# FS6322-02

## Three-PLL Clock Generator IC

## 1.0 Features

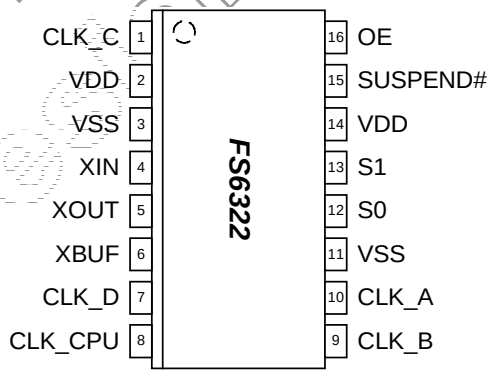
- Three PLLs with deep reference, feedback, and post dividers to provide precision clock frequencies
- Multiple outputs provide several clocking options
- Suspend feature shuts down a selection of PLLs and outputs for power conservation
- Outputs may be tristated for board testing
- S0 and S1 frequency select inputs modify output frequencies for design flexibility
- Glitch-free slewing of CLK_CPU output enables downstream PLLs to remain locked
- 5V to 3.3V operation
- Accepts 5 to 30MHz crystals
- Custom frequency patterns, pinouts, and packages are available. Contact your local AMI Sales Representative for more information.

## 2.0 Description

The FS6322 is a ROM-based CMOS clock generator IC designed to minimize cost and component count in a variety of electronic systems.

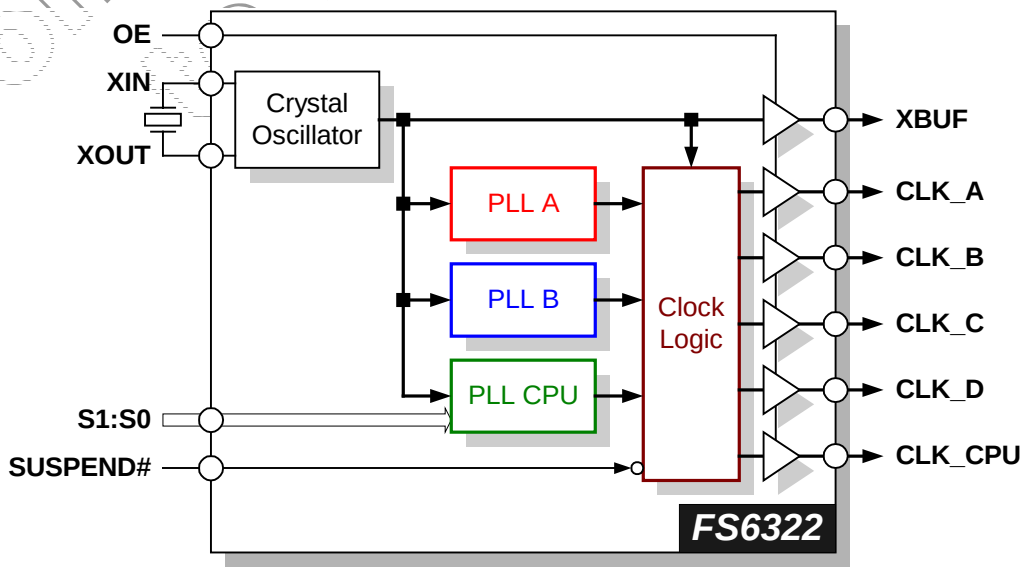
Three low-jitter phase-locked loops (PLLs) drive up to five low-skew clock outputs to provide a high degree of flexibility. A buffered copy of the reference clock is also available. The device is packaged in a 16-pin SOIC to minimize board space.

### Figure 1: Pin Configuration




16-pin (0.150") SOIC

### Figure 2: Block Diagram



## Table 1: Pin Descriptions

Key: AI = Analog Input; AO = Analog Output; DI = Digital Input; $DI^U$ = Input with Internal Pull-Up; $DI_D$ = Input with Internal Pull-Down; DIO = Digital Input/Output; DI-3 = Three-Level Digital Input, DO = Digital Output; P = Power/Ground; # = Active Low pin

| PIN | TYPE | NAME | DESCRIPTION |
|---|---|---|---|
| 1 | DO | CLK_C | C clock output |
| 2 | P | VDD | Power supply (5V to 3.3V) |
| 3 | P | VSS | Ground |
| 4 | AI | XIN | Crystal oscillator feedback |
| 5 | AO | XOUT | Crystal oscillator drive |
| 6 | DO | XBUF | Buffered crystal oscillator frequency output |
| 7 | DO | CLK_D | D clock output |
| 8 | DO | CLK_CPU | CPU PLL output with controlled frequency slew rate |
| 9 | DO | CLK_A | A clock output |
| 10 | DO | CLK_B | B clock output |
| 11 | P | VSS | Ground |
| 12 | DI | S0 | Frequency select control input for the CLK_CPU output |
| 13 | DI | S1 | Frequency select control input for the CLK_CPU output |
| 14 | P | VDD | Power supply (5V to 3.3V) |
| 15 | DI | SUSPEND# | Active-low control input powers-down selected PLLs and outputs |
| 16 | DI | OE | Output enable input: logic-high enables outputs; logic-low tristates outputs (high impedance) |

## Table 2: Frequency Table
## FS6322-02: 3.3 volt device
### (all frequencies in MHz)

| SUSPEND# | S1 | S0 | FREF | CLK_A (pin 10) | CLK_B (pin 9) | CLK_C (pin 1) | CLK_D (pin 7) | XBUF (pin 6) | CLK_CPU (pin 8) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 14.31818 | 25.00000 | OFF | OFF | OFF | OFF | OFF |
| 0 | 0 | 1 | 14.31818 | 20.00000 | 48.00000 | 66.00000 | 24.57598 | 14.31818 | 14.31818 |
| 0 | 1 | 0 | DO NOT USE | | | | | | |
| 0 | 1 | 1 | DO NOT USE | | | | | | |
| 1 | 0 | 0 | 14.31818 | 25.00000 | 40.00000 | 40.00000 | 40.00000 | 14.31818 | 24.57598 |
| 1 | 0 | 1 | 14.31818 | 20.00000 | 48.00000 | 83.00071 | 24.57598 | 14.31818 | 14.31818 |
| 1 | 1 | 0 | DO NOT USE | | | | | | |
| 1 | 1 | 1 | DO NOT USE | | | | | | |

# 3.0 Electrical Specifications

## Table 3: Absolute Maximum Ratings

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. These conditions represent a stress rating only, and functional operation of the device at these or any other conditions above the operational limits noted in this specification is not implied. Exposure to maximum rating conditions for extended conditions may affect device performance, functionality, and reliability.

| PARAMETER | SYMBOL | MIN. | MAX. | UNITS |
|---|---|---|---|---|
| Supply Voltage, dc ($V_{SS}$ = ground) | $V_{DD}$ | $V_{SS}$-0.5 | 7 | V |
| Input Voltage, dc | $V_I$ | $V_{SS}$-0.5 | $V_{DD}$+0.5 | V |
| Output Voltage, dc | $V_O$ | $V_{SS}$-0.5 | $V_{DD}$+0.5 | V |
| Input Clamp Current, dc ($V_I$ < 0 or $V_I$ > $V_{DD}$) | $I_{IK}$ | -50 | 50 | mA |
| Output Clamp Current, dc ($V_I$ < 0 or $V_I$ > $V_{DD}$) | $I_{OK}$ | -50 | 50 | mA |
| Storage Temperature Range (non-condensing) | $T_S$ | -65 | 150 | °C |
| Ambient Temperature Range, Under Bias | $T_A$ | -55 | 125 | °C |
| Junction Temperature | $T_J$ | | 150 | °C |
| Lead Temperature (soldering, 10s) | | | 260 | °C |
| Input Static Discharge Voltage Protection (MIL-STD 883E, Method 3015.7) | | | 2 | kV |

**CAUTION: ELECTROSTATIC SENSITIVE DEVICE**

Permanent damage resulting in a loss of functionality or performance may occur if this device is subjected to a high-energy electrostatic discharge.

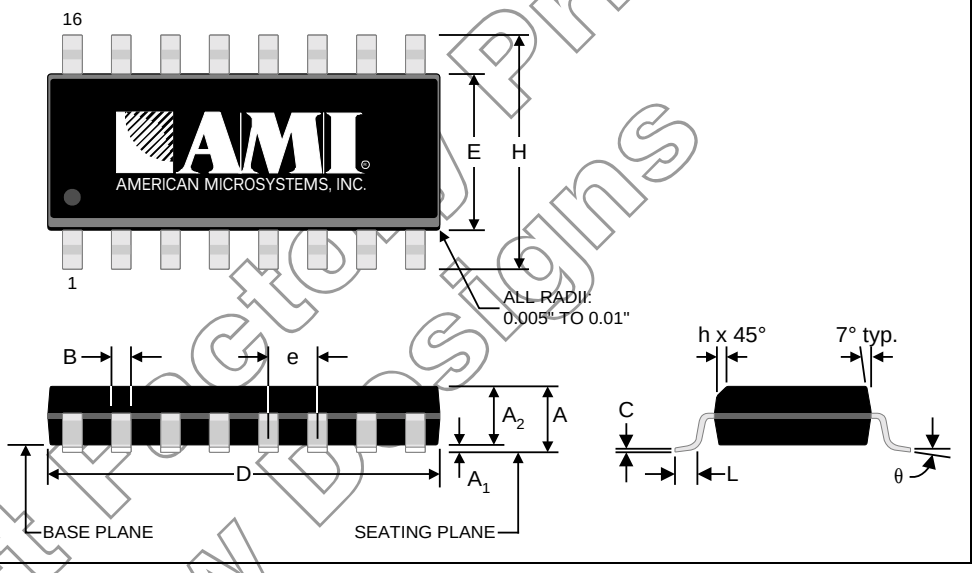
## Table 4: Operating Conditions

| PARAMETER | SYMBOL | CONDITIONS/DESCRIPTION | MIN. | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|---|
| Supply Voltage | $V_{DD}$ | 5V ± 10% | 4.5 | 5 | 5.5 | V |
| | | 3.3V ± 10% | 3 | 3.3 | 3.6 | |
| Ambient Operating Temperature Range | $T_A$ | | 0 | | 70 | °C |
| Crystal Resonator Frequency | $f_{XIN}$ | | 5 | | 30 | MHz |
| Output Load Capacitance | $C_L$ | | | | 15 | pF |

## 4.0 Package Information

### Table 5: 16-pin SOIC (0.150") Package Dimensions

| | DIMENSIONS | | | |
|---|---|---|---|---|
| | INCHES | | MILLIMETERS | |
| | MIN. | MAX. | MIN. | MAX. |
| A | 0.061 | 0.068 | 1.55 | 1.73 |
| A1 | 0.004 | 0.0098 | 0.102 | 0.249 |
| A2 | 0.055 | 0.061 | 1.40 | 1.55 |
| B | 0.013 | 0.019 | 0.33 | 0.49 |
| C | 0.0075 | 0.0098 | 0.191 | 0.249 |
| D | 0.386 | 0.393 | 9.80 | 9.98 |
| E | 0.150 | 0.157 | 3.81 | 3.99 |
| e | 0.050 BSC | | 1.27 BSC | |
| H | 0.230 | 0.244 | 5.84 | 6.20 |
| h | 0.010 | 0.016 | 0.25 | 0.41 |
| L | 0.016 | 0.035 | 0.41 | 0.89 |
| Θ | 0° | 8° | 0° | 8° |




### Table 6: 16-pin SOIC (0.150") Package Characteristics

| PARAMETER | SYMBOL | CONDITIONS/DESCRIPTION | TYP. | UNITS |
|---|---|---|---|---|
| Thermal Impedance, Junction to Free-Air 16-pin 0.150" SOIC | $\Theta_{JA}$ | Air flow = 0 m/s | 95 | °C/W |
| Lead Inductance, Self | $L_{11}$ | Corner lead | 4.0 | nH |
| | | Center lead | 3.0 | |
| Lead Inductance, Mutual | $L_{12}$ | Any lead to any adjacent lead | 0.4 | nH |
| Lead Capacitance, Bulk | $C_{11}$ | Any lead to $V_{SS}$ | 0.5 | pF |

## 5.0 Ordering Information

| ORDERING CODE | DEVICE NUMBER | PACKAGE TYPE | OPERATING TEMPERATURE RANGE | SHIPPING CONFIGURATION |
|---|---|---|---|---|
| 11825-101 | FS6322-02 | 16-pin (0.150") SOIC (Small Outline Package) | 0°C to 70°C (Commercial) | Tape and Reel |





**American Microsystems, Inc., 2300 Buckskin Rd., Pocatello, ID 83201, (208) 233-4690, FAX (208) 234-6796, WWW Address: http://www.amis.com E-mail: tgp@amis.com**