# MULTIFORMAT COMMUNICATION SYSTEM

## COURSE

The COURSE accommodates a set of up to 10 dual channel ISDN, Digital Hybrid (analog line), V35/X21 or TCP/IP communication boards in a 4-unit chassis with dual power supplies.

The AES-EBU inputs and outputs are optional. It also offers an ISDN universal terminal adapter to easily connect to the S (rest of the world) and U (US & Canada) interfaces.

The telephone Hybrid application offers pulse and/or DMTF dialing, detection of incoming ring signal and caller ID. The Hybrid Board has two telephone line connectors.

The TCP/IP Boards have a communication interface for encoded audio through Ethernet protocol TCP and/or UDP. The Ethernet connection is at 10/100 Base T Ethernet connection uses a RJ45 connector in the rear of the unit.



## APPLICATIONS

- It is an array of audio codecs, telephone hybrids and IP Links which can be remotely controlled by one PC.
- It establishes full-duplex audio channels through point-to-point X21 or V.35 digital line connections.
- Offers the following audio compression modes: G.711, G.722, MPEG II and III and Split Modes G.722/MPEG III.
- With the addition of the AEQ IMPACT Audio Router the Course transforms itself into a Multi-channel Talk Show System which is able to share the system resources from all studios.

## BENEFITS AND COMPETITIVE ADVANTAGES

- Member of the E@sy family: Enables remote control multi network access COURSE or any other AEQ E@sy products, which makes the units a cohesive, powerful and user friendly system.
- Space saver high capacity communication: in only 4-rack unit hosts 20 mono or 10 stereo channels.
- Built-in ISDN Terminal Adapter with dual port compatible with ETSI (Euro ISDN) and ANSI (USA & Canada) communication at 64 and 128 Kbps.
- Analog inputs and outputs with digital optional with 24 bits converters and SRC (Sample Rate Converter) on all digital I/O.
- Meets the needs of different budgets. The modular system allows from one up to ten boards in the chassis.
- Possibility to enhance to a Multi-channel Talk Show System with the AEQ Systel Software and the AEQ Impact Audio Router.
- Dual ISDN channel when used at 64 Kbps.
- Dual Telephone Hybrid with caller ID
- Echo cancellation capability.
- Frequency Extender available to improve the audio quality of telephone analog lines calls.

# MULTICOMMUNICATION BOARD SYSTEM

The system consists of modular chassis capable of hosting 10 communication boards, two power supplies auto range and redundant, a controller board with the E@sy RS422 remote control interface.

The COURSE uses an audio interface of 2 analog audio channels, with an optional digital audio interface.

Each board has A/D D/A converters of 24 bits, and isolation transformers in the analog I/O.  The Digital inputs have the transformers and the SRC (Sample Rate Converters)

## FUNCTIONS AND OPTIONS (PER BOARD)

### DRA - CODEC

2 Channel Audio Codec (stereo) Board. Includes:

**Designed to accept one or two digital AES/EBU I/O boards.  It has two transformer balanced inputs, two analog outputs and two DB-9 connectors for the digital AES/EBU I/O.  The V.35/S.21 interface connects at 64, 128 or 256 Kbps.  The board also has a data auxiliary port which is used with the compression encodings to enable a data sub-channel.**

**DSP Boards**

It is the engine, and is indispensable in each module. It is located at the front of the chassis and has a 24 bit A/D - D/A converter.

### DRA - TA 1

**Communication Interface Board**

Universal ISDN Terminal Adapter with S and U interfaces. It connects at 64, 64+64 and 128 Kbps.  This board also has an auxiliary data port, which along with the appropriate encoding modes creates a data sub-channel.

### DRA - AES/EBU(AES-3)

**AES/EBU (AES-3) Input and Output Boards.**

The inputs and outputs are transformer coupled.   They have Sample Rate Converters (SRC) with range 1:3 and 3:1 at 24 real bits without truncating. Support binary rates of 16kHz to 48kHz. The SRC dynamic range is 128 dB and the THD + noise at 1 kHz of 11dB. One AES/EBU board is needed per channel.  This optional board plugs directly into the DRA-DSP board.

### DRA - HYBRID

It is a telephone hybrid with echo canceller and frequency extender capability with AES/EBU input and output optional. Dialing and configuration is done via software which is provided with the board. Selectable pulse or tone dialing, ring on incoming calls and caller ID. It is capable of two simultaneous phone calls.

### DRA - IP

TCP/IP Board: TCP module acts as an audio communication interface for encoded signal through a TCP or UDP protocol.  Maximum bit rate of 128Kbps.

## CHASSIS AND POWER SUPPLY

**DRA-42**
The 19" and 4U rack can host up to 10 communication boards. These include the system controller board, the remote control interface RS-422, the synchronism port AES/EBU (AES-11) and the synch follower port. It has two auto-range and auto-switching Power Supplies (90-240 VAC, 50-60 Hz.). It includes Course software and E@sy adapter.

## E@sy SOFTWARE FOR course

The COURSE control and configuration is implemented by connecting the E@SY communication port to a PC. Several software applications can be run to operate and/or configure the unit. They include:

**The Real Time Control application and Supervisor** (standard package at no extra cost).
This application controls the E@SY equipment connected to a computer, checking the status and controlling remotely the unit's configuration.  It is possible to monitor the types of equipment and boards, update the phone directory, select the encoding algorithm, initiate calls and monitor the call status.
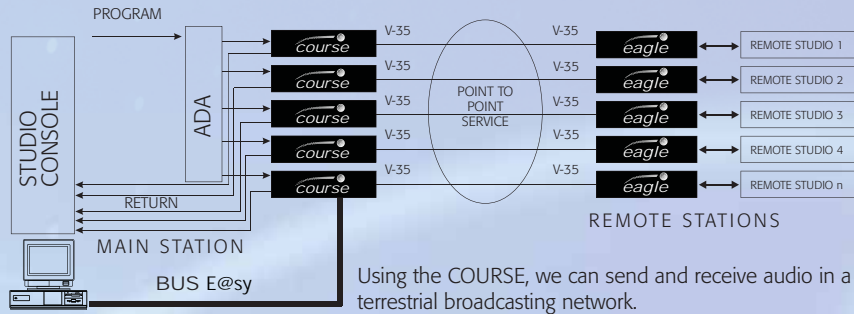It also includes a firmware application for updates through the E@sy connection.
The following applications are optional and provides added value to the device control.
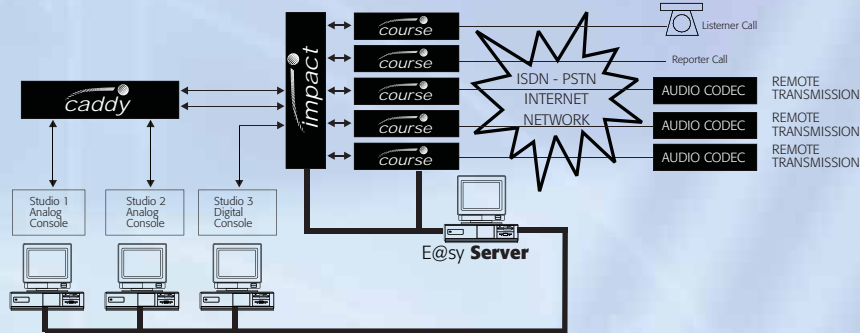
**Systel 6000**
Software for the Multi-Channel Talk Show System.  It controls and integrates the Impact audio router, the Eagle audio codec and the Course.

## AEQ course

# MULTICOMMUNICATION BOARD SYSTEM

## Permanent Broadcasting Network



**MAIN STATION**

**REMOTE STATIONS**

Using the COURSE, we can send and receive audio in a terrestrial broadcasting network.
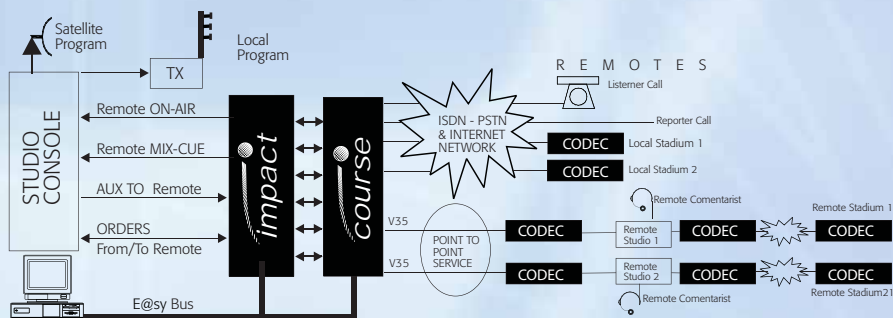
## Codec sharing system among studios



Each studio has exclusive access to control any available codec.
The IMPACT router will route the audio to the studio mixer. If the channel is analog the CADDY will convert the audio to analog since the IMPACT inputs and outputs are digital.

## Complex Sport Programs



In the Main Control Room, the COURSE receives calls via analog line, Internet or ISDN lines from listeners, reporters and signal from different sports venues. Furthermore through a point-to-point digital connection receives full duplex signals from sister Stations. It is feasible to mix the signals from sports venues and remote sport casters.
The COURSE is capable of sending a MIX-MINUS signal from the IMPACT router to a remote location.
The router sends the audio channels with the 'Remote ON-AIR Program' and a signal with a mix of different Talkback Audio from the remote sites (remote MIX-CUE). This will allow the operator to select which remote signal to send ON-AIR.

Talkback instructions from the Studio are sent via the Audition bus to the remote broadcasting site. This channel can be substituted by the 4-wire coordination channel.
The E@sy software provides integrated control and facilitates multiples sets of E@sy and communication interfaces.

# APPLICATION EXAMPLES

# MULTICOMMUNICATION BOARD SYSTEM

## SPECIFICATIONS

### *Communication interfaces*

**ISDN.**
"S" 2B+D interface Euro ISDN compatible (ETS 300 012, ETS 300 125, ETS 300102), RJ-45 connector.
"U" 2B1Q interface ANSI compatible (ANSI T1.601-1992, T1.602-1996, T1.607-1998), RJ-11 connector.

**Point-to-Point.**
RS-422 connector, V.35 o X.21 interface, DB-25 connector.

### DRA –HYBRID

**Telephone Line Interface.**
Transformer Input/Output
Impedance: 600 Ohm.
Nominal Input Level: -10 dBm.
Nominal Output Level: -6.5 dBm.
*In a Multiplex mode, the telephone line output level that comes form the nominal input level is -7.5 dBm.

### DRA IP

**LAN**
10/100 Base-T Ethernet.
RJ-45 Connector.
Digital PLL to update the synchronism clock.
**Protocols:**
A-RTP (Aeq Real Time Protocol) UDP based for audio transmission.
A-RTCP (Aeq Real Time Control Protocol) UDP based to control the TCP audio link and set up communication.

### *Analog Inputs and Outputs.*

**Main Inputs.**
- Transformer balanced, with RF filters, Hartman.
- Input Impedance: > 6 kOhms.
- Max level: + 22 dBv. A/D.
- A/D Converters at 24 bits.

**Main Outputs.**
- Transformer balanced, Hartman.
- Output Impedance: < 50 Ohms.
- Max Level: + 22 dBm.
- A/D Converters at 24 bits.

### *Encoding, synchronism and bandwidth modes.*

- G. 711 A y µ Laws, with echo cancellation. 300 Hz - 3,3 KHz.
- G. 711 with frequency extender compatible with AEQ TLE-02D. 50 Hz - 3 KHz. Echo cancellation.
- G.722, statistical  20 Hz - 7 KHz.
- G.722, H.221/H.242, 20 Hz - 7 KHz.
- AEQ H 221/H242, 20 Hz - 3,5 KHz., 32 Kbps.
- MPEG LII at 24, 32 and 48 KHz sampling, 64 Kbps, 20 Hz - 11 KHz.
- MPEG LII at 32 KHz sampling, 128 Kbps, dual, 20 Hz - 11 KHz.
- MPEG LII at 48 KHz sampling, 128 Kbps, mono 20 Hz - 20 KHz, joint stereo 20 Hz - 15 KHz.
- MPEG LII at 48 KHz sampling 256 Kbps stereo, 20 Hz - 20 KHz.
- MPEG LIII at 32 y 48 KHz sampling, 64 Kbps, 20 Hz - 15 KHz.
- MPEG LIII at 32 KHz sampling, 128 Kbps, dual, 20 Hz - 15 KHz.
- MPEG LIII at 48 KHz sampling, 128 Kbps, mono, 20 Hz - 20 KHz.
- MPEG LIII at 48 KHz sampling, 128 Kbps, stereo, 20 Hz - 15 KHz.
- Universal decoder LIII for all MPEG LIII modes at 64-128 Kbps,  48 KHz.

### *Digital audio Interfaces.*

- AES/EBU (AES-3), with transformer.
- Sampling frequency supported from 16KHz to 48KHz.
- Sampling Rate Converter (SRC): range 1:3 and 3:1, 24 real bits without truncating,  inputs and independent output.
- External synchronism input AES-11.
- SRC Dynamic Range: 128 dB
- SRC THD + noise @1KHz: -117 dB.
- Dual AES/EBU independent monaural interface with different sampling rate) configurable to one dual input.
- DB-9 connectors.

### *Other Interfaces.*

- Data Sub-channel: DB-9, RS-232, asynchronous, data 8 bits, no parity, 1 stop bit, configurable speed.
- Remote control: DB-9, RS-422 full-duplex multi-access 38.400.

### *Power.*

Auto-range; auto-switching from 90 to 250 VAC, 50/60Hz.

### *Standard.*

Electromagnetic Compatibility: EN 50081-1, EN 50082-2.
CE mark.