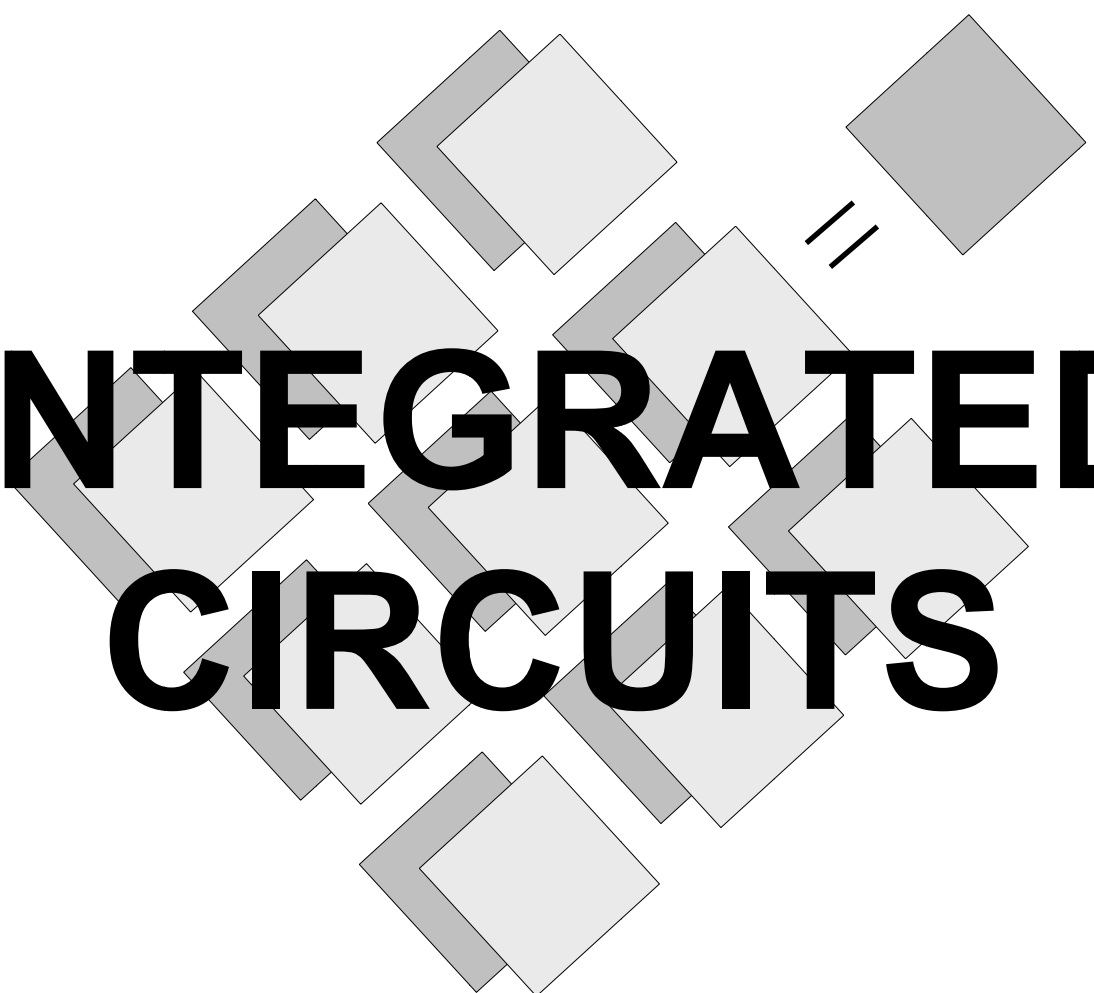




# *SHORT FORM CATALOG*

A background graphic consisting of several overlapping, semi-transparent squares of varying shades of gray, arranged in a diamond-like pattern. A resistor symbol (two parallel lines of unequal length) is positioned to the right of the central text.

# INTEGRATED CIRCUITS



**by LSI/CSI**

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## TIMERS

### Programmable Digital Delay Timer.... (14 Pins)

#### LS7210, LS7210-S

- Generates delays from milliseconds to “years”
- Delays programmed by 5 Binary Weighted inputs and time-base
- External clock or RC oscillator sources time-base
- **Four Operating Modes:**  
DUAL DELAY      DELAYED OPERATE  
ONE-SHOT        DELAYED RELEASE
- 4.75V to 15V operation

### Programmable Digital Delay Timer.... (18 Pins)

#### LS7211, LS7211-S; LS7212, LS7212-S

- Generates delays from 100ns to “days”
- **Time Base is External Clock or Oscillator:**  
RC (LS7211); Crystal (LS7212)
- 8 Binary-Weighted Delay Bits
- 3 Selectable Prescalers      • Four Operating Modes
- Reset for Delay Abort      • 4V to 18V Operation
- Programmable frequency division
- Real Time delays from  
50/60Hz (LS7211); Watch crystal (LS7212)

### Programmable Digital Delay Timer.... (14 Pins)

#### LS7213R, LS7213R-S

- Produces real-time delays from  
10kHz-1kHz time-base range
- **Eight time delay ranges:**  
**0.1 – 1:** Seconds; Minutes; Hours  
**1 - 10:** Seconds; Minutes; Hours  
**10 - 100:** Seconds; Minutes
- RC Oscillator generates time-base
- Four operating modes
- Reset for Delay Abort
- Complementary outputs
- Delay-in-Progress indicator output
- 3V to 5.5V Operation

### Light-Activated Programmable Timer... (8 Pins)

#### LS7217, LS7217-S **New!**

- Interfaces directly to photo-resistor
- **Programmable duration selection:**  
4 hours, 6 hours, 8 hours, dusk-to-dawn
- Shunt regulator
- 50Hz / 60Hz time base selection
- Relay driver output
- 6.5V +/- 0.75V operation
- Applications include lighting timer for  
low-voltage landscape lighting

## INCREMENTAL ENCODER INTERFACE

### Quadrature Clock Decoders.... (14 Pins; 8 Pins; 8 Pins)

#### LS7082N, LS7082N-S;

#### LS7083, LS7083-S; LS7084, LS7084-S;

#### LS7183, LS7183-S; LS7184, LS7184-S

- Interfaces Incremental Encoders to Up/Down Counters
- Interfaces Rotary Encoders to Digital Pots (LS7084, LS7184)
- Converts Quadrature Pulses to Up/Down Counter Controls
- x1, x4 Frequency Multiplication: LS7083, LS7084
- x1, x2, x4 Frequency Multiplication: LS7082N, LS7183, LS7184
- Index I/O (LS7082N)
- **Outputs by device type:**  
LS7082N - Up Clock, Down Clock, Direction Control  
LS7083, LS7183 - Up Clock and Down Clock  
LS7084, LS7184 - Clock and Direction Control
- 4.5V to 10V Operation: LS7082N, LS7083, LS7084
- 3V to 5.5V Operation: LS7183, LS7184

### 24-Bit Quadrature Pulse Counter.... (20 Pins; 24 Pins)

#### LS7166, LS7166-S; LS7166-TS24

- Interfaces Incremental Encoders to Microprocessor Bus
- 1.2MHz Quadrature Clock Frequency
- x1, x2, x4 Frequency Multiplication
- 8-Bit I/O Bus      • 24-Bit Comparator
- TTL and CMOS compatible      • 3V to 5.5V operation

### 24-Bit x 2 Axes Quadrature Pulse Counter.... (28 Pins)

#### LS7266R1, LS7266R1-S, LS7266R1-TS

Same features as LS7166 except as shown below:

- Dual architecture to support X and Y axes
- Digital filtering of Quadrature clocks
- Programmable 8-Bit filter clock prescalers
- Error flag for excessive noise indication
- Programmable Count Range Limits
- Programmable Index input
- Up to 4.3MHz Quadrature Clock Frequency

### 32-Bit Quadrature Counter with Serial Interface... (14 Pins)

#### LS7366R, LS7366R-S, LS7366R-TS

- Interfaces Incremental Encoders to Microprocessors  
via 4-wire SPI/Microwire bus
- Up to 9.6MHz Quadrature Clock Frequency  
with x1, x2 and x4 Frequency Multiplication
- Internal digital filtering of Quadrature clocks and Index
- Internal decoding of Quadrature clocks
- Index Driven Operations
- 8-Bit, 16-Bit, 24-Bit and 32-Bit Programmable Configuration
- 3V to 5.5V operation

### 24-Bit x 4-Axes Quadrature Clock Counter... (48 Pins)

#### LS7566R-TS

- Interfaces Incremental Encoders to a Microprocessor Bus
- Up to 9.6MHz Quadrature Clock Frequency
- Independent Programmability of each axis for multiple count  
and I/O modes with Independent Read/Write Control Registers
- x1, x2 and x4 Resolution Multiplication
- Maskable processor Interrupt Output
- 3-state Octal I/O Bus
- Digital Filtering of Quadrature Clock
- 3V to 5.5V Operation

### **32-Bit x 1-Axis Quadrature Counter..... (24 Pins; 38 Pins)**

**LS7766SO, LS7766SO-S, LS7766SO-TS; LS7766SH-TS** **New!**

### **32-Bit x 2-Axes Quadrature Counter..... (28 Pins; 48 Pins)**

**LS7766DO, LS7766DO-S, LS7766DO-TS; LS7766DH-TS** **New!**

- Direct Interface with Incremental Encoders
- 9.6MHz (5V), 4.5MHz (3.3V) Quadrature Clock Frequency
- Programmable I/Os for Index and Marker Flags
- Separate mode-control registers for each axis
- Sets of 32-bit counters, input registers, output registers, comparators and octal status registers for each axis
- Digital filtering of the input quadrature clocks
- Pin selectable 3-state Hex / Octal bus
- **SO / DO** = Single-axis / Dual-axes Octal I/O Bus
- **SH / DH** = Single-axis / Dual-axes with pin selectable Hex / Octal I/O Bus
- 3V to 5.5V Operating voltage range

## **LIGHTING CONTROLS**

### **Touch Control Light Dimmer .... (8 Pins)**

**LS7231, LS7231-S, LS7232, LS7232-S, LS7233, LS7233-S**

- Touch or pushbutton input control
- Controls resistive loads
- Momentary input activation causes ON/OFF switching
- Prolonged input activation causes variable dimming
- Brightness Memory and Dimming Direction Reverse features depending on Part Number
- DOZE input for external control of DIM-TO-OFF time
- SLAVE input for control by Remote Extension
- Ideal for wall-switch control of ceiling mounted lighting, foot-switch control of large floor lamps and hand-switch control of small table lamps.

### **Touch Control Light Dimmer .... (8 Pins)**

**LS7232ND, LS7232ND-S**

- Same features as **LS7231, LS7232, or LS7233** except DOZE input is replaced by 3-State MODE input.
- MODE input selects **LS7231, LS7232** or **LS7233** type functionality.
- **LS7232ND** can directly replace **LS7232** in PCBs, without modification, where DOZE input is not used.

### **Proximity/Touch Control Halogen Light Dimmer... (14 Pins)**

**LS7232NT, LS7232NT-S**

- Proximity (No-Touch), touch or pushbutton input control
- No-Touch control through optical sensing
- Controls resistive and inductive loads
- Automatic safety cutout
- Soft turn-on • Mode inputs select from 7 operating modes
- Operating options include Memory and Delayed-Off

### **Multi-Level Dimmer.... (16 Pins)**

**LS7315, LS7315-SW**

- Pushbutton input controls
- Up to 10 selectable intensity (power) levels
- Controls high-voltage lamps and **electronic-transformer** coupled low-voltage lamps via a triac interface
- A selected BRIGHTNESS LEVEL input becomes an output that can drive an LED to indicate the selected intensity
- Applications include wall switch (two-wire) and plug-in (three-wire) dimmer configurations

### **Multi-Level Dimmer.... (14 Pins)**

**LS7317, LS7317-S** **New!**

- Pushbutton input controls
- Up to 5 selectable intensity (power) levels
- A selected intensity level input becomes an output that can drive an LED to indicate the selected intensity
- Applications include wall switch (two-wire) and plug-in (three-wire) dimmer configurations

### **Auto Shut-Off Light Switch with Delayed Off.... (8 Pins)**

**LS7338, LS7338-S**

- **Operating Sequence:**  
TIMED-ON — DELAYED-OFF — OFF
- Manual or Automatic Sequence Advance
- External RC programs On-Timer
- Transition from Timed-On to Delayed-Off indicated by reduction of light brightness
- Light Dims-To-Off during the Delayed-Off period

### **Light Dimmer with Up and Down Controls.... (8 Pins)**

**LS7535, LS7535-S; LS7535FT, LS7535FT-S**

- Touch or pushbutton UP and DOWN input controls
- Momentary UP/DOWN input activation cause ramping to MEMORY ON/OFF states
- Prolonged UP/DOWN input activation cause variable dimming operation towards MAX/MIN Brightness Levels
- DOZE input for external control of DIM-TO-OFF time
- **LS7535** has “soft” Turn-On/Off; **LS7535FT** has instant Turn-On/Off

### **Touch Control Step Dimmer with AGC.... (8 Pins)**

**LS7538, LS7538-S; LS7539, LS7539-S; LS7541, LS7541-S**

- Touch Sensitivity is independent of Touch Plate Size and Line-Plug Polarity.
- Pin selection of three available Brightness Step Sequences
- **LS7539** and **LS7541** are functionally equivalent
- Pushbutton control can be implemented
- Applications include Wall Switch step dimmers and Touch Control step dimmer modules for small table lamps to large floor lamps

### **AGC Touch Control Light Switch with Soft-Off ....(8 Pins)**

**LS7540, LS7540-S** **New!**

- Touch Sensitivity is independent of Touch Plate Size and Line-Plug Polarity.
- If Off, a 'Touch' produces Max Intensity (On) instantaneously
- If On, a 'Touch' initiates intensity ramp-down (**Soft-Off**). Max intensity to Off ramp-down time is programmed by an external RC. The **Soft-Off** feature provides light for the User to exit the room. Ramp-down time = 0 if no RC is connected.
- Applying a 'Touch' during ramp-down causes the ramp- down to stop. Once stopped, a 'Touch' causes the ramp-down to Off to resume. Stopping and starting the ramp-down can be repeated as often as desired giving the User full control in setting the light intensity.
- Pushbutton control can be implemented.
- Applications include Wall Switches and Touch Control modules for small table lamps to large floor lamps.

### Touch Control Halogen Light Dimmer .... (8 Pins)

**LS7631, LS7631-S; LS7632, LS7632-S**

- Touch or pushbutton input control
- Controls high-voltage lamps and \*transformer-coupled low-voltage halogen lamps. \***Magnetic transformers and many electronic transformers.**
- Controls **Florescents** and **CFLs** via dimming ballasts
- Direct replacement for **P/N SLB0587**
- Soft-turn on
- Automatic safety shutdown
- 3-state input selects one of three modes of operation
- **LS7631** - dimming cycles through Maximum and Minimum
- **LS7632** - dimming stops at Maximum and Minimum

### Touch Control Halogen Light Dimmer .... (8 Pins)

**LS7634, LS7634-S, LS7634FO, LS7634FO-S**

**LS7635, LS7635-S, LS7635FO, LS7635FO-S**

- **LS7634** functionally equivalent to **LS7631**
- **LS7635** functionally equivalent to **LS7632**
- **Compatible with virtually all electronic transformers.**
- **“FO”** versions power up Full On.

### Reverse-Phase (Trailing-Edge) Halogen Light Dimmer...(8 Pins)

**LS7636, LS7636-S; LS7636FO, LS7636FO-S** **New!**

**LS7637, LS7637-S; LS7637FO, LS7637FO-S**

- Pushbutton input control for direct or remote activation
- Controls high-voltage lamps and \***electronic transformer** coupled low-voltage halogen lamps.  
\***Compatible with all electronic transformers.**
- Controls **Florescents** and **CFLs** via dimming ballasts
- Drives FETs or IGBTs
- Reverse-phase technology **eliminates RFI** generation
- Soft turn-on and soft turn-off
- **“FO”** versions power up Full On after application of AC.
- 3-state input selects one of three modes of operation
- **LS7636 P/Ns** - dimming cycles through Maximum and Minimum
- **LS7637 P/Ns** - dimming stops at Maximum and Minimum

### Voltage Controlled Light Dimmer with Soft On/Off.... (8 Pins)

**LS7642, LS7642-S, LS7642FO, LS7642FO-S** **New!**

- Touch or pushbutton input control for soft turn-on and turn-off.
- Analog voltage input directly controls lamp intensity
- Interfaces easily with a uC for programmable lighting control
- Controls high-voltage lamps and \*transformer-coupled low-voltage halogen lamps. \***Magnetic transformers and virtually all electronic transformers.**
- Automatic safety shutdown
- Controls **Florescents** and **CFLs** via dimming ballasts
- **“FO”** version powers up at the intensity set by the analog voltage.

### NOTE:

Our **“Bright Ideas”** booklet contains some unique ideas for wall switch products. It is available upon request or as a PDF download file from our website.

## COUNTERS

### 8/6 Decade Up Counter with 8 Decade Latch.... (40 Pins)

**LS7030; LS7031**

- 10MHz Count Frequency
- Multiplexed BCD and 7-Segment (**LS7030**) data outputs
- Leading Zero Blanking output • On-chip Scan Oscillator
- Decimal Point and Overflow control inputs
- The **LS7031** can latch external prescalers into the two LSD latches for counting to 1GHz
- 4.75V to 15V operation

### 6 Decade Pre-Determining Up/Down Counter.... (40 Pins)

**LS7055; LS7056**

- 250kHz Count Frequency
- Fully Synchronous counting
- Multiplexed BCD and 7 Segment data outputs
- Preset, Presignal and Main Signal Storage Registers
- Three Comparators with Output Flags
- Thumbwheel interface for loading registers
- On-chip Scan Oscillator
- 4.75V to 15V operation

### 32-Bit/Dual 16-Bit Binary Up Counter.... (18 Pins)

**LS7060, LS7060-S; LS7062, LS7062-S**

- 15MHz Count Frequency
- Byte multiplexed Three-State data outputs
- Unique Cascade Feature allows data bytes from many counters to be sequentially multiplexed to the output bus in a Multiple Counter System
- 32-bit latch
- 4.75V to 5.25V operation

### 32-Bit/Dual 16 Bit Binary Up Counter.... (24 Pins)

**LS7061, LS7061-SD, LS7061-S; LS7063, LS7063-SD, LS7063-S**

- Same features as **LS7060** and **LS7062** except there is a 40-bit latch instead of 32-bit latch
- Ability to latch external eight bits allows attachment of external prescaler for counting to 3.84GHz

### 24-Bit Multi-Mode Counter.... (20 Pins; 24 Pins)

**LS7166, LS7166-S; LS7166-TS24**

- 25MHz Count Frequency
- 8-Bit I/O bus
- 24-Bit Comparator
- **Programmable Count Modes:**  
Quadrature (x1, x2, x4); Non-Quadrature Normal/Modulo-N; 24 Hour Clock; Non-Recycle, Binary; BCD
- TTL and CMOS compatible
- 3V to 5.5V operation

### 24-Bit x 2 Axes Multi-Mode Counter.... (28 Pins)

**LS7266R1, LS7266R1-S, LS7266R1-TS**

- Up to 30MHz Count Frequency
- 8-Bit I/O bus • Dual 24-Bit Comparator
- **Programmable Count Modes:**  
Quadrature (x1, x2, x4); Non-Quadrature, Range Limit; Normal/Modulo-N; Non-Recycle, Binary; BCD
- TTL and CMOS compatible
- 3V to 5.5V operation

### 32-Bit Multi-Mode Counter with Serial Interface.... (14 Pins)

#### LS7366R, LS7366R-S, LS7366R-TS

- Synchronous (SPI) serial interface
- Up to 40MHz count frequency
- 32-bit Counter, Comparator, Input and Output Registers
- Two 8-bit registers to program functional modes
- 8-bit instruction register and 8-bit status register
- Programmable input for Counter Load Output Register Load or Counter Reset
- Modulo-N, Non-recycle, Range-limit or Free-running modes of up/down counting
- 8-bit, 16-bit, 24-bit and 32-bit programmable configuration
- 3V to 5.5V operation

### 24-Bit x 4 Multi-Mode Counter.... (48 Pins)

#### LS7566R-TS

- Up to 40MHz Count Frequency • 3-state Octal I/O Bus
- Each of the four Binary Counters have independent support circuits: Comparators, Registers, Latches, etc.
- **Programmable Count Modes include:** Quadrature (x1, x2, x4); Non-Quadrature (Up/Down); Free-run; Non-recycle; Modulo-n; Range-limit
- 3V to 5.5V operation

### 32-Bit x 1-Axis Multi-Mode Counter..... (24 Pins; 38 Pins)

#### LS7766SO, LS7766SO-S, LS7766SO-TS; LS7766SH-TS **New!**

### 32-Bit x 2-Axes Multi-Mode Counter..... (28 Pins; 48 Pins)

#### LS7766DO, LS7766DO-S, LS7766DO-TS; LS7766DH-TS **New!**

- 40MHz (5V), 20MHz (3.3V) Count Frequency
- Separate mode-control registers for each axis
- Sets of 32-bit counters, input registers, output registers, comparators and octal status registers for each axis
- Pin selectable 3-state Hex / Octal Bus
- **SO / DO** = Single-axis / Dual-axes Octal I/O Bus
- **SH / DH** = Single-axis / Dual-axes with pin selectable Hex / Octal I/O Bus
- **Programmable Count Modes:** Quadrature (x1, x2, x4); Non-Quadrature (Up/Down), Range Limit; Normal/Modulo-N; Non-Recycle
- 3V to 5.5V Operating voltage range

## PIR SENSOR INTERFACE ICs

### All ICs feature:

- Direct Interface to PIR sensor
- Two-stage differential amplifier-filter
- Amplifier-filter characteristics externally programmable
- Noise rejection circuitry
- Programmable on-time
- Single, Dual pulse modes
- LED indicator output

### PIR Sensor Interface.... (16 Pins)

#### LS6501LP, LS6501LP-S, LS6501LP-SW

- Selectable dead time
- Ambient light inhibit
- Regulated 5V for PIR Sensor
- Triac/Relay output interface for AC/DC applications
- Applications include triac or relay controlled indoor occupancy sensors and outdoor motion-triggered lighting providing energy savings, security and convenience

### PIR Sensor Interface.... (16 Pins)

#### LS6505, LS6505-S

- Selectable dead time
- Triac output interface
- Three operating modes
- **Each mode offers 3 operating conditions:**
  - Mode A:** On - Auto - Off
  - \*Mode B:** On then Auto until Off for 15 seconds - Prior condition – Off
  - Mode C:** On then Auto - Auto - Off for 8 seconds then Auto
- **\*Note: Mode B is compliant with California Title 24**
- Wall switch sensors are adaptable to 3-way operation with a remote switch

### PIR Sensor Interface.... (16 Pins)

#### LS6506R, LS6506R-S; LS6507R, LS6507R-S **New!**

- **LS6506R** drives a Latching Relay
- **LS6507R** drives a Triac
- Same common features as the other PIR Sensor Interface ICs except for Dual Pulse Mode
- Sensitivity adjustment
- Pushbutton for Manual-On /Off control
- Ambient light override adjustment
- Selectable time-out adjustments
- Manual-Auto On / Manual-Auto Off or Manual-On / Manual-Auto Off modes
- Applications include Ceiling or Wall-Mounted Occupancy Sensors for control of fluorescent lights, electronic and magnetic ballasts, motors (**LS6506R**), incandescent lamps (**LS6507R**)

### PIR Sensor Interface.... (14 Pins)

#### LS6511, LS6511-S

- Concurrent pulse mode • 5V Shunt Regulator
- Direct relay drive • Very low quiescent current
- Ideal for security systems; automatic doors; motion-triggered remote monitoring (for cameras, etc.)

## BRUSHLESS DC MOTOR CONTROLS

### BLDC Motor Commutator/Controller.... (20 Pins)

#### LS7260, LS7260-S, LS7260-TS; LS7262, LS7262-S, LS7262-TS

- Open or closed loop control of 3 and 4 phase motors
- Hall Sensor inputs control output commutation sequence for electrical sensor spacings of 60°, 120°, 240°, or 300°
- Speed controlled by Pulse Width Modulation (**PWM**) of output drivers
- Control inputs include Analog Speed, Forward/Reverse, Output Enable and Positive Static Braking
- Overcurrent Sensing disables output drivers
- Direct drive of FETs (**LS7260**) and Bipolar Transistors (**LS7262**)
- 5V to 28V operation

### BLDC Motor Commutator/Controller.... (20 Pins)

#### LS7362, LS7362-S, LS7362-TS

- Same features as **LS7262** except Pulse Width Modulation occurs only in low-side drivers allowing use with High Voltage motors



### **BLDC Motor Controller.... (28 Pins)**

**LS7560N, LS7560N-S, LS7560N-TS;**

**LS7561N, LS7561N-S, LS7561N-TS**

- Backwards compatible to **LS7560, LS7561**
- Single-Chip Open or Closed Loop Motor Controller
- **User Selectable Features Include:**
  - PWM of All Drivers or Low-Side Drivers Only
  - Polarity of High Side Drivers
  - Static or Dynamic Braking
  - 60°/300° or 120°/240° Electrical Sensor Spacing
- Level-Sensitive Enable
- Cycle-by-Cycle Overcurrent Sensing
- Overcurrent Condition Disables All Drivers (**LS7560N**) or Low-Side Drivers Only (**LS7561N**)
- Fault LED Indicator Output
- 10V to 18V Operation

## **AC MOTOR CONTROLS**

### **AC Motor Multi-Speed Controller.... (18 Pins)**

**LS7311, LS7311-S**

- Pushbutton input controls
- Up to ten selectable Speed (power) Levels
- A selected Speed Level input becomes an output that can drive an LED to indicate the selected speed
- Run, Pulse and Off control inputs
- Applications include consumer appliances such as Blenders, Range Hoods, Fans, etc.

### **AC Motor Multi-Speed Controller.... (16 Pins)**

**LS7315, LS7315-SW**

- Same features as **LS7311** except there are no Run and Pulse inputs

### **AC Motor Multi-Speed Controller.... (14 Pins)**

**LS7317, LS7317-S **New!****

- Pushbutton input controls
- Up to 5 selectable speed (power) levels
- Auto-Pulse, Boost and Off control inputs
- A selected speed level input becomes an output that can drive an LED to indicate the selected speed
- Applications include consumer appliances such as Blenders, Range Hoods, Fans, etc.

## **STEPPER MOTOR CONTROL**

### **Stepper Motor Controller.... (24 Pins)**

**LS7290, LS7290-S, LS7290-TS **New!****

- Controls two-phase **Bipolar** and four-phase **Unipolar** motors
- **Inexpensive replacement for L297.**
- Direct interface to **L298 for Bipolar motors**
- Interfaces to four AND Gates driving four N-Channel MOSFETs for **Unipolar motors**
- **Programmable step sizes:** Full, 1/2, \*1/4, \*1/8, \*1/16, \*1/32  
\*Current feedback control not available for microsteps.
- **Nominal clock frequency:** 8MHz
- **Maximum stepping rate:** greater than 30k per second
- **Programmable inter-step blanking delays:** 1.25us, 2.5us, 3.75us, and 5us at 8MHz
- **H-bridge PWM resolution:** 0.39%
- Two PWM and Four Phase outputs for H-Bridge control
- On-chip Crystal Oscillator, RC Oscillator or External source, controls Step Frequency and Duty Cycle
- **Supply voltage:** 3V to 5.5V

## **PROGRAMMABLE DIGITAL LOCKS**

### **Automotive Ignition Digital Lock .... (14 Pins)**

**LS7220, LS7220-S**

- 5,040 four digit Combinations (for a 10 number keypad)
- Combinations are hard-wire programmed
- Sense input enables chip operation
- Save Memory feature saves Unlock Condition for Valet Parking
- Save input sets Save Memory and Lock input resets Save Memory
- Save Memory and Lock Status outputs
- Convenience Delay determined by external capacitor
- Static or Momentary Lock Control output

### **Keypad Programmable Digital Lock .... (20 Pins)**

**LS7222, LS7222-S; LS7223, LS7223-S**

- 38,416 four digit Combinations (for a 4 x 4 keypad matrix)
- 3 different user programmable codes
- **LS7222** Programmable Codes: Arm, Disarm, Duress
- **LS7223** Programmable Codes: Lock 1, Lock 2, Duress
- Lock and Program Status Outputs
- Static and Momentary Lock Control outputs
- Alarm and Tamper Detection outputs

### **Machine or Area Access Digital Lock .... (14 Pins)**

**LS7225, LS7225-S; LS7226, LS7226-S**

- 5,040 four digit Combinations (for a 10 number keypad)
- Combinations are hard-wire programmed
- Sequence Enable Input enables Combination Entry
- Combination Entry time controlled by external capacitor
- Static or Momentary Lock Control Output
- Tamper Detection Output
- Lock Status Output

## DIVIDERS

### AC Line Frequency Dividers.... (8 Pins)

#### REDx/y, REDx/y-S

- Frequency division of 50Hz/60Hz sine waves
- 50Hz/60Hz Division Select input
- Reset and Enable input controls
- Clock input shaping network interfaces directly with 50Hz/60Hz AC Line through a current limiting resistor
- 4.5V to 15V operation
- **Available Dividers:**  
5/6, 50/60, 100/120, 300/360, 500/600, 3000/3600

### Selectable Six-Decade Divider.... (8 Pins)

#### RDD106, RDD106-S

- Backwards compatible to RDD104
- Divides by  $10^1$ ,  $10^2$ ,  $10^3$ ,  $10^4$ ,  $10^5$ ,  $10^6$
- Division Select determined by state of two inputs
- Divides External Clock or Crystal Oscillator Frequency
- Up to 30MHz Frequency
- 3V to 15V operation

All our Standard Products are assembled in RoHS compliant packages. Non-RoHS packages may be available on special order. Please contact our Sales Department for more information.

LSI/CSI is certified to ISO 9001:2000.

LSI/CSI has been ISO certified since 1996.

LSI/CSI [Data Sheets](#) can be downloaded directly from our website, [www.lsicsi.com](http://www.lsicsi.com).

Price and delivery information can be obtained by calling **631-271-0400** or sending an e-mail to [sales@lsicsi.com](mailto:sales@lsicsi.com).

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## LS7642 PRESS RELEASE

### Voltage Controlled Light Dimmers

LSI/CSI announces two new innovative additions to its extensive line of Lighting Control ICs. Designated **LS7642** and **LS7642FO**, these new ICs have been designed for easy control via manual or uC interface.

An analog voltage at the control input directly determines the phase angle of the triac trigger pulse. For automated applications such as emulating dawn, daylight and dusk for environments such as chicken houses, the control voltage can be provided by the uC yielding accurate control of dimming patterns. For manual applications such as wall switches, the wiper of a sliding or rotary potentiometer can provide the control voltage. Turn-on and turn-off of illumination is accomplished automatically by uC signal, or manually by pushbutton or touch sense. For both turn-on and turn-off, the brightness is softly ramped up and ramped down, respectively, from the illumination set by the control voltage.

The **LS7642** powers up in the Off state and the **LS7642FO** powers up in the On state to the illumination set by the control voltage. The **LS7642FO** will be desirable in parts of the world where the AC power may be interrupted several times daily.

#### Other features include:

- Extension input for remote turn-on and turn-off.
- Controls high voltage lighting such as incandescent and halogen lamps.
- Controls low voltage lighting such as \*transformer-coupled halogen lamps  
\*Compatible with magnetic and virtually all electronic transformers.
- Controls **Fluorescents** and **CFLs** via dimming ballasts.
- Supply voltage: 5V.

**LS7642** and **LS7642FO** are available in RoHS compliant 8-Pin SOIC and DIP packages.

## **LS7636\_LS7637 PRESS RELEASE**

### **New Reverse Phase (Trailing-Edge) Dimmer ICs Eliminate RFI**

LSI/CSI announces the addition of four innovative Reverse Phase Dimmers, **LS7636**, **LS7636FO**, **LS7637** and **LS7637FO**, to its extensive line of Lighting Control ICs. According to Pete Visconti, VP Sales and Marketing, "A huge advantage is gained by our customers using LSI's ICs employing Reverse Phase (Trailing-Edge) technology driving FETs or IGBTs. These new ICs overcome the disadvantages associated with triac-based (Leading-Edge) dimmers. Dimmers made with these new ICs eliminate the RFI generated by triac-based light dimmers that can interfere with a nearby electronics such as an AM radio."

A Reverse Phase Dimmer IC turns on the drive transistors at the zero-crossover point of each half cycle, enabling a slow current rise. Current is terminated later during the half-cycle depending on the desired dimming level. RFI generation is minimized since power to the load is not turned on abruptly as with leading-edge (triac-based) dimmers eliminating the need for external filtering. Another important benefit is that these Dimmer ICs can drive **any** Electronic Transformer.

The LS7636 ICs automatically reverse direction when reaching maximum or minimum intensity while the LS7637 ICs stop dimming when reaching maximum or minimum intensity. LSI's **LS7636FO** and **LS7637FO** versions power up to **Full-On** intensity when AC power is first applied.

All of these ICs have three selectable operating modes. These modes allow the load to be turned on to maximum intensity or to a previous set memory level in response to a short pushbutton application and to continue dimming in the same direction or reverse with each new long pushbutton application.

#### **Other features include:**

- Soft turn-on and soft turn-off.
- Local or remote pushbutton control.
- Interfaces with N-Channel FETs or IGBT power devices to drive output loads.
- Two application configurations available:
  1. A single output driver version for moderate power loads.
  2. A dual output driver version for large power loads.
- Over Current Sense Input shuts down the output if the voltage across a fractional-Ohm feedback resistor exceeds an internal threshold.
- 50Hz/60Hz AC line frequency
- 115VAC/220VAC operation
- Supply voltage: 12V

**LS7636**, **LS7636FO**, **LS7637** and **LS7637FO** are available in 8-Pin DIP and SOIC packages

## Mixed-Signal Full Custom Integrated Circuits from LSI/CSI

**I**n addition to its line of Standard Product ICs, LSI/CSI has been producing Turnkey, Mixed-Signal Full Custom ICs for a broad range of industries since 1969.

Our [Capabilities Brochure](#) describes the Processes, Non-Volatile Memory Options and Design Methodologies that show why we are the ideal high-volume, low-cost solution.

Please contact us to receive our [Capabilities Brochure](#).

We can be reached at [631-271-0400](tel:631-271-0400), or [sales@lsicsi.com](mailto:sales@lsicsi.com).

Alternatively, you can download this brochure from our Web Site, [www.lsicsi.com](http://www.lsicsi.com).

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### LS7290 PRESS RELEASE

## A New Low Cost Precision Stepper Motor Controller for Bipolar and Unipolar Motors

LSI/CSI announces the availability of its new high performance stepper motor controller integrated circuit. “A huge advantage for our customers is that **this new IC can replace the expensive L297** in most applications”, according to Pete Visconti, VP Sales and Marketing. Designated **LS7290**, this IC is capable of step sizes ranging between full and 1/2 step.

The **LS7290** is designed to control **two-phase Bipolar motors** or **four-phase Unipolar motors** with minimum burden on the resources of a host micro-controller. For bipolar motors, the **LS7290** interfaces with an external Dual Full Bridge Driver such as the L298, which contains a pair of H-bridges driven by the **LS7290** PWM and Phase Control outputs. The H-bridges allow for the selection of wide range of motor sizes. For unipolar motors, the **LS7290** PWM and Phase Control outputs interface with four AND gates driving four NMOS driver transistors.

Inputs to the **LS7290** are available to control the step size, step command, motor direction, over-current sense, over-current threshold and inter-step phase drive blanking delays. The programmable inter-step blanking delays allow for delay selection to suit a specific motor resulting in reduced audible motor noise, increased step accuracy, and reduced power dissipation. The basic timing clock can be supplied either from the built-in oscillator or from the system clock.

#### **LS7290 features include:**

- Programmable step sizes: full, 1/2, \*1/4, \*1/8, \*1/16, \*1/32 (\*Current feedback control not available)
- Nominal clock frequency: 8MHz
- Maximum stepping rate: greater than 30k per second
- Programmable inter-step blanking delays: 1.25us, 2.5us, 3.75us, and 5us at 8MHz
- H-bridge PWM resolution: 0.39%
- Supply voltage: 3V to 5.5V

**LS7290** is available in 24-pin DIP, SOIC and TSSOP packages.

## **LS7766 PRESS RELEASE**

### **A Powerful Multi-Mode Counter with Interfaces for Incremental Encoders**

LSI/CSI introduces the **LS7766**, a robust addition to its family of encoder interface and motion control ICs. The **LS7766** supersedes its rivals in versatility and system throughput. Available in both single-axis or dual-axis versions, it has a count range of 32-bits to support applications where large magnitudes of data are involved. Its configurable Octal/Hex parallel IO bus enhances the system throughput by a factor of two over its predecessors. Its many configurable counting modes relieves the host micro-controller of various control and data formatting tasks reducing the burden on its resources.

The **LS7766** can directly interface with an incremental encoder. The quadrature signals from the encoder are validated with internal digital filters to eliminate errors from induced noise and encoder dither, providing a high level of reliability. The filtered signals are decoded for clock and direction before applying to the 32-bit counter. Alternatively, the count inputs can be configured to function in the non-quadrature mode if encoder interface is not required.

#### **Each axis of the LS7766 consists of:**

- 32-bit Counter
- 32-bit Input-Data-Register
- 32-bit Output-Data-Register
- Two 8-bit Functional Mode and IO Configuration Registers
- 8-bit Command Register
- 8-bit Status Register

#### **The programmable IOs include:**

- 16-bit bi-directional parallel bus to interface with micro-controllers
- Count inputs to process both quadrature and non-quadrature signals
- Index input for load\_register and reset\_register operations
- Flag outputs for event status
- Clock and Direction outputs from decoded quadrature signals

The maximum count frequency: 40MHz. Supply voltage range: 3V to 5.5V

**LS7766** is available in several versions of single-axis, dual-axis, octal-bus and hex-bus packages. The minimal version is available in 24-pin DIP, SOIC and TSSOP packages. The full-fledged version is available in a 48-pin TSSOP package

## **LS6506R LS6507R PRESS RELEASE**

### **Versatile PIR Interface IC Controls Any Type of AC Load**

LSI/CSI introduces the **LS6506R**, a step forward in PIR Sensor Interface ICs. Since the **LS6506R** is designed to drive a latching relay, it can be used in a Wall Switch configuration (no Neutral available) to enable the full AC Mains cycle to be applied across any load rendering the Wall Switch suitable for driving all types of resistive and inductive loads including incandescent lamps, fluorescent lamps, electronic and magnetic transformers, motors, etc. Products incorporating the **LS6506R** produce energy savings in commercial and home applications. A sister chip, the **LS6507R**, drives a triac in series with the load and is suitable to be used in a lower cost Wall Switch configuration for driving incandescent lamp loads.

For home and commercial occupancy sensor applications, the ICs can be used in Wall Switch configurations to manually or automatically switch loads on and off. For commercial applications, a feature is offered where the lights can be manually switched off and will remain off as long as motion is detected allowing for uninterrupted Power Point Presentations, etc.

#### **Other features include:**

- Five timeout selections ranging between 30 seconds and 30 minutes.
- Two operating modes.
- On chip voltage regulator for reliable performance.
- PIR sensitivity adjustment.
- Ambient light override control.
- LED indication for motion detection.
- 50Hz/60Hz operation.

**LS6506R** and **LS6507R** are available in RoHS compliant 16-Pin SOIC and DIP packages.

### **- ADVANCE INFORMATION ICs -**

#### **COUNTERS**

**32-Bit Binary Up Counter ..... (18 Pins; 24 Pins) **Prototype SOICs are available for evaluation!****

LS7060C, LS7060C-S, LS7062C, LS7062C-S;

LS7061C, LS7061C-S, LS 7061C-SD,

LS7063C, LS7063C-S, LS7063C-SD

- Same features as **LS7060**, **LS7062** and **LS7061**, **LS7063**, respectively, except operation is at higher speed and lower power.

**[Advance Information IC Data Sheets](#) can be obtained by calling **631-271-0400** or sending an e-mail to **[sales@lsicsi.com](mailto:sales@lsicsi.com)**.**

**We welcome your comments and suggestions.**

## ORDERING SYSTEM

CODE	PACKAGE	NOTES
P/N	RoHS Compliant Standard Plastic DIP	1, 2, 3
P/N - SD	RoHS Compliant Skinny DIP option	1, 2, 3
P/N - S	RoHS Compliant Standard SOIC	1, 2, 3, 4
P/N - SW	RoHS Compliant Widebody SOIC option	1, 2, 3, 4
P/N - S14	RoHS Compliant 14-Pin SOIC version of 8-pin part	1, 2, 3, 4
P/N - C	Ceramic DIP Option	1, 2, 3, 5
P/N - CM	Ceramic Military DIP Option	1, 2, 3, 6
P/N - TS	RoHS Compliant TSSOP	1, 2, 3, 4
P/N - TS24	24-pin RoHS Compliant TSSOP version of 20-pin part	1, 2, 3, 4

Note 1: See Table 1 for package body widths

Note 2: Package outline drawings conform to JEDEC standards

Note 3: Packages shipped in anti-static tubes

Note 4: Tape and Reel option is available. Contact factory for details.

Note 5: Includes Mil-Std 883E Class B visual per Method 2014, plus fine and gross leak testing per Method 1014

Note 6: Includes all testing per Note 5 plus HTRB Burn-In at 125 degrees C for 168 hours per Mil-Std 883E Class B, Method 1015.

**Table 1. Package Body Width (mils) - All packages conform to JEDEC Standards**

# of Pins	P/N, -C, -CM	-SD	-S	-SW	-TS
8	300	-	150	-	-
14	300	-	150	-	173
16	300	-	150	300	-
18	300	-	300	-	-
20	300	-	300	-	173
24	600	300	300	-	173
28	600	*	300	-	173
38	-	-	-	-	173
40	600	-	-	-	-
48	-	-	-	-	240

**\*28-Pin 'SD' package is no longer available.**

**ADDITIONAL ORDERING OPTIONS:**

Probed Wafers (P/N-PW), Waffle Packed Die (P/N-WP)

Non-RoHS Compliant Packages may be available by Special Order - Contact Factory for details.

**LSI/CSI**



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