

ARRI(GB) LTD., 1-3 The Airlinks, Spitfire Way, Heston, Middlesex TW5 9NR, England
Tel: 081-848 8881
Telex: 916075 ARRIGB G
Fax: 081-561 1312

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OPERATORS GUIDE

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Remote Interface Node





Introduction

The Remote Interface Node (RI node) forms an essential part of the network accessories that can improve the flexibility and reliability of your ARRI lighting control system. The RI node allows a complex network of data signals, both inputs and outputs, to be transmitted together in a simple 'bus' that is routed around your installation.

The RI Node communicates with the host console using a proprietary network called ETCNET, which is based on the Ethernet cabling system.

It is worth noting that while ETCNET uses the Ethernet cabling system and available network accessories, the data that is passed to and from the host console is *not* compatible with desktop computers or other systems using the Ethernet data structure. If you require any further information on using ETCNET or its accessories, then contact your lighting control supplier or ARRI(GB) for a copy of the ETCNET Planning and Installation Guide.

Remote Interface Node features

The RI node can support the following interfaces:

- ◆ 2 VGA monitors (mimicking the host console display)
 - ◆ 3 DMX outputs (Dimmers 1–1536)
 - ◆ 1 RS232 serial port for Designers Worksheet – DWS (Digitiser)
- Later software versions are planned to support:
- ◆ 1 Remote Focus Unit (RFU)
 - ◆ 1 Alpha-Numeric keyboard
 - ◆ 1 Parallel Printer

What is ETcNet?

ETcNet is a proprietary communications protocol based on the IEEE standard 802.3, also known as Ethernet. Data is passed from the host console to receivers or 'Nodes', using standard Ethernet network cables, Transceivers, Repeaters & Concentrators.

Ethernet networks can use a variety of cabling methods, below is a description of the three most common cable systems:

The choice of network cabling depends on the size of installation and interconnection requirements. If you require more detailed information on using Ethernet Cabling, then contact your local dealer or ARRI (GB).
To ensure that you are fully aware on cable installation techniques, read the ETcNet Planning and Installation Guide before starting your installation.

Thinnet

Thinnet cabling is perhaps the most simplest to use and install. Connections from the host console to Remote Nodes is made using common 50 Ω BNC plugs & 'T' pieces and 50 Ω Belden 9907 or RG58C/U Co-Ax cable. The maximum cable run using Thinnet is 185 metres (approx 600 feet) with a maximum of 30 network devices connected to the cable. Each end of the cable must be fitted with 50 Ω termination plugs. It is not allowable to have any single line spurs using Thinnet. As such, 'T' connectors are fitted directly to the network devices with the Thinnet cable 'daisy chaining' all of the devices together. To allow multiple drop points around a building, special Make-Before-Break Thinnet connectors are available from network suppliers. These connectors provide a high level of network security when connecting and disconnecting network devices.

Thicknet

Thicknet uses a heavier 50 Ω Co-Ax type cable, Belden 9880 and therefore is more suited to permanent installations with cable distances of between 200 metres to 500 metres (600 feet to 1500 feet). Like Thinnet cabling, the Thicknet cable must be terminated at both ends with 50 Ω terminators. Connections to all network devices are made through special 'Taps' that are permanently fitted to the Thicknet cable. This prevents the Thicknet bus cable from being interrupted when network devices are connected or removed. The Thicknet tap is connected to a Transceiver device that allows direct connection to AUI port, Thinnet port or RJ45 port on the host console or network device (node). Some Thicknet taps may have their own transceivers built in. The (drop) cable from the Transceiver to the network device may be up to 45 meters (150 feet)

Twisted Pair

This type of cabling system uses a twisted pair wire cable (STP or UTP) and RJ45 connectors. The cabling runs from the Node to a central Concentrator or 'Hub' which forms the common connection point for the network. All equipment on the network is connected directly to the Concentrator in a 'Star' configuration. The maximum distance from any network device to the concentrator is 100 metres (325 feet). Twisted pair cabling may be used to connect two network devices (eg host console and a node) together directly without the need for a central concentrator. However this requires the use of a Null Concentrator cable or adaptor and limits the 'network' to just two devices.

Do not attempt to use a standard twisted pair cable to connect two devices together without using a Null Concentrator.

How the RI Node is used

The Remote Interface Node can be used in a number of different ways depending on your requirements. It can be used to simply provide duplicate Remote Monitor outputs of the host console, (eg for the stage manager) or as a full remote programming station with Monitors and a Digitiser, or as a Remote DMX source. All of the input and output connections are constantly available without the need to set configuration modes.

Remote Monitor source

Once connected to the network using one of the wiring arrangements described above, the Node will provide a duplicate copy of the host console's screen outputs. All of the screens are copied down to the node apart from the graphical digitiser layout display. However this display is only used for information during programming of digitiser regions. The monitor outputs are standard VGA colour, ie the same as the host console.

For extra versatility a Remote Focus Unit (RFU) may also be plugged in to the node to give the Stage Manager the option of running cues, selecting channels, etc, from the same location.

Remote Programming Station

When connected to the network, the node can be used as a remote programming station for the host console. This is achieved by connecting a digitiser to the Node as well as two remote monitors. The digitiser then provides all the functions of the front panel of the host console as well as any pre-programmed regions. While the graphical digitiser layout screen is not displayed from the node, programming of regions is still available.

This arrangement allows an operator to fully control or programme the show from, say, a stalls position, without removing the host system from the control room.

Remote DMX Source

The Node has three DMX outputs that are an exact copy of the DMX outputs from the host console. This therefore allows the network to be used to 'pipe' the three DMX data lines around a large building in a single cable and bring out the DMX in any number of locations, eg alternative programming locations, 'spare' dimmer locations and the dimmer room. The monitor outputs can also be used to provide a display of the output screens in any location, along with Digitiser or RFU input for testing purposes.

Tracking Backup Systems

If you have a Tracking Backup system, where two control desks are linked together via the network, the Remote Interface Node can still be used as a Remote Programming station as well as a remote DMX source. The Master console communicates all of its DMX data & Monitors via the network to the Node.

Should a failure occur, then the Master console shuts down, passing control to the Slave console which then becomes the Master. Monitors and DMX etc. continue to be generated by the node. This arrangement therefore gives you a totally automatic changeover of DMX, Monitors and any accessories connected to the Node.

Installing the RI Node

To install the RI, follow these steps:

If you are installing the node for the first time, then you will need to configure both the Node and the host console to communicate via ETCNet.

The host console and the RI must be set up so they are able to communicate via the same ETCNet port.

Configuring the host console

1. Ensure that the host console is switched off.
2. Open the host consoles lid and support the lid.
3. Locate DIP switches S1 & S2. These switches select the ETCNet Port to be used. Follow the tables below to enable the required ETCNet Port.

THINNET Port (BNC connectors & RG58C/U cable)

S1	1 = Off
	2 = Off
	3 = Off
	4 = Off
	5 = Off
	6 = Off
S2	1 = On
	2 = On
	3 = On
	4 = On
	5 = On
	6 = On

Twisted Pair Port (RJ45 connectors and UTP or STP cable)

S1	1 = On
	2 = On
	3 = On
	4 = On
	5 = On
	6 = On
S2	1 = Off
	2 = Off
	3 = Off
	4 = Off
	5 = Off
	6 = Off

AUI Port (15pin D-Type to Transceiver)

S1	1 = On
	2 = On
	3 = On
	4 = On
	5 = On
	6 = On
S2	1 = Off
	2 = Off
	3 = Off
	4 = Off
	5 = Off
	6 = Off

4. Locate DIP switch S4. This switch selects the operational mode of the host console.
- a) If you have a single console, then to enable ETCNET to be used with NODES only, set S4 as follows.

S4
 1 = xx - Don't change
 2 = On
 3 = On
 4 = xx - Don't change
 5 = xx - Don't change
 6 = xx - Don't change
 7 = xx - Don't change
 8 = xx - Don't change

- b) If you have two consoles to be used in Tracking Backup, set switch S4 to the following positions in the Master and Slave console.

Master
 S4
 1 = xx - Don't change
 2 = On
 3 = OFF
 4 = xx - Don't change
 5 = xx - Don't change
 6 = xx - Don't change
 7 = xx - Don't change
 8 = xx - Don't change

Slave
 S4
 1 = xx - Don't change
 2 = OFF
 3 = On
 4 = xx - Don't change
 5 = xx - Don't change
 6 = xx - Don't change
 7 = xx - Don't change
 8 = xx - Don't change

5. Now the host console is set to communicate via the desired ETCNet port to the node, for either a Single console or Tracking Backup mode.
- Close the lid of the host console.

Configuring the RI Node

1. Ensure that the RI is disconnected from the mains supply.

2. The RI must be able to communicate with the host console through the appropriate ETcNet port. To set the correct ETcNet port to be used with the host console follow these steps:

i) Remove the four pozidrive screws securing the lid of the RI.

ii) Locate jumper set J22. This is positioned on the right hand side of the PCB close to the power inlet socket.

iii) Set the Jumpers as given below to enable the required ETcNet Port

THINNet Port (BNC connectors & RG58C/U cable)

J22: 1 to 6 Fitted,
7 to 12 Removed

Twisted Pair (RJ45 connectors & UTP or STP cable)

J22: 1 to 6 Removed
7 to 12 Fitted

AUI Port (15pin D-Type to Transceiver)

J22: 1 to 6 Removed
7 to 12 Fitted

Note: Do not change jumpers 13 or 14 on J22. These are factory set and the unit will not operate if they are disturbed.

iv) Replace the lid using the four screws removed above.

Connecting Up the Node and Console

Caution: Ensure that all signal connections are made to the node BEFORE power is applied to the system.

1. Place the node on a firm, stable, flat surface with at least 150mm of space behind it for ventilation and cable clearance. The unit should be at least 2m away from dimmers and high current A/C lines.

Caution: Do not leave the node in a flightcase tray or on a soft surface. This will inhibit proper ventilation.

Alternatively, the node may be mounted on a wall using secure fixings through the keyhole apertures on the base of the node.

2. Ensure that the front panel power switch is off (down)
3. Insert the female end of the power lead in the connector labelled **AC Input** on the node's back panel.
4. Insert the male end of the console power lead in a grounded 100–240 VAC outlet.

Caution: Do not use this equipment with an ungrounded power supply

5. Insert the video signal cables into the monitors (if necessary). Connect the opposite ends of monitor video cables in to the 15pin High Density D-type connectors marked **CRT 1** and **CRT 2**

6. Connect the monitor power cables to a suitable AC power source. The switched AC outlets on the rear panel of the node may be used.

7. Connect the RI node to the Network using either the BNC (Thinner), 15 Pin D-type (AVI port) or the RJ45 (Twisted pair/10BASE-T) connector.

Note: If you are using Thinner, then you must ensure that the network is not broken (open circuit) when connecting or disconnecting a node. If the network is broken, then the host console may disable network communications. If this occurs, finish connecting any network devices & cabling correctly, including terminations.

To restart network communications, turn the host console (or both consoles if using Tracking Backup) Off and On again.

8. Turn RI and monitor power switches to their **On** positions.

The Node will then display the monitor status of the host console and is now available for normal use.

Downloading Software

When you receive your node it should be programmed with the current version of software.

From time to time we issue software upgrades for the host console and this may require the node to be reprogrammed as well. Software Upgrades for control consoles are normally done direct from disk (occasionally they may also include a new EPROM for the console as well). Upgrading the Node is also done direct from disk, from the host console to the node, via the network.

NOTE: The nodes and host console MUST be running the same software versions to operate correctly. All consoles are shipped with the correct version of Remote Node Download software on disk. It may be necessary to perform the download operation if a node has been supplied at a later date to the console.

Should you need to upgrade the Node software follow these steps:

1. Connect the Node to a single, host console using the ETcNet network. Ensure that the host console has a monitor plugged in to monitor output **CRT1**
2. Turn the Node on
3. Place the 'Remote Node Download Disk' in to the disk drive of the host console.
4. Turn the host console ON.
5. The display on the host console will change to show a screen as below:

Remote Interface Downloader Vsn 1.??

This Device: xx:xx:xx¹
New RIU Code: V1.?

Remote Units				
Address	Type	Code Vsn	CRC	Status
nn:nn:n ²	RIU	1.?	???	--

Note 1) xx:xx:xx is the Ethernet address of the Host System
 Note 2) nn:nn:nn is the Ethernet address of the Remote Node

6. The softkeys along the bottom of the screen are used to select the required node to download software to.
To download new software to all of the nodes, press softkey [S1]
The display will now change the STATUS line to show **IN PROGRESS**
When the download is complete the STATUS line will now show **PASS**
When the all Nodes have 'passed', the download is finished.
7. Switch off the host console and Node(s). Remove the disk from the host console and switch on the console and Nodes.
All the Nodes should now show the Cue List and Output screen as normal.

Monitor connectors and pinouts

Colour RGB monitors

Signal
RGB, Analogue signal: VGA (640x480) compatible monitor

Console connector
15 pin High Density D-type, female

Pinout
1 Red (analogue)
2 Green (analogue)
3 Blue (analogue)
4 N/C
5 TTL Ground
6 Red Ground
7 Green Ground
8 Blue Ground
9 N/C
10 TTL Ground
11 N/C
12 N/C
13 Horizontal sync (TTL)
14 Vertical sync (TTL)
15 N/C

Connecting to dimmers

To drive dimmers, insert appropriate USITT DMX512 (1990) dimmer data cable(s) in the DMX output(s) connectors on the rear panel. There are three DMX outputs normally numbered as; Dimmers 1-512, 513-1025 and 1025-1536.

Note: These dimmer numbers are the default settings. You may offset any of the DMX output streams via the host console's **I/O Configuration** screen.

Digital output – USITT DMX512 (RS485)

The digital dimmer data signal may be connected directly to suitable digital dimming equipment conforming to the USITT DMX512 (1990) standard, or to ARRI CONNEXION Output Modules. The Output Modules decode the digital signals and output analogue, wire-per-dimmer, control signals adjustable between -12.5 and +12.5Vdc. If you are unsure on the suitability of your dimmer system using DMX512 (1990), contact your ARRI dealer.

Connector

XLR 5-pin female

Pinout

1	Common (screen)
2	Data (-) (DMX512)
3	Data (+) (DMX512)
4	Not used
5	Not used

Cable Type

Shielded twisted pair approved for RS422/485, eg Belden 9841, Alpha 5271, Proplex PC222T, should be used for runs of up to 1000 metres.

Installing Designer's Worksheet – DWS (Digitiser)

Remote Interface Node

The Designer's Worksheet is one of the remote units available for use with RI Node. It provides a full command interface, capable of replicating all of the console keys.

Follow these steps to install your Designer's Worksheet:

1. Insert the serial lead supplied with the digitiser into the socket on rear panel of the Digitiser labelled **Interface**.
2. Insert the (RS-232) 9-pin D-type socket of the Designer's Worksheet signal cable into the Ris connector labelled **Digitiser** on the front panel.
3. Insert the plug end of the pointing device (puck or stylus) in the digitiser connector labelled **Pen/Cursor**.
4. Attach the stylus holder to the upper left or right hand corner of the worksheet by removing the protective paper from the base and pressing the adhesive to the tablet.
5. Place one printed template sheet under the clear plastic flap on the graphics tablet.

Note: Additional Imagine 3 template sheets are available from your dealer or ARRI(CB).

6. Set the voltage selection switch to match your electrical outlet. In the UK, set the voltage switch to 220Vac.
7. Insert the power cord into the back of the worksheet and into a grounded 220-240 VAC outlet.

8. Set the three sets of DIP switches on the DWS as indicated on the chart below.

Switch A		Switch B		Switch C	
1	Off	1	Off	1	On
2	Off	2	On	2	On
3	Off	3	Off	3	Off
4	Off	4	On	4	Off
5	On	5	Off	5	Off
6	On	6	Off	6	Off
7	On	7	On	7	On
8	On	8	On	8	Off

9. Turn the DWS power on by pressing the on/off switch. The LED labelled **Indicator** on the digitiser's rear panel is lit when power is on and the unit is connected correctly.

10. At the host console, press [Setup], and select **1, System Settings**. Press [ENTER].

11. Select **10, Designer's Worksheet Setup**. IMAGINE displays Designer's Worksheet Options Menu. Select the digitiser size/layout that you wish to use. To disable the console's sliders in preference to the DWS sliders (if available on the tablet layout chosen), press softkey [S1].

Installing Remote Focus Unit

The Remote Focus Units is not yet supported by current RI Node software

When software support for the RFU becomes available, the Remote Focus Unit (RFU) allows you to set channels levels, check dimmers and record or run cues from remote locations. To install the Remote Control Unit, follow these steps:

1. Insert the RFU cable into the connector on the back of the console labelled **Remote Control**.
2. Turn RFU power switch to **On**.
3. The RFU will display an opening message then the current status of cues in playbacks

RFU connector and pinout

Console connector
XLR 6-pin female

Pinout

1	Data(+) from RFU
2	Data(-) from RFU
3	Data(+) to RFU)
4	Data(-) to RFU)
5	+12 volts DC supply
6	0 volts/shield

Cable Type

3 twisted pairs, overall screen, eg Belden 9503

NOTE: To avoid power supply volt drop in cable runs in excess of 50 metres, use Belden 9502 two twisted pair for pins 1-4 and two 2.5mm² wires for pins 5 and 6.

Installing the alphanumeric keyboard

The Alphanumeric keyboard is not yet supported by current RI Node software

When software support for the alphanumeric keyboard becomes available, you can use the keyboard to assign text names to cues, submasters, groups, and shows.

You can use a standard PC XT/AT compatible keyboard, in its AT-compatible mode. To be sure of compatibility, use ARRI part No Y2.YA016.0. Although you may be able to use keyboards from other manufacturers, ARRI does not guarantee the results.

Follow these steps to install the alphanumeric keyboard:

1. Be sure the selector switch is set to the AT position.

2. Insert the keyboard cable into the connector labelled **keyboard** on the node's front panel.

Note: ARRI consoles use the standard US keyboard layout. It is not possible to configure ARRI consoles to use special language characters or accents that may be printed on your keyboard.

Keyboard connector and pinout

Console connector
DIN 5-pin female

Keyboard pinout

- 1 Clock
- 2 Data
- 3 Reset
- 4 Ground
- 5 +5 Vdc

Installing a printer

The printer output is not yet supported by current RI Node software.

When software support becomes available, RI nodes will support parallel printers only, that are Epson FX80 compatible or Laser Printers that are Hewlett-Packard compatible. Printer functions can be activated from the host console or from the digitiser. The printer port uses standard IBM compatible parallel printer leads. Lead pinouts and connector specifications are shown below.

Follow these steps to install the printer:

1. Insert a standard IBM parallel printer cable into connector labelled **Parallel Printer** on the back panel of the node.
2. Insert opposite end of printer cable into printer.

The Printer is now ready for use.

Printer connectors and pinouts

Parallel printer and Centronics interface adaptor

Console connector
DB25F
Printer connector
Centronics D36

Pinout	Signal
1	STRB
2	D0
3	D1
4	D2
5	D3
6	D4
7	D5
8	D6
9	D7
10	N/C
11	Busy
12, 13	not used
14 to 25	nc
13 to 17, 19 to 36	