarity.

The sockets on the SX-20 will readily accept "domestic" 6.35mm Ring/Tip/Sleeve connectors. However, be advised that the Neutrik sockets used on the SX20 are *NOT* designed or rated to operate correctly with the "Bantam" style 1/4" TRS connectors commonly used with Broadcast patchbays.

SX-20 Analog INPUT channels will accept both balanced signals on 3 conductor Balanced cables, and unbalanced signals on 2 conductor Unbalanced cables.

SX-20 Analog OUTPUT channels will happily drive balanced 3 core cables and devices. However, the SX-20 Analog outputs will NOT work with Unbalanced cables and loads.

(Connecting Unbalanced loads such as speakers or domestic recording devices using unbalanced cabling will result in a severely degraded audio signal being heard).



## SX-20 "RS-422" 9-pin control ports

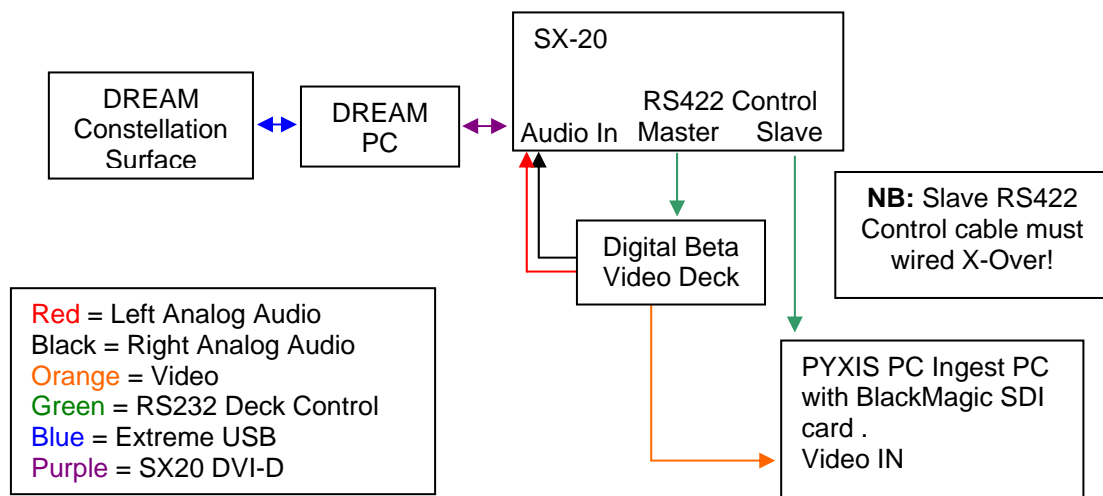
The SX-20 is equipped with two RS-422 9-pin deck control ports.

One is configured as a Master (Output), and the other as a Slave (Input). The "Master" port is hardwired to **Send** deck control commands **to** a Slave device with a standard RS-422 "Straight Through" cable.

The "Slave" port is hardwired to **Receive** deck control commands **from** a Master/Controlling device with a standard RS-422 "Straight Through" cable.

Both ports may be configured to run as Master (Outputs) Simultaneously, by forcing the Slave port into "Chase" mode via the DREAM software and using a RS-422 "cross-over" cable on the SX-20 "Slave" port.

One reason for configuring both RS422 ports as "Master" would be to allow the DREAM Constellation control surface to simultaneously control an external Video feeder device such as a Digital Betacam deck, and a separate external video recording device, such as a standalone PYXIS Ingest PC. (See example schematic below).



To re-state, the SX20 9-pin ports are hardwired for specific modes

Master Port + "Straight through" cable = Fairlight is Master device

Slave Port + "Straight through" cable = Fairlight is Slave device

Master Port + "Crossover" cable = Fairlight is Slave device

Slave Port + "Crossover" cable = Fairlight is Master device

## Initial test

### Power Shorts Test

Check for shorts as follows: 12V Between TP +12V (near power connector) and TP GND

-12V Between TP -12V (near power connector) and TP GND

5V Between TP 5V (behind power connector) and TP GND

3.3V Between TP 3V3\_SENSE (above U8) and TP GND

2.5V Between TP 2V5\_SENSE (near U23) and TP GND

**1.5V Between TP 1V2\_SENSE (near U28) and TP GND**

### Power up Test

The SX-20 will not power up until it is connected to a Crystal card via a DVI cable, and the PC is turned on.

Do not "hot plug" the SX-20. Always connect the DVI cable to the SX-20 before turning the SX-20 on. There should be no need to reset the PC.

A working system should have 4 green L.E.D.s on, for +12v, -12, 5v and 3v3.

An un-programmed SX-20 will have red led LD20 showing; the led is off on a programmed SX-20.

Check for Red phantom power L.E.D.s D45 and D48 – which are switched by SW2 and SW4.

Check for >47v between TP GND and all pins on R197, R198, R338 and R339 whilst the Phantom power L.E.D.s are on, Or use a Phantom Power test cable.

### Status L.E.D.s

The Blue power led indicates +12v only.

The status led indicates a number of system states.

Red The Main clock VCXO is out of range.

Orange The recovered Codec clocks are out of range

Green Constant

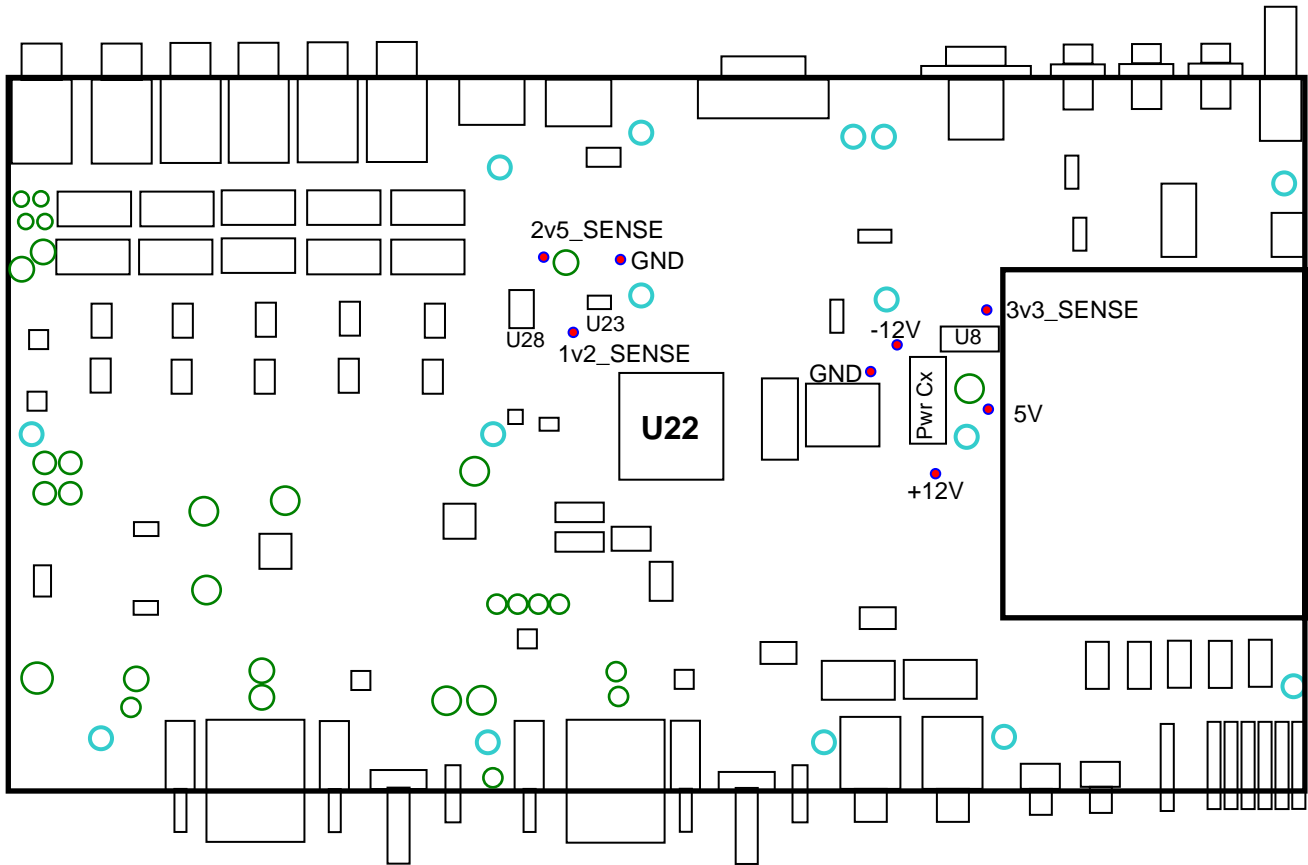
The core has stopped. Audio may still be passed, but 9-pin control, metering and synchronization will not function.

Green Flashing

All clocks and PLLS are functioning and have lock. The core is running. Default state.

SX-20 Motherboard Schematic View

- = Test Point
- = Capacitor
- = Circuitboard Mounting hole



## Programming a new SX-20 (P/N BIOS101B) card

The SX-20 has two sections that need to be programmed to get it to function.

- FPGA (Cyclone) – Location U22 , centre board
- Flash Memory – Location U25

Under normal circumstances the FPGA is programmed on power up by the Flash. The utility SX-20\_Flash.exe is capable of programming the Flash without the FPGA being active. Hence we need not be concerned about the FPGA.

Procedure: Connect the SX-20 to the Crystal card with a dual link, dual domain DVI (DVI-I) cable. This cable has all pins loaded including the four analog pins, one ground spade, and 24 digital pins.

NOTE: some cables not sold as DVI-I have all these pins, but they may not be connected end to end.

NOTE: The Flash/Programming app requires exclusive use of the Crystal card and will not run if another Crystal application is active. Please close all Crystal and Dream applications before proceeding.

The SX-20\_Flash app can be found at :

C:\Program Files\Fairlight\DreamII\SX-20 Flash

Also required in the same directory is the programming file SX-20.rpd. The .rpd file can be replaced with different file versions from windows explorer.

SX20 Flash is a small applet used to re-program SX20 units with internal firmware. This applet is shipped with all Dream and Xynergi class software installers. While the process for updating an SX20 unit is a fairly simple one, there are some hardware and software fault conditions that may cause the update process to fail. This document seeks to act as a "Troubleshooting guide" for the SX20 flash applet.

PLEASE NOTE: There is no reason why "End Users" should need to utilize the SX20 Flash applet in their daily operation. If a newly released DREAM software version DOES require the SX20 unit to be updated, this step will be noted in the accompanying README document.

Most DREAM software releases have an accompanying SX20 firmware version, which they are designed to work with. Field Technicians should only use the SX20 Flash applet to "mix" SX20 firmware versions and DREAM software versions under the direct instruction of FairlightAU.

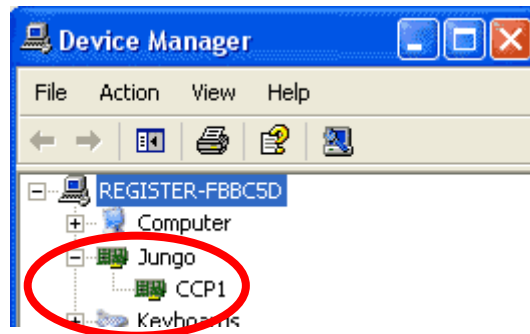
Parts required:

1 X Fairlight Dream2/Xynergi class Audio Production System, with CC-1 card and DREAM2 1.11.2 or later installed.

### Before launching SX20 Flash

- Confirm that SX20 is connected to CC-1 in Host PC with correct format DVI-I cable, of no more than 5 metres(15') in length.
- Confirm that the SX20 unit has Mains Power connected, and the rear power switch is ON
- Confirm that the Host PC is ON
- Confirm that the CC-1 card is correctly detected in Windows "Device Manager"

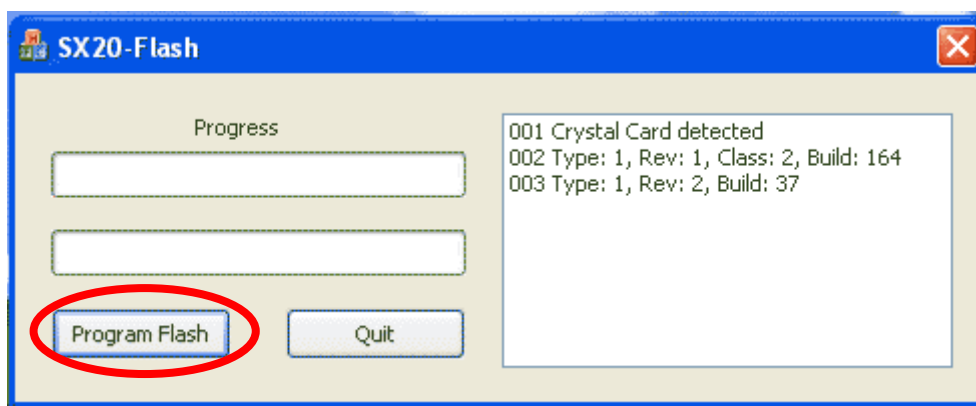




- Confirm that SX20 is powered up OK (BLUE Power Light + GREEN Flashing Status light) Using SX20 Flash

SX20 Flash can be found in :

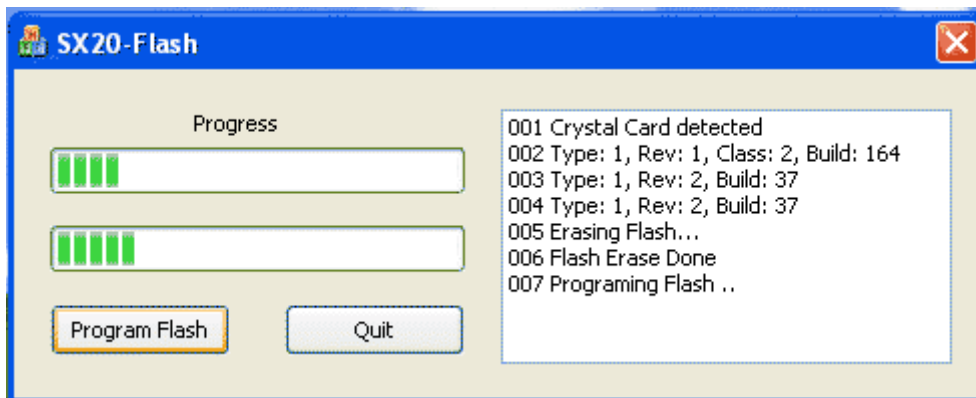
Start button > All Programs > Fairlight > Dream II > Dream II Utils > SX20 Flash



If the SX20 is detected OK, then SX20 Flash will show a report of the current CC-1 Core software version, and current SX20 Firmware version.

Assuming all is well, simply click "Program Flash".

The applet will erase the SX20 Flash Memory first, then load the new software.



Once complete, it will pop-up a notice box instructing you to reboot your SX20.



Power the SX20 OFF by turning off the Mains Switch at rear right of the unit.

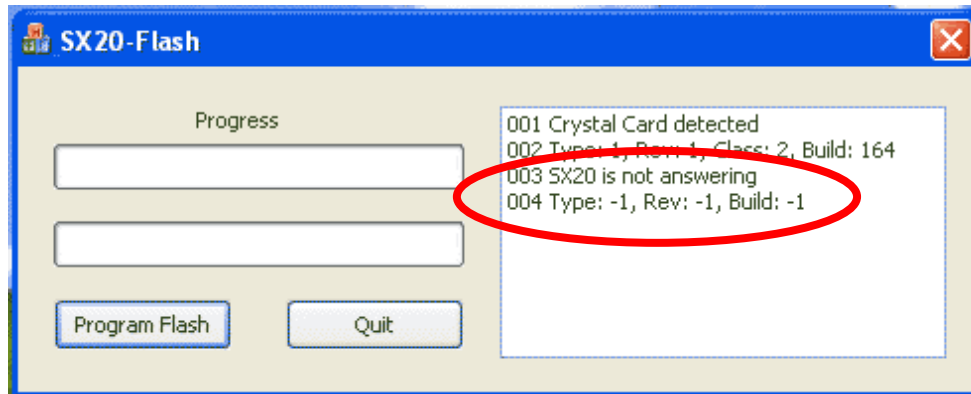
Wait at least 30 seconds, then turn it back ON.

If all is well, the Power Light should be BLUE, and the Status light should be flashing GREEN

## SX20 Flash Error Messages

Under some conditions, SX20 Flash will display an error message. The following is a quick overview of those messages and likely causes.

### On SX20 Flash launch: SX20 is not answering



This is most likely caused by the SX20 being turned off, or not connected to the Host CC-1 card.

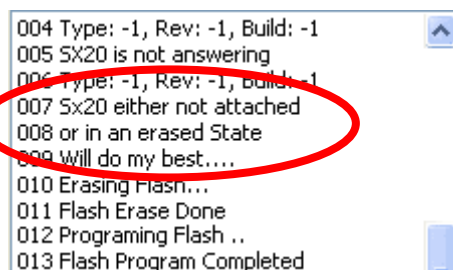
NOTE! "Not connected" may also mean you have a BAD DVI-I cable, with 1 or more pins damaged or not connected!

Please check your SX20, and ensure the Mains Switch at right rear is turned ON.  
(The Front Panel Power indicator should be BLUE, and the Status light should be flashing GREEN)

Please check your DVI-I cable, and ensure that it is firmly connected to the SX20 and CC-1 card.

If SX20 Flash STILL does not detect the SX20 correctly, retry with a Known Working DVI-I cable

### On "Program Flash" command: SX20 Not attached or Erased



This is most likely because

1. You have seen and recognized the previous "On Launch : SX20 is not answering" error
2. You have confirmed the DVI-I cable is connected and functioning correctly,
3. the SX20 is switched ON
4. the Front Panel Status light is Static GREEN, or RED
5. you suspect the SX20 firmware of being erased or corrupt

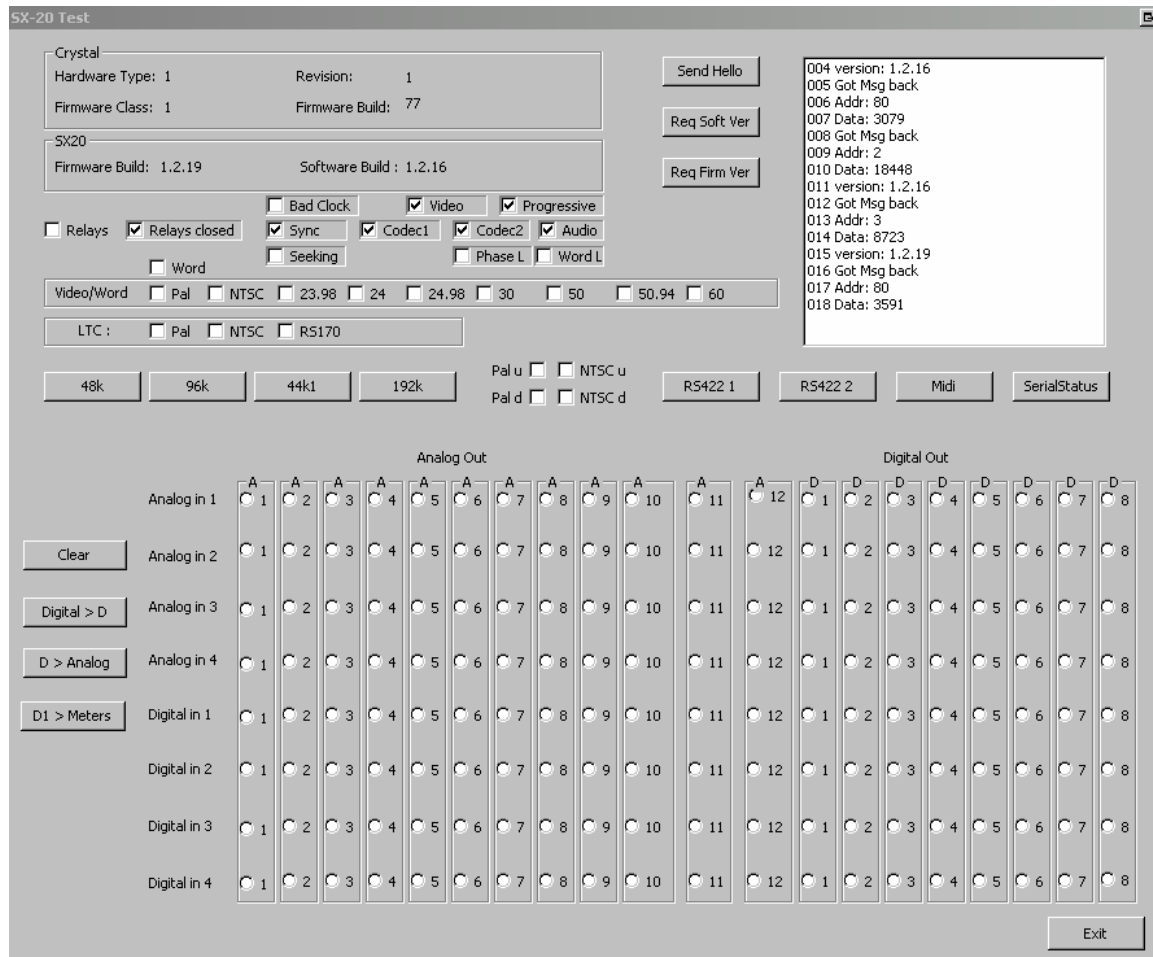
and am attempting to "Program Flash" anyway.

# Testing

The idea behind this testing is to make sure that the SX-20 is electrically working,

For all tests, connect the SX-20 to a Crystal card via a DVI-I cable. Run the application SX-20\_test.exe. The application can be found at:

C:\Program Files\Fairlight\DreamII\SX-20 Test



The following text relates to the use of the this program.

## Hello

Make sure you have valid communication by hitting <Send Hello>, and watching for a return packet in the message window similar to:

0xx Got Msg back

0xx Addr: 80

0xx Data 3591

The data field contains status information described in <Status> below, and is likely therefore to be different to the 3591 shown

If a valid message is returned then we have verified the path through the Crystal card, and down the DVI cable, the FPGA is running the communications decoder, the internal processor is running and has responded and the Crystal card receivers and decoders are running.

## Request Software Version

Hitting <Req Soft Ver> will interrogate the SX-20 for its software version.

Watch for a return packet in the message window similar to

0xx Got Msg back

0xx Addr: 2

0xx Data 18448

Version 1.2.16

The data field contains the version bits packed together in an 18 bit word.

The data is extracted and used to fill in the <Software Build> field.

## Request Firmware Version

Hitting <Req Firm Ver> will interrogate the SX-20 for its firmware version.

Watch for a return packet in the message window similar to

0xx Got Msg back

0xx Addr: 3

0xx Data 8723

Version 1.2.19

The data field contains the version bits packed together in an 18 bit word.

The data is extracted and used to fill in the <Firmware Build> field.

## Bad Clock/ Video/ Progressive

The <Video> tick box will be flagged if a valid video clock is detected and decoded on the video clock input of the SX-20. The <Progressive> tick box will be flagged if a valid progressive video clock is detected and decoded on the video clock input of the SX-20. It is valid to have both <Video> and <Progressive> tick boxes flagged.

It is also valid to have ONLY <Video> or ONLY <Progressive> flagged. If both are flagged then the SX-20 will use the standard video clock as it can extract phase information from this signal. No ticks means the SX-20 has no valid clock signal to lock to. <Bad Clock> is flagged if the detected clock is outside of the SX-20's lock range (about +/- 70 PMM). Asking the SX-20 to lock to PAL when an NTSC signal is present will result in a <Bad Clock> flag.

## Relays / Relays closed

Tick the <Relays> box to request the SX-20 unit to CLOSE its analog output relays. The <Relays Closed> box will flag a second or so after the relays close. This box is always read from the SX-20, so should always show the actual state of the relays.

IE the <Relay Closed> box should reflect the same status as the <Relays> box. If the SX-20 is restarted, but not the SX-20\_test software, then the two boxes may show differing states. Toggle the <Relays> box until the two are back in phase.

## Sync/ Codec1/ Codec2/ Audio

<Sync> is flagged if the SX-20 main PLL is locked. <Codec1> is flagged if codec1 (U36) has recovered a valid clock. <Codec2> is flagged if codec1 (U29) has recovered a valid clock. <Audio> is flagged if

the audio carrier signal is present and valid from the host CC-1 Crystal card. All of these boxes are read back from SX-20 and must be present for correct operation.

### Seeking/ Phase L / Word L

<Seeking> will flag if the SX-20 is seeking to lock to an external signal.<Phase L> – phase lock is flagged when the tightest lock possible is achieved to the external signal. This may be true phase lock for signals that can be decoded as such or the best ppm achievable by the SX-20 – usually better than 0.2 ppm.<Word L> – word lock is flagged when the SX-20 has achieved the same sample rate as the external signal. These boxes are read back from the SX-20.

### Video/ Word

These boxes request the SX-20 to lock to an external clock as specified by the box label. If a valid external timecode signal is not available, then <Bad Clock> will be flagged. Once <Word>, or any of the <Video/Word> timecode option boxes are ticked, the SX-20 will display <Seeking>, and a combination of <Word L>, <Phase L>, or <Bad Clock>. <Word L> usually takes about 10 seconds to achieve.<Phase L> usually takes about another 10 seconds to achieve. NOTE: <Video/Word> tick boxes are dumb and do not interact with other rates in the same set

– try not to tick more than one at any given time.

### LTC

These boxes request the SX-20 to decode an external LTC source at a frame rate specified by the box label. The incoming LTC packets are displayed in the message box. NOTE: <LTC> tick boxes are dumb and do not interact with other rates in the same set

– try not to tick more than one. NOTE: The test software does not have the full interrupt capabilities of DreamII, and thus does not service the LTC reader often enough. This leads to the message “LTC out of step” appearing twice every 100 lines or so. This is normal for this test and is not an error.

### 48k/ 96k/ 44k1 /192k/

These buttons request the SX-20 to

- generate internal clock rates as specified
- sample at the specified rate
- expect incoming AES/EBU timecode at the specified rate
- expect external word clock at the specified rate.

**NOTE:** DreamII does not currently support 192k sample rate

### PAL u/ PAL d/ NTSC u/ NTSC d

These tick boxes request the SX-20 to pull the base rate by

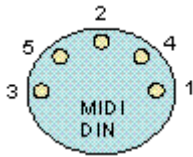
Tick Box	Pull Up/Pull Down ratio
<Pal u>	24/25
<Pal d>	25/24
<NTSC u>	1000/1001
<NTSC d>	1001/1000

## RS422 / Midi

Hitting these boxes sends the test pattern 0,1,2,3 out the specified port.

If a loop back cable is used, the returning messages will appear in the message window

MIDI Cable pinout



- O..... Pin 1 (No Connection)
- O..... Pin 4 (+5V DC Voltage)
- O..... Pin 2 (Ground/Common)
- O..... Pin 5 (MIDI Data - Hot)
- O..... Pin 3 (No Connection)

RS422 Pinout:

Pin	Master	Slave
1	Ground	Ground
2	Receive A	Transmit A
3	Transmit B	Receive B
4	Transmit Common	Receive Common
5	Spare	Spare
6	Receive Common	Transmit Common
7	Receive B	Transmit B
8	Transmit A	Receive A
9	Ground	Ground

## Patch bay

Reading the patch: - in on the left, out on the top.

Tick boxes to make connections.

<Clear> removes all connections.

## Tech Tip #1

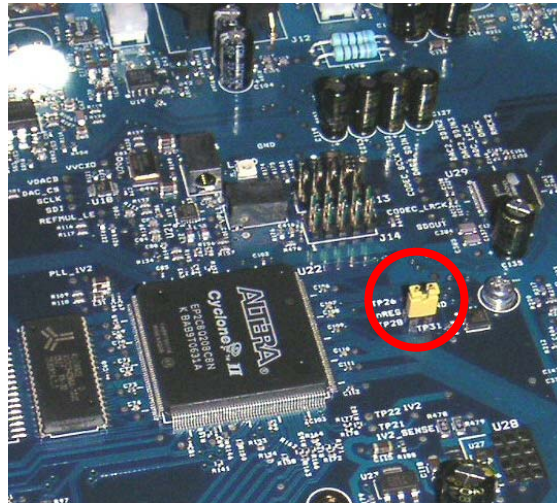
WARNING!

The following procedure effectively "hardwires" the Inputs of the SX-20 directly to its Outputs for testing purposes. **NOTE:** This procedure unlocks the analog output relays, and will not protect speakers from switch on "thumps", or other nasty noises!

For a quick "pure hardware" test

1. Power down and disconnect the SX-20 from the host CC-1 equipped PC
2. Remove the top cover of the SX-20 unit
3. Locate the 2 pin jumper header TP25, beside the "Altera Cyclone II" chip
4. Insert a standard IDE style jumper across this header (See picture at Right)-
5. Connect the SX-20 to a host CC-1 equipped PC- Power up the SX-20
6. Start the host PC
7. DO NOT launch DreamII software

This "test mode" jumper will effectively hardwire the Inputs of the SX-20 directly to the Outputs. Any form of DreamII patching will be over-ridden, and the meters will reflect the test mode signal routing as below.



SPDIF In 1 => Analog Out 1

SPDIF In 2 => Analog Out 2

SPDIF In 3 => Analog Out 3

SPDIF In 4 => Analog Out 4

SPDIF In 1 => Analog Out 5

SPDIF In 2 => Analog Out 6

SPDIF In 3 => Analog Out 7

SPDIF In 4 => Analog Out 8

SPDIF In 1 => Analog Out 9

SPDIF In 2 => Analog Out 10

SPDIF In 3 => Analog Out 11

SPDIF In 4 => Analog Out 12

Analog In 3 => SPDIF Out 1

Analog In 4 => SPDIF Out 2

Analog In 1 => SPDIF Out 3

Analog In 2 => SPDIF Out 4

Analog In 3 => SPDIF Out 5

Analog In 4 => SPDIF Out 6

Analog In 1 => SPDIF Out 7

Analog In 2 => SPDIF Out 8

## ECN #1048

### SX20 LTC modification

**Cause:**

The Sx20 LTC ECN 1048 fixes a problem with the LTC reader on SX20.

**Symptom:**

The SX20 LTC in will only read LTC for a few minutes, after which it stops. Turning the SX20 off for several minutes will allow it to continue again for a few more minutes.

**Reason:**

The sx20 LTC reader has no path to ground on it's hot input. If the LTC driver (external device) is AC coupled, then it has no path to ground on it's hot output. The capacitors used for AC coupling charge up over a few minutes, raising the logic low level of the incoming data above the switching point of the sx20 receiver (zero volts)

**Solution:**

Providing a DC path to ground stops the driving capacitor from charging and keeps the signal symmetrical about the 0v point. The Resistive value chosen provides a path to ground without excessive load on the signal.

**Other notes**

The same symptom could occur if the driving signal is DC coupled, but has a voltage offset in relation to the sx20. This would again move the logic level of the drive signal outside the sx20 switch range. The driving signal should always be symmetrical about the sx20 zero volt point.

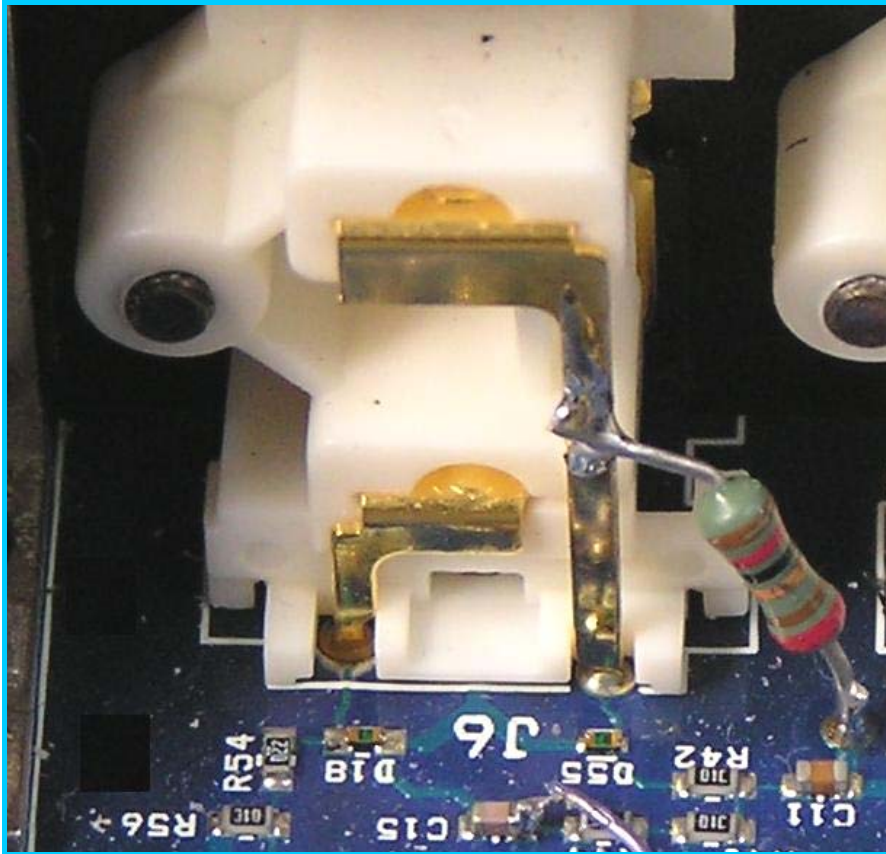
**Modification:**

470k across C11 (surface mount)

**For the field:**

**Either** - 100k from round pad next to C11 to long leg of RCA socket - as pictured:





**OR** - if cable mod 100k from hot to ground.

**Example** - If wiring a XLR balanced signal from a Pyxis to RCA

- connect 1 and 3 to shield
- connect 2 to hot
- 100k from pin 2 to pin 3

## Important Note on SPDIF

### **SPDIF**

- Unbalanced digital transmission with status bits set to consumer mode telling the other end what to expect.

### **AES3**

- Balanced digital transmission with status bits telling the other end what to expect.

### **But did you know that SX20 actually uses:**

**AES-3id** - Transmission of AES3 formatted data by unbalanced coaxial cable. With professional mode status bits.

useful info...

<http://www.rane.com/note149.html>

Resistor networks, transformers etc can be use to change transmission characteristics, but not the status bits.

Please be aware that you cannot always plug the SX20's output (labeled SPDIF) into a standard converter and get useful results. This is because an active standards converter may expect SPDIF status bits and not AES-3id status bits.

It is possible to buy AES-3id standards converters - as long as you know that's what you need !!!  
<http://www.lindos.co.uk/lsc24t.pdf>