SmarTrunk Systems, Inc.

SmarTrunk II®

DIGITAL TRUNKING SYSTEM

THE WORLD'S MOST POPULAR VHF/UHF RADIO TRUNKING PROTOCOL

- Proprietary digital signalling prevents unauthorized mobile users
- Supports PTT (Push-to-Talk) dispatch, private calling, radiotelephone, and conventional operation
- Operates in environments with co-channel users
- May be installed in parallel with a conventional repeater system
- Up to 16 trunked channels per system
- Over 4,000 ID's for group or individual calling
- Remote "Radio Kill" to disable illegal or non-paying customers
- Store and forward dialing, just like cellular phones
- Last number re-dial; Automatic 10 number speed-dial
- Affordable alternative to cellular, PCS, and other radio trunking formats (Smartnet®, LTR®, MPT, etc.)

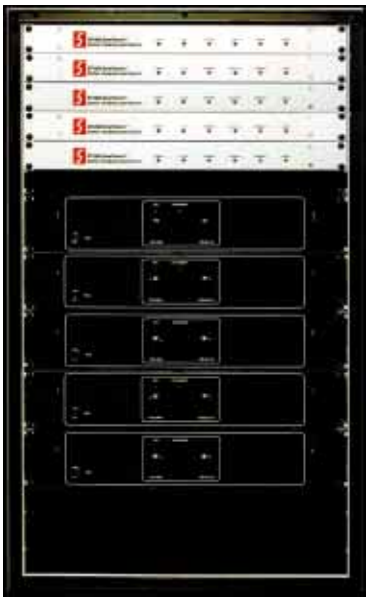
A WORLD STANDARD TRUNKING SYSTEM

The SmarTrunk II Digital Trunking System is designed to provide sophisticated trunking and telephone interconnect features using low cost two-way radio equipment at frequencies below 800 MHz. First introduced in 1994, the SmarTrunk II trunking protocol is now offered by most of the world's leading radio manufacturers, including Alinco, Icom, Kenwood, Motorola, Standard, and Yaesu/Vertex. There are now over 5,000 SmarTrunk II systems operating in over 90 countries worldwide.

The proprietary SmarTrunk II trunking protocol provides automatic channel acquisition and call privacy for systems of up to 16 channels and 4,000 subscribers. Many types of calls are supported, including mobile to landline, mobile to mobile, landline to mobile, group calling, emergency calls, as well as conventional operation. Best of all is the relatively low cost of both the base and mobile radio equipment, making SmarTrunk II the system of choice for trunking applications below 800 MHz.

THE SMARTRUNK II CONTROLLER

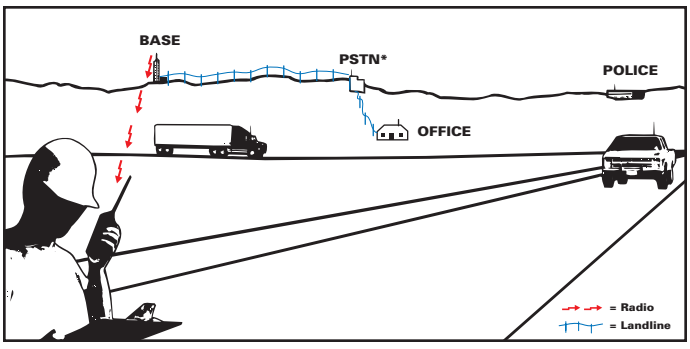
The heart of the SmarTrunk II System is the Digital Trunking Controller which performs all the signaling and trunking functions, including subscriber validation and call record accounting. The controller can be connected to any full duplex base station or repeater (one controller per channel), and may also be installed in parallel with a conventional tone panel.



For systems offering telephone interconnect, the ST-853 provides the interface between the base radio and the telephone system or PABX, making SmarTrunk II an ideal solution for in-plant paging systems.

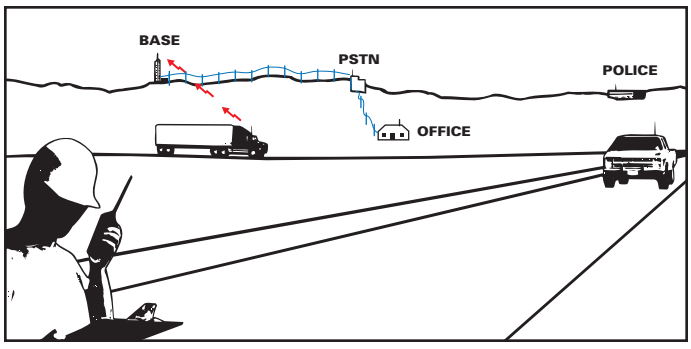
- Capacity for over 4,000 subscribers per system
- Over 300,000 paging codes available
- Over 4,000 call accounting records per channel
- Two subscriber telephone line inputs
- Proprietary signalling protocol highly immune to hackers and pirates
- User friendly PC programming, locally or remotely via modem
- Single access point for programming and system management
- Serial databus linking all controllers at a single site
- Multi-level password scheme for control of system access
- Versatile array of telephone interconnect features
- Priority and emergency call override feature
- Compatible with most radio base stations and repeaters

VERSATILE DESIGN PROVIDES A WIDE



Public Switch Telephone Network

LANDLINE TO MOBILE



MOBILE TO LANDLINE

Portable Radio

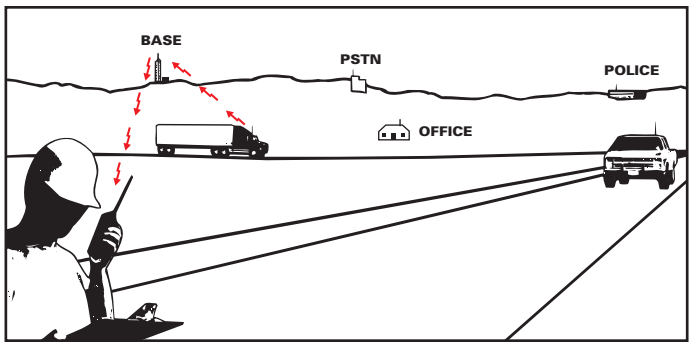
Modem

Telephone

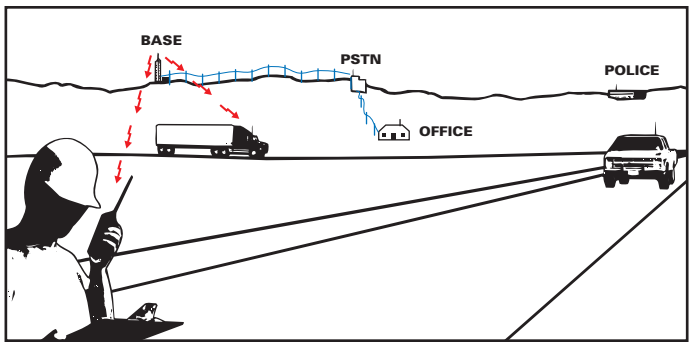
FAX

A SmarTrunk II system with mobile, portable, and fixed site users. Offering a wide range of flexibility, SmarTrunk II can support any combination of PTT dispatch, private calling, and radiotelephone applications.

VARIETY OF COMMUNICATIONS OPTIONS



MOBILE TO MOBILE



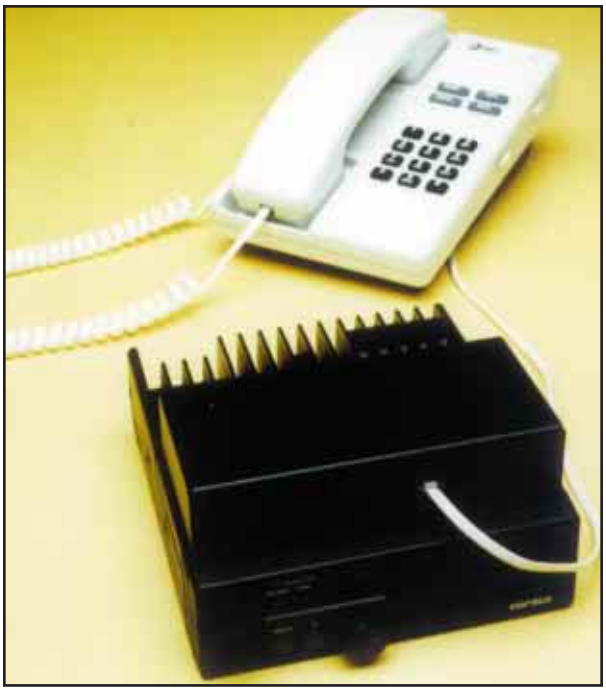
GROUP CALLING

ALSO AVAILABLE: SPECIAL RADIO/TELEPHONE INTERFACE MODULE

The ST-869 SmarTrunk II Radio/Telephone Interface Module provides the complete interface circuitry between a half or full duplex RF transceiver and fixed station telephone equipment (telephone, fax machine or computer modem). When used with a full duplex transceiver, the ST-869 provides "POTS" (Plain Old Telephone System) service to remote locations where it is either impractical or uneconomical to run copper wire to subscriber sites.

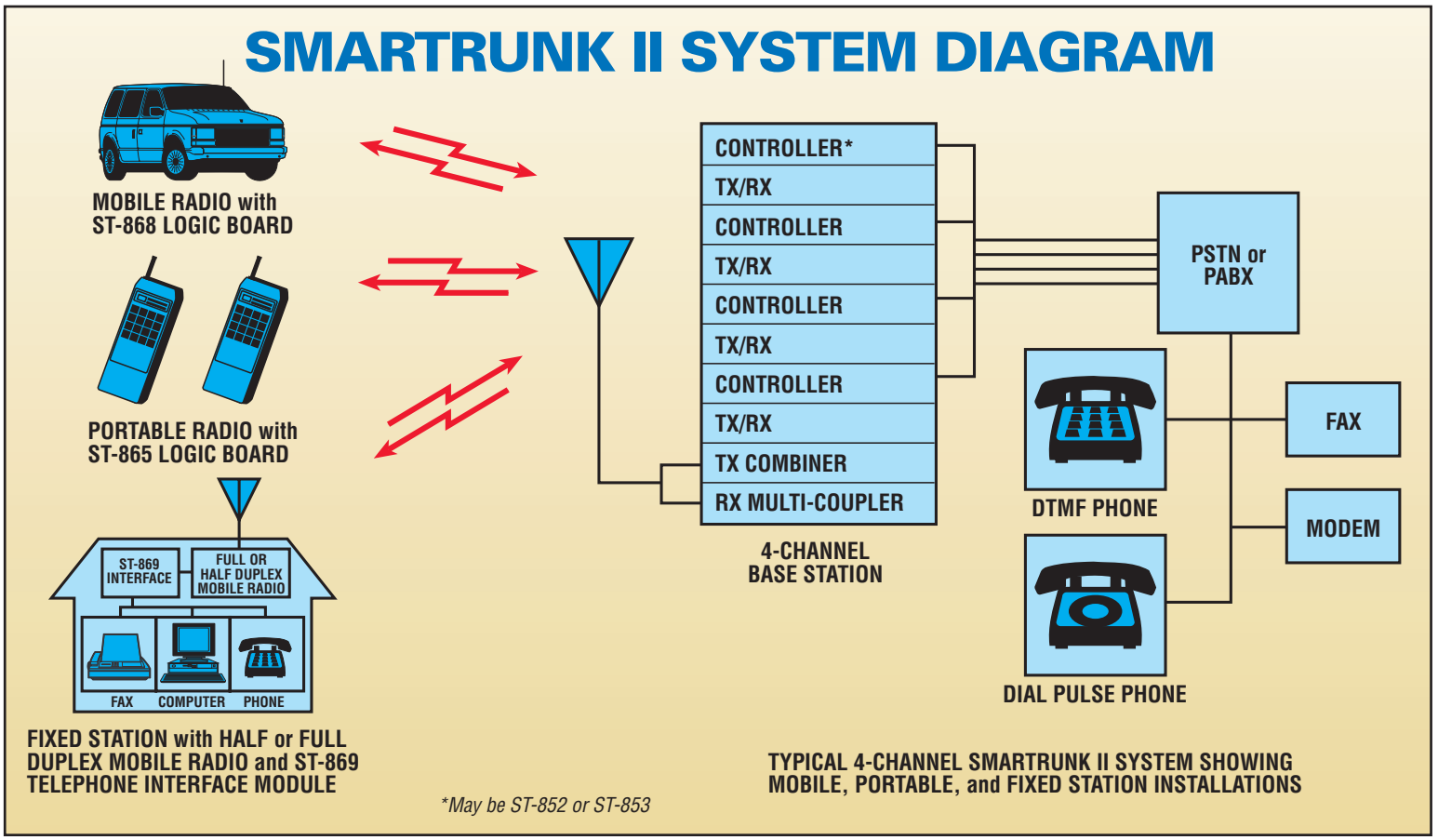
Common applications for this type of WLL (Wireless Local Loop) service include pay phones, public calling offices in small towns and villages, remote industrial sites such as mines and oil fields and rural homes, offices or vacation retreats. Features include:

- Connects directly to a standard telephone, fax machine, or computer modem
- Built-in VOX (Voice Operated Transmit) circuit for use with half-duplex radios
- 48V talk battery and 4.0 REN output rings up to four extensions
- Includes SmarTrunk II logic
- Works with the same SmarTrunk II base station as mobile and portable units



The ST-869 can connect directly to any telephone, fax machine, or computer modem. Compact size allows easy installation on many mobile transceivers.

SMARTRUNK II SYSTEM DIAGRAM

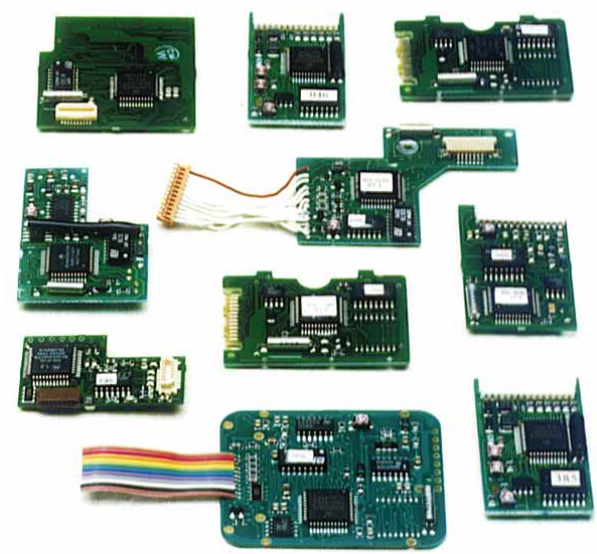


*May be ST-852 or ST-853

SMARTRUNK II LOGIC BOARDS

A key component of the SmarTrunk II system is a miniature logic board which installs inside the mobile or portable radio equipment. Specified as the ST-865XX or the ST-868-XX, these logic boards are custom-designed for each radio and control all the signaling and trunking functions, including scan, PTT, and monitor.

SmarTrunk II logic boards are available from SmarTrunk distributors or directly from the radio manufacturer or dealer. In most cases, the logic boards are designed to plug into the host radio equipment for a simple field installation. In some cases, solder connections are required. Detailed installation and programming instructions are provided for each logic board.



NEW "OMNI" FEATURE SET FOR SMARTRUNK II LOGIC BOARDS

Logic boards for newer radio models offer the latest SmarTrunk II Omni Feature Set with new capabilities found only in more expensive trunking systems:

- **Multiple channel banks**—for roaming and wide area applications. Allows user to easily select different banks of radio frequencies or different talk groups with the turn of a switch or press of a button.
- **Multiple PTT groups**—up to 16 different talk groups selected with channel select switch or function button. Ideal for users who frequently change work assignments.
- **Multiple receive groups**—allows user to receive several different pre-programmed talk groups. Useful for supervisory monitoring and control.
- **SmartScan**—remembers open channels on each scan cycle. Provides faster channel access, especially on larger systems.
- **Positive Radio Kill**—allows a system operator to remotely disable a lost or stolen radio.
- **PC Programming**—integrated with radio software for easy programming of logic board parameters.

Note: Actual features may vary from model to model. Contact factory for details.

LOGIC BOARDS ARE AVAILABLE FOR MANY POPULAR RADIO MODELS

Portable Radios

Alinco DJ-191/680
Alinco DJ-195/196**
Icom IC-F3/F4 Series**
Icom IC-F30/F40 Series**
Kenwood TK-270/278
Kenwood TK-370/378
Kenwood TK-270/278G**
Kenwood TK-370/378G**
Motorola GP68
Motorola GP88
Motorola GP300
Motorola GP350
Motorola P1225**
Motorola Pro Series**#
Motorola ELP Series**
Standard HX270
Standard HX290**
Yaesu/Vertex VX10**
Yaesu/Vertex VX210**
Yaesu/Vertex VX400**
Yaesu/Vertex VX500
Yaesu/Vertex VX800**

Mobile Radios

Alinco DR-108/130/140/430
Alinco DR-135**
Alinco DR-605*
Icom IC-F310/410**
Icom IC-F320/420**
Icom IC-F1010/F2010**
Icom IC-F1020/F2020**
Kenwood TK-760/768
Kenwood TK-860/868
Kenwood TK-760/768G**
Kenwood TK-860/868G**
Motorola GM300
Motorola GM350
Motorola M216
Motorola Pro Series**
Motorola SM50
Motorola SM120
Motorola M1225**
Ranger SM-1630-US*
Ranger SM-1645-HS*
Standard GX1608
Tait T-2000 series
Telemobile TM-MTD25*
Yaesu/Vertex FTL-2011/7011

** Full duplex models ** Omni Feature Set # Not available for European 5-tone models*

SMARTRUNK II SYSTEM SPECIFICATIONS

Subscriber Database

Number of subscribers	Up to 4,096
Call records database	4,500 per channel, storage programmable by call type, saved as ASCII text file
Call record	Contains subscriber number, time/date, number dialed, call duration, call type, channel used
Time-date stamp	Recorded by internal real time clock
File transfer	Site data is uploaded or downloaded from one controller

Programmable Subscriber Features

Subscriber Number	1 to 5 digits
Subscriber Paging Code	6 digits (320,000 combinations)
Type	Half duplex, full duplex, or group
Call limit timer	30 seconds to 60 minutes
Mobile activity timer	1 to 255 seconds
Mobile to mobile calls	Enabled or disabled
Courtesy beep	Enabled or disabled
Telephone line access	Enabled or disabled on a per line basis
Toll restriction	Up to 8 restricted prefixes and 8 override prefixes

Signalling Specifications

Paging codes	Digital BPSK (SmarTrunk II)
Busy channel indicator	CTCSS tone or carrier

Repeater Interface

PTT	2 form C relay contact
Transmit audio	0–3.0V P to P adjustable
CTCSS output	0–3.0V P to P adjustable
Receiver audio	200mV RMS to 2.0V RMS
Squelch	By internal squelch circuit or by external control

Telephone PSTN Interface

Interface type	Loop start (local loop) or 4 wire E&M (optional)
Number of lines	2 telephone line inputs
Connection	Via RJ-11C modular
Protection	MOV
Ringer equivalence	0.4 REN
Regeneration	By DTMF or dial pulse
Telco decoding	By DTMF or rotary dial click detector
Overdial completion	By overdial length parameter or DTMF (*) detection
Call progress tones	Ringback, busy, go-ahead beep
Disconnect	Upon busy, dialtone, or DTMF (#) detection; by timer
Regulatory approvals	U.S. FCC Part 68 and 15 Class A; Canada DOC; Russia MOC; Australia/New Zealand AUSTEL

Controller Programming

Software	User friendly, PC-based DOS application
Local programming	By RS-232 serial port at 9600 Baud
Remote programming	Via external 9600 baud modem
Mobile answer timer	1–255 seconds
Custom sign-on message	Up to 20 characters
Programming security	Two-level password scheme, up to 8 characters each
Morse Code Station ID	Up to 20 characters
Line 2 priority override	Enabled or disabled
Emergency telephone #	Up to 16 digits
Telephone line options	Incoming and outgoing calls enabled or disabled on a per line basis, programmable auto routing

Other Specifications

Call types	1. Mobile to landline 2. Landline to Mobile 3. Mobile to mobile 4. Group dispatch call 5. Operator call 6. Emergency call 7. Priority override
Data retention	Nonvolatile RAM with battery back-up
Controller communication	Serial databus
Front panel indicators	Power, Carrier, Transmit, Connect, Telco, Line 2
Rear panel connectors	DB-9 serial port, DB-25 repeater connector, two 4 wire modular databus connectors, two RJ-11C telephone line connectors
Operating voltage	13.6VDC ±20%
Operating current	100mA average, 250mA max
Operating temperature	–25°C to +65°C
Housing size	19.0" x 6.25" x 1.75" rack mount

ST-869 Radio/Telephone Interface Module

Telephone handset interface	Standard RJ-11C jack which supplies talk battery to a standard telephone set; supports manual or fully automatic operation
PTT switching	Built in VOX (Voice Operated Switching) for half duplex operation, continuous for full duplex operation
Signalling	SmarTrunk II Digital Signalling
Talk battery	48VDC
Ringer equivalence	4.0 REN
Ringing voltage	90VAC at 20Hz

Specifications and descriptions subject to change without notice.

SmarTrunk Systems, Inc.

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Revised 10/00