

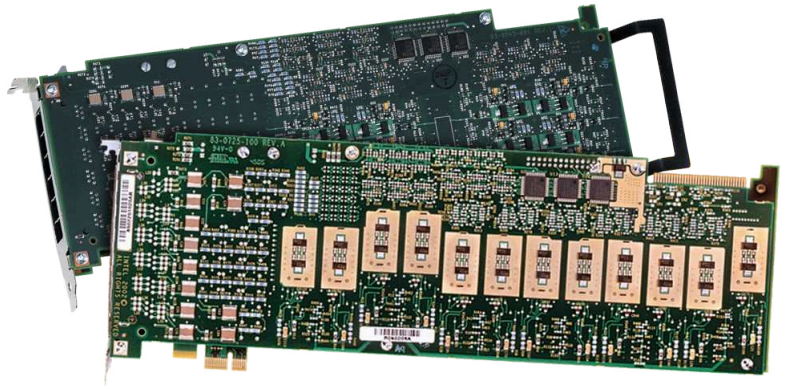


## D/120JCT-LS

PBX integration board for advanced connectivity for unified & Internet-ready call, voice & fax

### Datasheet

The Sangoma D/120JCT-LS Media Board is a 12-port analog PCI or PCI Express board. This high performance, scalable product supports voice, fax, and software-based speech recognition processing in a single PCI or PCI Express slot, providing 12 analog telephone interface circuits for direct connection to analog loop start lines. Sangoma JCT Media Boards can be used by developers to provide small- and medium-sized enterprise CT applications that require high-performance voice and fax processing. They use DSP voice processing, making them well-suited for server-based CT systems under Windows and Linux. They also provide a powerful platform for creating sophisticated IVR applications. Their Caller ID support lets apps receive calling party information via a telephone trunk line. Caller ID is supported for North America (CLASS), UK (CLI), and Japan (CLIP). Fax and software-based speech recognition processing enable unified messaging apps. They also provide AGC so even a weak phone signal can be recorded/replayed with clarity.



#### ✓ Supports G.726 Bit Exact and GSM Coders

- Enables implementation of unified messaging applications that meet VPIM standards

#### ✓ Supports Continuous Speech Processing (CSP)

- Provides a flexible speech processing technology, which, when coupled with efficient drivers, off-loads critical real-time signal processing in speech-enabled applications to on-board DSPs. Reduces system latency, increases recognition accuracy, and improves overall system response time for high-density speech solutions.

#### ✓ Telcordia CLASS, UK CLI, Japanese Caller ID, and Other International Protocols

- Supports an international Caller ID capability via on-hook audio path

#### ✓ A Variety of Country-specific Approvals

- Expands an application's ability to serve several global market segments at no extra cost

#### ✓ A-law or $\mu$ -law Voice Coding at Dynamically Selectable Data Rates

- Allows for a beneficial tradeoff between disk storage and voice quality
- 24 kbit/s to 64 kbit/s, selectable on a channel-by-channel basis

#### ✓ Separate Models Available with Universal PCI or PCI Express Edge Connector

- Universal PCI form factor compatible with 3.3 V and 5.0 V bus signals; and PCI Express form factor compatible with x1 lane configuration or higher.

#### ✓ Supports Up to 4 Channels of DSP-based On-board Fax Across CT Bus

- Reduces the number of boards per system

# Technical Specifications

## Number of Ports

- 12

## Maximum Boards Per System

- 8 (Linux and Windows). Number may be limited by application and system performance

## CT Bus Loads Per Board

- 20

## Analog Network Interface

- On-board loop start interface (12)

## Resource Sharing Bus

- CT Bus

## Control Microprocessor

- Intel 80486 GXSF running at 32.768 MHz with 2 MB SDRAM

## Digital Signal Processor

- Freescale DSP56303 @ 100 MHz, with 128Kx24 private SRAM

## Supported Operating Systems

- Linux, Windows: Details at <https://wiki.sangoma.com/display/DVC/Sangoma+Voice+Cards>

## CSP

- Yes

## FAX

- Yes

## Signaling

- Analog loop start

## Host Interface — PCI

### Bus Compatibility

- Complies with PCI-SIG Bus Specification, Rev. 2.2; Universal slot (5 V or 3.3 V)

### Bus Mode

- 32-bit

### Bus Speed

- 33 MHz maximum

### Shared Memory

- 32 KB to 64 KB page

### Interrupt

- 1 IRQ (INTA) shared by Sangoma® JCT PCI Media Boards

### I/O Port

- None

## Physical Dimensions — PCI

### Standard-Height, Full Length Form Factor

- 12.28 in. (31.2 cm) long
- 4.2 in. (10.67 cm) high

## Power Requirements — PCI

### +5 VDC

- 1.2 A typical; 1.4 A maximum

### +12 VDC

- 235 mA typical; 285 mA maximum

### -12 VDC

- 80 mA typical; 100 mA maximum

## Host Interface — PCI Express

### Bus Compatibility

- Complies with PCI-SIG PCI Express Base Specification, Rev. 1.1; x1 or higher compatible

### Bus Speed

- 2.5 GHz maximum per direction

### Shared Memory

- 32 KB to 64 KB page

### Interrupt

- Legacy INTA emulation shared by Sangoma® JCT PCIe Media Boards

### I/O Port

- None

## Physical Dimensions — PCI Express

### Standard-Height, Full Length Form Factor

- 12.28 in. (31.2 cm) long
- 4.2 in. (10.67 cm) high

## Power Requirements — PCI Express

### +3.3 VDC

- 1.12 A typical; 1.4 A maximum

### +12 VDC

- 800 mA typical; 900 mA maximum

## Environmental Requirements

### Operating Temperature

- +32°F (0°C) to +122°F (+50°C)

### Storage Temperature

- 4°F (-20°C) to 158°F (+70°C)

### Humidity

- 8% to 80% noncondensing

## Telephone Interface

### Trunk Type

- Loop start
- Ground start for inbound applications with AC ringing

### Impedance

- 600 Ohms nominal

### Ring Detection

- 40 Vrms to 130 Vrms, 15.3 Hz to 68.0 Hz (each configurable by parameter\*)

### Loop Current Range

- 20 mA to 60 mA, (Euro) 20 mA to 120 mA, polarity insensitive

### Echo Return Loss

- 17 dB minimum (at country impedance)

### Crosstalk Coupling

- >-75 dB

### Speech Digitization

- 64 kbit/s,  $\mu$ -law PCM

### Frequency Response

- 300 Hz to 3400 Hz  $\pm 3$  dB (transmit and receive)

### Connector

- RJ14; 6 jacks (each jack supports 2 channels)

## Reliability

### Estimated MT 3F Per Telcordia Method

- PCI: 154,000 hours
- PCI Express: 154,000 hours

## Approvals, Compliance and Warranty

### Country-specific Safety and Telecom Approvals

- <https://portal.sangoma.com/>

### Warranty Information

- <https://www.sangoma.com/warranties>

\*Analog levels: 0 dBm0 corresponds to a level of +3 dBm at tip-ring analog point. Values vary depending on country requirements; contact your Sangoma account manager

# Springware/JCT Technical Specifications

## Facsimile

### Fax Compatibility

- ⦿ ITU-T G3 compliant (T.4, T.30)
- ⦿ ETSI NET/30 compliant

### Maximum Data Rate

- ⦿ 14.4 kbit/s (v.17) send
- ⦿ 9.6 kbit/s (v.29) receive

### Variable Speed Selection

- ⦿ Automatic step-down to 12,000 bit/s, 9600 bit/s, 7200 bit/s, 4800 bit/s, and lower

### Transmit Data Modes

- ⦿ Modified Huffman (MH)
- ⦿ Modified Read (MR)

### Receive Data Modes

- ⦿ MH, MR

### File Data Formats

- ⦿ Tagged Image File Format-Fax (TIFF-F) for transmit/receive MH and MR

### ASCII-to-fax Conversion

- ⦿ Host-PC-based conversion
- ⦿ Direct transmission of text files
- ⦿ Windows fonts supported
- ⦿ Page headers generated automatically

### Error Correction

- ⦿ Detection, reporting, and correction of faulty scan lines

### Image Widths

- ⦿ 1728 pixels
- ⦿ 2048 pixels
- ⦿ 2432 pixels

### Image Scaling

- ⦿ Automatic horizontal and vertical scaling between page sizes

### Polling Modes

- ⦿ Normal
- ⦿ Turnaround

### Image Resolution

- ⦿ Normal (203 pels/in. x 98 lines/in.; 203 pels/2.54 cm x 98 lines/2.54 cm)
- ⦿ Fine (203 pels/in. x 196 lines/in.; 203 pels/2.54 cm x 196 lines/2.54 cm)

## Fill Minimization

- ⦿ Automatic fill bit insertion and stripping

## Audio Signal

### Receive Range

- ⦿ -40 dBm to -7 dBm nominal, configurable by parameter\*\*

### Automatic Gain Control

- ⦿ Application can enable/disable
- ⦿ Above -22 dBm results in full-scale recording, configurable by parameter\*\*

### Silence Detection

- ⦿ -40 dBm nominal, software adjustable\*\*

### Transmit Level (Weighted Average)

- ⦿ -9.5 dBm nominal, configurable by parameter\*\*

### Transmit Volume Control

- ⦿ 40 dB adjustment range, with application-definable increments, capped according to country-specific regulations

## Frequency Response

### 24 kbit/s

- ⦿ 300 Hz to 2600 Hz  $\pm 3$  dB

### 32 kbit/s

- ⦿ 300 Hz to 3400 Hz  $\pm 3$  dB

### 48 kbit/s

- ⦿ 300 Hz to 2600 Hz  $\pm 3$  dB

### 64 kbit/s

- ⦿ 300 Hz to 3400 Hz  $\pm 3$  dB

## Audio Digitizing

### 13 kbit/s

- ⦿ GSM 6.10 @ 8 kHz sampling

### 24 kbit/s

- ⦿ 4-bit OKI ADPCM @ 6 kHz sampling

### 32 kbit/s

- ⦿ 4-bit OKI ADPCM @ 8 kHz sampling
- ⦿ G.726 @ 8 kHz sampling

### 48 kbit/s

- ⦿ G.711  $\mu$ -law PCM @ 6 kHz sampling

### 64 kbit/s

- ⦿ G.711  $\mu$ -law PCM @ 8 kHz sampling

## Digitization Selection

- ⦿ Selectable by application on function call-by-call basis

## Playback Speed Control

- ⦿ Pitch controlled
- ⦿ Available for 24 kbit/s and 32 kbit/s data rates
- ⦿ Adjustment range:  $\pm 50\%$
- ⦿ Adjustable through application or programmable DTMF control

## DTMF Tone Detection

### DTMF Digits

- ⦿ 0 to 9, \*, #, A, B, C, D per Telcordia LSSGR Sec 6

### Dynamic Range

- ⦿ -38 dBm0 to -3 dBm0 per tone, configurable by parameter\*\*

### Minimum Tone Duration

- ⦿ 40 ms, can be increased with software configuration

### Interdigit Timing

- ⦿ Detects like digits with a >40 ms interdigit delay
- ⦿ Detects different digits with a 0 ms interdigit delay

### Twist and Frequency Variation

- ⦿ Meets Telcordia LSSGR Sec 6 and EIA 464 requirements

### Noise Tolerance

- ⦿ Meets Telcordia LSSGR Sec 6 and EIA 464 requirements for Gaussian, impulse, and power line noise tolerance

### Cut-through

- ⦿ Local echo cancellation permits 100% detection with a >4.5 dB return loss line

### Talk-off

- ⦿ Detects less than 20 digits while monitoring Telcordia TR-TSY-000763 standard speech tapes (LSSGR requirements specify detecting no more than 470 total digits)
- ⦿ Detects zero (0) digits while monitoring MITEL speech tape #CM 7291

## Global Tone Detection

### Tone Type

- ⦿ Programmable for single or dual

### Maximum Number of Tones

- ⦿ Application-dependent

### Frequency Range

- ⦿ Programmable within 300 Hz to 3500 Hz

### Maximum Frequency Deviation

- ⦿ Programmable in 5 Hz increments

### Frequency Resolution

- ⦿  $\pm 5$  Hz. Separation of dual-frequency tones is limited to 62.5 Hz at a signal-to-noise ratio of 20 dB

### Timing

- ⦿ Programmable cadence qualifier, in 10 ms increments

### Dynamic Range

- ⦿ Programmable, default set at  $-6$  dBm0 to  $-3$  dBm0 per tone Global Tone Generation

### Tone Type

- ⦿ Generate single or dual tones

### Frequency Range

- ⦿ Programmable within 200 Hz to 4000 Hz

### Frequency Resolution

- ⦿ 1 Hz

### Duration

- ⦿ 10 ms increments

### Amplitude

- ⦿ Programmable within  $-43$  dBm to  $-3$  dBm per tone

## MF Signaling

### MF Digits

- ⦿ 0 to 9, KP, ST, ST1, ST2, ST3 per Telcordia LSSGR Sec 6, TR-NWT-000506 and ITU-T Q.321

### Transmit Level

- ⦿ Complies with Telcordia LSSGR Sec 6, TR-NWT-000506

## Signaling Mechanism

- ⦿ Complies with Telcordia LSSGR Sec 6, TR-NWT-000506

### Dynamic Range for Detection

- ⦿  $-25$  dBm0 to  $-3$  dBm0 per tone

### Acceptable Twist

- ⦿ 6 dB

### Acceptable Frequency Variation

- ⦿ Less than  $\pm 1$  Hz

## Call Progress Analysis

- ⦿ Busy tone detection
- ⦿ Ring back tone detection
- ⦿ Positive voice detection
- ⦿ Positive answering machine detection
- ⦿ Fax/modem detection
- ⦿ Intercept detection
- ⦿ Dial tone detection before dialing

## Tone Dialing

### DTMF Digits

- ⦿ 0 to 9, \*, #, A, B, C, D per Telcordia LSSGR Sec 6, TR-NWT-000506

### Frequency Variation

- ⦿ Less than  $\pm 1$  Hz

### Rate

- ⦿ 10 digits/s maximum, configurable by parameter\*\*

### Level

- ⦿  $-4.0$  dBm per tone, nominal, configurable by parameter\*\*

## Pulse Dialing

### 10 Digits

- ⦿ 0 to 9

### Pulsing Rate

- ⦿ 10 pulses/s, nominal
- ⦿ 20 pulses/s for Japan, configurable by parameter\*\*

### Break Ratio

- ⦿ 60% nominal, configurable by parameter\*\*

## Analog Caller Identification

### Applicable Standards

- ⦿ Telcordia TR-NWT-000030
- ⦿ Telcordia TR-NWT-000031
- ⦿ Telcordia TR-NWT-001188
- ⦿ TAS T5 PSTN1 ACLIP: 1994 (Singapore)

### Modem Standard

- ⦿ Bell 202 or V.23, serial 1200 bits/sec (simplex FSK signaling)

### Receive Sensitivity

- ⦿  $-48$  dBm ( $-50$  dBv) to  $-1$  dBm

### Noise Tolerance

- ⦿ Minimum 18 dB SNR over 0 to  $-48$  dBm dynamic range

### Data Formats

- ⦿ Single Data Message (SDM) and Multiple Data Message (MDM) formats via API calls and commands

### Line Impedance

- ⦿ AC coupled 600 Ohm (@ 1.8 kHz) termination during Caller ID on-hook detection interval

### Message Formats

- ⦿ IASCI or binary SDM, MDM message content
- ⦿ FSK generation per Telcordia TR-NWT-000030
- ⦿ CAS tone generation and DTMF detection per Telcordia TR-NWT-001273

## Ordering Information

- ⦿ Please see the Models tab for this product

\*\* Analog levels: 0 dBm0 corresponds to a level of  $+3$  dBm at tip-ring analog point. Values vary depending on country requirements; contact your account manager