SyncLink PCMCIA Serial Adapter

Hardware User's Manual

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Overview

The SyncLink PCMCIA Serial Adapter is an add-in card for use in systems with a PCMCIA expansion slot. The card provides a single serial port for use by the system. A variety of serial protocols and interface standards are supported. Refer to the software documentation included with the card for details on using the card for a specific application.

Features

- Speeds up to 512Kbps synchronous (115200bps asynchronous)
- SDLC, HDLC, ASYNC
- Selectable hardware CRC: CRC-16, CRC-32, None
- DPLL Clock Recovery
- Clock Generation
- Mark or Flags transmit idle patterns
- Encoding: NRZ,NRZB,NRZI,NRZ-S,FM0,FM1,Manchester
- Selectable interface for RS-232, V.35, RS-422, RS-530, RS-449, X.21
- Full set of control and status signals (DTR,DSR,RTS,CTS,DCD,RI)

Specifications

- Infineon SAB82532 serial controller (one port)
- 64 Byte Receive and Transmit FIFOs
- 16-bit 5V PCMCIA system interface
- Environmental: Temperature 0C to 60C standard, humidity 0 to 95% non-condensing; alt. - 200 to +10,000 ft
- Standard Type II PCMCIA card: length 3.37 inches, width 2.126 inches, weight 1.0 Oz
- Power usage: 200mA +5V
- Regulatory: FCC Class B, EN55022 Class B, EN55024
- Connector: DB-25 (male)
- Cable Options: DB-25 (female) to DB-25 (male); DB-25 (female) to 34-pin V.35 (male); DB-25 (female) to 37-pin RS-449 (male); DB-25 (female) to 15-pin X.21 (male)

PCMCIA and Cardbus

PCMCIA is a standard for an 16-bit ISA like expansion bus with a small physical format. Cardbus is a standard for a 32-bit PCI like expansion bus with the same physical format as PCMCIA. Most systems with a PCMCIA or Cardbus slot support both standards in the same slot. The PCMCIA standard identifies 5V and 3.3V electrical variations and Type I, II, III physical (thickness) variations. The SyncLink PCMCIA card is a 5V Type II card which is supported by most systems. The SyncLink card is physically keyed to prevent insertion into a slot that cannot support it. Refer to your system documentation for more details on which card types are supported.

Signal Specifications

Each serial signal (control, status, data, or clock) is compatible with an electrical specification that is selected by placement of jumpers on the card. This section briefly describes the specifications supported by the card.

Single Ended Signals (RS-232/V.28)

Single ended signals supported by the card are compatible with both RS-232 and ITU V.28 standards. Each single ended signal uses one conductor in a cable, and all single ended signals share a common ground conductor.

- Maximum Voltage Range: +15 to -15V (between signal and ground)
- +3V to +15V (+5V typical) = control/status signal on or data value of 0
- -3V to -15V (-5V typical) = control/status signal off or data value of 1
- Voltage between -3V to +3V = invalid (indeterminate) state
- Max cable length 50 feet
- Max data rate 20kbps

The maximum data rate of 20kbps is part of the RS-232/V.28 standards. The SyncLink card can operate at speeds up to 120kbps depending on the cable length and loading. Longer cables and increased loading reduces the maximum supported data rate.

Differential Signals (RS-422/V.11)

Differential signals supported by the card are compatible with RS-422 and ITU V.11 standards. Each differential signal uses two conductors in a cable (signal pair). A common ground conductor is recommended for use with differential signals to reduce common mode voltages between cable ends which may result in incorrect or impaired operation.

- Maximum Voltage Range: +5 to -5V (between conductors in a pair)
- +200mV to +5V (+2V typical) = control/status signal on or data value of 0
- -200mV to -5V (-2V typical) = control/status signal off or data value of 1
- Voltage between -200mV to +200mV invalid (indeterminate) state
- Max cable length 4000 feet
- Max data rate 10Mbps

Longer cables and increased loading reduces the maximum supported data rate.

Clock Polarity

Synchronous serial communications (HDLC/Bisync/Monosync) may use separate clock signals to control the timing of data signals. One clock cycle equals one bit. There are two clock edges (rising and falling) for each clock cycle. On one edge, the transmit data output changes. On the other edge, the receive data input is sampled. The assignment of clock edges to transmit data transition and receive data sampling is referred to as clock polarity.

The SyncLink card uses the clock polarity in the RS-232/RS-422/V.24/V.28/V.11 standards as described below:

RS-232/V.28 Single Ended Signals

- +3V to +15V (+5V typical) = clock on
- -3V to -15V (-5V typical) = clock off
- On to Off edge (falling edge) = receive data sample (bit center)
- Off to On edge (rising edge) = transmit data transition (bit edge)

RS-422/RS-485/V.11 Differential Signals

- +200mV to +5V (+2V typical) = clock on
- -200mV to -5V (-2V typical) = clock off
- On to Off edge (falling edge) = receive data sample (bit center)
- Off to On edge (rising edge) = transmit data transition (bit edge)

Most serial communications equipment uses the above clock polarity, but some non-standard equipment may use the opposite polarity. For differential signals, the polarity can be altered by inverting the conductors of each clock signal pair.

Serial Interface Selection

The serial adapter supports different interface types which are selected by software configuration. By default on power up, the interface is disabled and does not drive any outputs. The method of changing the interface type depends on the operating system and application. For example, Windows implements this setting in the device properties of the device manager and Linux implements the settting with an ioctl() call. Refer to the software documentation for details.

Some interface types require a conversion cable in addition to a specific jumper setting to provide the necessary connector type. Refer to the Serial Pin Assignments section for more details.

Differential Input Termination

Each port on the card has 120 ohm termination of RS-422 differential inputs. Termination is used to increase signal reliability at high speeds (generally 1Mbps or more). At high speeds, receivers at each end of a cable should be terminated.

Maximum Data Rate

The serial controller on the SyncLink PCMCIA card supports synchronous data rates up to 2Mbps. However, the card does not support DMA transfers and relies on the system processor to exchange data with the controller. The maximum practical data rate depends on the processor speed and system load. For most modern systems, a maximum data rate of 512Kbps is possible. Slower or heavily loaded systems may only be able to support 128Kbps. Fast systems with low interrupt latency may be able to sustain connections faster than 512Kbps.

Serial Connector Pin Assignments

The serial connector on the card is a miniature 26 pin connector. A conversion cable is included with the card to supply a standard single DB-25 (25 pins) male connector. The assignment of signals to the connector pins is controlled by the software interface selection. For interface types that use a connector different than DB-25 an adapter cable purchased from MicroGate is required. The following sections describe the jumper settings and cables for each supported standard.

WARNING

Do not place excessive strain on the cable or card connector to prevent damage to the connector or system slot.

RS-232

The RS-232 standard uses single ended signals on a DB-25 connector. The adapter DB-25 connector follows this standard when the software is configured for RS-232. Use any straight through 25 conductor DB-25M to DB-25F cable (such as MicroGate Part # CMF000) to connect the adapter connector to the communications equipment.

The maximum data rate supported by the adapter when using RS-232 is 128Kbps. Cable length and signal loading may reduce the maximum usable data rate from this value.

RS-232 DB-25 Male DTE			
Signal Name	**Electrical Desc**	**Pin #**	**Direction**
Earth/Shield Ground		1	
TxD, Transmit Data	RS-232/V.28	2	Output
RxD, Receive Data	RS-232/V.28	3	Input
RTS, Request to Send	RS-232/V.28	4	Output
CTS, Clear to Send	RS-232/V.28	5	Input
DSR, Data Set Ready	RS-232/V.28	6	Input
Signal Ground		7	
DCD, Data Carrier Detect	RS-232/V.28	8	Input
TxC, Transmit Clock	RS-232/V.28	15	Input
RxC, Receive Clock	RS-232/V.28	17	Input
DTR, Data Terminal Ready	RS-232/V.28	20	Output
RI, Ring Indicator	RS-232/V.28	22	Input
AuxClk, DTE Clock Output	RS-232/V.28	24	Output

Figure 1 RS-232 Cable (Part# CMF000)

V.35

The V.35 standard uses a mix of single ended and differential signals on a 34 pin block connector. To use this standard, configure the software for V.35 mode and use the MicroGate V.35 cable (Part # 2534GT, picture shown below).

Note that the RI signal is available on the adapter's DB-25 connector when V.35 mode is selected, but is not available (NC = no connect) on the 34 pin block connector when using the V.35 cable.

V.35 Male DTE				
Signal Name	**Electrical Desc**	**DB25 Pin #**	**V.35 Block Pin #**	**Direction**
Earth/Shield Ground		1	A	
TxD (+/A), Transmit Data	RS-422/V.11	2	P	Output
RxD (+/A), Receive Data	RS-422/V.11	3	R	Input
RTS, Request to Send	RS-232/V.28	4	C	Output
CTS, Clear to Send	RS-232/V.28	5	D	Input
DSR, Data Set Ready	RS-232/V.28	6	E	Input
Signal Ground		7	B	
DCD, Data Carrier Detect	RS-232/V.28	8	F	Input
RxC (-/B), Receive Clock	RS-422/V.11	9	X	Input
AuxClk (-/B), DTE Clock Output	RS-422/V.11	11	W	Output
TxC (-/B), Transmit Clock	RS-422/V.11	12	AA	Input
TxD (-/B), Transmit Data	RS-422/V.11	14	S	Output
TxC (+/A), Transmit Clock	RS-422/V.11	15	Y	Input
RxD (-/B), Receive Data	RS-422/V.11	16	T	Input
RxC (+/A), Receive Clock	RS-422/V.11	17	V	Input
DTR, Data Terminal Ready	RS-232/V.28	20	H	Output
RI, Ring Indicator	RS-232/V.28	22	NC	Input
AuxClk (+/A), DTE Clock Output	RS-422/V.11	24	24	Output

Figure 2 V.35 Cable (Part# 2534GT)

RS-422/RS-449/RS-530

The RS-422 standard describes differential electrical signals but not connector or pin assignments. The RS-530 and RS-449 standards define specific connectors and pin assignments using differential signals. The differential signals on the card meets RS-422 electrical specifications.

RS-530 uses differential signals on a DB-25 connector. The adapter DB-25 connector follows this standard when the software is configured for RS-422 mode. Use any straight through 25 conductor DB-25M to DB-25F cable (such as MicroGate Part # CMF000) to connect the adapter to RS-530 communications equipment.

RS-449 uses differential signals on a DB-37 connector. To use this standard, configure the software for RS-422 mode and use the MicroGate RS-449 cable (Part # 2537FM).

RS-422/RS-530/RS-449 Male DTE				
Signal Name	**Electrical Desc**	**DB25 RS-530 Pin #**	**DB37 RS-449 Pin #**	**Direction**
Earth/Shield Ground		1	1	
TxD (+/A), Transmit Data	RS-422/V.11	2	4	Output
RxD (+/A), Receive Data	RS-422/V.11	3	6	Input
RTS (+/A), Request to Send	RS-422/V.11	4	7	Output
CTS (+/A), Clear to Send	RS-422/V.11	5	9	Input
DSR (+/A), Data Set Ready	RS-422/V.11	6	11	Input
Signal Ground		7	19	
DCD (+/A), Data Carrier Detect	RS-422/V.11	8	13	Input
RxC (-/B), Receive Clock	RS-422/V.11	9	26	Input
DCD (-/B), Data Carrier Detect	RS-422/V.11	10	31	Input
AuxClk (-/B), DTE Clock Output	RS-422/V.11	11	35	Output
TxC (-/B), Transmit Clock	RS-422/V.11	12	23	Input
CTS (-/B), Clear to Send	RS-422/V.11	13	27	Input
TxD (-/B), Transmit Data	RS-422/V.11	14	22	Output
TxC (+/A), Transmit Clock	RS-422/V.11	15	5	Input
RxD (-/B), Receive Data	RS-422/V.11	16	24	Input
RxC (+/A), Receive Clock	RS-422/V.11	17	8	Input
RTS (-/B), Request to Send	RS-422/V.11	19	25	Output
DTR (+/A), Data Terminal Ready	RS-422/V.11	20	12	Output
DSR (-/B), Data Set Ready	RS-422/V.11	22	29	Input
DTR (-/B), Data Terminal Ready	RS-422/V.11	23	30	Output
AuxClk (+/A), DTE Clock Output	RS-422/V.11	24	17	Output

Figure 3 RS-530 Cable (Part# CMF000)

Figure 4 RS-449 Cable (Part# 2537FM)

X.21

X.21 is an interface standard using differential signals on a DB-15 connector. To use this standard, install the RS-422/485 jumpers on a port and use the MicroGate X.21 cable (Part # 2515FM).

The X.21 signal names are different than those used by the adapter and other interface standards. The mapping of the X.21 signals to the adapter signals are shown in the table below.

The maximum data rate supported by the adapter when using X.21 is 10Mbps. Cable length and signal loading may reduce the maximum usable data rate from this value.

X.21 Male DTE				
Signal Name	**Electrical Desc**	**DB25 Pin #**	**DB15 Pin #**	**Direction**
Earth/Shield Ground		1	1	
T+, Transmit Data	RS-422/V.11	2	2	Output
R+, Receive Data	RS-422/V.11	3	4	Input
I+, Indicator (DSR/DCD)	RS-422/V.11	6,8	5	Input
Signal Ground		7	8	
S-, Clock Input (TxC, RxC)	RS-422/V.11	9,12	13	Input
I-, Indicator (DSR/DCD)	RS-422/V.11	10,22	12	Input
X-, Clock Output (AuxClk)	RS-422/V.11	11	14	Output
T-, Transmit Data	RS-422/V.11	14	9	Output
S+, Clock Input (TxC, RxC)	RS-422/V.11	15,17	6	Input
R-, Receive Data	RS-422/V.11	16	11	Input
C+, Control (DTR)	RS-422/V.11	20	3	Output
C-, Control (DTR)	RS-422/V.11	23	10	Output
X+, Clock Output (AuxClk)	RS-422/V.11	24	7	Output

Figure 5 X.21 Cable (Part# 2515FM)