



# Splice Technology Products

- ▶ Applications
- ▶ Splice Machines
- ▶ SpliceBand

# Splice Technology Market Applications



Telecom

Industrial and Consumer



Motor, Coil, Transformer Windings

Automotive



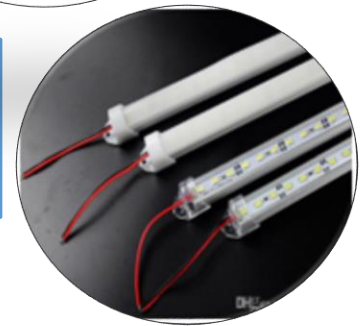
Medical

Other Consumer and Textile



Strain Relief

Lighting



## Spliceband wire connections provide exceptional value and reliability

The proven technology solves assembly problems where soldering is inadequate mechanically due to vibration, susceptibility to pull forces, fatigue or other usability factors (heat sinking, wetting, flux restrictions)





## Repeatable Process and Controls:

- Oxide and contamination free, gas-tight connections
- Efficient, continuously feed material
- Fixed machine settings
- Proven tool sets

Compliant industry standards:

UL486C

MIL STD 202

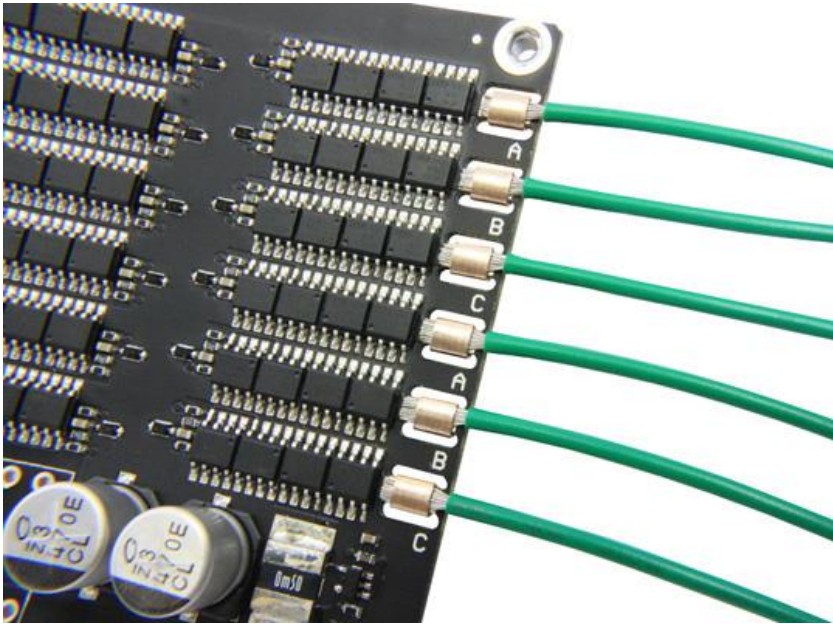
IEC 60352-2

IPC/WHMA-A -620

RoHS



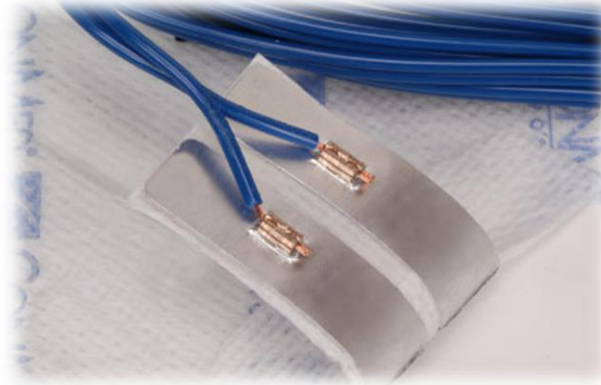
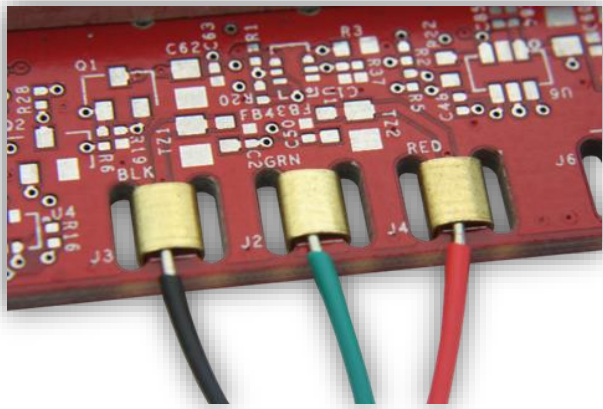
**autossplice**<sup>®</sup>



## Versatile, Cost Effective, and Production Efficient

- Splice machines, materials and tool sets are affordable and reliable
- Lowest applied assembly cost connection compared to hand soldering or resistance welding
- Spliceband compatible with solid and stranded wire types
- Production speeds up to 2300 connections per hour
- Direct Wire to PCB attachment reduces assembly costs, no separate connector required
- Splicing connections proven to be more than 50% faster than wire soldering connections

# Direct Board Interconnect Technology



## DBIT Direct to Board Connection

Cost Effective Interconnection

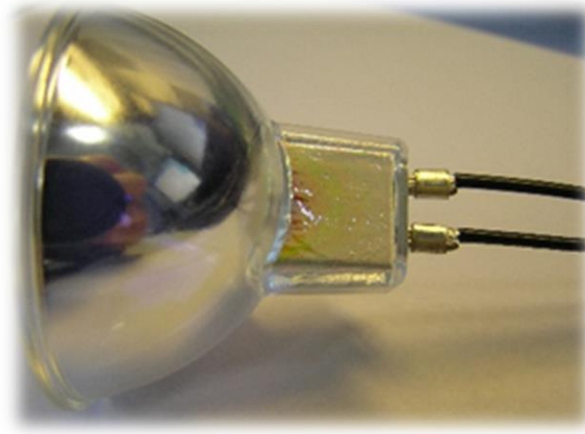
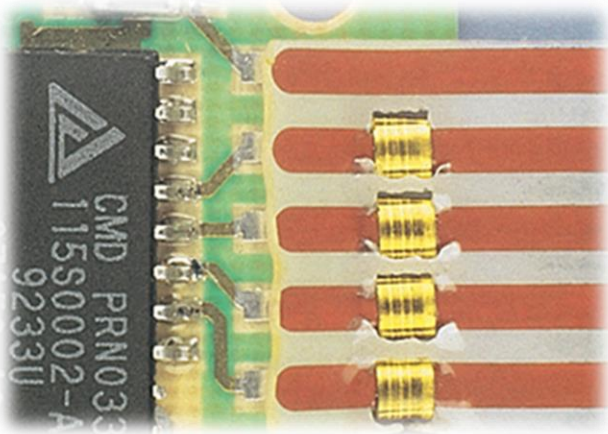
Low Profile

Wire to PCB

Wire or component to flex circuit

Wire to Component

Flex Circuit to PCB



## Strain Relief Band

- Pre-stamped Spliceband material used with Autosplice machines forms a pull relief for wire and cable assemblies
- Does not damage nor penetrate to wire
- Low Cost, Suited for High Volume Production
- 10 lbs. min pull force
  - “T-wing” style design in development
- Anticipated release October 2016
- Requires strain relief tooling for Autosplice machines



# Strain Relief Band

## Strain Relief Band

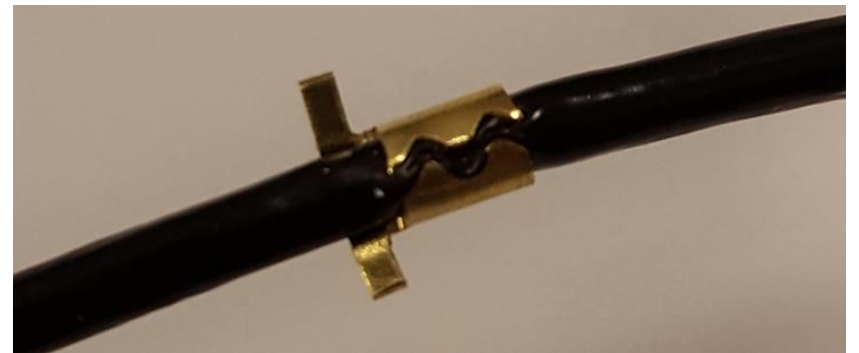
Designed to minimize the effect of improper stress to wires

### Key Features:

- Works with existing Spliceband machines for efficient assembly (requires Strain Relief Tool Set)
- Supports 10 lbs. pull force without slipping on jacket
- Does not damage wire when crimped or when stressed by pull force
- Continuously fed through machine, the strain relief spliceband crimps and forms relief in one process step



Strain relief band adds protection from pull forces preventing potential issues like this one



Spliceband Strain Relief



# Autosplice Advantages

Competitive Advantages	Splice	Solder	Resistance Weld	Epoxy
Initial Start-up Costs	\$\$	\$	\$\$\$	\$
Suited For Low Production	✓	✓	✓	✓
Suited For High Production	✓	✗	✗	✗
Environmentally Friendly	✓	✗	✓	✗
Process Control Repeatability	✓	✗	✗	✗
Operator Learning Curve	✓	✗	✗	✓
Volume Processing Costs	\$	\$\$\$	\$\$	\$\$\$
Reliability	✓	✗	✓	✗

## Two Versatile Splice Semi-Automated Machines

### SAS/2



- Flywheel based drive design uses 1/3 HP electric motor produces uniform crimps with fixed machine settings
- Comprehensive toolset library addresses most production requirements
- Push action feeding mechanism
- Suitable for Spliceband widths from 2mm up to 9mm

### ACS2000



- Servo motor drive design produces uniform crimps using compressed air source
- Operator adjustable controls for height and feed precision
- Programmable functions for enhanced production control
- Pull action feeding mechanism
- Suitable for Spliceband widths from 2mm to 6 mm

# The SAS/2



The industry standard is the SAS/2, offering:

Ease of operation

Excellent process reliability

Unprecedented machine life, over 25 years of reliable service reported by many customers

Over 30 sets of tooling sizes and styles

Accommodates virtually all connection needs

Functions with Spliceband material types and widths from 2mm to 9mm

(Standard widths include 2mm, 4mm, and 6mm)

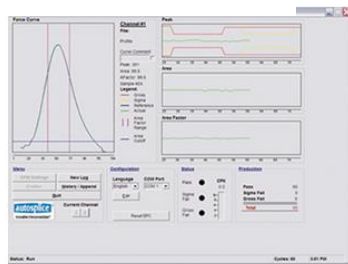
Operates with 110V or 230V

## AVAILABLE OPTIONS

Crimp Force Monitor

Guillotine Cut-off Assembly

Horn Base Clincher



Optional Crimp Force Monitor

# The ACS2000



The ACS2000 advances 40 years of SAS Splicing expertise and technology into an economical and efficient Splicing system.

Large range of available tool sizes enables an almost unlimited options of applications.

The rapid change tooling minimizes set-up time between application changeovers.

Programmable production counters.

Functions with Spliceband material widths of 2mm, 4mm and 6mm (1mm in development)

110V or 230V

87Psi

## AVAILABLE OPTIONS

Crimp Force Monitor

Guillotine Cut-off Assembly

Horn Base Clincher



Optional Crimp Force Monitor

# Guillotine Automation



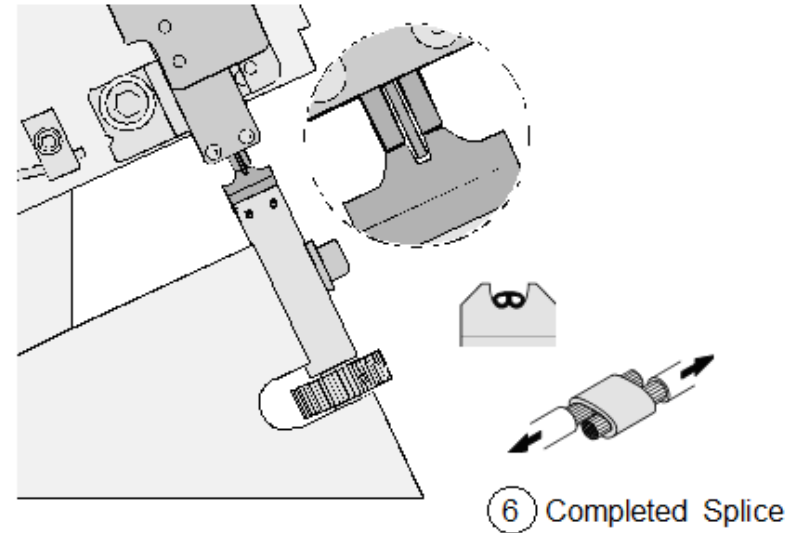
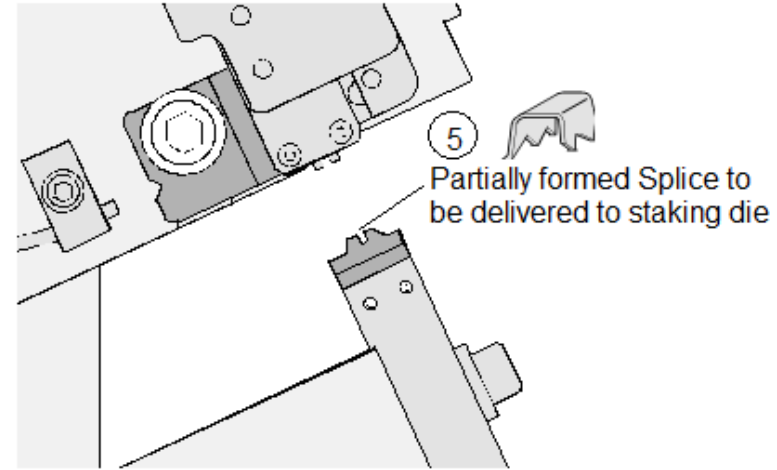
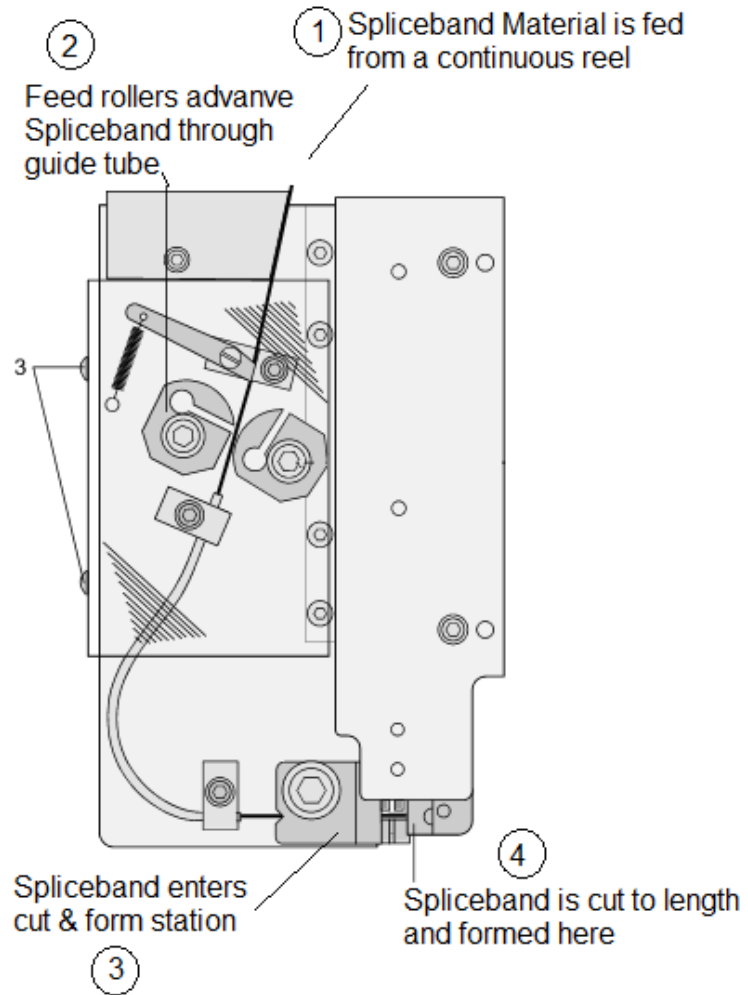
Finger Guard  
removed for Video

# Fast Learning Curve and Operation



The machine operator places components or leads into a lower staking die, depresses a footswitch, and parts are immediately spliced, with assured repeatability

# Splice Forming Process



# Spliceband Material Options

Material	Application
Brass	General Purpose up to +120°C
Tin plated Brass	General Purpose up to +120°C resists corrosion, pre-soldered components
Copper Nickel	High Reliability up to +260°C, resists corrosion, weldable
Nickel Plated Steel	High Reliability, up to +260C resists corrosion, weldable
Stainless Steel	Specialty Purpose, over +260°C, resists corrosion
Inconel	High Temperature +600°C
Customer Specified	On request
Material thickness 0.25mm - 0.50mm	
Material widths between 2mm and 9mm (standard widths are 2mm, 4mm, 6mm)	



# AQS 5000 Mobile Micrograph Laboratory

Provides cross section analysis of crimp connections

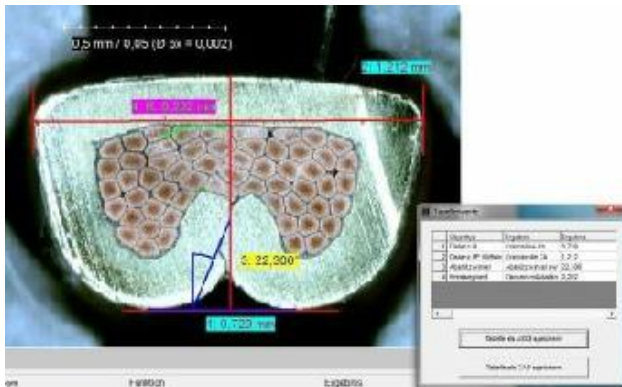
Performs cutting, grinding and etching for preparation of crimp samples

Ground surfaces are viewed under optical zoom with raster and controllable LED ring light

Microscope includes USB 1.3 MP camera and imaging software

AQM 9.0 and AQM Pro 9.0 software  
Provide basic measurement functions (circles, radii, distance etc.)

AQM Pro 9.0 enables  
Exportable files to Excel  
12 languages  
Large user tool library  
Customizable user interface



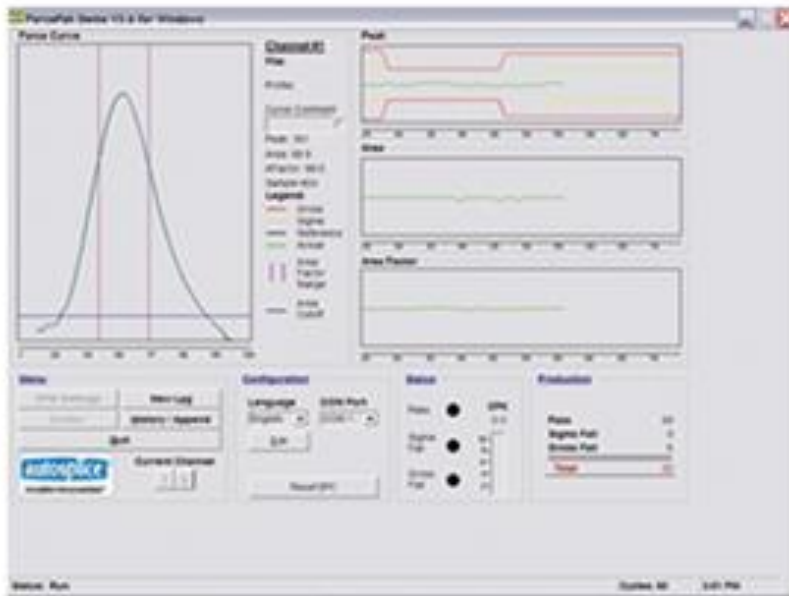
# Crimp Force Monitor



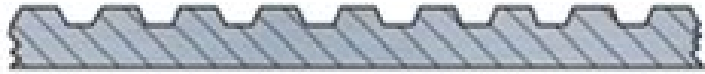
CFM 4000 Crimp Force Monitor option for the SAS/2 and ACS2000 Machines

Production Quality Monitoring for Detection of:

- Incorrect strip length
- Missing strands
- Incorrect wire cross-section
- Incorrect terminal
- Inconsistent terminal material
- Insulation in wire crimp
- Incorrect insertion depth
- Incorrect crimp height



# Engineered Spliceband Types



Standard Serration  
Bare Wire and General Use

Standard serrations provide an excellent mechanical connection, compliant to UL 486C



"M" Serration  
Magnet Wire Use

"M" Serrations are designed to penetrate enamel coated unstripped magnet wire, eliminating the need for pre-stripping

## Hand Soldering

- ✎ Unreliable Connection / Inconsistent Process
- Noxious Solder Fumes
- Lower pull strength
- Fatigue susceptibility
- Low Initial Start Up Costs

## Resistance Welding

- ✎ Expensive Equipment Start-Up
- ✎ Expensive Spare Parts
- ✎ Larger Operating Learning Curve

## Pre-Formed Crimp Terminals & Presses

- ✎ Expensive Equipment Start-Up
- Expensive Spare Parts
- Expensive Component Cost

## Epoxy

- ✎ Expensive High Volume Equipment Start-Up Costs
- ✎ Short material shelf life

# Assembly Machine Technology Comparisons

MACHINE PROCESSING CAPABILITY	Splice	Solder	Ultrasonic Weld	Epoxy
Wire to Wire	YES	YES	YES	NO
Wire to Component Lead	YES	NO	NO	NO
Wire to Metal Tab	YES	YES	NO	NO
Wire to PCB	YES	YES	NO	NO
Plated Parts	YES	NO	NO	YES
Long Life Tooling	YES	YES	NO	NO
Replacement Components Cost	\$	\$	\$\$\$	\$
Tool Parts Standard or Custom	STD	CUSTOM	CUSTOM	CUSTOM

# Reliable and Proven Capability

Autosplice meets or exceeds UL 486C for spliced connections



AWG	Pullout Force (lbs.) UL 486C	Test Current for Max 50°C Rise (Amps)
30	1.5	3
28	2	3.5
26	3	5.5
24	5	7
22	8	9
20	10	12
18	10	17
16	15	18
14	25	30
12	35	35
10	40	50