APOGEE LABS

IOCBS4
BIT SYNC MODULE

FEATURES

- Clock recovery from data only
- Analog input
  - ◊ Bipolar or unipolar, auto detect
  - ◊ Accommodates baseline shifts and variations
- Bit rate from 1 Kbps to 10 Mbps NRZ codes
  - ◊ 1 Kbps to 5 Mbps BiØ codes
- Selectable input and output codes
  - ◊ BiØ-L/M/S, NRZ-L/M/S, and RNRZ
- 250 bit nominal acquisition

- Loop bandwidth from 0.7% to 6%
- Programmable features
  - ◊ Nominal bit rate
  - ◊ Tracking limit
  - ◊ Data detector type
  - ◊ Input code and polarity
  - ◊ Output code and polarity
- Added feature: Bit error rate estimation
  - ◊ Based on frame sync errors
  - ◊ Contains minor frame synchronizer
  - ◊ Counts frame sync patterns and errors
  - ◊ Presents counts and the derived BER

OVERVIEW

This Model IOCBS4 provides a flexible, cost effective means of reconstructing a clock from data-only signal lines and recovering the data. It can handle signal corruptions commonly found in cable runs and RF links such as noise, baseline shifts, and amplitude variations. Bit code conversion is provided at both the input and output interfaces. IRIG Randomizing and De-Randomizing is also included. For example, the output, when coded, can be used for tape recording or fiber optic link transmission.

Up to eight IOCBS1's can be housed in the Model 2873 chassis. Optionally, by installing standard AL2073 interfacer modules, a wide variety of output signal formats may be produced.

Incorporating both Integrate & Dump (I&D) and Filter & Sample (F&S) type data detectors provides the optimum detection type for wideband or pre-modulation filtered data types.

APPLICATION NOTES

Long coax runs will typically degrade signals producing effects such as edge rounding, attenuation, ground loop baseline offset, baseline variations, and coupled noise. Common scenarios that cause these issues to occur can be found in building to building runs (hundreds of feet of coax), umbilical cables, patch panels, and matrix switches.

Fiber optic runs can produce similar symptoms that coax runs produce with additional problems such as AC coupling induced baseline offsets & variations, interfering signals, system noise, and multi-path amplitude variations.

The IOCBS4 will recover the clock and restore the data to RS-422 levels. Example signals are shown below.
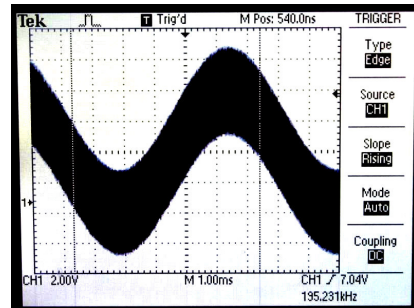
This 1 Mbps NRZ signal has been rounded and noise has been picked up
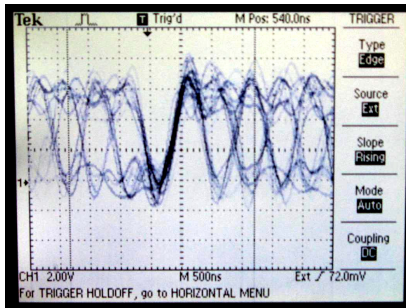
This 165 Kbps signal is subjected to amplitude modulation
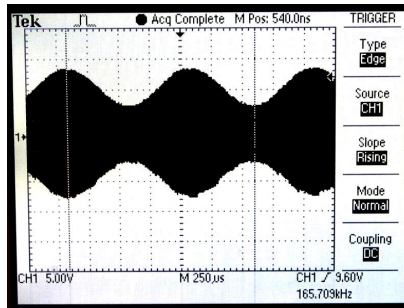
This 500 Kbps signal has a 150 Hz baseline variation of over 100%

SPECIFICATIONS

GENERAL

- Single slot module (3" x 6" x 0.9")
- Up to 8 modules can be housed in AL2873 chassis
- Option for use in AL2073S and AL2073 chassis' using rotary switch capability. Contact factory for details.

INPUT

- Data only / BNC connector
- Amplitude: 0.5Vp-p to 10Vp-p combined signal, baseline, shift/variation, and noise
- Baseline shift: Up to +/-10V baseline offset
- Baseline variation: Up to the signal amplitude (p-p) with a frequency up to 0.1% of the bit rate
- Amplitude variation: Up to the signal amplitude
- Termination: 51Ω, 75Ω, and 1KΩ jumper selectable
- Rate: 1Kbps to 10 Mbps NRZ codes / 1Kbps to 5 Mbps BiØ codes
- Codes: NRZ-L/M/S, BiØ-L/M/S, RNRZ-15

OUTPUT

- RS-422 Data and 0° Clock / Triax connectors
- 51Ω / 75Ω driver
- 2.0 V minimum differential output; 50Ω load
- 2.5 V nominal common output voltage
- Codes: NRZ-L/M/S, BiØ-L/M/S, RNRZ-15

DATA RECOVERY

- Data detector: Integrate/Dump & Filter/Sample provided
- Performance: Within 1 db of theoretical at rates to 10 Mbps. Within 1.5 db of theoretical at rates above 10 Mbps.
- Signal/Noise Range: Operates to Eb/No of less than 1 db

CLOCK RECOVERY

- Tracking: 6.2%, 3.1%, 1.6%, 0.7%
- Capture: = Tracking range
- Retention: Retains synchronization in input signals with transition gaps up to 100 bits occurring once every 500 bit times

FILTER

- Narrow - 0.7 times bit rate used with pre-mod filtered data
- Wide - 1.4 times bit rate used when no pre-mod filter was used
- Amplitude: 0.5Vp-p to 10Vp-p combined signal, baseline, shift/variation, and noise
- Baseline shift: Up to +/-10V baseline offset
- Baseline variation: Up to the signal amplitude (p-p) with a frequency up to 0.1% of the bit rate
- Amplitude variation: Up to the signal amplitude
- Termination: 51Ω, 75Ω, and 1KΩ jumper selectable
- Rate: 1Kbps to 20 Mbps NRZ codes / 1Kbps to 10 Mbps BiØ codes
- Codes: NRZ-L/M/S, BiØ-L/M/S, RNRZ-15

ENVIRONMENTAL

- Operating temperature: -20° to 65° C
- Relative humidity: 15% to 95%; non-condensing
- Altitude: Sea level to 10,000 feet

POWER

- +5V input / 5.5 watts

MEAN TIME BETWEEN FAILURES

- ~ 100,000 hours