

Key Features

- Reed-Solomon error correction encoder.
- Variable data rates up to 40 Mbps output.
- Compatible with Intelsat(IESS-308) and DVB (ETS 300 421) standards and other commonly used (N,K,t) RS configurations.
- Supports multiple codeword lengths N and correction powers t.
- Single 5V supply
- Connectorized 3"x 3" module for ease of prototyping. Standard 40 pin 2mm dual row connectors (left, right, bottom)
- Interfaces with 5V and 3.3V logic.

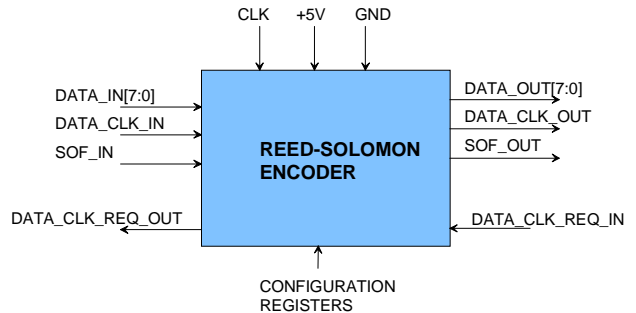
For the latest data sheet, please refer to the **ComBlock** web site: www.comblock.com/download/com1006.pdf. These specifications are subject to change without notice.

For an up-to-date list of **ComBlock** modules, please refer to www.comblock.com/product_list.htm.



Electrical Interface

Encoder Inputs / Outputs



Input Module Interface	Definition
DATA_IN[7:0]	Input data. Select 1-bit serial or 8-bit parallel format. In serial mode, data bit is on DATA_IN(0).
DATA_CLK_IN	Input byte clock. One CLK-wide pulse. Read input data at rising edge of CLK when DATA_CLK_IN = '1'
SOF_IN	Input Start of RS frame. One CLK-wide pulse, aligned with DATA_CLK_IN. Marks the first byte in the input RS frame.
DATA_CLK_REQ_OUT	Output pulse requesting an input data sample from the module upstream. One CLK-wide pulse.
Output Module Interface	Definition
DATA_OUT[7:0]	Output data. Select 1-bit serial or 8-bit parallel format
DATA_CLK_OUT	Output byte clock. One CLK-wide pulse. Read output data at rising edge of CLK when DATA_CLK_OUT = '1'
SOF_OUT	Output start of RS frame. One CLK-wide pulse, aligned with DATA_CLK_OUT. Marks the first byte in the output RS frame.
DATA_CLK_REQ_IN	One CLK wide input pulse indicating that the module

	downstream is requesting another data sample.
Serial Monitoring & Control	DB9 connector. 115 Kbaud/s. 8-bit, no parity, one stop bit. No flow control.
Power Interface	4.75 – 5.25VDC. Terminal block. Power consumption is approximately proportional to the CLK frequency. The maximum power consumption at 40 MHz is 300mA.

Configuration (via Serial Link / LAN)

Complete assemblies can be monitored and controlled centrally over a single serial or LAN connection.

The module configuration parameters are stored in non-volatile memory. The installation default values are highlighted in bold. All control registers are read/write.

Parameters	Configuration
RS Code	0000 = Intelsat (225, 205, 10) 0001 = Intelsat (219, 201, 9) 0010 = Intelsat (194, 178, 8) 0011 = Intelsat (208, 192, 8) 0100 = Intelsat (126, 112, 7) 1000 = DVB (204, 188, 8) 1100 = code (80, 56, 12) 1101 = code (255, 233, 11) 1110 = code (66, 52, 7) Default value 1101 . REG0 bit 3-0
Internal / External clock selection	0 = internal clock 1 = external clock Default value 0 . REG1 bit 0
Input serial / parallel	00 = 1 bit serial 01 = 8-bit parallel Default value 00 . REG1 bit 2-1
Output serial / parallel	00 = 1 bit serial 01 = 8-bit parallel Default value 00 . REG1 bit 4-3
Tx unique word	0 = off 1 = on Default value 1 . REG1 bit 5
Internal pattern generation (test mode)	When set, the baseband input is disabled and a periodic pattern is internally generated at the encoder input. The pattern consists of an 8-bit counter, MSB transmitted first. The test

	pattern bit rate is automatically set by the external sink module (typically a modulator) as part of the flow control mechanism. 0 = off 1 = on Default value 0 . REG1 bit 6
--	---

Monitoring (via Serial Link / LAN)

Monitoring registers are read-only.

Parameters	Monitoring
Version	Returns '1006x' when prompted for version number.

Default configuration at manufacturing:

REG0 = 0x0D

REG1 = 0x20

Reed-Solomon Codes

Intelsat IESS-308

Field Generator Polynomial:

$$p(x) = x^8 + x^7 + x^2 + x + 1. \text{ in GF}(8).$$

Code Generator Polynomial:

$$g(x) = (x + \alpha^{120}). (x + \alpha^{121}). (x + \alpha^{122}). \dots (x + \alpha^{119+2t}).$$

where α is a root of $p(x)$, and t is the maximum number of correctable errors in a block.

$$\alpha = 02_{\text{HEX}}.$$

User selectable codeword length N and correction power t :

$$(N, K, t) = (225, 205, 10).$$

$$(N, K, t) = (219, 201, 9).$$

$$(N, K, t) = (194, 178, 8).$$

$$(N, K, t) = (208, 192, 8).$$

$$(N, K, t) = (126, 112, 7).$$

DVB ETS 300 421

Field Generator Polynomial:

$$p(x) = x^8 + x^4 + x^3 + x^2 + 1. \text{ in GF}(8).$$

Code Generator Polynomial:

$$g(x) = (x + \alpha^0). (x + \alpha^1). (x + \alpha^2). \dots (x + \alpha^{15}).$$

where $\alpha = 02_{\text{HEX}}$.

Codeword length N and correction power t :

$$(N, K, t) = (204, 188, 8).$$

Other Common RS Codes

Field Generator Polynomial:

$$p(x) = x^8 + x^4 + x^3 + x^2 + 1. \text{ in GF}(8).$$

Code Generator Polynomial:

$$g(x) = (x + \alpha^0) \cdot (x + \alpha^1) \cdot (x + \alpha^2) \dots (x + \alpha^{2t-1}).$$

where $\alpha = 02_{\text{HEX}}$.

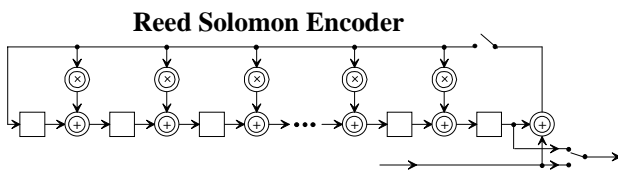
User selectable codeword length N and correction power t:

$$(N, K, t) = (80, 56, 12)$$

$$(N, K, t) = (255, 233, 11)$$

$$(N, K, t) = (66, 52, 7)$$

Encoder Block Diagram



Unique Word

A unique word is used for synchronizing the received data stream with the periodic code blocks.

The unique word is 32-bit long:

01011010 00001111 10111110 01100110 (binary)

0x 5A 0F BE 66 (hex)

The most significant bit (left-most) is transmitted first.

In order to limit the bandwidth expansion to less than 5%, the unique word transmission frequency depends on the code block size:

Code block size (after RS encoding)	UW transmission rate
≥ 1024 bits	Once every block
≥ 512 bits and < 1024 bits	Once every two blocks

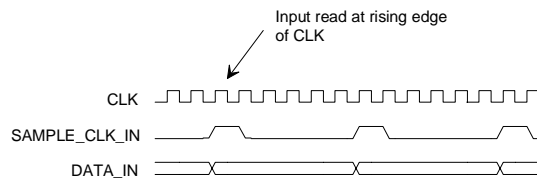
The unique word is not error corrected.

The unique word transmission can be disabled by software command.

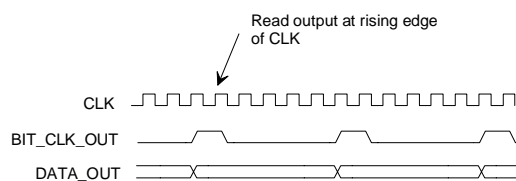
Timing

The I/O signals are synchronous with the rising edge of the reference clock CLK (i.e. all signals transitions always occur after the rising edge of the reference clock CLK). The maximum CLK frequency is 40 MHz.

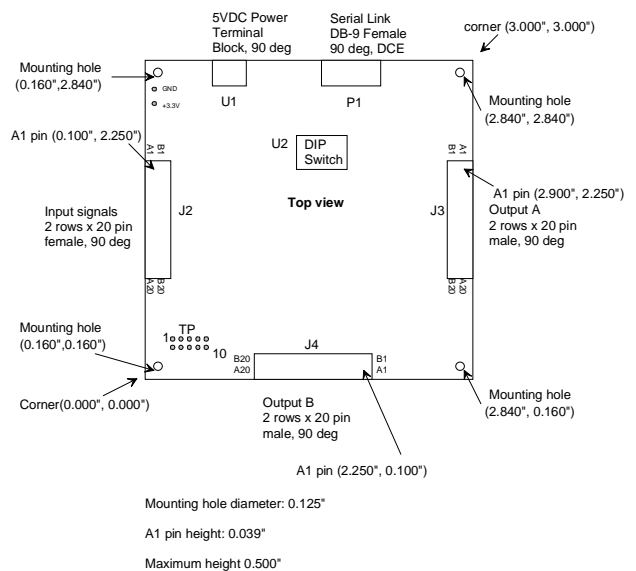
Input



Output



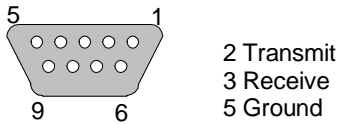
Mechanical Interface



Pinout

Serial Link P1

The DB-9 connector is wired as data circuit terminating equipment (DCE). Connection to a PC is over a straight-through cable. No null modem or gender changer is required.



DB-9 Female

The demodulator is designed for direct connection with the following modules:

COM-1010 Convolutional Encoder

ComBlock Ordering Information

COM-1006 REED-SOLOMON ENCODER

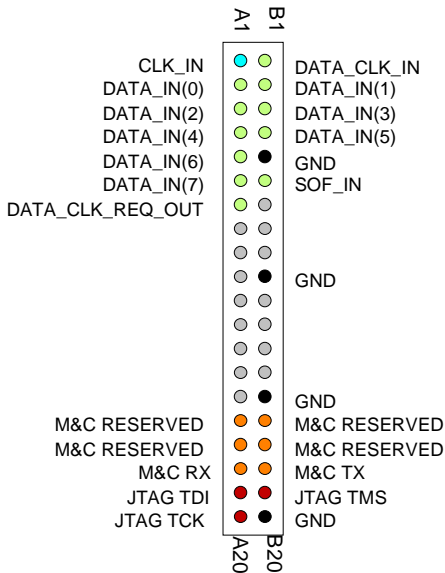
MSS • 18221 Flower Hill Way #A •
Gaithersburg, Maryland 20879 • U.S.A.

Telephone: (240) 631-1111 x19

Facsimile: (240) 631-1676

E-mail: sales@mobile-sat.com

Input Connector J2



Output Connectors J3, J4

