Asynchronous to Synchronous Converter

Model 2010
Documentation Number 2010AS3297

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B&B Electronics -- September 1997

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1.0 WARRANTY INFORMATION

B&B Electronics warrants all Model 2010 components to be free from defects, and will—at our option—repair or replace the product should it fail within one year from the first date of shipment.

This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse or unauthorized modification. If this product fails or does not perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall B&B Electronics be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. B&B Electronics specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed as user's acceptance of these terms.

1.1 RADIO AND TV INTERFERENCE

The Model 2010 generates and uses radio frequency energy, and if not installed and used properly—that is, in strict accordance with the manufacturer's instructions—may cause interference to radio and television reception. The Model 2010 has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the Model 2010 does cause interference to radio or television reception, which can be determined by disconnecting the RS-232 interface, the user is encouraged to try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, reorienting the receiving antenna and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

1.2 SERVICE

All warranty and non-warranty repairs must be returned freight prepaid and insured to B&B Electronics. All returns must have a Return Materials Authorization number on the outside of the shipping container. This number may be obtained from B&B Electronics Customer Service at (815) 433-5100. *Packages received without an RMA number will not be accepted.*
B&B Electronics' technical staff is available to answer any questions that might arise concerning the installation or use of your Model 2010. Technical Service hours: 8 AM to 5PM CST, Monday through Friday.

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2.0 GENERAL INFORMATION

Thank you for your purchase of this B&B Electronics product. This product has been thoroughly inspected and tested and is warranted for one year parts and labor. If any questions or problems arise during installation or use of this product, please do not hesitate to contact B&B Electronics Technical Support at (815) 433-5100.

2.1 FEATURES
• Conforms to CCITT V.14 and V.22 standards
• Adapts asynchronous terminals to synchronous modems and multiplexers
• Allows character lengths from 8 - 11 bits
• Requires no AC power or batteries
• Data rates to 19.2 Kbps
• Automatically adjusts synchronous data rates
• Miniature size
• Accepts external clocking
• Made in the USA

2.2 DESCRIPTION
The Model 2010 converter gives asynchronous hardware access to the high speed capabilities of synchronous modems or multiplexers. The Model 2010 plugs directly into the asynchronous RS-232 DTE port and connects via RS-232 cable to the synchronous DCE device.

Drawing power from the RS-232 interface, the Model 2010 needs no AC power or batteries to operate and supports data rates to 19.2 Kbps. Because the Model 2010 automatically adjusts the synchronous data rate to match the asynchronous DTE's output rate, no data rate strapping is necessary. The Model 2010 derives clocking externally from the clock of the synchronous DCE, and imposes no limit on data block size. Characters may be up to 11 bits long.

Measuring only 3.2" x 2.0" x .75", the Model 2010 is housed in a sturdy ABS plastic case. It comes fully equipped with a DB-25 male connector and a DB-25 female connector.

3.0 CONFIGURATION

The Model 2010 is configured using four internal switches. Figure 1 shows the switch locations with respect to other PC board components.
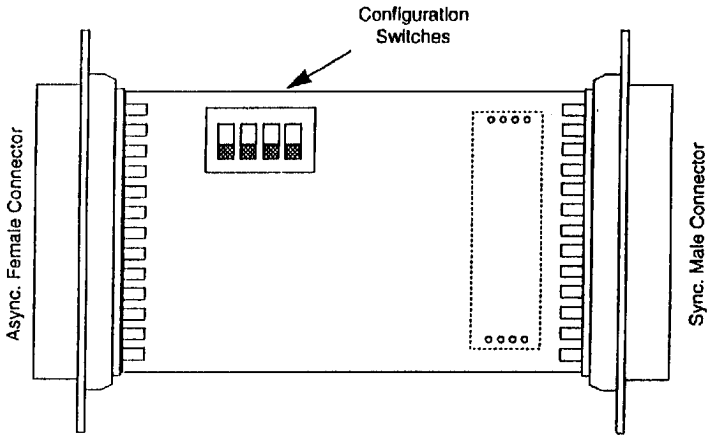
Figure 1. Switch locations on the 2010 PC board

3.1 SETTING INTERNAL SWITCHES

The four switches shown in Figure 2 allow selection of character length and extended signaling rate. These switches are located internally on the Model 2010's PC board. To access them use a small flathead screwdriver to pop open the Model 2010's case as shown in Figure 3.

Figure 2. Close-up of the Model 2010's configuration switches

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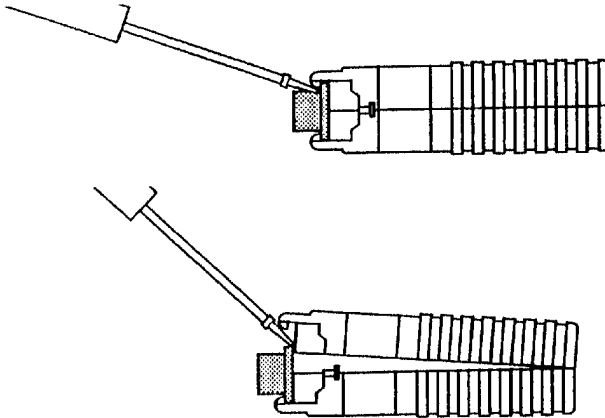
Figure 3. Opening the Model 2010's case with a small screwdriver

3.2 SWITCH SETTINGS

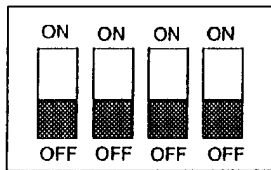All possible settings for the Model 2010's configuration switches are presented in the following summary table and descriptions. If you have additional questions regarding configuration, contact B&B Technical Support at (815) 433-5100.

SWITCH SUMMARY TABLE		
Position	**Function**	**Factory Default**
Switch 1-1	Character Length	Off ⎫ 10 bit
Switch 1-2	Character Length	Off ⎭
Switch 1-3	Signalling Rate	Off -2.5% to +1%
Switch 1-4	Not Used	

Switches SW1-1 and SW1-2: Character Length

Switches SW1-1 and SW1-2 are set in combination to determine the character length for asynchronous data.

<u>SW 1-1</u>	<u>SW 1-2</u>	
Off	On	8 bit
On	On	9 bit
Off	Off	10 bit
On	Off	11 bit

Switch SW1-3: Extended Signaling Rate (ESR)

The setting for switch 1-3 determines the range of variability the Model 2010 looks for in asynchronous data rates (i.e., the actual variance from a given frequency level the Model 2010 will tolerate).

<u>SW 1-3</u>
Off   -2.5% to +1%
On   -2.5% to +2.3%

Switch SW1-4: Not Used

4.0 INSTALLATION

The Model 2010 is designed to be used in *pairs*, with one unit installed between an asynchronous DTE and a synchronous DCE on either end of a synchronous communication link. Figure 4 (below) illustrates a typical Model 2010 installation.
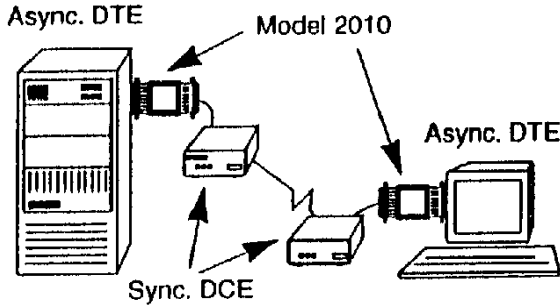
Figure 4. Typical Model 2010 application

4.1 CONNECTING THE ASYNCHRONOUS PORT

The asynchronous port of the Model 2010 is a DB-25 female and is configured as "DCE". Therefore, it wants to talk to a DTE device such as a terminal or PC. The Model 2010 may be plugged directly into the DB-25 serial port of a DTE or connected via "straight through" cable.

4.2 CONNECTING THE SYNCHRONOUS PORT

The synchronous port of the Model 2010 is a DB-25 male and is configured as "DTE." Therefore, it wants to talk to a DCE device such as a modem or multiplexer. The Model 2010 may be plugged directly into the DB-25 serial port of a DCE or connected via "straight through" cable.

APPENDIX A: SPECIFICATIONS

Data Rates: Up to 19.2 Kbps

Clocking: Provided by modem or multiplexer

Buffer: 4 bit RTS override feature empties buffers before dropping RTS, making the Model 2010 usable in a polling environment

Data Transmission: Full or half duplex

Connectors:
   Async.: DB-25 female
   Sync.:   DB-25 male

Power: No external power required; uses power from data and control signals

Temperature Range: 0-60°C (32-140°F)

Altitude: 0-15,000 feet

Humidity: Up to 95% non-condensing
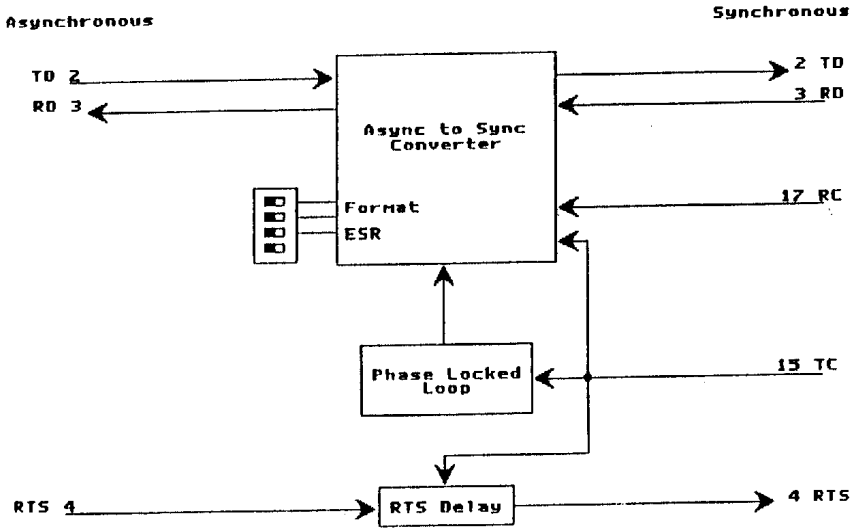
Dimensions: 3.2" x 2.0" x 0.75"

Weight: 2 oz.

APPENDIX B: ASYNCHRONOUS PORT CONNECTIONS (CONFIGURED AS "DCE")

Pin	Name	Description
1	FG	Frame Ground; connected straight to synchronous port
2	TXD	Transmit Data (to 2010); data input from asynchronous port; input to the 2010 power supply
3	RXD	Receive Data (from 2010); data output to asynchronous port
4	RTS	Request to Send (to 2010); input to the 2010 power supply
5	CTS	Clear to Send (from 2010); connected straight through to synchronous port
6	DSR	Data Set Ready (from 2010); connected straight through to synchronous port
7	SG	Signal Ground; connected straight through to synchronous port
8	CD	Carrier Detect (from 2010); connected straight through to synchronous port
9	+DCV	Connected straight through to synchronous port
10	-DCV	Connected straight through to synchronous port
20	DTR	Data Terminal Ready (to 2010); input to 2010 power supply
22	RI	Ring Indicator (from 2010); connected straight through to synchronous port

APPENDIX C: SYNCHRONOUS PORT CONNECTIONS (CONFIGURED AS "DTE")

Pin	Name	Description
1	FG	Frame Ground; connected straight to asynchronous port
2	TXD	Transmit Data (from 2010); data output to synchronous port
3	RXD	Receive Data (to 2010); data input from the synchronous port; input to 2010 power supply
4	RTS	Request to Send (from 2010); 4 bit delay from asynchronous port (2010 waits 4 bits before dropping RTS to the synchronous port; this facilitates use in a polling environment)
5	CTS	Clear to Send (to 2010); connected straight through to asynchronous port
6	DSR	Data Set Ready (to 2010); connected straight through to asynchronous port
7	SG	Signal Ground; connected straight through to asynchronous port
8	CD	Carrier Detect (to 2010); connected straight through to asynchronous port
9	+DCV	Connected straight through to asynchronous port
10	–DCV	Connected straight through to asynchronous port
15	TXC	Transmit clock (to 2010); used to synchronize data conversion from 2010 to synchronous port
17	RXC	Receive clock (to 2010); used to synchronize data conversion from 2010 to synchronous port
20	DTR	Data Terminal Ready (from 2010); input to 2010 power supply
22	RI	Ring Indicator (to 2010); connected straight through to asynchronous port

APPENDIX D: BLOCK DIAGRAM

Asynchronous   Synchronous

TD 2 ─────────────────►┌─────────────┐─────────────► 2 TD
RD 3 ◄─────────────────│   │◄───────────── 3 RD
                       │ Async to Sync│
                       │ Converter │
                       │   │
      ┌─┐   │   │◄───────────── 17 RC
      │■│──────────────│ Format   │
      │■│──────────────│ ESR   │◄─────┐
      │■│──────────────│   │   │
      │■│   └──────▲──────┘   │
      └─┘   │   │
                       ┌─────────────┐   │
                       │ Phase Locked│◄──────────── 15 TC
                       │   Loop   │   │
                       └──────┬──────┘   │
                              │   │
                              ▼   │
RTS 4 ───────────────────►┌─────────┐───────────────► 4 RTS
                          │RTS Delay│
                          └─────────┘

Pins 1,5,6,7,8,9,10,20,and 22 are connected straight through