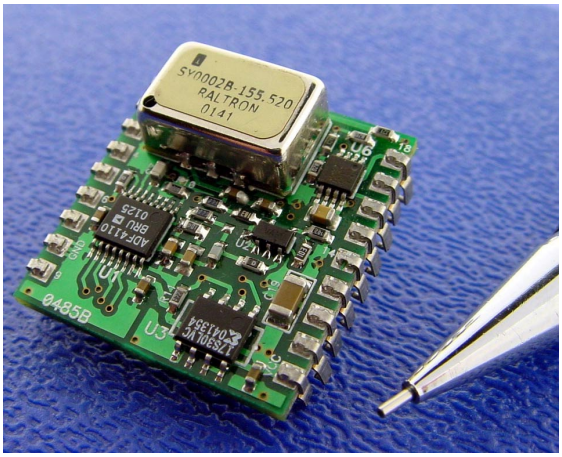
# SY02-HIPL

Date: January 6, 2004




## • INTRODUCTION

The SY02-HIPL is a high frequency crystal-based PLL synchronizer designed as a module level subsystem for easy incorporation into telecommunication equipment.

## • FEATURES

- Low jitter output from intrinsically low jitter VCXO or VCSO;
- One references LVEPECL input **up to 800MHz** (pre-select frequency value –upon order)
- One high frequency LVPECL output **up to 800MHz** with E/D function (pre-select frequency value –upon order)
- Alarms and status;
- Provides free running clock output;
- 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.

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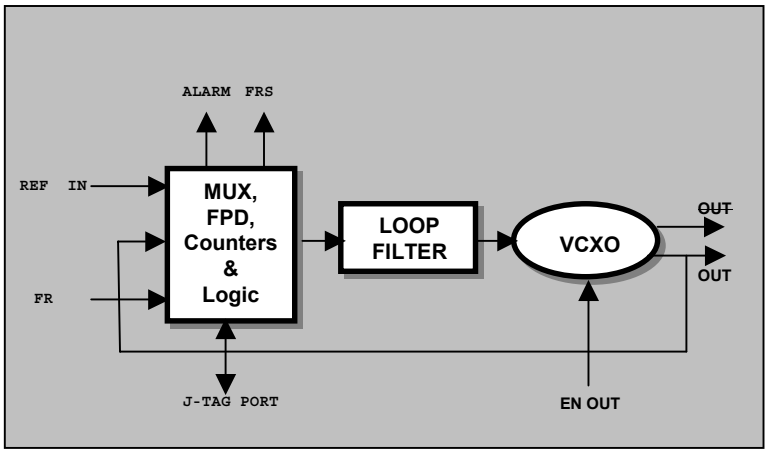



- **DESCRIPTION**

The SY02-HIPL is a High Frequency Phase Lock Loop has been designed as a module level subsystem for easy incorporation into telecommunication equipment. The module generates the high frequency (up to 622.08MHz) 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 SY02-HIPL can be locked to one reference input frequency of 155.52MHz. The module has fast locking time and tolerates reference inputs with different duty cycles. The loop bandwidth is optimized according to used VCXO and wanted output performance. 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-HIPL will automatically switch to free run mode and FRS output will indicate it. The 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 |

## • 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 | 0.15 | 0.3 | 2.97 | 3.3 | 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 | LV/PECL | Vcc-1.680 | Vcc-1.620 | Vcc-1.560 | Vcc-1.085 | Vcc-1.025 | Vcc-0.885 |
| 5 | SEL | Select Input Reference -> input to select A (SEL=0) or B (SEL=1) | DC | 0 | 0.15 | 0.3 | 2.97 | 3.3 | 3.465 |
| 6 | RESET | Reset input -> Reset active high<br>In normal operation must be Grounded | DC | 0 | 0.15 | 0.3 | 2.97 | 3.3 | 3.465 |
| 7 | REFB IN | Reference B Input -> Reference B input signal | LV/PECL | Vcc-1.680 | Vcc-1.620 | Vcc-1.560 | Vcc-1.085 | Vcc-1.025 | Vcc-0.885 |
| 8 | GND | Ground | ----- | ----- | ----- | ---- | ------ | ------ | ------ |
| 9 | FRS | Free-Run Status -> Output indicates that the module is in free run, active high | DC | 0 | 0.15 | 0.3 | 2.97 | 3.3 | 3.465 |
| 10 | Vcc | Positive supply voltage | DC | ----- | ----- | ----- | 3.135 | 3.3 | 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 | 0.15 | 0.3 | 2.97 | 3.3 | 3.465 |
| 13 | FR | Free-Run -> Control input to select free run of the module, active high | DC | 0 | 0.15 | 0.3 | 2.97 | 3.3 | 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/Output Frequencies available;

| Frequency | Suffix | Frequency | Suffix | Frequency | Suffix |
|---|---|---|---|---|---|
| 19.440MHz | O1** | 112.000MHz | B7 | 777.6000MHz | F6 |
| 20.000MHz | M1** | 114.000MHz | B8 | | |
| 20.1416MHz | A3** | 125.000MHz | G2 | | |
| 20.4800MHz | A4** | 133.000MHz | G4 | | |
| 22.2171MHz | A5** | 139.264MHz | E6 | | |
| 26.0000MHz | G3** | 155.520MHz | O4 | | |
| 27.0000MHz | A6** | 156.250MHz | G6 | | |
| 29.4912MHz | A7** | 161.1328MHz | B9 | | |
| 32.768MHz | E5** | 166.6286MHz | B10 | | |
| 34.560MHz | A8** | 167.3316MHz | C1 | | |
| 37.0560MHz | A9** | 168.0407MHz | C2 | | |
| 38.880MHz | O2** | 175.0000MHz | C3 | | |
| 44.4343MHz | B1** | 178.9440MHz | C4 | | |
| 44.7360MHz | T3** | 184.3200MHz | C5 | | |
| 51.8400MHz | D2** | 311.0400MHz | O6 | | |
| 61.4400MHz | U1** | 622.0800MHz | O7 | | |
| 62.5000MHz | G5** | 625.000MHz | C8 | | |
| 65.5360MHz | B2** | 644.5312MHz | C9 | | |
| 77.7600MHz | O3 | 666.5143MHz | C10 | | |
| 78.125MHz | B3 | 669.1281MHz | F1 | | |
| 78.6432MHz | B4 | 669.3266MHz | F2 | | |
| 82.9440MHz | B5 | 690.5692MHz | F3 | | |
| 92.6000MHz | U3 | 710.9486MHz | F4 | | |
| 100.000MHz | B6 | 719.7344MHz | F5 | | |

** Signifies an Input Frequency Only

## ➢ P/N System

**SY02-HIPL – < Input Frequency> - <Output Frequency>-S- <Temp. Range>- <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;
**4** – 3.3V

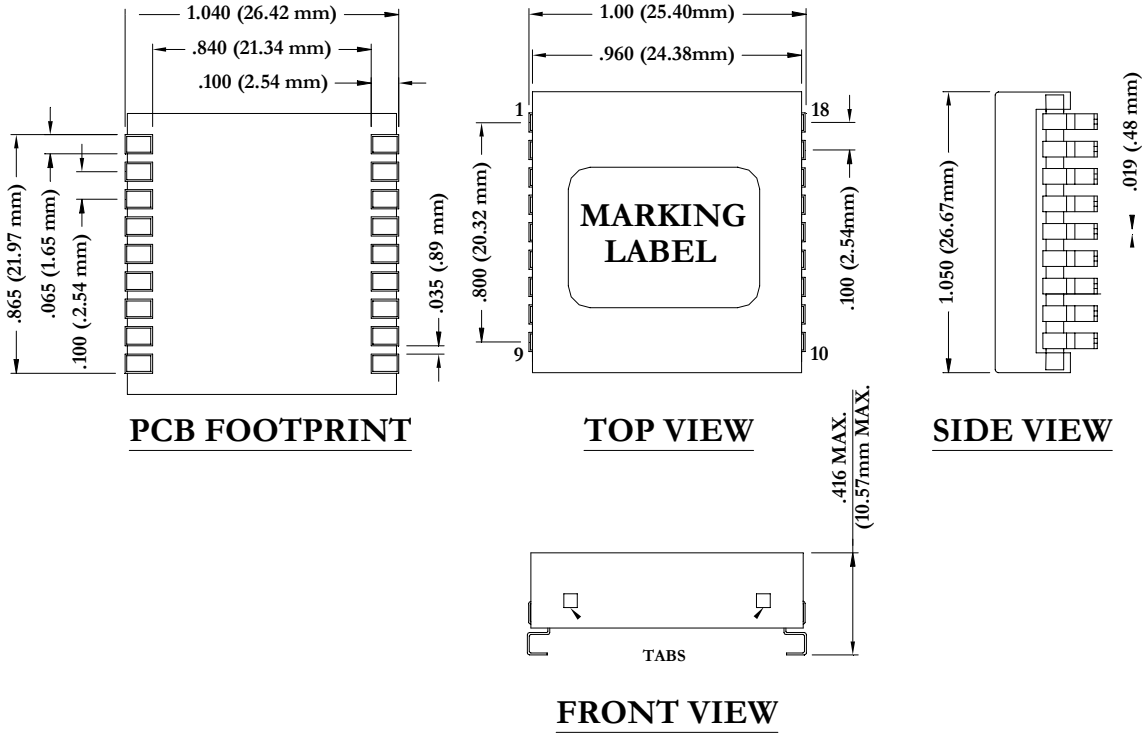
➢ Operating Temperature Range;
**C** - 0°C to 70°C
**I** -40°C to +85°C

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

## • SPECIFICATION

| | | | |
|---|---|---|---|
| General Specifications | Mechanical | 0.96" x 1.050" | SMT Module FR4 18 pins dual-in-line |
| | Power<br>Environment<br><br>Internal Oscillators | 3.3VDC, <200mA<br>Operating Temperature<br>Humidity<br>VCXO or VCSO | Regulated<br>0°C to 70°C<br>5% to 95% non-condensing<br>Depend of the frequency |
| Input Signals | Number of Reference Inputs | 1 | |
| | Input reference frequency<br>Signal Level | See above table<br>LVPECL | <br>Voh; 2.272V min ; Vol; 1.68Vmax |
| Output Signals | Number of Outputs | 1 | |
| | Output 1 | See above table | other frequency contact Raltron |
| | 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)<br>±150PPM(VCSO) | T=+25C; Vcc/load-=nominal |
| Signal Quality Performance | Jitter generation | <0.001UI RMS<br><0.001UI RMS<br><0.0001 UI RMS<br><0.0001 UI RMS | HPF 30Hz<br>HPF 500Hz<br>HPF 12KHz<br>HPF 100KHz |
| | Jitter attenuation | -40dB<br>-10dB | Fj=10Hz~1KHz<br>Fj=1KHz~10MHz |
| | Jitter tolerance | 2 µs, 10 Hz (0.05 UI @ 8KHz) | |

- **OUTLINE DRAWING**




- **REFLOW PROFILE**