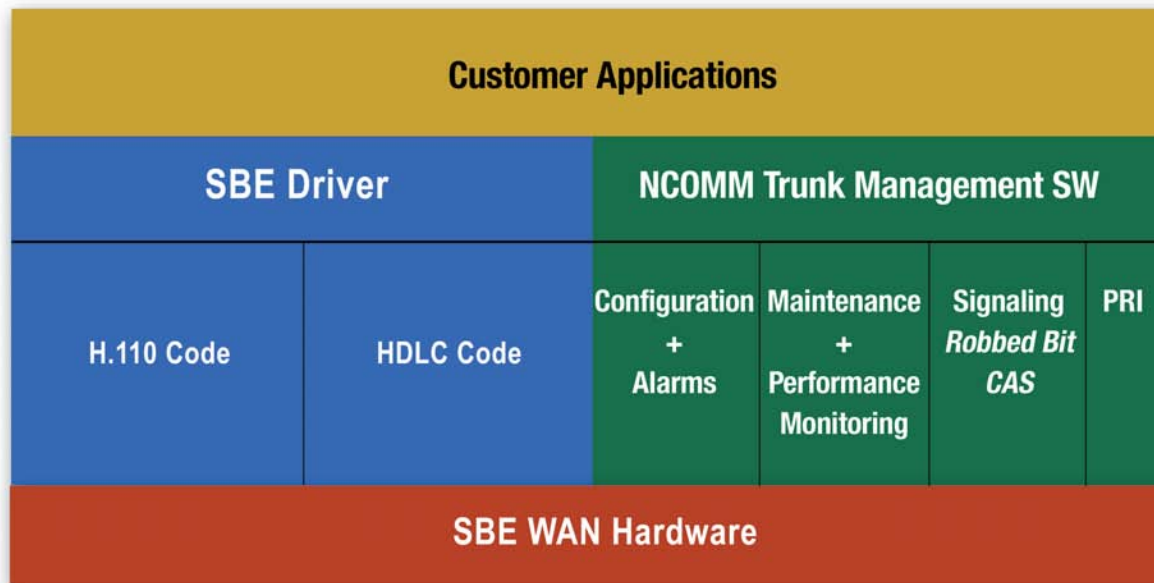




Intelligent WAN Solutions Accelerate
OEM Product Deployments

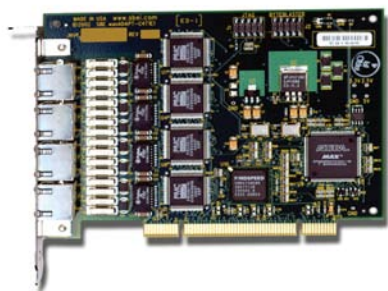


SBE Integrated Hardware/Software WAN Products *The Industry's Most Complete Solutions*

- ▶ SBE WAN modules bundled with intelligent software from NComm
- ▶ TMS performs all aspects of T1/E1, T3/E3, SONET/SDH, and ISDN support
- ▶ Enables alarming, performance monitoring and signaling
- ▶ Designed to be framer independent and portable to any OS
- ▶ NComm's TMS available with SBE's T1/E1 & T3/E3 WAN NICs
- ▶ Integrated SBE/NComm solution designed to reduce time-to-market by 6-12 months
- ▶ Complete Linux support integrated and tested

SBE, a leading supplier of high performance OEM communications solutions, is now the leading supplier of the industry's most complete and advanced integrated WAN package. These next generation solutions combine the best of class NComm source code with SBE's channelized T1/E1 and T3/E3 PCI and PMC cards. Merging their core competencies, users can now implement comprehensive WAN solutions coupling high-performance WAN interfaces with top-level software. The software and hardware are pre-integrated and fully tested in a Linux environment leaving your development engineers to focus on integrating your unique value-adds.

Bringing together this unprecedented duo results in significant cost savings for OEMs and speeds up time-to-market by 6-12 months. NComm's Trunk Management Software (TMS) modules are available with SBE's full line of T1/ E1 and T3/E3 channelized WAN adapters. Offering PCI, PMC, and PTMC form factors, SBE's WAN boards provide single, dual or quad port options as well as clear channel and channelized versions. H.100/H.110 support is also available. This document is intended to outline the features and benefits of the



value that NComm's Trunk Management Software (TMS) provides.

Drivers, especially framer code, are very hardware specific and generally do not process data or make high-level decisions, such as managing telco alarms and signaling. Enabling this functionality often requires many engineering hours to incorporate into the user's application.

However, the NComm/SBE solution is different. It is more than just a driver, and in fact, it does process

NComm and SBE integrated WAN solution. The following analysis can also be helpful in understanding how other framer drivers contrast with SBE's offerings and the added

data and make high-level decisions. The NComm/SBE solution offloads the task of managing telco alarms and signaling from the user's application and maintains a consistent API across all SBE current T1/E1 and T3/E3 products as well as future SONET products, regardless of the framer devices.

NComm's TMS interfaces with the driver to complete the layer 1 requirements, including global standards compliance. TMS is architected to be hardware independent and provides all of the high-level algorithmic processing of the raw data to and from the low-level driver. TMS provides well-defined APIs utilizing only 3 function calls: Control, Callback and Poll. This allows for the simplest and fastest integration possible to your upper level applications, such as routing, call processing, APS Control (SONET/SDH), SNMP handling, and etc. To support higher-level applications, the NComm/SBE solution delivers many advanced functionality and benefits.

Key Advantages of the NComm/SBE Solution

I. CONFIGURATION MANAGEMENT *(Included with SBE's Channelized WAN Boards)*

Base level TMS

- Configures according to high level functionality, not low level registers – providing ease-of-use.
- Single commands may set off multiple activities including full initialization, takedown and re-initialization of the entire trunk.
- Interfaces to T1 spans controlled by TMS.
- Maintains configuration data for the spans.

II. ALARM MANAGEMENT *(Included with SBE's Channelized WAN Boards)*

All alarm functionality comes up fully functional and working (provided hardware is ready & debugged!)

- Alarm processing (detection, declaration, and clearing) fully standard compliant per T1.231 (US)
- Programmable alarm integration timers for OOF, LOS, AIS, RAI and others.
- The E1 alarm capabilities will meet standards per I.431, G.732, and ETSI 300-233.
- All integration is completed per standard - with default settings of programmable integration timers. Alarm states are reported to your value-added application and a response alarm is automatically sent back into the network per T1.231.
Example: When OOF (Out-Of-Frame) detected, 2 1/2 second timer started. If condition persists for 2 1/2 seconds, an OOF (RED) alarm state is declared and an RAI (Yellow) alarm is sent back into the network.
- Standard compliant alarm responses maintained for simultaneous event/defect occurrences.
- Alarm information also used by Maintenance/Performance Monitoring and Signaling Modules.
- The alarm functionality is architected to allow for the proper implementation of signaling (bit freezing) should that be required in initial development, or as added functionality during the product's life cycle.



III. MAINTENANCE MANAGER *(Included with SBE's Channelized WAN Boards)*

- Establish performance reports captured in 192 15-minute buckets (48 hrs) for near and far end (T1.231 for US)
- Provide Time-Of-Day reporting including time resets and associated data classification (T1.231)
- Provide performance reports captured in 96 15-minute buckets (24 hrs) for near and far end (TR-54016 for T1)
- Establish the Facility Data Link (FDL) and handle request/response automatically
- Provide programmable TCAs (Threshold Crossing Alerts), as per T1.231
- All maintenance capabilities come up fully functional and working.
- Standard compliant performance is immediately achieved.

IV. LOOPBACKS *(Included with SBE's Channelized WAN Boards)*

- Initiate requests for loopbacks (T1.403 US)
- Respond to requests for loopbacks (T1.403 US)
- Program Loopback codes and detection times

V. BIT ORIENTED CODES *(Included with SBE's Channelized WAN Boards)*

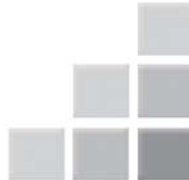
- BOC (Bit Oriented Codes) and BOM (Bit Oriented Messages) transmitted and received
- Facility for custom BOC/BOM transmissions and receipt
- Bit Oriented Message (BOM/BOC) handling per T1.403

VI. T1 RBS/ROBBED BIT AND E1 CAS/CHANNEL ASSOCIATED SIGNALING

(Included with SBE's Channelized WAN Boards)

- All signaling capabilities are fully functional and working when brought up
- Standard compliant performance is immediately achieved
- All known T1 Robbed Bit signaling models included in:
 - T1.403 (11 models)
 - TR-008 (6 models)
 - GR-303 (8 models)
 - GR-506
 - ATT Pub 43801 (14 models)
 - EIA/TIA 464 (2 models)
- Bit freezing and debouncing to accommodate line hiccups
- E1 Channel Associated Signaling (CAS) models, including Q.421 and Q.422

VII. TR-008 MANAGEMENT *(Optional License)*

- All TR-008 capabilities come up fully functional and working
 - Processes TR-008 Specific Alarms
 - Data link processing of the Concentration, Maintenance, Alarm, and Switch (CMAS) bits
 - Operates in MODE I, MODE II and/or MODE III
 - Allows the implementation of either the Local Digital Switch (LDS), the Remote Terminal (RT), NOTE side of the interface
- 

SBE WAN Hardware Modules



	Form Factor	# Ports	Sync Serial	T1/E1	T3 and/or E3	H.110/H.100	Channelized	Driver Support *
adaptPCI-1T3E3	PCI	1		■			L	
wanPCI-CxT1E1	PCI	1/2/4	■			■	L, S, NB, FB	
wanPCI-HC4T1E1	PCI	4	■		■	■	L	
wanPCI-1T1E1LP	PCI	1	■				L, S, NB, FB	
wanPMC-C1T3	PMC	1		■		■	L	
wanPMC-xT3E3	PMC	1 or 2		■			L	
wanPMC-CxT1E1	PMC	1/2/4	■			■	L, NB, FB	
wanPTMC-256T3	PTMC	1		■	■	■	L	
wanPTMC-C4T1E1	PTMC	4	■		■	■	L	
wanPTMC-C24TE1	PTMC	12 or 24	■			■	L	

SBE provides TMS pre-ports to Linux only

* L = Linux; S = Solaris; NB = NetBSD; FB = FreeBSD

■ SBE WAN module bundled with TMS software
 ■ TMS option available

NComm TMS Software Modules

	T1	E1	T3	E3	SONET	SDH
Configuration and Alarms	■	■	■	■	■	■
Performance Monitoring	■	■	■	■	■	■
Channel Associated Signaling	■	■	■			
SLC-96 (TR-008)	■	■	■			
Primary Rate Interface - ISDN (User Side)	■	■	■			
National ISDN - 2 Models	■	■				
Lucent 4ESS Switch Type	■	■				
Lucent 5ESS Switch Type	■	■				
Nortel DMS Switch Type	■	■				
VT/TU Mapping	■				■	■
Automatic Protection Switching (Linear)	■				■	■

■ Pre-ported and tested on select SBE WAN modules
 ■ Future SBE release
 ■ Optional license available
 ■ Not Applicable

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