INTELLIGENT CONTROLS

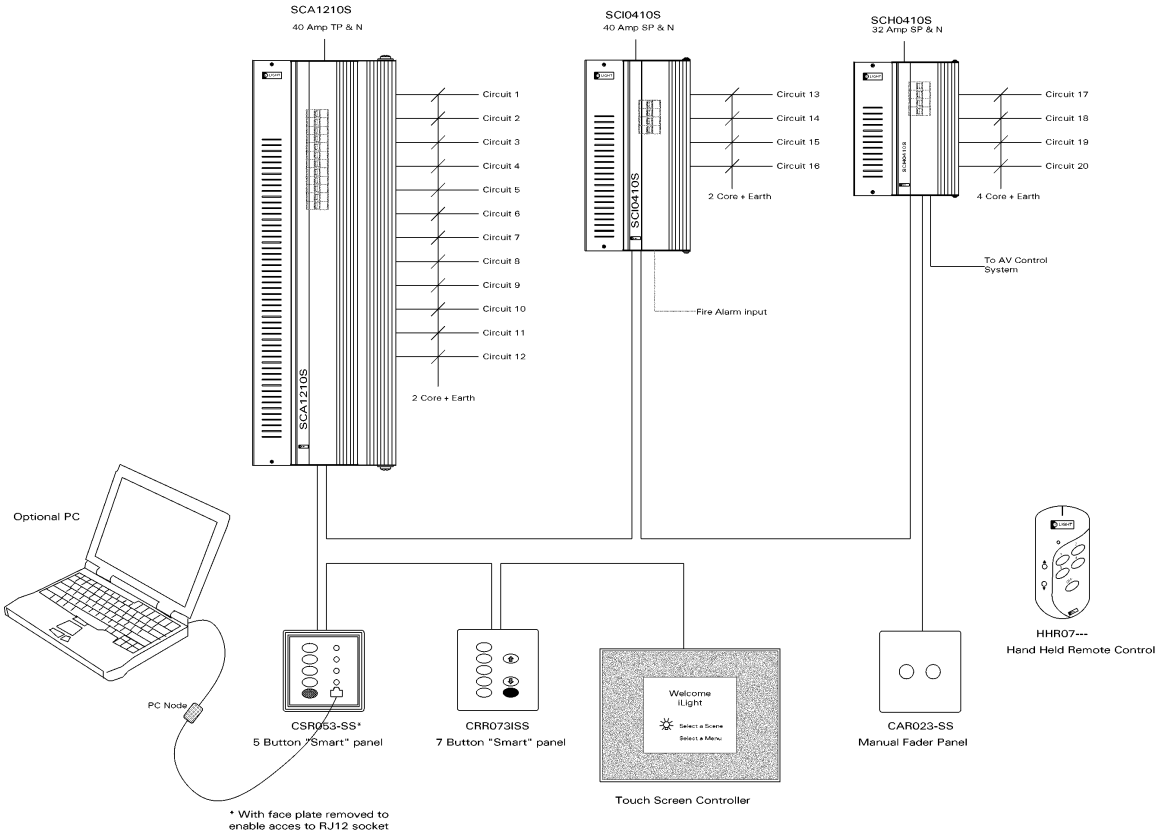
iCANnet™ Network

The iCAN™ network is the data connection system which connects all of the devices (Source Controllers, User Interfaces, Auxiliaries and Accessories) together and enables them to communicate with one another in an intelligent manner.

The iCAN™ network is based on the CAN bus network. CAN is an acronym for Controller Area Network. This is a bus system developed by Robert Bosch GMBH, for use in the automotive industry. Because it was developed to work in highly hostile environments with excessive noise, vibration, extreme temperatures and environmental conditions, it is intrinsically stable and reliable.

The iCAN™ network transmits data at 50k baud. This data rate ensures data integrity and at the same time is sufficiently fast to ensure rapid transfer of configuration data between a PC running the iCANsoft™ programming software and the devices connected on the network. The fast data rate reduces programming time and thus the time required on site during the commissioning and programming phases of a project.

Figure 1: typical system



The terminology used in the iCAN™ network (iCANnet™) is node, physical segment and logical segment. A node is any single device connected to the network. Multiple devices connected together form a segment. There are two types of segment – physical and virtual. A physical segment is capable of connecting together 100 nodes. A virtual segment is a number of physical segments which are connected together using repeaters and can contain no more than 255 nodes.

Each physical segment may be up to 1000 metres in length using CAT5 FTP cable. 255 virtual segments can be connected together on either a CAN or Ethernet backbone, using network bridges.

Thus 65,000 devices may be connected together in one iCANnet™ system. iCANnet™ systems may be interconnected by a number of methods including Ethernet, modem and the internet as shown on the next page.

Contact the iLight™ customer support help-line for further information on a reliable process to cable a large network

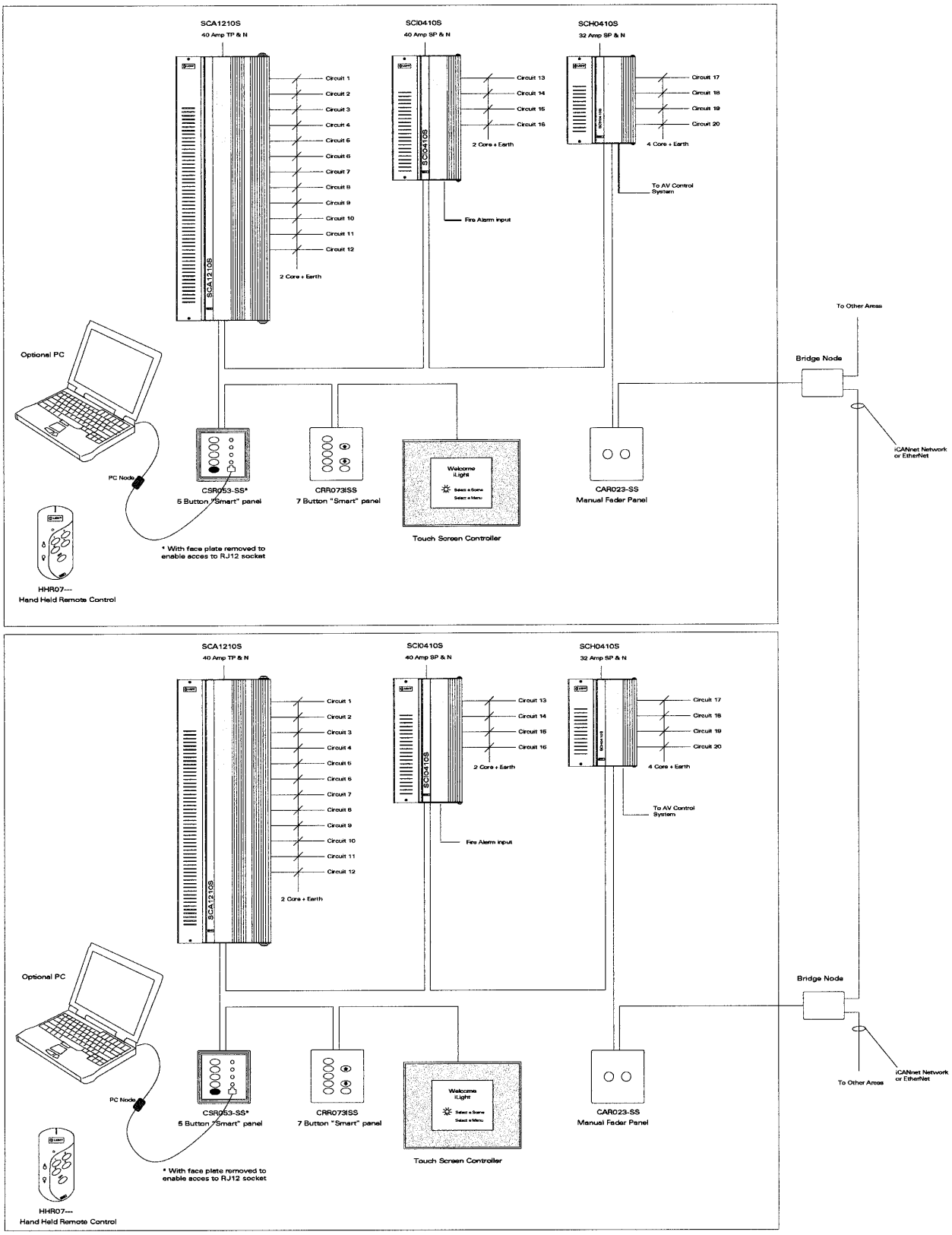

SCA1210S
40 Amp TP & N
SCI0410S
40 Amp SP & N
SCH0410S
32 Amp SP & N
Circuit 1
Circuit 2
Circuit 3
Circuit 4
Circuit 5
Circuit 6
Circuit 7
Circuit 8
Circuit 9
Circuit 10
Circuit 11
Circuit 12
2 Core + Earth
Circuit 13
Circuit 14
Circuit 15
Circuit 16
2 Core + Earth
Circuit 17
Circuit 18
Circuit 19
Circuit 20
4 Core + Earth
Fire Alarm input
To AV Control System
To Other Areas
Bridge Node
iCANnet Network or EtherNet
Optional PC
PC Node
CSR053-SS*
5 Button "Smart" panel
CRR073ISS
7 Button "Smart" panel
Welcome
iLight
Touch Screen Controller
CAR023-SS
Manual Fader Panel
* With face plate removed to enable acces to RJ12 socket
HHR07---
Hand Held Remote Control

Figure 2

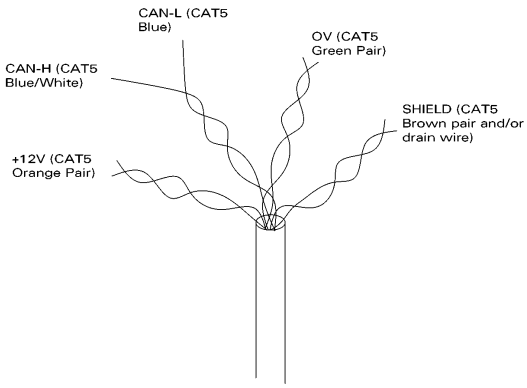
Network Architecture

The network itself utilises a four pair CAT5 FTP (screened) data cable, to which various devices or "nodes" are connected.

The wires of two of the pairs are used together to reduce volt drop. One of these pairs is used for +12volt and the other for ground (GND). One pair is used for data. The remaining pair is used for the shield (and/or drain wire).

The connections are:

- +12V (orange and orange/white)
- CAN_H (blue/white)
- CAN_L (blue)
- 0V (green and green/white)
- SHIELD (brown and brown/white and/or drain wire)



In this system the concept of a centralised controller and the complicated task of "binding" individual slave devices to the central controller is completely eliminated. Each individual device will inherently know what it is (by means of the firmware in the CPU card within the product) and simply listen to and broadcast on to the iCANnet™. This means that in most cases, particular devices on the network do not know or care about others. They simply respond to network messages which are addressed to them and broadcast their own class of messages with no particular destination in mind.

A key principle of the iCAN™ network is that all the functions associated with a particular device are located within that device. For example, all scene information is stored within the actual source controllers. This means that if any device should fail, only the functions associated with that device are lost and other devices on the network are not affected. From a maintenance point of view, this concept of self-contained units both speeds up fault finding and allows a high level of fault tolerance in large systems.

This "Broadcast Network" provides the necessary flexibility to ensure that the system can be easily and at low cost, altered or added to after installation, without the need for experts.

Network Addressing

The iCANnet™ network is extremely powerful and flexible. Each device requires an address which is made up of the following elements:

- Segment Number. There may be up to 255 segments in each network.
- Node Number. There may be up to 255 nodes within each network segment. Each physical device (source controller or panel) is a node.

Within each device there may be up to 255 Channels, each of which is individually addressable.

To make the system easier to use, all the circuits within a designated part of the installation (e.g. part of one room) can be assembled into an Area. Areas can then be assembled into Groups where required. For example one large room may be partitioned into several smaller rooms. The Channels in the smaller rooms are assembled into one Area per room. When the partitions are opened, the larger room will consist of two or more Areas. These together form a Group.

There may be up to 65,000 Areas on any one network. It is possible to assemble up to 64 Areas into a Group and there may be up to 64 Groups per network.

Grand Master messages may be sent to which all devices will respond, for example Fire Alarm override.

iCANsoft™ allows a network to be easily and quickly configured whether it is a small collection of devices or a large system consisting of numerous devices requiring many Areas and Groups. iCANsoft™ is designed for ease of use by the lighting designer and commissioning engineer alike.

iCANnet™ is a two way control system. This enables a supervisory controller to request, for example, the status of any device and receive a rapid reply.

Network Messages

iCANnet™ uses CANbus to transmit and receive messages. The powerful error checking built into the network controllers ensures message delivery, even for very busy networks.

The most common messages are:

Select Scene: Area Number (x) Scene number (y) @ (z) Fade Time. This allows one of 128 scenes to be set across as many as 65,000 areas, with a fade time of up to one hour.

Note: This is a very powerful message. As the scene levels are stored in the source controllers, it is possible to call up the same scene from many devices on the network. This makes it possible to have many different fade times for the same scene. Key uses of this are in (say) a restaurant, where they may have a 2 Scene

panel at the staff entrance door, a Touch Screen controller in the Maitre D' station and a Time Clock controller. Scene 1 would be the "Welcome" Scene. When this is selected from the entrance door control panel it might have a fade time of two seconds. Whereas the off scene from the same panel might have a thirty second fade time. However, when Scene 1 is selected from the Touch Screen, the fade time could be fifteen seconds, and if the off scene were selected from the time clock, it could be set to a fade time of five minutes.

We are not aware of any other system available today, that offers this level of control and flexibility.

Go To: These commands are typically used by Show Control systems and Audio Visual controls. "Channel 56 go to 75% over five seconds".

Grouping Areas/Channels: It is possible to group up to 64 areas. This function is primarily used for room joining between rooms with de-mountable partitions. It can also be used for corridor hold on, to allow lights to stay on in one area, when another area is still being used.

Status Echo: Using this command, an appropriate device can request the current network status. This will result in the current scene or channel level in an area being returned to the requesting device.

This is primarily used by LCD Touch Screen controllers. However, it is equally useful when the iCANnet™ network is interfacing to a BMS system or an AV System, so that it appears as one complete network to the user.

Network Configuration

Refer to Section 13 - Programming and Configuration, later in this binder.