

Product Description

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Qualified Persons

 **WARNING**

Only qualified persons knowledgeable in the installation, operation, and maintenance of overhead and underground electric distribution equipment, along with all associated hazards, may install, operate, and maintain the equipment covered by this publication. A qualified person is someone trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from nonlive parts of electrical equipment
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed
- The proper use of special precautionary techniques, personal protective equipment, insulated and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment

These instructions are intended only for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

Retain this
Instruction Sheet

NOTICE

Thoroughly and carefully read this instruction sheet before installing or operating an IntelliNode Interface Module. Become familiar with the Safety Information on page 4 and Safety Precautions on page 5. The latest version of this publication is available online in PDF format at sandc.com/en/support/product-literature/.

Retain this
Instruction Sheet

This instruction sheet is a permanent part of the IntelliNode Interface Module. Designate a location where users can easily retrieve and refer to this publication.

Proper Application

 **WARNING**

The equipment in this publication is only intended for a specific application. The application must be within the ratings furnished for the equipment. Ratings for the IntelliNode Interface Module are listed in the ratings table in S&C Specification Bulletin 1043-31.

Special Warranty Provisions

The standard warranty contained in the seller's standard conditions of sale, as set forth in Price Sheets 150 and 181, applies to IntelliNode Interface Modules, except that the first and second paragraphs of said warranty are replaced by the following:

(1) General: The seller warrants to the immediate purchaser or end user for a period of 10 years from the date of shipment that the equipment delivered will be of the kind and quality specified in the contract description and will be free of defects of workmanship and material. Should any failure to conform to this warranty appear under proper and normal use within 10 years after the date of shipment the seller agrees, upon prompt notification thereof and confirmation that the equipment has been stored, installed, operated, and maintained in accordance with recommendations of the seller and standard industry practice, to correct the nonconformity either by repairing any damaged or defective parts of the equipment or (at the seller's option) by shipment of necessary replacement parts. The seller's warranty does not apply to any equipment that has been disassembled, repaired, or altered by anyone other than the seller. This limited warranty is granted only to the immediate purchaser or, if the equipment is purchased by a third party for installation in third-party equipment, the end user of the equipment. The seller's duty to perform under any warranty may be delayed, at the seller's sole option, until the seller has been paid in full for all goods purchased by the immediate purchaser. No such delay shall extend the warranty period.

The seller further warrants to the immediate purchaser or end user that for a period of two years from the date of shipment the software will perform substantially in accordance with the then-current release of specifications if properly used in accordance with the procedures described in seller's instructions. The seller's liability regarding any of the software is expressly limited to exercising its reasonable efforts in supplying or replacing any media found to be physically defective or in correcting defects in the software during the warranty period. The seller does not warrant the use of the software will be uninterrupted or error-free.

For equipment/services packages, the seller warrants, for a period of one year after commissioning, that the IntelliNode Interface Modules will provide automatic fault isolation and system reconfiguration per agreed upon service levels. The remedy shall be additional system analysis and reconfiguration of IntelliTeam SG system until the desired result is achieved.

Warranty Qualifications

The standard warranty contained in the seller's standard conditions of sale, as set forth in Price Sheets 150 and 181, is contingent upon the installation, configuration, and use of the control or software in accordance with S&C's applicable instruction sheets. This warranty does not apply to major components not of S&C manufacture, such as batteries, communication devices, and remote terminal units. However, S&C will assign to the immediate purchaser or end user all manufacturers' warranties that apply to such major components.

Warranty of equipment/services packages is contingent upon receipt of adequate information on the user's distribution system, sufficiently detailed to prepare a technical analysis. The seller is not liable if an act of nature or parties beyond S&C's control negatively impact performance of equipment/services packages; for example, new construction which impedes radio communication, or changes to the distribution system that impact protection systems, available fault currents, or system loading characteristics.

Safety Information

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to the product. Become familiar with these types of messages and the importance of these various signal words:

 **DANGER**

“DANGER” identifies the most serious and immediate hazards that will likely result in serious personal injury or death if instructions, including recommended precautions, are not followed.

 **WARNING**

“WARNING” identifies hazards or unsafe practices that can result in serious personal injury or death if instructions, including recommended precautions, are not followed.

 **CAUTION**

“CAUTION” identifies hazards or unsafe practices that can result in minor personal injury if instructions, including recommended precautions, are not followed.

NOTICE

“NOTICE” identifies important procedures or requirements that can result in product or property damage if instructions are not followed.

Following Safety Instructions

If any portion of this instruction sheet is unclear and assistance is needed, contact the nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C’s website **sandc.com**, or call the S&C Global Support and Monitoring Center at 1-888-762-1100.

NOTICE

Read this instruction sheet thoroughly and carefully before installing the IntelliNode Interface Module.



Replacement Instructions and Labels

If additional copies of this instruction sheet are required, contact the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

It is important any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

DANGER



The IntelliNode Interface Module line voltage input range is 93 to 276 Vac. Failure to observe the precautions below will result in serious personal injury or death.

Some of these precautions may differ from your company's operating procedures and rules. Where a discrepancy exists, follow your company's operating procedures and rules.

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|---|--|
| <ol style="list-style-type: none"> 1. QUALIFIED PERSONS. Access to the IntelliNode Interface Module must be restricted only to qualified persons. See the "Qualified Persons" section on page 2. 1. SAFETY PROCEDURES. Always follow safe operating procedures and rules. Always maintain proper clearance from energized components. 2. PERSONAL PROTECTIVE EQUIPMENT. Always use suitable protective equipment, such as rubber gloves, rubber mats, hard hats, safety glasses, arc-flash clothing, and fall protection, | <p>in accordance with safe operating procedures and rules.</p> <ol style="list-style-type: none"> 3. SAFETY LABELS AND TAGS. Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels and tags. Remove tags ONLY if instructed to do so. 4. MAINTAINING PROPER CLEARANCE. Always maintain proper clearance from energized components. |
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IntelliTeam® SG Automatic Restoration System

IntelliRupter® PulseCloser® Fault Interrupters, 6800 Series Automatic Switch Controls, and the IntelliNode Interface Module (used with a protective relay, recloser control, or remote terminal unit RTU), let Scada-Mate® Switching Systems, pad-mounted distribution switches, breakers, reclosers, or a mix of this equipment form teams that provide fast, fully automatic fault isolation and service restoration. Up to two automatic switch positions of the pad-mounted gear can be used and configured independently to provide additional flexibility for the transfer process.

Using peer-to-peer communications and distributed intelligence, team members protect a line segment by monitoring the feeder(s) for voltage loss and fault conditions, sharing information (both within the team and between teams) and making decisions on how to pick up load safely and effectively. With the IntelliTeam SG system, complex configurations with multiple alternate sources can be implemented.

IntelliTeam SG System Features

Distributed intelligence—The team does not require a SCADA master station for circuit reconfiguration, though the IntelliTeam SG system is compatible with SCADA systems using DNP.

Automatic load transfer—Team members can transfer load from their normal source to an alternate source to provide power to as many customers as possible. Teams coordinate automatic operations to prevent overloading of a feeder during transfer operations. Each team can have multiple alternate sources.

Return to normal—Team members can return the circuit to its normal configuration automatically when stable three-phase voltage has been restored to the faulted line segment.

READY status on LCD—The faceplate LCD reads “R” when the team is ready to take action, even if a transfer event has already occurred. It indicates there are no errors, faults, or team communication problems present.

Safety and reliability features—The IntelliTeam SG system is designed to avoid operational problems, such as opening a switch when the current is above the loadbreak rating. Features that help ensure team safety include the ability to limit the number of line segments picked up by a team, updated loading information, logic preventing extended parallel circuits, and the ability to lock out automatic operation so the control or line switch can be operated manually.

Local setup of remote team controls—When the team members have their RTU addresses set, the IntelliLink® Setup Software and a personal computer can be used to enter or change setpoint values for any team member on the communications network from a single control, even members of other teams. The IntelliLink software can speak TTY, DNP, and ICP.

Critical team information available locally—The IntelliLink software and local LCD can display critical data for all of the team members. Information is available for each team where the local control is a member.

Stand-alone operation fallback—If team operation is not possible, team members operate as stand alone controls.

IntelliNode Interface Module Overview

The IntelliNode Interface Module enables a host protective relay or recloser control to operate as part of an IntelliTeam SG system, with all normal team member logic and communications capabilities.

The IntelliNode Interface Module is the actual team member (the device included in the IntelliTeam SG system), and it polls and controls the host intelligent electronic device (IED). The interface module does not interfere with the normal protective functions of the IED. The interface module must receive an Open and Locked Out indication before it takes control of the IED. If the interface module is implemented with a switch control IED, it waits until it receives a Sectionalizer Tripped indication before it will issue any IntelliTeam SG system commands.

The host IED initiates sectionalizing or protection on overcurrent and voltage, and optionally the IED can initiate sectionalizing on an extended loss of voltage.



Figure 1. The remote faceplate and main chassis of the panel-mounted IntelliNode Interface Module.

During operation, the IntelliNode Interface Module continually polls the IED for status and analog data. Collected data are used for the IntelliTeam SG system process. In addition, the interface module exchanges information with the other team members as needed. When the IntelliTeam SG system action is required, the interface module provides the interface to, and operates the IED in response to, IntelliTeam SG system requirements.

The IntelliNode Interface Module includes the following major components, as shown in Figure 1 on page 7 and Figure 2 on page 8.

Panel-mounted interface module—A corrosion-resistant aluminum case with Velcro attachment can be installed in most IED enclosures.

Rack-mounted interface module—A standard 19-inch (48-cm) wide, 3U high rack-mount case installs with protective relays in the substation and in recloser control enclosures.

Faceplate LCD and navigation controls—These permit local, easy viewing of team status without a portable computer.

Faceplate LEDs and switches—Clearly labeled LEDs display information about team readiness, automatic operation, and communication activity.

Faceplate local communication access ports—These enable users to connect a computer to the interface module and use IntelliLink software to view data, change setpoints, download logged data, and update interface module software.

IED communication port—The port connects to the host control device and communicates using the DNP 3.0 protocol. The interface module is configurable to use DNP points as they are mapped in the host device to satisfy the data requirements of the IntelliTeam SG system.

Radio communication ports—Two communication ports connect to an IntelliTeam SG system-compatible communication system and the SCADA system radio. The DNP points list is configurable.

Power requirements—The IntelliNode Interface Module can be ordered for a specific power requirement of 12 Vdc, 24 Vdc, 48 Vdc, 125 Vdc, 120 Vac, or 240 Vac.

Communication equipment—The IntelliTeam SG system uses the DNP 3.0 protocol and a radio or fiber-optic modem for peer-to-peer communication. A radio system or fiber-optic modem can be used for two-way DNP 3.0 protocol communication between the interface module/host IED and the SCADA master station.

IntelliTeam SG system software—The software resides in the IntelliNode module and manages the moment-by-moment functioning of the installation. The software can be easily updated with the IntelliLink software update utility. Version upgrades are handled by a software update, and the computer chips don't need to be replaced.

IntelliLink software—The software verifies and changes all setup and configuration parameters, monitors real-time operating data, performs troubleshooting, creates reports, and exports data for use in spreadsheets. The IntelliLink software resides on the portable computer and runs in the Microsoft® Windows environment.



Figure 2. A rack-mounted IntelliNode Interface Module.

Feature Comparison

Table 1. 6800 Series Automatic Switch Control compared with the IntelliNode Interface Module

Feature	6800 Series Controls	IntelliNode Interface Module
Sensor inputs	Current and voltage sensors	No
Faceplate display	LCD displays team information, real-time data, automation parameters, event logs, maintenance information and fault settings	LCD displays team name, status, real-time load, setup information, and maintenance information
Line monitoring	True RMS voltage and current	Polled host IED data for voltage and current
Data logging	Logs voltage, current, kvars, power factor, overcurrent, loss of voltage, fault magnitude, fault duration, and equipment diagnostics	Extensive diagnostic data logging
Information storage	Non-volatile battery backed RAM	Non-volatile compact flash card and internal non-volatile RAM
Overcurrent protection	Coordinates with source-side protective device	No-host IED provides protection
Loss of voltage (LOV) protection	Opens switch at LOV or coordinates with source-side protective device	Host IED provides protection and optionally provided by the interface module
Phase unbalance protection	Opens switch on loss of phase or phase unbalance	Host IED provides protection and optionally provided by the interface module
Fault interrupting	Selectable shots-to-lockout prevents the source-side protective device from reclosing into a fault multiple times	No-host IED provides fault interruption
Automatic sectionalizing	Coordinating with source-side reclosing device, the control can help reduce loss of service and locate faulted line sections	Host IED provides sectionalizing, optional 3-phase and single-phase sectionalizing
IntelliTeam SG automatic restoration	IntelliTeam SG restores service to as many unfaulted line segments as can be supported by alternate sources	IntelliTeam SG system restores service to as many unfaulted line segments as can be supported by alternate sources
Return to normal	Teams can automatically return to normal starting with teams closest to the restored normal source	Teams can automatically return to normal starting with teams closest to the restored normal source
Sensor powered	Optional	Not available
Battery back-up power	Standard battery system with automatic charging and battery monitoring	No
SCADA communications	DNP 3.0 protocol using a radio system or fiber-optic modem	DNP 3.0 protocol using a radio system or fiber-optic modem

**IntelliNode Interface
Module Features**

Dependable quality—Electronics are manufactured in an ISO 9001-certified plant.

Toughness and reliability—Module is designed to withstand the difficult environmental and electrical conditions found in electric distribution applications.

Flexible communications capabilities—The local communications port on the face-plate allows connection of a portable computer to access the interface module with IntelliLink software. Three chassis-mounted serial ports allow DNP 3.0 protocol communication with the host IED, a radio, and the SCADA system radio.

Setpoint control of IntelliTeam SG system parameters—Automatic operation options, address information, and other operating parameters can be viewed and changed as needed.

Non-volatile memory—Programming, setpoint configuration, and operation data are stored in nonvolatile RAM on the processor board. The compact flash card is an optional location for storing long-term data logging information.

Real-time clock—A crystal-controlled clock, with a back-up battery, provides accurate timestamping of real-time data.

Optional GPS clock—The clock provides a time standard that is accurate at all locations.

**Suggested Team
Setup Procedure**

Figure 3 on page 12, Figure 4 on page 13, and Figure 5 on page 14 show the normal order for setting up an IntelliTeam SG system.

NOTICE

These flowcharts assume the team consists entirely of IntelliNode Interface Modules controlling a protective relay or recloser control. If the team includes S&C 5800 Series Automatic Switch Controls, refer to Instruction Sheet 1042-501.

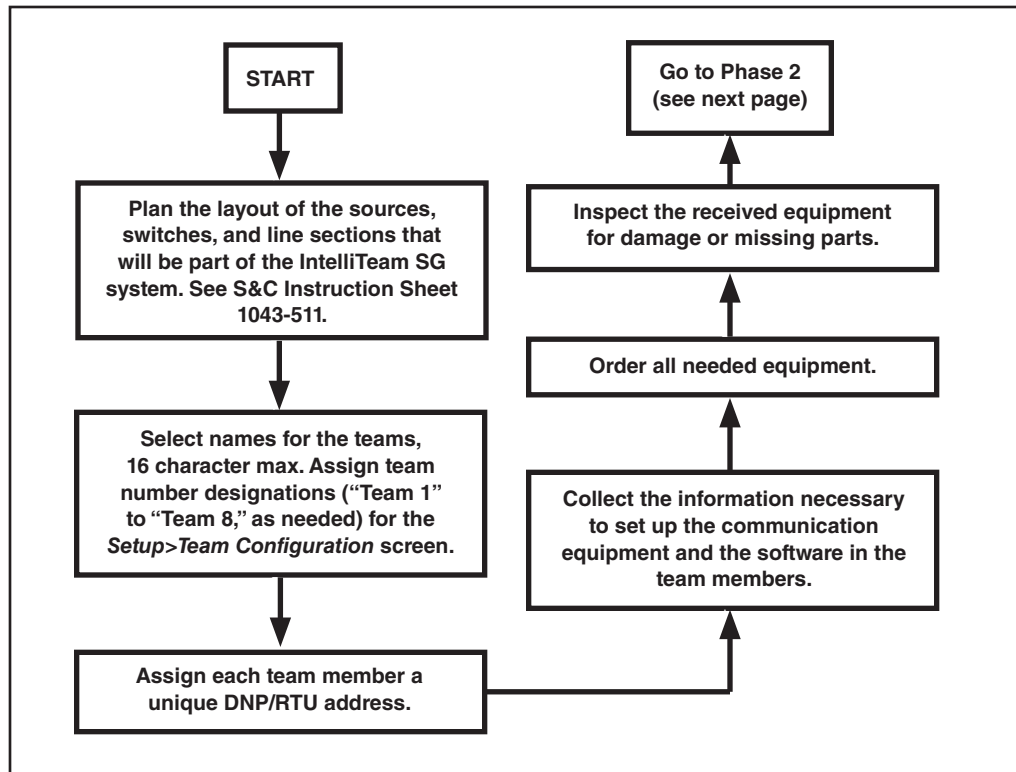


Figure 3. Suggested team setup procedure – Phase 1.

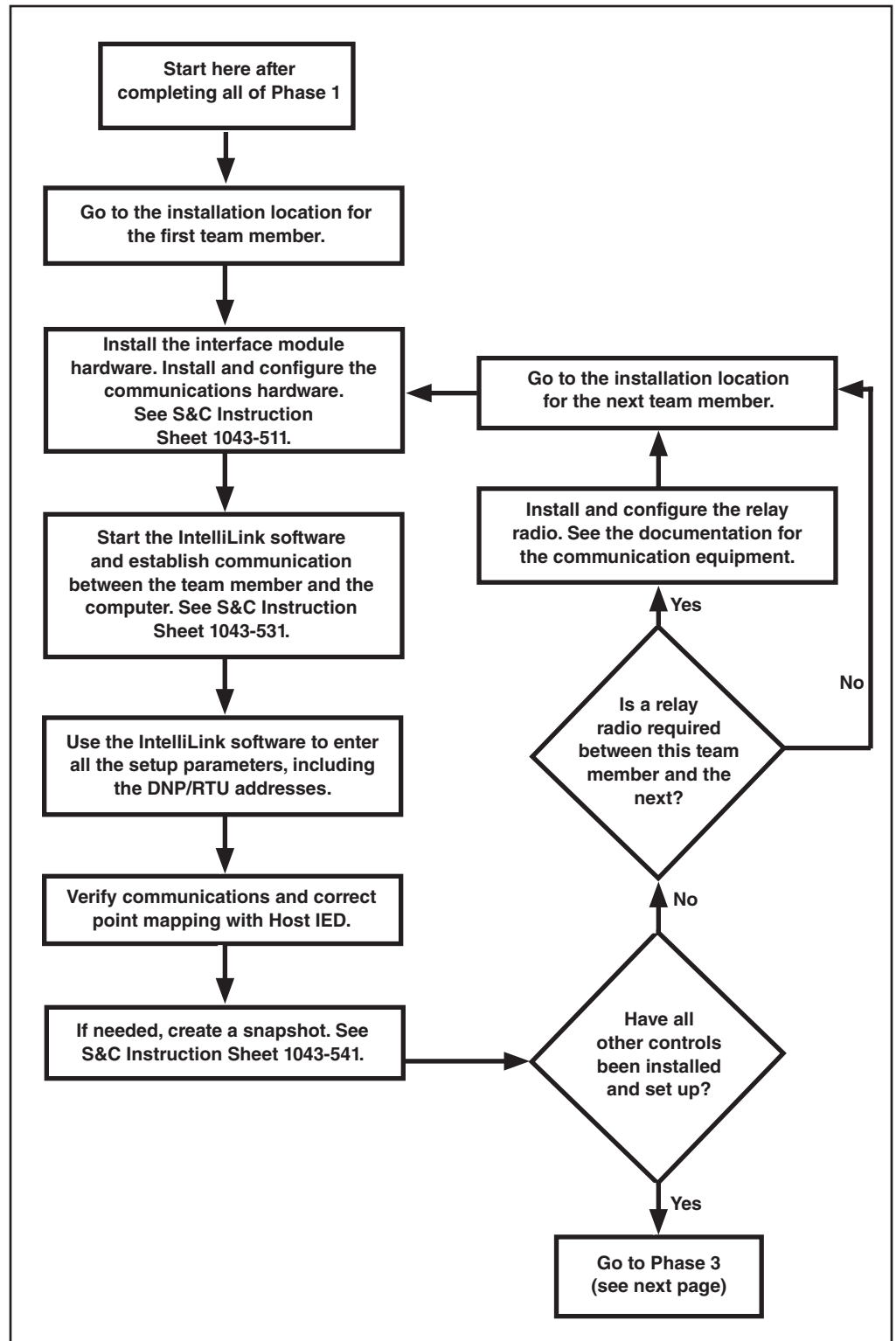


Figure 4. Suggested team setup procedure – Phase 2.

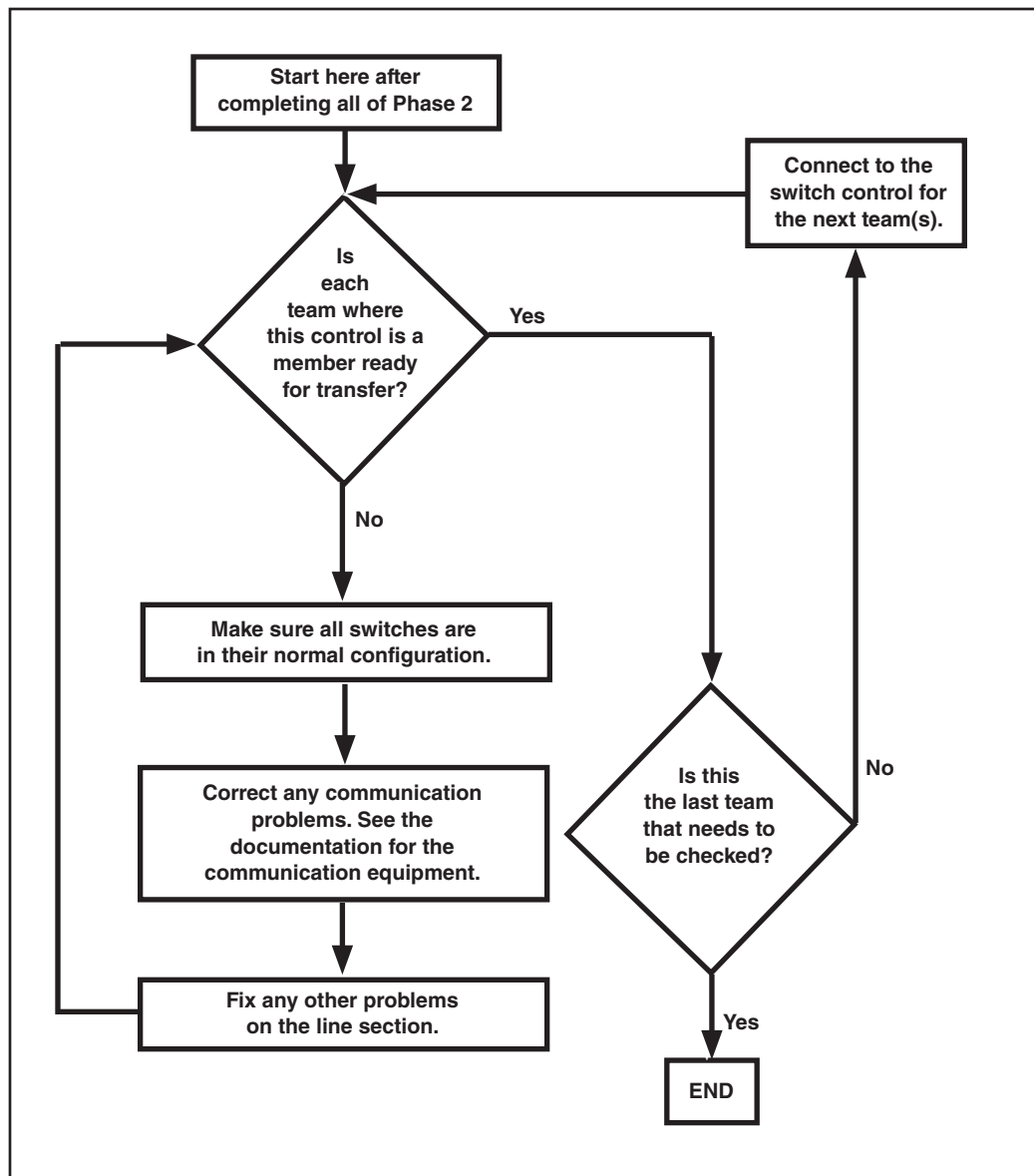


Figure 5. Suggested team setup procedure – Phase 3.

This completes the IntelliNode Interface Module product description.

Go to S&C Instruction Sheet 1043-511 for installation instructions.