



## BOB-II-SDD(M) and BNAB-SDD Installation Notes ~ December 3, 2002

### Introduction:

BOB-II-SDD modules offer a simple stand-alone videotext overlay function for distance data. Unlike standard BOB-II modules, BOB-II-SDD does not interact with a host computer or micro-controller.

BNAB-SDD provides a convenient host board for BOB-II-SDD modules, including quadrature distance encoder interface hardware.

### BOB-II-SDD(M):

Pin	Description
1	Raw +12V supply (+8~16V acceptable), 65mA
2	Power supply ground and digital common ground
3	+5V $\pm$ 5% auxiliary regulated DC output
4	Up/Down count control input, 5V logic
7	Count pulse input (falling edge sensitive), 5V logic
10	CPU reset (active low, bypass with .001~.01uF)
12	Operator Switch A input (see text)
13	Operator Switch B input (see text)
14	Video mode control input, 5V logic
21	Connect to signal ground (pin 25)
22	Connect to signal ground (pin 25)
23	Optional transparency control pin (see text)
24	Connect to pin 26 (or transparency control)
25	Signal ground
26	Connect to pin 24 (or transparency control)
27	Video output shield ground
28	Video output, 1Vpp into 75 ohm cable
29	Video input cable shield ground
30	Video input, requires 1Vpp into 75 ohms

Pins not called out above are no-connects.

Distance encoders that provide output in Pulse/Direction format (at 5V) may be connected directly to the BOB-II-SDD module, but most commonly available encoders provide quadrature outputs instead. In any case, the system encoder must produce 10 cycles per foot of cable metered.

An LS7084 or equivalent encoder interface circuit is required, external to the BOB-II-SDD module, in order to use quadrature encoders. The LS7084 also manages encoder electrical noise and mechanical jitter issues, thus ensuring the most accurate count of quadrature encoder cycles. Pin 7 receives the LS7084 clock output signal. Pin 4 receives the LS7084 direction signal. Refer to the BNAB-SDD schematic for more details on this hookup, including passive components tied to other pins of the LS7084 chip.

If the distance register is decremented (by the encoder) below 000.0f, it rolls over to 999.9f and counts downward from there. If incremented past 999.9f, it rolls over to 000.0f and continues upward. The maximum count pulse input rate for no missing counts is 300,000 pulses per second.

Two operator control switches may be connected to pins 12 (switch A) and 13 (switch B) of the BOB-II-SDD module, in order to provide the functions described below. These switches must be Normally Open (NO) momentary type, providing contact closure to ground when activated.

Switch A cycles through five possible data display positions (center and corners of the screen), and display OFF. When powered up, BOB-II-SDD clears the distance register to zero and displays distance at screen center.

Switch B provides distance clear and preset functions. If it's held down, the distance register increments slowly upward from zero. This allows inspection system operators to eliminate offset between datum zero and camera starting position in a pipeline, for instance. Switch B has no effect if the display position has been set to OFF.

The video mode control input on pin 14 may be left unconnected or pulled up to logic high to invoke the default Genlock/Overlay mode. Connect pin 14 to ground or logic low to select Local video mode (a blue matte background will be generated internally).

**Caution:** If display position changes are commanded while the video mode is set to Genlock/Overlay and a video signal is **not** present at the video input pin, unwanted characters may appear in the display (when video is again supplied or Local mode is invoked). This

condition may be rectified by simply changing display position again, with external video applied in Genlock/Overlay mode, or in Local mode.

An optional character transparency control may be connected to BOB-II-SDD in lieu of the wire link between pins 24 and 26. Hookup wiring must be short and direct, because the control wires carry wideband video at a relatively high impedance level. Use a 2K linear pot, and connect as follows:

**Pin 23: Counterclockwise end**

**Pin 24: Clockwise end**

**Pin 26: Wiper**

The video input (pin 30) can tolerate up to +2.5VDC bias mixed with incoming video. The video output includes some DC bias, about +1V when properly terminated downstream. Contact Decade Engineering or refer to the BOB-II FAQ (at our website) for additional information on these issues if necessary.

## **BNAB-SDD:**

Video In/Out connectors are prominently labeled on the board. J8 is an optional video I/O connector footprint.

J7 is provided for operator controls. Molex KK series 6-pin female plugs (e.g. 22-01-2067) are compatible. Note that contacts for these connectors are often sold separately. Pin 1 is marked (\*). J7 pinout follows:

1. **Ground**
2. **Ground**
3. **Video mode control input**
4. **Switch B (Preset/Clear)**
5. **Switch A (Display Position)**
6. **N/C (+5V)**

The screwdriver control marked "VMIX" (VR1) is provided for character transparency adjustment. The full clockwise setting of VMIX results in maximum character contrast against the video background. Full CCW makes the characters nearly disappear.

J5 is for the distance encoder. Molex KK series 4-pin female plugs (e.g. 22-01-2047) are compatible. Connect an encoder with 5V (TTL) quadrature outputs and 10 cycles per foot of distance to be displayed. Swap signal phases if count direction is incorrect. J5 pinout follows:

1. **Power supply out to encoder (+5V)**
2. **Signal phase A input**
3. **Signal phase B input**
4. **Ground**

The power connector (J6) center pin is +12V. The sleeve is ground. Standard coaxial DC power plugs having ID of

2.1mm and OD of 5.5mm, such as *RadioShack.com* part number 910-0902, are suitable.

Normal power consumption for the BOB-II-SDD/BNAB-SDD board set is less than 90mA, not including encoder supply current. Slide the power switch right to power up this system. The LED at D3 should light up. Slide left to turn it off.

The power supply regulator on BOB-II can supply about 100mA maximum to external devices, and this is often sufficient for distance encoders. There are exceptions! Contact Decade Engineering if you need to use an encoder that draws higher current.

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