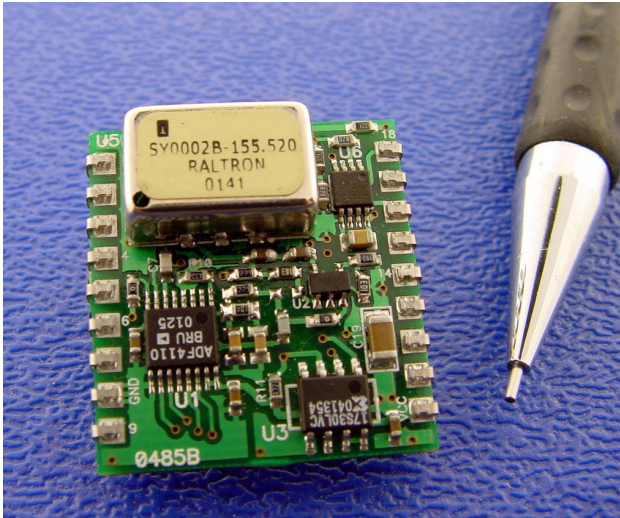


**SY02-HLPL****PRELIMINARY SPECIFICATION**

Date: July 1, 2002

**• INTRODUCTION**

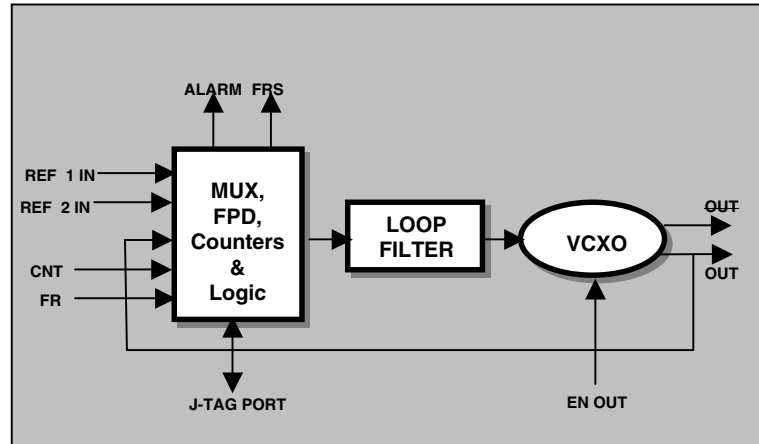
The SY02-HLPL is a dual input reference hitless switching device with high frequency crystal-based PLL synchronizer designed as a subsystem module. Mainly used at high speed Line Interface Cards in telecommunication products mainly related to STN-n or OC-n. The SY02-HLPL is a synchronization solution for timing and jitter topics specified within ITU-T Recommendations G.813, ETSI -ETS 300 462-4, and Bellcore GR-1244-CORE.

**• FEATURES**

- Low jitter output from intrinsically low jitter VCXO or VCXO;
- Two input references from **8KHz to 77.76MHz** (See page 3 for options)
- One high frequency LVPECL output with enable/disable function up to **800MHz** (pre-select frequency value – See page 3 for options)
- Alarms and status;
- Provides free running clock output;
- Provides a manual input frequency selection
- The unit changes timing modes in response to external events;
- J-TAG service port for re-programming and servicing;
- 3.3V DC power supply
- Small dimensions: 0.96" x 1.050"

**• APPLICATIONS**

- ATM
- SDH
- PDH
- SONET
- Other telecommunication equipment.



### DESCRIPTION

The SY02-HLPL synchronization module is a high frequency PLL that performs hitless switching plus additional features necessary for timing at high-speed Line Interface Cards. The functional block diagram is shown in the figure above. The SY02-HLPL receives two reference signals, from 8KHz to 77.76MHz (See page 3 for available options) and using PLL synthesizer generates a high frequency signal necessary for transceivers or framers. The PLL that is complemented by high-speed logic that provide processing, switching between the timing modes, alarm and status messages and etc. A high quality VCXO provides very low jitter at the output.

The SY02-HLPL incorporates a High Frequency Phase Lock Loop has been designed to generate high frequency (up to 800MHz) output from a low jitter VCXO (Crystal Based Oscillator) or VCSO (SAW based oscillators). The output can be disabled externally by setting OUTEN pin high. The module supports a MANUAL operating mode where unit will switch according to a control pin CNT. During an event where the external reference signal disappears, the user instruct a reference change into the module through the control pin. The ALARM output signals monitor the status of the phase loop LOL (Loss of Lock) and LOR (Loss of Reference). If the reference REF IN is absent, the SY02-HLPL will automatically switch to free run mode and FRS output will indicate it. The SY02-HLPL is provided in an SMD package dimensions are 0.96x1.050 inch and power supply is 3.3V.

#### - OUTPUT PROGRAMMING

OUTEN	FR	OUTPUT
0	0	Locked to Reference
1	X	Output Disabled
0	1	Free-Run

#### - ALARM STATES

LOL	LOR	ALARM
0	0	No alarm
1	0	1
0	1	1

#### - Input Reference Selection

CNT	Input Reference Selection
0	Ext Ref 1
1	Ext Ref 2

• **PIN DESCRIPTION**

	Name	Description	Signal Technology	VL			VH/ DC Voltage		
				Min	Typ	Max	Min	Typ	Max
1	ENABLE	Output Enable -> the input pin to enable the output, active low	DC	0	0.25 (0.15)	0.5 (0.3)	4.5 (2.97)	5.0 (3.3)	5.25 (3.465)
2	TCK	J-TAG port for factory usage – TCK	----	----	----	----	----	----	----
3	TDO	J-TAG port for factory usage – TDO	----	----	----	----	----	----	----
4	REFA IN	Reference A Input -> Reference A input signal	HCMOS (3.3 Tolerable)	0	----	0.5 (0.3)	4.5 (2.97)	----	----
5	SEL	Select Input Reference -> input to select A (SEL=0) or B (SEL=1)	DC	0	0.25 (0.15)	0.5 (0.3)	4.5 (2.97)	5.0 (3.3)	5.25 (3.465)
6	RESET	Reset input -> Reset active high In normal operation must be Grounded	DC	0	0.25 (0.15)	0.5 (0.3)	4.5 (2.97)	5.0 (3.3)	5.25 (3.465)
7	REFB IN	Reference B Input -> Reference B input signal	HCMOS (3.3 Tolerable)	0	----	0.5 (0.3)	4.5 (2.97)	----	----
8	GND	Ground	----	----	----	----	----	----	----
9	FRS	Free-Run Status -> Output indicates that the module is in free run, active high	DC	0	0.25 (0.15)	0.5 (0.3)	4.5 (2.97)	5.0 (3.3)	5.25 (3.465)
10	Vcc	Positive supply voltage	DC – 5V (3.3V)				4.5 (2.97)	5.0 (3.3)	5.25 (3.465)
11	NC	Not Connected	----	----	----	----	----	----	----
12	ALARM	Alarm out -> Alarm output indicates loss of reference or loss of lock – High when the unit is Unlocked	DC	0	0.25 (0.15)	0.5 (0.3)	4.5 (2.97)	5.0 (3.3)	5.25 (3.465)
13	FR	Free-Run -> Control input to select free run of the module, active high	DC	0	0.25 (0.15)	0.5 (0.3)	4.5 (2.97)	5.0 (3.3)	5.25 (3.465)
14	TDI	J-TAG port for factory usage – TDI	----	----	----	----	----	----	----
15	TMS	J-TAG port for factory usage – TMS	----	----	----	----	----	----	----
16	OUT	Oscillator Output -> Output of the module	LV/PECL	Vcc-1.680	Vcc-1.620	Vcc-1.560	Vcc-1.085	Vcc-1.025	Vcc-0.885
17	GND	Ground	----	----	----	----	----	----	----
18	OUT	Complimentary Output	LV/PECL	Vcc-1.680	Vcc-1.620	Vcc-1.560	Vcc-1.085	Vcc-1.025	Vcc-0.885

• **ORDERING INFORMATION**

- Input Frequencies available;

Frequency	Suffix	Frequency	Suffix	Frequency	Suffix
8KHz	F8	19.44MHz	O1	77.76MHz	O3
1.544MHz	T1	24.704MHz	T3		
2.048MHz	E1	32.768MHz	E4		
8.192MHz	E2	38.88MHz	O2		
12.352MHz	T2	51.84MHz	D1		
16.384MHz	E3	62.50MHz	G1		

- Output Frequencies available (in MHz);

Frequency	Suffix	Frequency	Suffix
51.84	D1	156.25	G4
62.50	G1	166.328	C1
77.76	O3	622.08	O5
125	G2	666.513	C2
133	G3		
155.52	O4		

➤ **P/N System**

**SY02-FEC – IP < Input Frequency> - OU<Output Frequency>-S-T<Temp. Range>-C <Cover Option>**

➤ See above Chart  
If not listed Place **NL** and state the Freq.)

➤ See above Chart  
(If Output Freq. Not applied place **NA** and state the Freq.)

➤ Supply Voltage;  
**2** - 5V  
**4** - 3.3V

➤ Operating Temperature Range;  
**C** - 0°C to 70°C  
**I** -40°C to +85°C

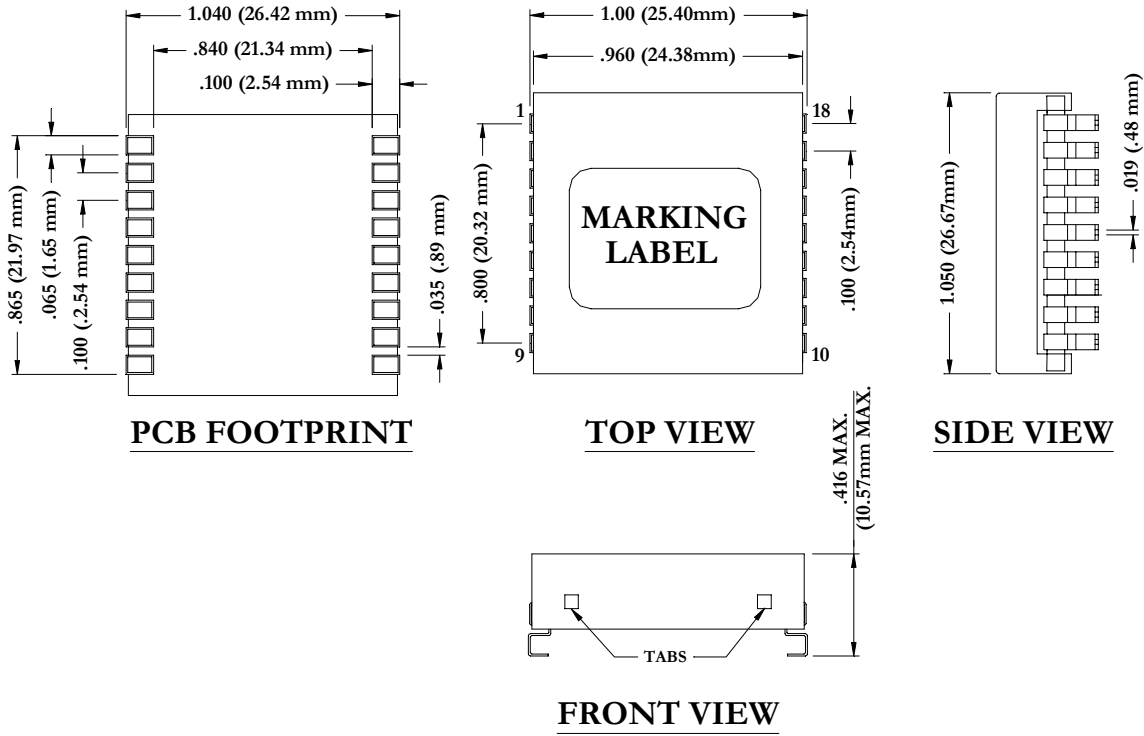
➤ Cover Option;  
**M** – Metal Cover  
**N** - Non Covered unit

➤ For other Options please contact the factory

● **SPECIFICATION**

General Specifications	Mechanical	0.96" x 1.050"	SMT Module FR4 18 pins dual-in-line
	Power Environment	3.3VDC, <200mA Operating Temperature Humidity	Regulated 0°C to 70°C 5% to 95% non-condensing Depend of the frequency
	Internal Oscillators	VCXO or VCXO	
Input Signals	Number of Reference Inputs	2	See page 3 for input frequencies
	Input reference frequency	User select	See page 3 for input frequencies
	Signal Level	LVCMOS	Voh; 2.97V min ; Vol; 0.33Vmax
Output Signals	Number of Outputs	1	
	Output 1	User select	See page 3 for output frequencies
	Output 1 Signal Level	LVPECL (W/ Complimentary option)	Voh; 2.272V min ; Vol; 1.68Vmax
	Duty Cycle	50+/-10%	50%+/-5% available upon request
	Tracking/Capture Range	±50ppm APR min	
	Free Run stability	±30ppm (VCXO) ±150PPM(VCXO)	T=+25C; Vcc/load=nominal
Signal Quality Performance	Jitter generation	<0.001UI RMS <0.001UI RMS <0.0001 UI RMS <0.0001 UI RMS	HPF 30Hz HPF 500Hz HPF 12KHz HPF 100KHz
	Jitter attenuation	-40dB -10dB	Fj=10Hz~1KHz Fj=1KHz~10MHz
	Jitter tolerance	2 μs, 10 Hz (0.05 UI @ 8KHz)	

• **OUTLINE DRAWING**



• **REFLOW PROFILE**

