

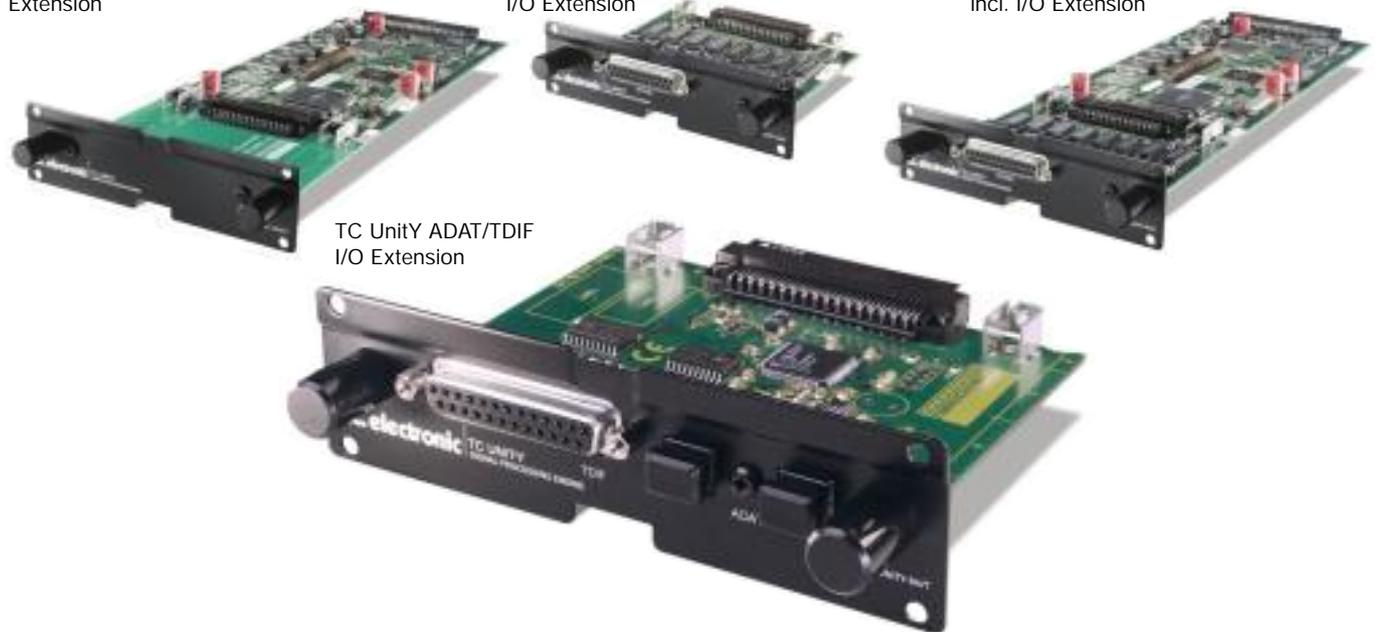
TC UNIT·Y SIGNAL PROCESSING ENGINE

TC UnitY main board
Extension

TC UnitY AES/EBU
I/O Extension

TC UnitY main board
incl. I/O Extension

TC UnitY ADAT/TDIF
I/O Extension



TECHNICAL SPECIFICATIONS:

PROCESSING

Number of effects per UnitY card	2 simultaneous (stereo)
Input resolution (signals from O2R)	24 bit
Output resolution (signals to O2R)	24 bit
External I/O resolution*	24 bit
Sample Rates	All rates supported by the O2R
Processing delay	6 cycles, 0.136 ms @ 44.1 kHz 0.125 ms @ 48 kHz

PRESETS

Number of presets	max 250 per card
Preset dump and load	via O2R MIDI ports
Backup battery life	>10 years

AUTOMATION

Scene Memory automation	All parameters based on Presets
Dynamic automation	16 parameters per card

Note *: Only applicable to UnitY cards including I/O extension boards.
For more information, please visit our website: www.tcelectronic.com

EXTERNAL I/O EXTENSION CARD

Number of channels using external inputs*	8
Number of channels using external outputs*	8
Formats supported*	AES/EBU, ADAT, TDIF
External I/O connectors*	AES/EBU: 25 pin SubD ADAT/TDIF: 25 pin SubD, Lightpipe

GENERAL

EMC complies with	EN 55103-1, EN 55103-2, FCC part 15 Class B, CISPR 22 Class B
Number of UnitY cards	Max 4 cards in one O2R
Main board dimensions	111 x 223 mm (4.4" x 8.8")
I/O Extension board* dimensions	111 x 88 mm (4.4" x 3.5")
Full UnitY assembly dimensions	111 x 311 mm (4.4" x 12.2")

Note: Due to continuous development and standardization all specifications are subject to change without notice.

TABLE OF CONTENTS

I

INTRODUCTION	2
TECHNICAL SPECIFICATIONS	3
LICENSE CODES	4
INSTALLATION OF 02R SOFTWARE	6
GETTING STARTED	8
CONTROLLING THE ENGINES	9
PRESET HANDLING	10
SENDS	11
RETURNS EXTENDED ROUTING	12
RETURNS STANDARD ROUTING	15
M2000 D.C.ALGORITHMS	20
FINALIZER D.C.ALGORITHM	27
AUTOMATION	34
UTILITY PAGE SERIAL NUMBER, LICENSE CODES	35
DIGITAL I/O OPTIONS	36
UNIT•Y SOFTWARE UPLOAD	39
YAMAHA 02R NEW V2 FUNCTIONS	40
EMC AND SAFETY	44

Congratulations on the purchase of your new TC Electronic UNIT•Y package, which will revolutionize the way you work with your Yamaha 02R™ digital console.

Until now, plug-in cards for Yamaha 02R's only served to customize the console to the I/O requirements of the user. With the introduction of Unit•Y, TC has re-defined the use of your mixer's expansion slots, by adding sound processing to your possibilities.

Users already familiar with TC Electronic's Ultimate Sound Machines will rate the dynamics processing, reverb and effects algorithms amongst their favorites. Integrating these effects within the 02R environment presents a completely new way of looking at sound effect design.

Using a 02R with a UNIT•Y card is not just like having an external effects machine, it's better: Audio is routed internally at full 24 bit resolution. You don't have to worry about automixes not being complete, system clock optimization or dither.

New equipment normally requires some user learning time, before it can perform at its best. In this case the learning time has been spent at TC. We have learned how to operate the 02R in order to integrate the Unit•Y effects with the look & feel you already know.

The UNIT•Y plug-in card runs TC Electronic software on its own high speed DSP, proprietary Co-processor, Host processor and other associated hardware circuits.

Digital I/O options may be added to the card, thereby enabling you to also extend the mixer itself.

A standard 02R may handle up to 40 external inputs plus two Yamaha internal stereo effects simultaneously. That is a total of 44 channels.

If a UNIT•Y card is fitted, up to 44 external inputs plus two internal Yamaha stereo fx plus two internal TC stereo effects may be used simultaneously, a total of 52 channels of audio!

Options

New functions may be added to the card. Options may include both hardware and software.

New functions, details about the presets etc. will be announced at our web-site,

www.tcelectronic.com

Processing

Input resolution (signals from 02R)	24 bit
Output resolution (signals to 02R)	24 bit
Number of engines per UnitY card	One or Two
Sample Rates	All rates supported by the 02R
Processing Delay	18 cycles 0.408ms @ 44.1kHz 0.375ms @ 48kHz

Presets

Number of Presets	max 250 per card
Preset Dump and Load	via 02R MIDI ports
Backup battery life	>10 years

Automation

Scene Memory Automation	All parameters based on Presets
Dynamic Automation	16 parameters per card

External I/O Extension card*

Max number of channels using external inputs	8
Max number of channels using external outputs	8
External I/O resolution	24 bit
I/O card types	AES/EBU format or ADAT plus TDIF format

General

EMC	EN55103-1 and EN55103-2 FCC part 15, Class B CISPR 22, Class B
Safety complies with	IEC 65, EN 60065, CSA E65
Number of UnitY cards	Up to 4 cards in one 02R
Dimensions, Main Board	111 x 223 mm (4.4" x 8.8")
Dimensions, I/O Board	111 x 88 mm (4.4" x 3.5")
Dimensions, Full UnitY Assembly	111 x 311 mm (4.4" x 12.2")

Notes:

*) Only applicable to UnitY cards including optional I/O extension board. More I/O formats may become available. Check our web-site, www.tcelectronic.com

Due to continuous development and standardization all specifications are subject to change without notice.

Your card will stop working after 100 hours, if you don't get an Initial License!

Based on a flexible software plug-in philosophy, a UNIT•Y card may perform a variety of different tasks. With a new card you have received demo time for the different types of software modules available at the time of production.

The price of the card includes license for one TC software module. The modules for which you don't acquire a license, will become inoperational when the demo period expires.

Within 100 hours of 02R power-on time, you have to contact the TC Electronic office in Denmark (Europe) or in California (US) to tell us which module you wish to keep. Every time you turn on the mixer and enter the UNIT•Y pages, you will be informed how much demo time is left. Be sure to license your software, before the time runs out.

Two different software modules are available now. Names relate to well known TC processors with the addition of "DC" for Direct Control.

M2000 D.C. Reverb and Multi-effects

Two independant effects may be used simultaneously.

Finalizer D.C. Multi-band Dynamics processor

One 3-band stereo in / stereo out Compressor/Limiter/Expander may be used at a time.

HOW TO GET THE INITIAL LICENSE

- 1 Check the serial number on the back panel of your card.
- 2A Visit us on the Internet at www.tcelectronic.com and go to the web-site UnitY pages. Find the Initial License form, fill it in and return it.
- 2B Contact us by fax. Fill in the Initial License form supplied with your card.
Europe: +45 8621 7598.
- 2C Contact your dealer. Tell him the serial number of your card, and which module you wish to keep.
- 3 From TC, you will normally receive a license code within 24 hours on weekdays.*
If the license code is handled through a dealer, allow some additional handling time.
- 4 Enter the license code on the Utility page and press ENTER.

Note: The Initial License comes with no additional charges.

More information about how to enter License Codes may be found in the Utility chapter.

* TC will do its best to supply the licence code within the time target. However, TC is not reliable for any delays, nor for any damages or consequential damages caused by such a delay.

If you want to run other software modules as well...

On a new UNIT•Y card, the Initial License is already paid for, so it comes with no extra charges when you contact us.

To also run other software modules, Optional Licenses may be bought anytime. A license is valid only for the card you register. Contact your dealer or TC to find out about the exact price.

Two different software modules are available now, one of which is your Initial license described on page 4. Names relate to well known TC processors with the addition of "DC" for Direct Control. If more modules become available, you may look up info on the UNIT•Y pages of our web-site.

- **M2000 D.C. Reverb and Multi-effects**

Two independant effects may be used simultaneously.

- **Finalizer D.C. Multi-band Dynamics processor**

One 3-band stereo in / stereo out Compressor/Limiter/Expander may be used at a time.

If you have licenses for both modules, you may run either a Finalizer and one M2000 engine, or two M2000 engines simultaneously.

Different limitations to the number of simultaneous engines may apply to future modules.

HOW TO GET AN OPTIONAL LICENSE

- 1 Check the serial number on the back panel of your card.
- 2A Visit us on the Internet at www.tcelectronic.com and go to the web-site UnitY pages. Find the Optional License form, fill it in including Credit Card details, and return it.
- 2B Contact us by fax. Fill in the Optional License form supplied with your card, including a valid Credit Card number.
Fax number: +45 8621 7598.
- 2C Contact your dealer. Tell him the serial number of your card, and pay him for the module you wish to acquire.
- 3 From TC, you will normally receive a license code within 24 hours on weekdays after payment has been accepted.*
If the license code is handled though a dealer, allow some additional handling time.
- 4 Enter the license code on the Utility page and press ENTER.

Note: Your Credit Card will be charged for the Optional License.

More information about how to enter License Codes may be found in the Utility chapter.

The Operating System of your 02R console is kept in two internal EPROMs. In this manual we refer to it as 02R OS.

Two new EPROM's are delivered with every TC UNIT•Y card, and need to be fitted before you can use it.

No matter which 02R OS you're currently using, it must be replaced with the version delivered with your UNIT•Y card.

In co-operation with Yamaha, TC supply the newest available 02R OS on the EPROMs with each UNIT•Y card.

Thus 2.10 TC is based on the 02R OS available in November 1998.

The EPROM installation instructions on these pages are provided for a service engineer.

The EPROM's should only be replaced by a Yamaha or TC authorized engineer. Unauthorized attempts to replace the EPROMs may cause internal data to be corrupted or to void the warranty on your console.

Before installing the V2 EPROMs, we recommend that you back up your important data to an external storage device, such as the Yamaha MDF-2 MIDI Data Filer.

UPGRADING YAMAHA 02R V1 SOFTWARE

On top of being able to add the UNIT•Y effects to your system, many new Version 2 functions will be available on your 02R after this update.

Be sure to read the last pages of this manual for a summary of the new functions.

If you wish to obtain a new complete Yamaha 02R V2 manual, please contact your Yamaha supplier.

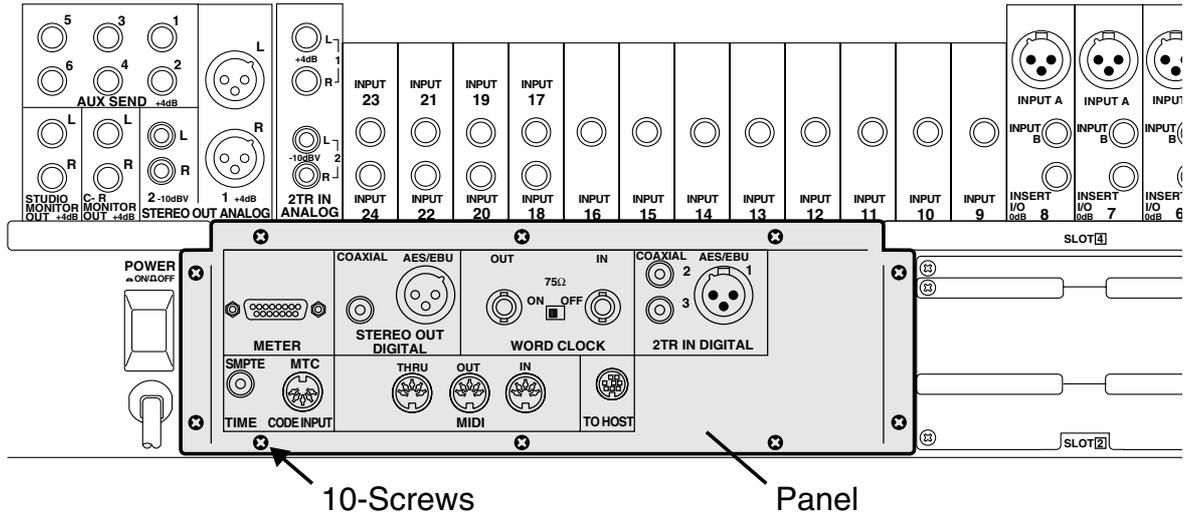
When the 02R is turned on for the first time after updating from V1, the Scene memory and Automix memory is automatically updated for use with V2.

A clock graphic appears on the display while updating is in progress.

The current Automix, however, is not updated. To also have the current Automix updated, you must store it to one of the 16 Automix memories before installing the V2 EPROM's.

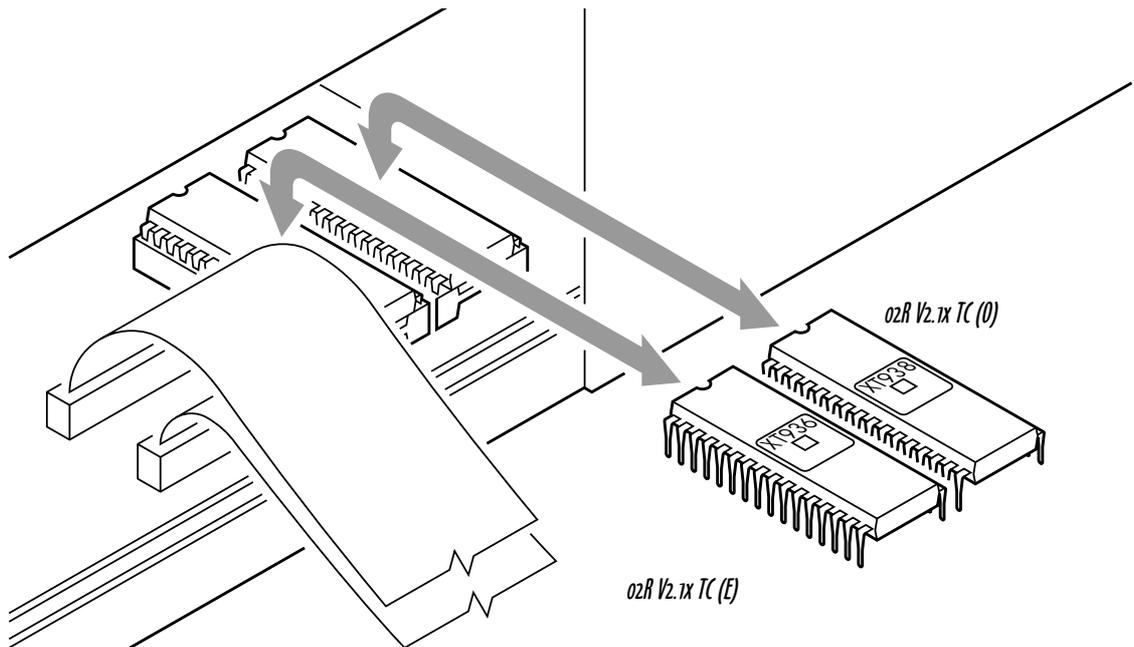
Do not turn off the 02R while the clock graphic is displayed. Doing so will destroy your data!

1



2

CAREFULLY REPLACE THE TWO EPROMs. NOTE MARKING ON CHIPS



After installing the software provided with the UNIT•Y card, you should see the V2 power-up screen within seconds after power is applied to the console. If that does not happen, the EPROMs have not been positioned correctly.

Do not leave the console powered on if the screen does not become active.

To see the OS revision number, hold down the UTILITY button while powering the console on. The 02R UNIT•Y software will identify itself, e.g. 2.10TC.

When the console has been confirmed operational, power it down again. Now you may fit the UNIT•Y card into any slot.

WHICH SLOT SHOULD BE USED FOR THE UNIT•Y CARD?

The UNIT•Y card may be fitted into any slot. More cards may be used simultaneously, but only one of them can use Extended Routing. A UnitY card using Extended routing is placed in slot 3 or 4, so you may still use all analog inputs of the 02R.

Each UNIT•Y card is basically controlled from 3 LCD screens on the 02R. The screens are accessible by holding down the FLIP button, thus entering 02R MIDI REMOTE mode. Alternatively, use the MIDI button to show page 5/5.

The first time you select the UNIT•Y card, press a REMOTE number according to the UNIT•Y slot you are accessing. With a card in Slot 1, press REMOTE 1. With a card in Slot 2, press REMOTE 2 etc. After selecting the correct remote number, dial up the TC Electronic screen with the wheel.

The 20 faders now control the UNIT•Y engines as described on the next pages of this manual.

To exit UNIT•Y control mode, hold FLIP for a short while or press any other 02R screen button, e.g. the VIEW button.

Each UNIT•Y Engine has its own page with some parameters controlled by the cursor and the wheel, while others are laid out on the faders. Parameters on the faders may be dynamically automated.

Engine 1: Fader 1-8

Engine 2: Fader 9-16

Output Mix: Stereo Fader 1-4

To switch between the UNIT•Y screens, several methods may be used.

If Fader Touch Select is enabled on the O2R Preferences page, touching fader 1-8 will take you to the UNIT•Y screen Engine 1. Touching fader 9-16 will take you to Engine 2 and touching one of the Stereo faders will take you to the Main screen.

You may also switch screens by pressing Select buttons.

If one of the UNIT•Y screens are shown, the Main screen is shown when you press one of the select buttons above the Stereo Faders.

To go to the Engine 1 screen, press one of the select buttons above fader 1-8.

To go to the Engine 2 screen, press one of the select buttons above fader 9-16.

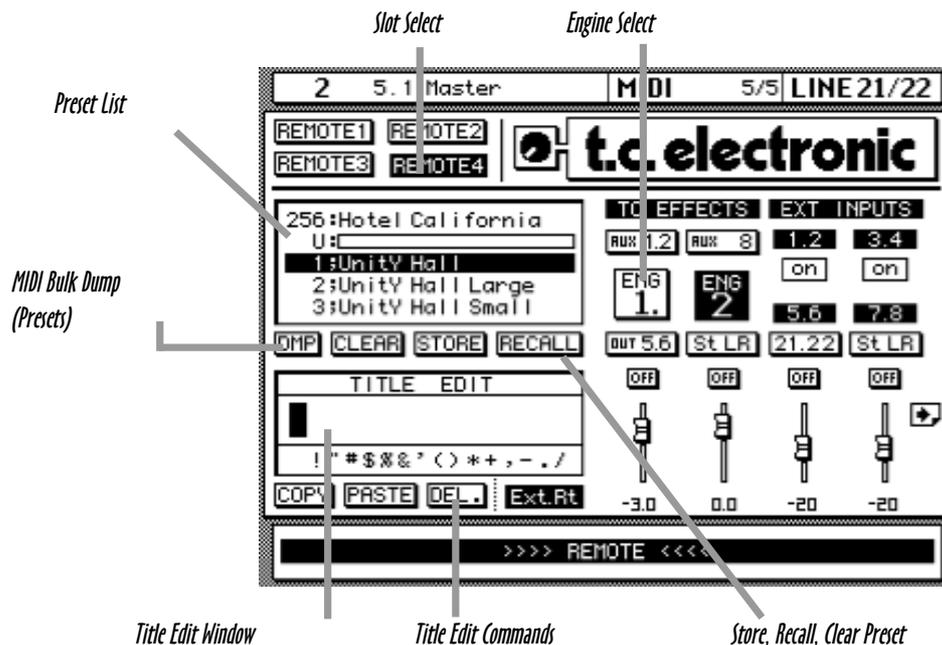
Finally you may move between the screens by using the cursor exits on the screen boundaries.

All preset handling is done on the UNIT•Y Main screen.

Dynamic automation of Engine parameters is carried out on the Engine screens.

Presets are stored on the individual UNIT•Y card. If you move your card to another 02R, you take your presets with you.

Presets are handled from the UNIT•Y Main screen. Select the Engine you want to Store or Recall, then use the Preset functions as on other 02R screens. As a short-cut to select an Engine, the two internal 02R FX select buttons can be used.



UNIT•Y Main screen

When an 02R Scene memory is recalled, so are presets and routing on the UNIT•Y Engines. The Scene memory keeps track of which preset is used on which engine. In addition to recalling the Engine presets, all the parameters laid out on the faders are also changed to match that Scene. Therefore non-fader UNIT•Y information is lost if not stored to a UNIT•Y Preset before storing the Scene.

The best procedure for working with UNIT•Y presets and Scene memories:

1. Store settings you wish to keep with a Scene as UNIT•Y presets,
2. Store the 02R Scene

The first 100 presets on the UNIT•Y list are ROM presets and reserved positions. They are marked “;”. On these locations you cannot use the Store or Clear functions.

The next presets are stored in RAM and available for you to program. RAM presets are marked “:” in the list. Factory presets above number 99 may be overwritten:

Preset 1-99: ROM and reserved. (1-49: M2000 D.C., 50-59: Finalizer D.C., 60-99: Reserved).

Preset 100-199: RAM. Additional factory presets (May be overwritten).

200-250: Unused RAM. First choice for user presets.

SENDS



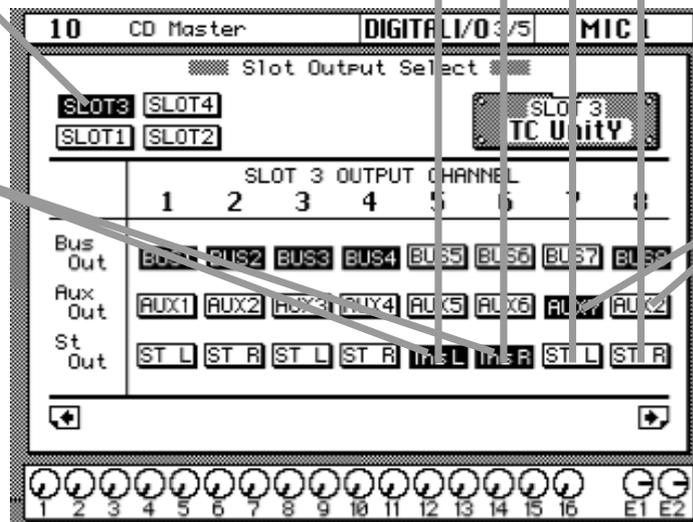
Getting signals to the UNIT•Y card is partly done on the UNIT•Y Main screen and partly on the 02R DIO screen shown below.

Routing on the 02R DIO screen and on the UNIT•Y main screen may be different from Scene to Scene.

Note slot number

Choose between these four signals on the Unit•Y main screen

Note:
To access Main L/R Insert, click
Enter twice in these locations.
Insert return is set on the
Main page by selecting RET
L.R.



Note:
To access Aux 7 and 8, click
Enter twice in these locations.

02R Slot Output Select Screen

The sends to the UNIT•Y engines may be chosen from the selected signals shown above. Engines can be fed from Aux 1, 2, 5, 6, 7 or 8, Bus 5-8, Main L/R or Main Insert. If a UNIT•Y card is placed in slot 1 or 2, Mic channels 5-8 or 13-16 also may be used as sends. If you press Enter twice on the L/R icons at bus 5 or 6, Engine 1 may be used as a Stereo Bus Insert processor.

Note: If you've got more than one UNIT•Y card, it's possible to specify more Stereo Bus Inserts at a time, but this assignment is not valid. Only use one Insert at a time.

Example

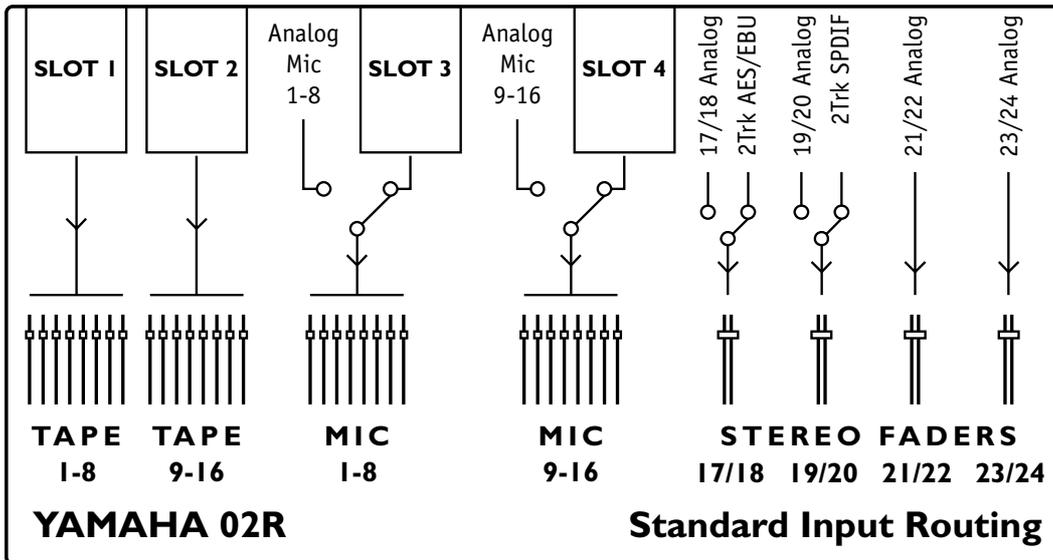
To send Aux 7 to Engine 1, press the DIO button in order to get to the 02R Output Select screen as shown above.

In column 7 go to the Aux icon. If it shows "1", click Enter twice to change it to "7".

Go to the UnitY main screen by holding the Flip button. Position the cursor on the Input Select Icon and turn the Parameter Dial until "Aux 7" is displayed.

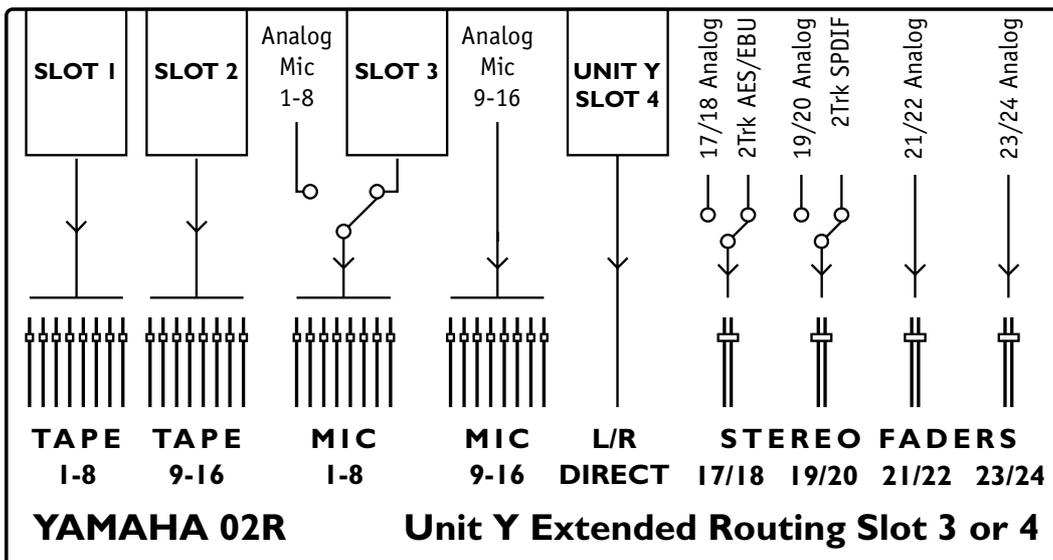
Now Aux 7 is routed to both Unit•Y Engine 1 and the internal Yamaha effect 1.

On a standard Yamaha 02R, the inputs are routed as shown below. To use a card in slot 3 or 4, blocks of 8 analog inputs have to be disabled.



With UNIT•Y software 2.1 and upwards, we have added new return options for the signals from a UNIT•Y card, so you don't have to give up inputs regardless if the UNIT•Y card is equipped with I/O or not.

If you use a UNIT•Y card containing I/O, you may even **mix more external and effects signals** to the Main L/R bus than what's possible on a normal 02R.



Extended routing may be applied to a UNIT•Y card in slot 3 or slot 4 by pressing the EXT RT button on the Main screen. Information about Extended Routing is kept with each 02R Scene Memory, but generally the mode should only be set in the beginning of a mix, and not when the card is passing audio.

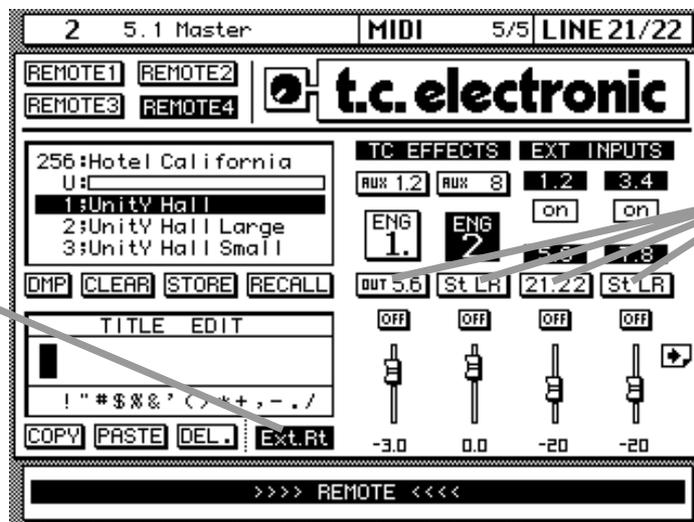
A Main screen display for a UNIT•Y card with DIO extension board is shown below.

Return "St LR": The signal is routed directly to the Main L/R Stereo Bus.

Return "21.22": The signal is routed to the channel 21/22.

Return "OUT 5.6", "OUT 7.8": The signal is sent to the outputs of the card.

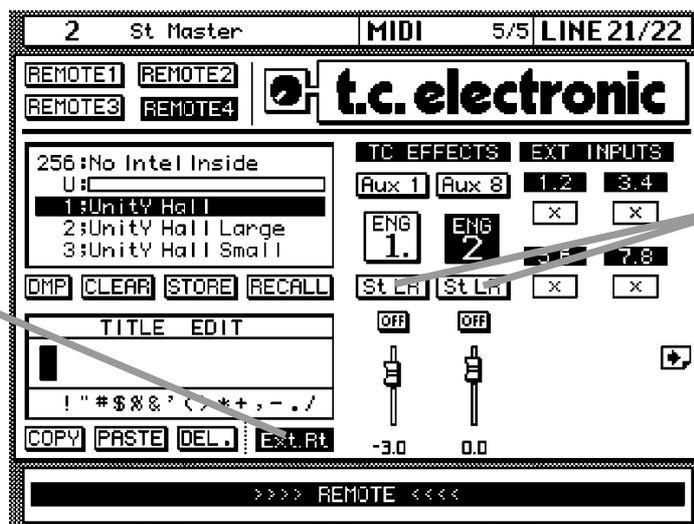
Enable Extended Routing by pressing this button



When Extended Routing is enabled, additional routing options become available.

Main screen. Extended Routing, card with DIO extension.

Enable Extended Routing by pressing this button



Note different routing options

Main screen. Extended Routing, no DIO.

If you can't enable Extended Routing...

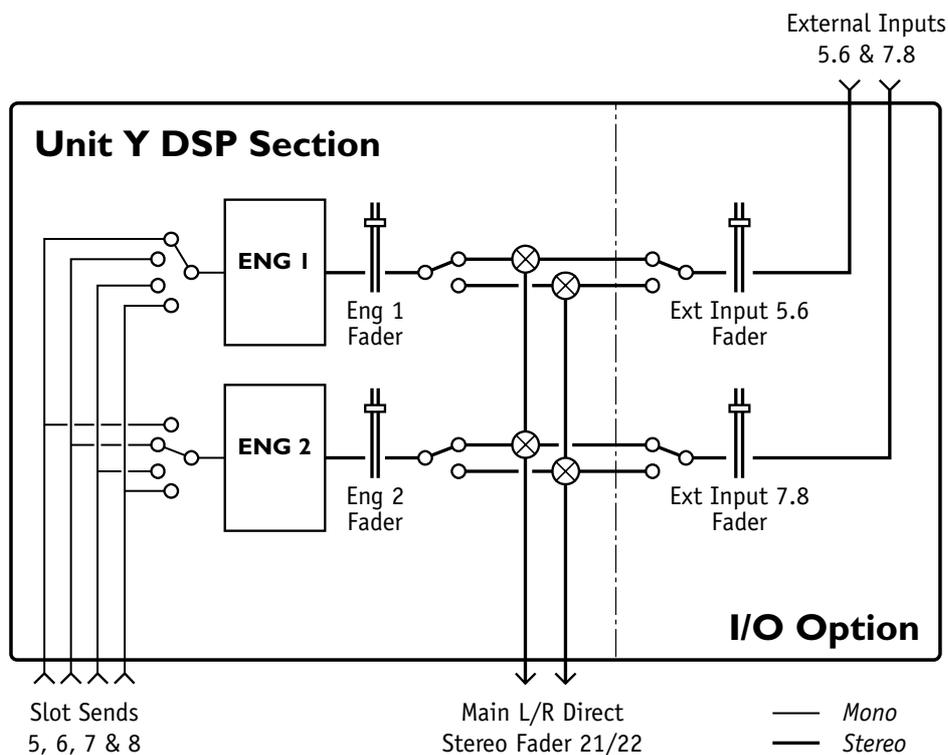
Please note, that the Extended Routing button is greyed out, if the UnitY card slot has been selected for return signals. In that case, go to the 02R DIO page "Input Signal Select" and enable the analog inputs at that slot instead of the card. Now Extended Routing may be enabled, so you can use analog inputs and UnitY signals at the same time.

When to use Extended Routing

We expect most users to always have Extended Routing enabled, but two restrictions apply to the use of this configuration:

- 1) Extended Routing is not possible when a Yamaha Cascade card is used,
- 2) It's not possible to put two UNIT•Y cards in Extended Routing mode at the same time.

A block diagram of the signal flow in Extended Routing mode is shown below.



UNIT•Y card with Extended Routing enabled

Example, Stereo production using UNIT•Y card with Extended Routing

To return both engines directly to the Main Stereo Bus, select "St L.R" with the Output Selectors on the UNIT•Y Main screen.

Turn up both Engine faders and the return signals are fed directly to the Stereo Bus.

If your UNIT•Y card has I/O capabilities, two additional stereo signals (5.6 and 7.8) may be mixed directly to the Stereo Bus by selecting "St L.R" on the External Input selectors.

UNIT•Y cards without I/O extension

For a card positioned in slot 1, the two UNIT•Y stereo engines will return on Tape inputs 5-8. The returns may be mixed to one stereo pair by using the Engine Output Select, thereby having a stereo composite signal returned on Tape input 5/6 or 7/8.

For a card positioned in slot 2, the two UNIT•Y stereo engines will return on Tape inputs 13-16. The returns may be mixed to one stereo pair by using the Engine Output Select, thereby having a stereo composite signal returned on Tape input 13/14 or 15/16.

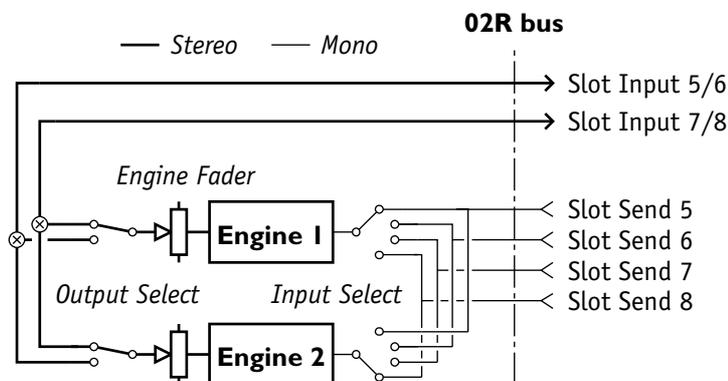
To adjust or mix the Engine return levels, use the Engine 1 and Engine 2 output fader controlled from the first two 02R stereo faders when you are on the UNIT•Y screens.

For a card positioned in slot 3, the UNIT•Y engines will return on Mic inputs 5-8.

For a card positioned in slot 4, the UNIT•Y engines will return on Mic inputs 13-16.

Note: A card without I/O is only suited for operation in slot 3 or 4 if Extended Routing is used unless you don't mind giving up 8 analog inputs.

If you use the Stereo Bus Insert Return, the return signals will also be available on channel 5/6. Be sure to turn them down to avoid phase cancellation or loops.



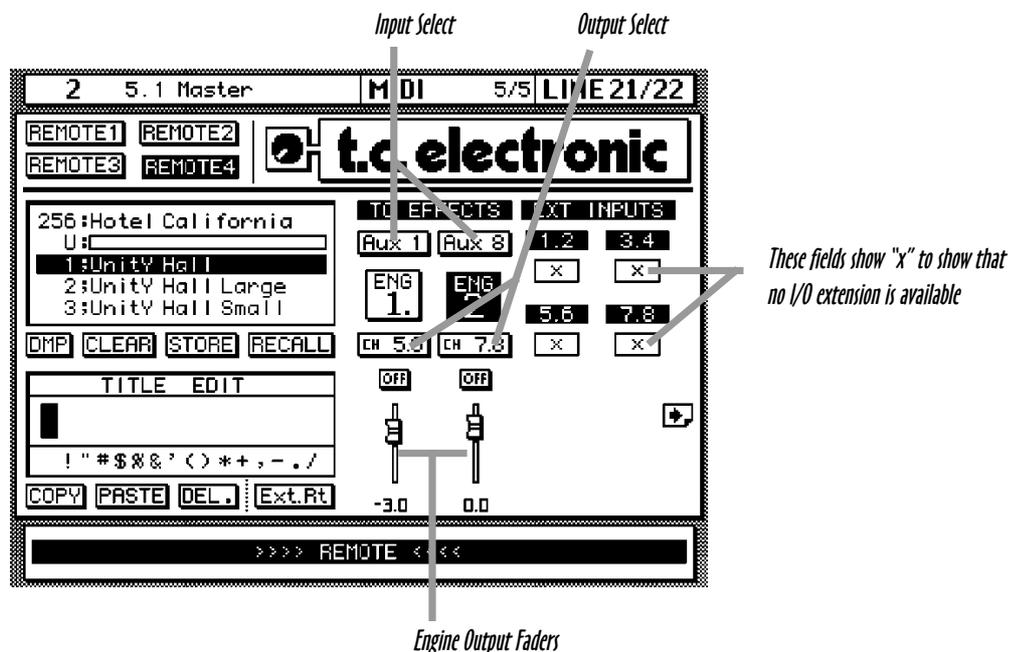
UNIT•Y card without I/O extension

Example 1, Stereo production using UNIT•Y card without I/O extension

To return both engines as one stereo return with a UNIT•Y card in slot 2, select the same destination with the Output Selectors on the UNIT•Y Main screen, eg. "15.16".

Turn up both Engine faders (Stereo fader 17/18 and 19/20) to 0dB.

Go to the normal 02R fader mode and turn up Tape input faders 15 and 16. Typically you would make them into a stereo pair.



Main Screen for UNIT•Y card without I/O extension

Example 2. 5.1 Surround production using UNIT•Y card without I/O extension

To return the engines in a discrete surround configuration with a UNIT•Y card in slot 2, use the Output Selectors on the UNIT•Y Main screen to select destination “13.14” for Engine 1 and “15.16” for Engine 2.

Turn up both Engine faders (Stereo fader 17/18 and 19/20) to 0dB.

Go to the normal 02R fader mode and turn up Tape input faders 13-16. Typically you would make them into two stereo pairs.

Make these 5.1 surround routing assignments:

Tape input 13 to LFr (Left front), Tape input 14 to RFr (Right front).

Tape input 15 to LS (Left surround), Tape input 16 to RS (Right surround).

If you wish to engage the Centre and Sub speaker for FX, the Centre should be made from a mix of LFr and RFr (typically at -6dB or lower compared to LFr and RFr), while the Sub can be made from a mix of all four FX returns.

Factory presets for discreet surround on the UNIT•Y card depend on this channel assignment. They are all labelled “5.1 xxxx”.

Engine 1 should take care of the front channels, while Engine 2 produces the surround.

UNIT•Y cards with I/O extension

For a card positioned in **slot 1**, the two UNIT•Y stereo engines will return on Tape inputs 5-8, or may be directed to outputs 5-8 of the card.

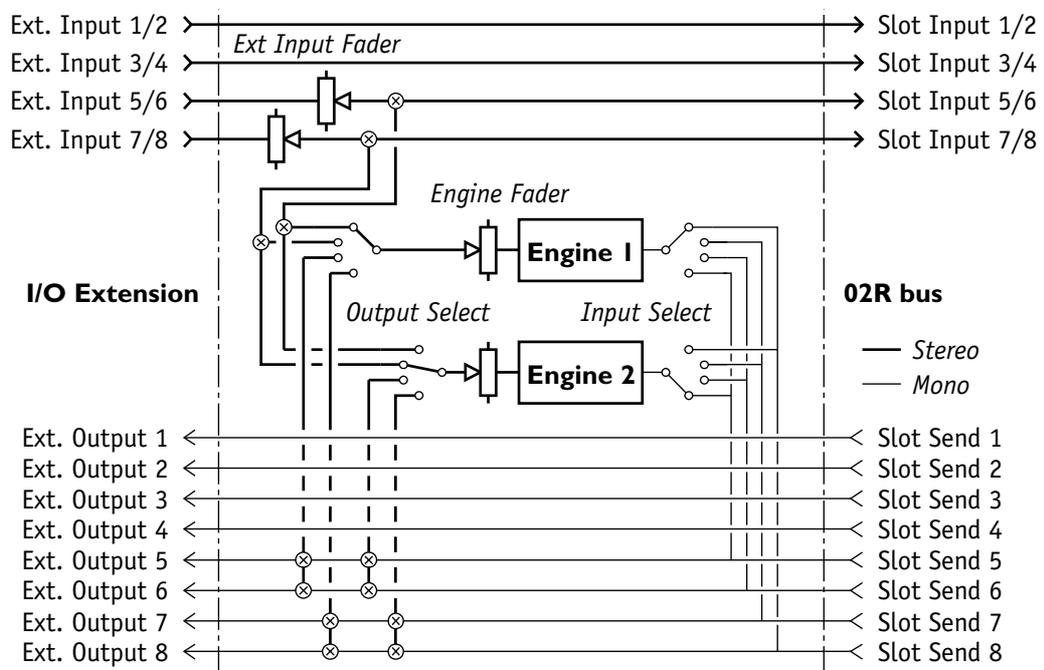
External inputs return on Tape inputs 1-8 like with a normal Yamaha I/O card. External inputs 5/6 and/or 7/8 may be mixed with UNIT•Y effects at 24 bit resolution. The submix is passed on to Tape input 5/6 and 7/8. Submix levels are automatable.

For a card positioned in **slot 2**, the two UNIT•Y stereo engines will return on Tape inputs 13-16, or may be directed to outputs 5-8 of the card.

External inputs return on Tape inputs 9-16 like with a normal Yamaha I/O card. External inputs 5/6 and/or 7/8 are mixed with UNIT•Y effects at 24 bit resolution. The submix is passed on to Tape input 13/14 and 15/16. Submix levels are automatable.

For a card positioned in **slot 3**, the two UNIT•Y stereo engines return on Mic inputs 5-8, or may be directed to outputs 5-8 of the card.

External inputs return on Mic inputs 1-8 like with a normal Yamaha I/O card. External inputs 5/6 and/or 7/8 are mixed with UNIT•Y effects at 24 bit resolution. The submix is passed on to Mic input 5/6 and 7/8. Submix levels are automatable.



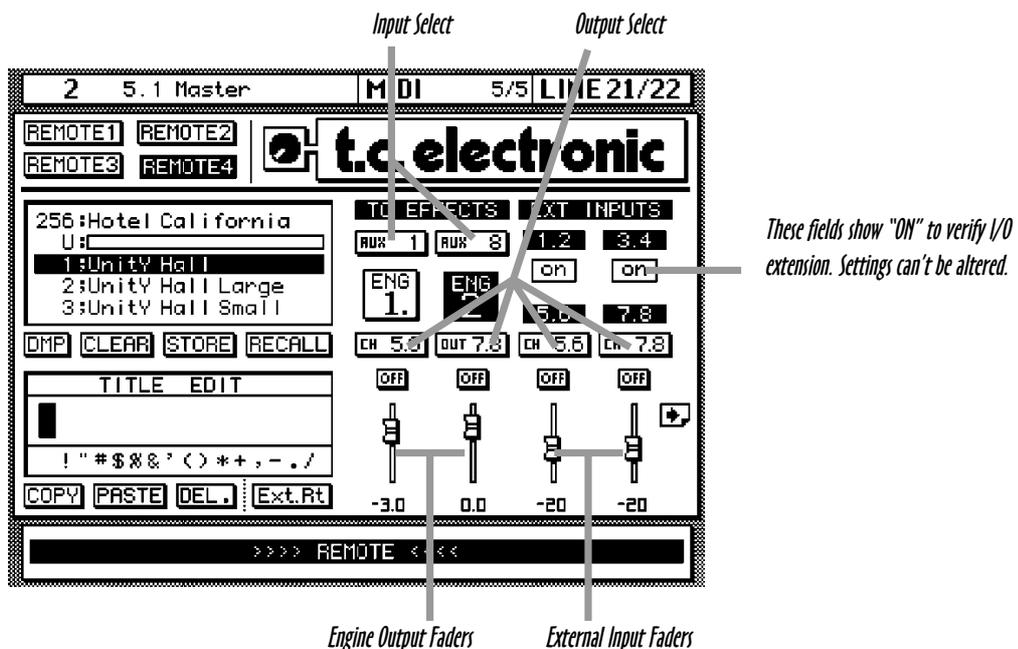
UNIT•Y card with I/O extension

For a card positioned in **slot 4**, the two UNIT•Y stereo engines return on Mic inputs 13-16, or may be directed to outputs 5-8 of the card.

External inputs return on Mic inputs 9-16 like with a normal Yamaha I/O card. External inputs 5/6 and/or 7/8 are mixed with UNIT•Y effects at 24 bit resolution. The submix is passed on to Mic input 13/14 and 15/16. Submix levels are automatable.

To adjust or mix the Engine return levels and external inputs 5-8, use the four stereo faders when you are on a UNIT•Y screen.

Note: If you use the Stereo Bus Insert Return, the return signals will also be available on channel 5/6. Be sure to turn them down to avoid phase cancellation or loops. For a card with DIO capabilities, it will often be more desirable to output the Finalizer from the card directly.



UNIT•Y Main screen for a card with I/O extension fitted

WHICH SLOT SHOULD BE USED FOR THE UNIT•Y CARD?

A UNIT•Y card using Standard Routing may be fitted into any slot.
More cards may be used simultaneously.

- Signals from a UnitY card in slot 1 will appear on Tape inputs 1-8.
- Signals from a UnitY card in Slot 2 will appear on Tape inputs 9-16.
- Signals from a UnitY card in Slot 3 will appear on Mic inputs 1-8.
- Signals from a UnitY card in Slot 4 will appear on Mic inputs 9-16.

Example 1, Stereo production using UNIT•Y card with I/O extension

To return both engines as one stereo return with a UNIT•Y card in slot 4, select the same destination with the Output Selectors on the UNIT•Y Main screen, eg. "15.16".

Turn up both Engine faders (Stereo fader no. 1 and 2) to 0dB.

External input 7/8 on the UNIT•Y card is mixed with the engine returns, and a mix of these 3 stereo signals is available on Mic inputs 15/16. To control the level of external input 7/8, use Stereo fader no. 4 when on a UNIT•Y screen.

External input 5/6 may be passed straight to Mic input 13/14, but remember to turn up its fader.

Fader positions of UNIT•Y output levels and external inputs are under automation control.

The most suitable signal to use with the UNIT•Y submix feature would probably be an external effect processor with digital outputs.

Example 2. Surround 5.1 production using UNIT•Y card with I/O extension

To return the engines in a discrete surround configuration with a UNIT•Y card in slot 4, use the Output Selectors on the UNIT•Y Main screen to select destination "13.14" for Engine 1 and "15.16" for Engine 2.

Turn up both Engine faders (Stereo fader no. 1 and 2) to 0dB.

External input 5/6 on the UNIT•Y card is mixed with Engine 1, and a mix of the stereo signals is available on Mic inputs 13/14. To control the level of external input 5/6, use Stereo Fader no. 3 when on a UNIT•Y screen.

External input 7/8 on the UNIT•Y card is mixed with Engine 2, and a mix of the stereo signals is available on Mic inputs 15/16. To control the level of external input 7/8, use Stereo fader no. 4 when on a UNIT•Y screen.

Make these 5.1 surround routing assignments:

Tape input 13 to LFr (Left front), Tape input 14 to RFr (Right front).

Tape input 15 to LS (Left surround), Tape input 16 to RS (Right surround).

If you wish to engage the Centre and Sub speaker for FX, the Centre should be made from a mix of LFr and RFr (typically at -6dB or lower compared to LFr and RFr), while the Sub can be made from a mix of all four FX returns.

Factory presets for discreet surround on the UNIT•Y card depend on this channel assignment. They are all labelled "5.1 xxxx".

Engine 1 takes care of the front channels, while Engine 2 manages the surround.

The most suitable signal to use with the UNIT•Y submix feature would probably be external effect processors assigned to front and surround channels.

Several different algorithms from TC's catalog of reverbs are available in the ROM presets. All the algorithms are controlled from slightly different screens covered on this page and the next. Reverbs are found in preset area 1-49 and 100-199. As explained in the preset titles, some of them are created for discrete 5.1 surround sound applications.

Basic Room Design

In natural reverberation, the initial reflections happens within the first second of the response. This is where the sound is very clearly reflected by the walls and floors, and you can 'feel' which type of room you are in. Later in the reverb process, the original sound is nearly drowned in a soup of millions of chaotic chain reflections and two very different rooms often sound much alike at this stage. The initial reflection is, therefore, the part of the reverb that really defines the room characteristics.

Most TC Reverbs are composed of an Initial reflection part (=I) and a dense Reverb part (=R). To create a perfect illusion of a real room, both parts needs to have the characteristics of the room you want to create, and the I/R balance must be right. To achieve a more artificial reverb effect, you may want to play down the role of the Initial reflections. To create a wet mix without too much reverb density, the I/R balance should favor the Initial reflections.

Remember to adjust the Pre Delay according to the basic shape you have chosen. Small rooms with a long predelay, for example, yield a very unusual listening experience.

INITIAL REFLECTIONS. ROOM SHAPES.

The Shapes of the Initial reflections refer to this scheme:

Hall, Simulates the early reflection measured in the Boston Symphony Hall.

Horseshoe, Borrows some acoustics from the Musikvereinssaal in Austria.

Prism, Has a pattern based on the conceptual 'golden ratio' shoe box hall.

Fan, Is based on the basic structure of the La Scala Concert Hall.

Club, Is based on a regular small club room.

Small, Simulates a small domestic room.

When designing your reverb, keep in mind that room acoustics lose their high frequency energy more easily over time. Setting the High Decay to a large amount of time will usually make the room sound too artificial.

No matter how you build your room illusion, you will discover an important characteristic of these famed reverbs: The true non-coherent outputs, which require a lot of extra processing power, but also make them true mono summing at +3dB, equally suitable for work in Mono, Stereo, Dolby 4:2:4 and 5.1 surround formats.

Initial reflections:
Room Shape
Room Size
Hi Cut frequency

Reverb:
Pre Delay
Diffusion type
Lo Decay frequency
Hi Decay frequency
Image Width

P. Dly	Decay	Lo X	Hi X	HiCut	HiAtt	LRBal	LRBal
18 ms	0.9 s	0.06	0.58	3.58 KHz	-14 dB	-6 dB	C
1	2	3	4	5	6	7	8

R & I Pre Delay
R Total Decay
R Lo Decay
R Hi Decay
R & I Hi Cut Att
I / R Balance
L / R Balance

UNIT • Y Reverb Engine screens

Modulation:
Intensity
Rate

Diffusion amount:
Diffusion type
Lo Decay frequency
Mid Decay frequency
Hi Decay frequency
HF Attenuation

P. Dly	Decay	Lo X	Mid X	Hi X	HiCut	Dist	LRBal
54 ms	3.8 s	0.90	1.66	0.30	5.01 KHz	15	C
1	2	3	4	5	6	7	8

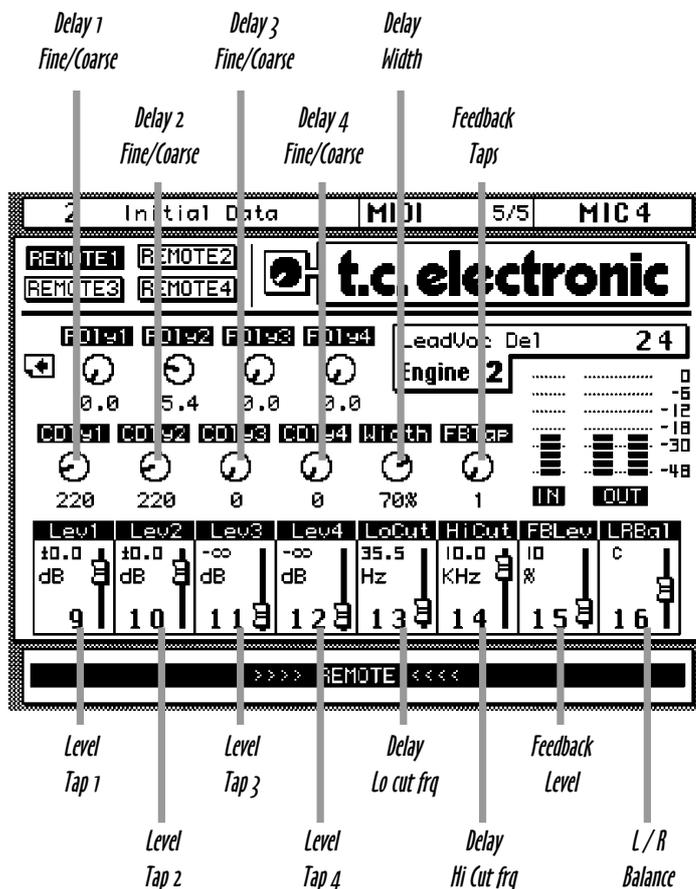
R & I Pre Delay
R Total Decay
R Lo Decay
R Mid Decay
R Hi Decay
R & I Hi Cut Att
I / R Balance
L / R Balance

The UNIT•Y card features a high resolution Delay algorithm. It offers up to 1200 ms of delay on 4 separate 24 bit resolution taps.

To maintain a high delay resolution in the entire range, the four delay parameters are broken down into coarse and fine delays.

A note of caution regarding dynamic automation:

Changing the Delay parameters while signal is present may cause audible glitch noise.

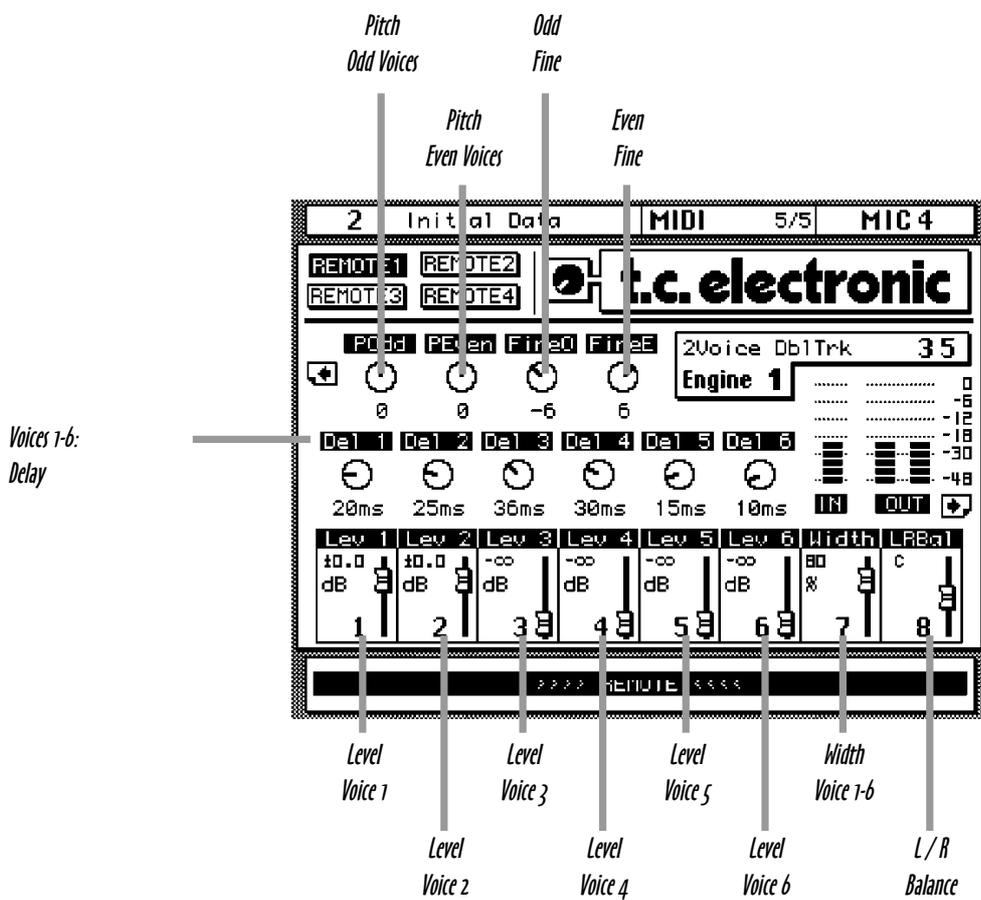


UNIT•Y Delay Engine screen

The Pitch change algorithm has 6 individual polyphonic voices with associated separate 24 bit delays useable for double tracking and beyond.

Pitch change is available over ± 1 octave and voice detuning may be applied.

When Width is greater than 0%, odd voices are panned left, even voices are panned right.



UNIT • Y Pitch Change Engine screen

TC's legendary guitar Chorus has been transferred to the digital domain and made even more flexible. This new true stereo algorithm is clean enough for even master signals requiring Flanging or Chorus effects.

For Flanging effects use small basic delay times and Feedback.

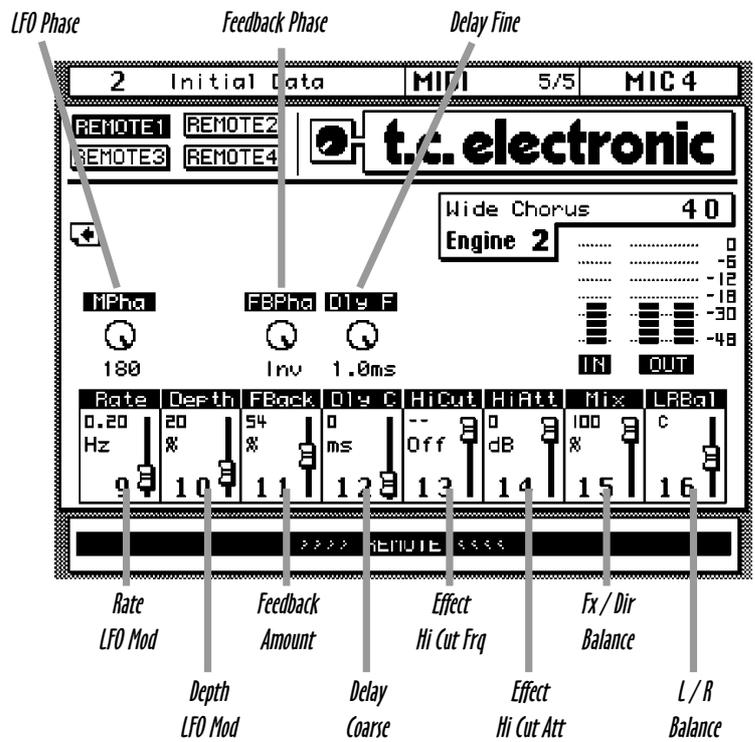
For Chorus effects use longer basic delay times and no Feedback.

Different stereo effects may be obtained by altering the LFO Phase parameter.

A low pass filter may be used on the input to allow you to roll off the high frequencies of the effect signal. You will probably want to make the effect a bit darker than the source.

The Chorus/Flanger effect is very sensitive to the balance between the effect and the direct signal. Because of this we have added a Fx / Direct balance control which enable you to route a complete signal through the algorithm, for instance an entire bus signal. For use in a Aux send / return environment, normally leave the balance at 100% effect.

Do not route the direct signal both through the UNIT•Y card and internally in the 02R. Doing so will produce unwanted phase cancellations due to small timing differences in delay between the two signal paths.



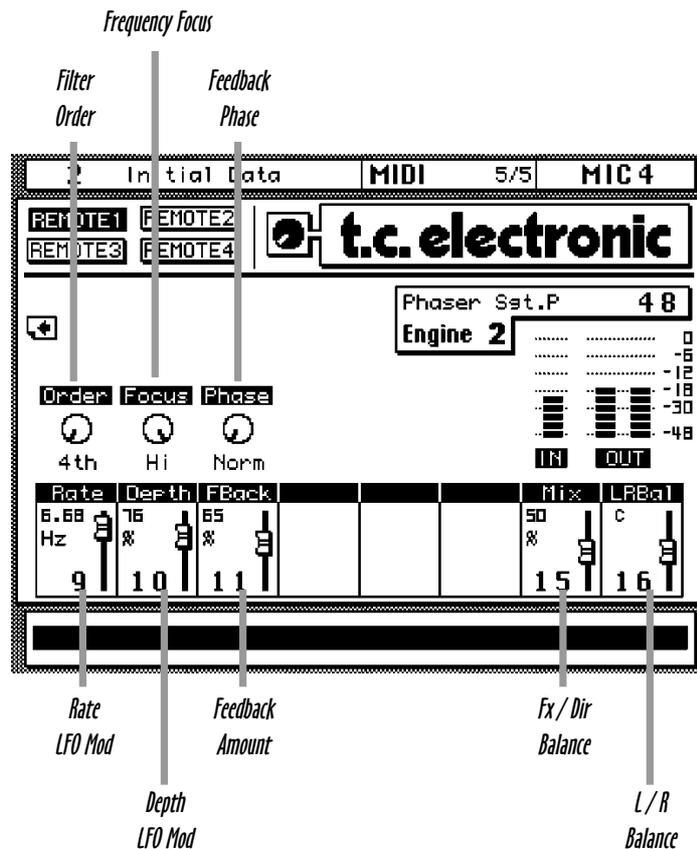
UNIT•Y Chorus/Flanger Engine screen

TC's famed guitar Phaser pedal, TC XII, has been transferred to the digital domain and made more flexible. This new true stereo algorithm is clean enough for even master monster Phasing.

By using the Order parameter, the Phaser is able to simulate different configurations of analog all-pass filters. To select the frequency range affected, use the Focus control.

The Phaser effect is very sensitive to the balance between the effect and the direct signal. Because of this we have added a Fx / Direct balance control which enable you to route a complete signal through the algorithm, for instance an entire bus signal. For use in a Aux send / return environment, normally leave the balance at 100% effect.

Do not route the direct signal both through the UNIT•Y card and internally in the 02R. Doing so will produce unwanted phase cancellations due to small timing differences in delay between the two signal paths.



UNIT•Y Phaser Engine screen

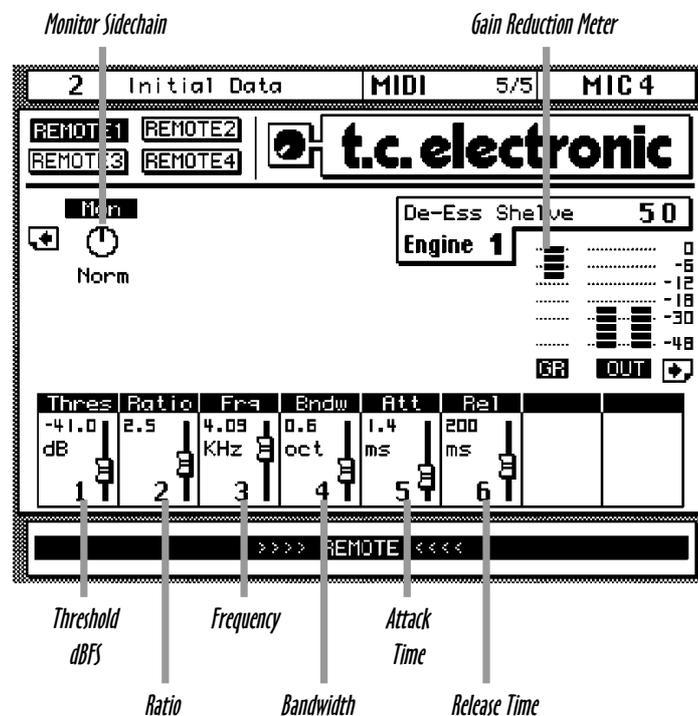
When working with digital audio, some of the desirable technical imperfections of analog are lost. Most noticeably, you lose the restricted dynamic range of high frequency content on analog tape, and may end up with vocal recordings momentarily up to 30dB too bright.

At TC we felt that a nice feature to add to the 02R would be a good De-esser to address this problem. Even though a De-esser is not used in an Aux send / return environment, you may direct entire group busses to the UNIT•Y card and have them processed.

This De-esser may process the audio with different bandwidth notches or high shelving. The Mon parameter allows you to listen to the sidechain in order to tune in on the frequency range you want to process. Be careful not to leave the parameter in the SChain position.

Going through the UNIT•Y card will delay the signal by 6 samples, corresponding to 125 μ s @ 48kHz sampling. The delay introduced is similar too moving a microphone 3.8 cm further away from the source.

Do not mix the De-essed signal from the UNIT•Y card with the direct signal in the 02R. Doing so will produce unwanted phase cancellations.



UNIT•Y De-esser Engine screen

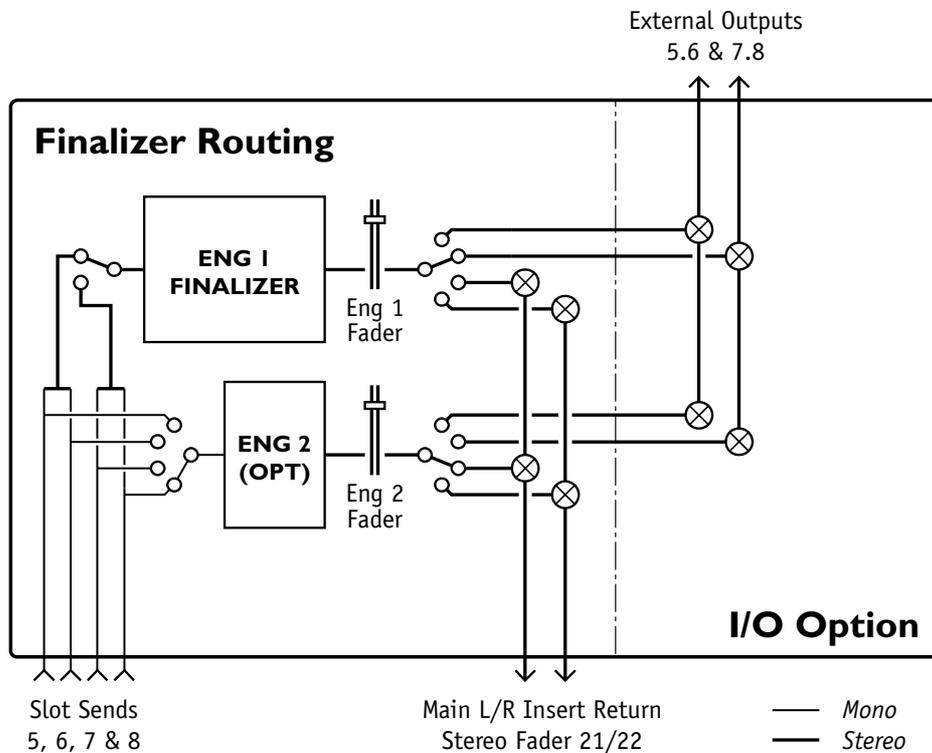
Multi-band compression is now available integrated into an 02R by running a high performance TC Finalizer software module on your UNIT•Y card. Please note, that the Finalizer module is optional. Read pages 4-5 to learn more about licenses, options etc.

If you have acquired the Finalizer D.C., you've got access to factory presets 50-59. Any of the presets recall the algorithm. Of course you may store Finalizer D.C. user presets in a RAM location. RAM locations 200 and upwards should be a first choice, but if you need more preset space, the 100-200 area may also be used. However, future software options may eat that area, thus erasing presets you haven't stored via MIDI.

Finalizer D.C. Routing

When the Finalizer algorithm is recalled, the Engine input configuration is switched from mono to stereo. Inputs may be derived from Slot Output 5.6 or 7.8 and would typically be Main L.R, Bus 5.6, Bus 7.8 or Main L.R Insert. Auxes or Direct outs can also be used.

Finalizer output signals either return to the 02R or output directly on UNIT•Y cards containing DIO option. Typical I/O applications would be a Finalizer D.C. insert on the Main L.R bus with the 02R master fader behaving normally, or to use the Finalizer Engine fader as the master fader with the Main L.R signal being output directly from the card. The output resolution is 24 bit.



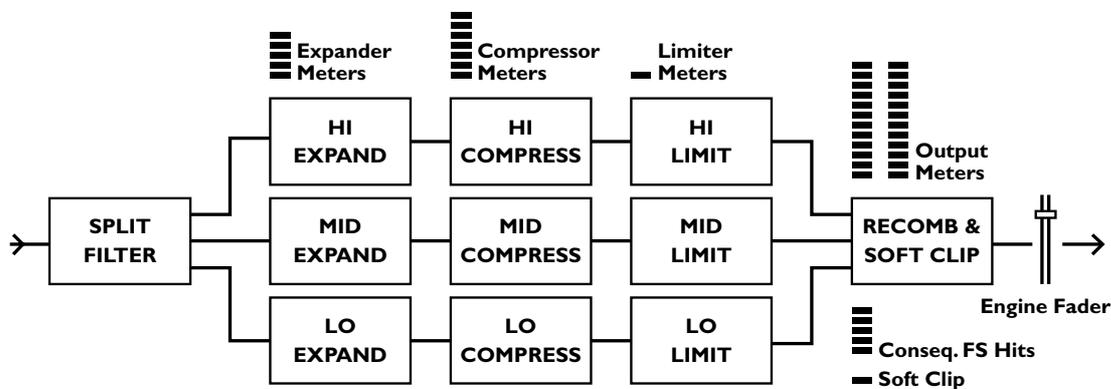
Finalizer D.C. Routing

Finalizer D.C. Routing

As with other UNIT•Y algorithms, I/O routing is partly done on the 02R Slot Output Select screen and partly on the UNIT•Y main screen. The procedure to access the Main L.R Insert mode is described on page 11.

Algorithm Structure

The Finalizer D.C. algorithm consists of a 3-band Expander, 3-band Compressor and 3-band Limiter followed by a broadband Soft Clipping circuit. All the 3-band structures may utilize a look-ahead delay to make the processing unobtrusive and free of dynamic distortion.



UNIT•Y Finalizer D.C. Block Diagram

The control of this very complex structure is made possible by combining the more than 60 individual parameters in an appropriate way, and mapping them to the flexible user interface of the Yamaha 02R. Visual feedback is accomplished using a vast amount of on-screen meters.

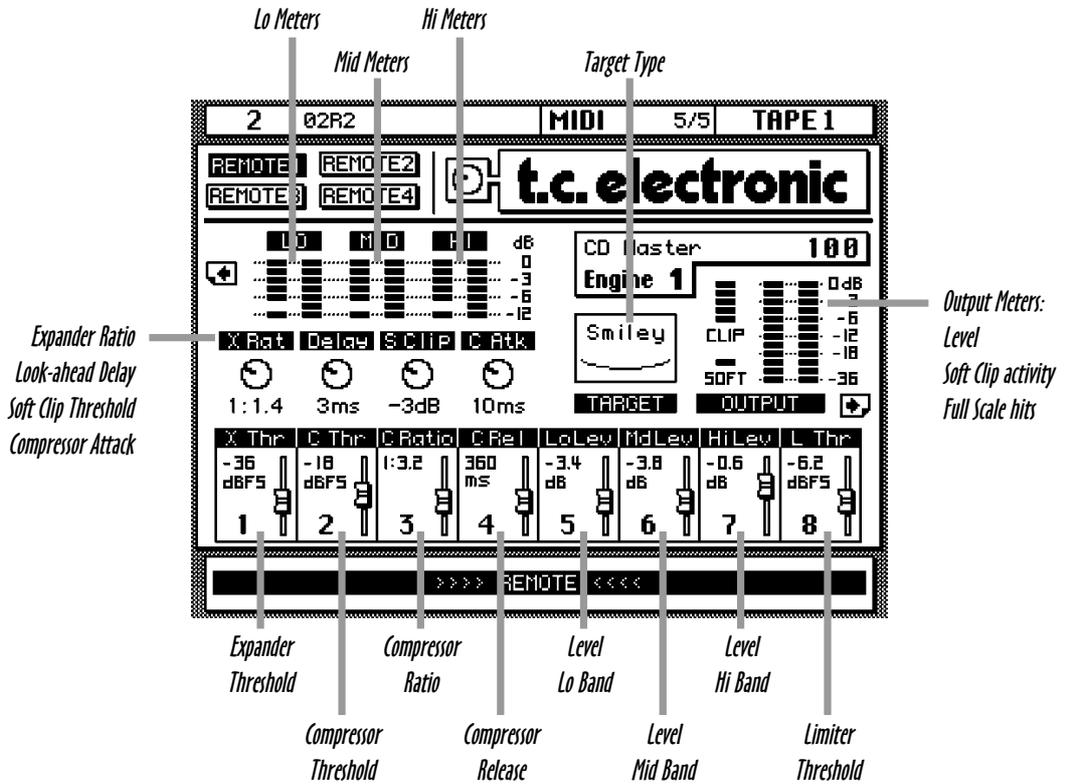
Multi-band Compression

Unlike normal broad-band compression, the spectral balance of the signal is typically affected by a multi-band compressor.

The Static spectral balance is set by the static gain in the different frequency bands. The Static balance is the same as the frequency response below the level of compression. In the Finalizer D.C., the Static frequency response is set by the three Band level faders.

The Dynamic spectral balance is made up by a combination of Make-up gain, compressor Threshold, compressor Ratio and time constants in the different frequency bands. The Dynamic balance can be seen as the spectral target of the working compressor.

In the Finalizer D.C., the Dynamic spectral balance is set as the Target Type of the compressor. By setting different Target Types you tell the Finalizer what sort of frequency response to aim for when dynamic processing takes place.



UNIT • Y Finalizer D.C. Engine screen

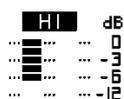
Generally parameter values are set for the Mid band. The Lo and the Hi band settings depend on the Target Type and Target Factor settings. Other “intelligent” interactions between parameters exist, allowing for rapid control while maintaining maximum sonic quality.

Look-ahead Delay

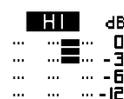
In order to have the control circuitry reacting to the signal ahead of time, the audio is delayed at 24 bit resolution the number of ms dialed in as Look-ahead Delay. Attack parameters of the Expander and Limiter are roughly set by selecting the Target Type, while Attack fine tuning is calculated based on the Look-ahead setting.

Gain Reduction Meters

Examples of gain reduction from Expansion, Compression and Limiting:



6dB of Expansion



3dB of Compression



6dB of Comp + Limit

Expander

Signal levels below the Expander **Threshold** will be lowered according to the Expander **Ratio**. If the Ratio is set at 1:2, 1dB of level drop on the input will result in 2dB level drop on the output. If you want to turn off the Expander, set the Threshold at OFF.

For high Ratios, the Expander becomes a Gate. For low Ratios, Expansion is subtle and may be used to counteract the gain applied in the Compressor section, thereby preventing noise floor build up. The Expander **Range** is set based on the value of the Ratio.

Expander **Attack** time is set based on Look-ahead Delay.

Expander **Release** time is set based on Target Type.

Compressor

Signal levels above the Compressor **Threshold** are lowered according to the Compressor **Ratio**. If the Ratio is set at 3.2:1, 3.2dB of additional input level is needed to make the output rise 1dB.

Threshold and Ratio in the Low and High band is based on the Mid band settings, and how the Target Type and Target Factor is set.

If you want to turn off the Compressor, set the Threshold at OFF.

Make-up gain is automatically calculated and applied as a function of Threshold and Ratio.

Compressor **Attack** time is shown for the Mid band. Release times for the Low and High band depend on the Mid band Release and the Target Type setting.

Compressor **Release** time is shown for the Mid band. Release times for the Low and High band depend on the Mid band Release and the Target Type setting.

Band Levels

The levels on each of the three frequency bands are controlled on the Lo, Mid and Hi faders. The levels are adjusted at the output of the compressor, prior to Limiter and Soft Clipping circuitry.

Limiter

Limiting takes place above the Limiter **Threshold**. Thresholds in the Low and High band is based on the Mid band settings, and how the Target Type is set.

If you want to turn off the Limiter, set the Threshold at OFF.

Limiter **Attack** time is based on the Target Type setting and the Look-ahead Delay. Attack times are always much faster than in the Compressor section.

Limiter **Release** time is based on the Target Type setting.

Soft Clip

When the three frequency bands of the Expander, Compressor and Limiter are re-combined, overshoots may result. To control these transients in a gentle way, a Soft Clipping circuit with selectable Threshold is included in the Finalizer D.C..

Watch the Soft Clip meter to make sure, that Soft Clipping is only active at signal peaks, unless you like a slight distortion to be added to the basic components of your signal.

Max Output Level

For Film mixing and Post Production it's often required to set the max peak output level to a value below Full Scale. The best place to adjust this is the Finalizer Engine Output fader on the Main UNIT•Y screen.

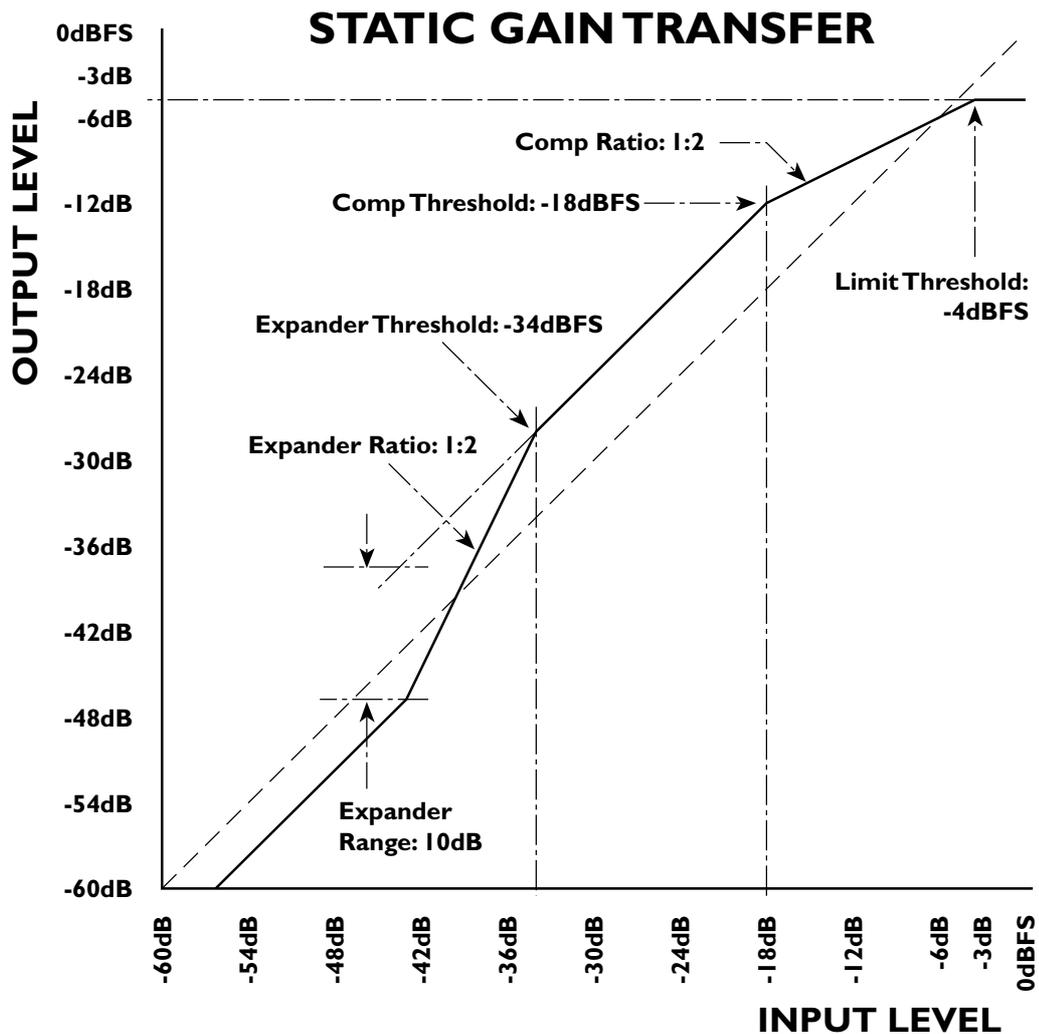
Gain Transfer Function

If you need a technical explanation for the Thresholds, Ratios and Ranges, this diagram shows the static gain transfer function through the system.

Signal Levels and Thresholds refer to digital Full Scale, 0dBFS.

If the line is above the 45 degree dotted line, gain is added.

If the line is below the 45 degree dotted line, the signal is attenuated.



Target

The Target parameter simplifies the control of the Finalizer D.C. significantly, by drastically reducing the amount of parameters to adjust. Instead a large amount of parameters are set appropriately in the background, with you having to care only about the most relevant settings. Therefore the extremely powerful Finalizer D.C. is easier to adjust than a simple broad-band compressor.

By setting a Target Type, you can focus on a type of processing suitable for your material.

Linear

All three bands are processed equally.
Static frequency response: Linear,
Dynamic frequency response: Linear.
Cross-over frequencies: 315Hz and 3.15kHz.
Applications: Neutral processing, Film & Post.

Pink

More attenuation on the Hi band with high levels.
Static frequency response: Linear,
Dynamic frequency response: Less brightness.
Cross-over frequencies: 315Hz and 3.15kHz.
Applications: Gentle processing, Classical music, Film & Post.

Talk

Mid band accentuation.
Static frequency response: Linear,
Dynamic frequency response: Focus on Mids.
Cross-over frequencies: 250Hz and 5kHz.
Applications: Speech and Vocal, Broadcast, Film & Post.

Hyped

Optimized Attack and Release times for maximum perceived loudness and brightness.
Static frequency response: Brighter,
Dynamic frequency response: Brighter.
Cross-over frequencies: 315Hz and 3.15kHz.
Applications: Processing for loudness, Pop music, Commercials.

Smiley

Hi and Lo processed more. Dynamic Attack and Release times.
Static frequency response: Smiley,
Dynamic frequency response: Smiley.
Cross-over frequencies: 315Hz and 3.15kHz.
Applications: Processing for loudness.

Finalizer D.C. tutorial

As a starting point, load preset number 50, The Finalizer.

If you use a CD as source material, it will already be mastered and have peaks at Full Scale. In that case, attenuate the signal by 10dB on the 02R before it gets to the Finalizer, in order to make the level within the expected range of the preset.

Insert the Finalizer D.C. on the Main L.R bus and play a mix at a typical level. You should have 3-6dB of compression on the Band meters. If not, adjust the Compressor Threshold until that happens.

When the Finalizer D.C. is running, the ON button above Fader 17/18 functions as a **By-pass**. Try turning it on and off.

Try the different **Targets** to get a feel of what the control they're doing. High Compressor Ratios or low Thresholds make the different types more pronounced.

The Compressor **Release** time is also an important factor affecting the overall loudness, faster settings being the loudest. But if heavy compression is used, pumping may result when time gets too short. Tweak the parameter and note the consequences.

Try to off-set the spectral balance by adjusting individual band Faders (Lo, Mid and Hi).

Turn off the **Limiter** by turning the Limiter Threshold all the way up. Turn off the Soft Clip function and watch the Output Meter for overloads. When overloads happen, the number of consecutive Full Scale hits will be shown on the Clip meter. Notice, that turning on the Soft Clip function often can make output clipping disappear.

Finally turn on the **Expander** by moving the Threshold away from OFF. When the Expander Ratio is set at 1:1.4, its range is restricted to max 8dB of attenuation. This setting may prove useful to get rid of some of the noise brought up by the compressor. Adjust the Threshold so only the very low level parts of the signal are affected.

BEWARE OF EXPLOSIVES!

The Finalizer D.C. is an extremely powerful tool that allows you to tighten up most material and add loudness to nearly any mix. This kind of processing can be very addictive, but you should try not to just add more and more. Even though you don't notice it at first, heavy multi-band compression and soft clipping does generate listening fatigue more easily than material with more of the natural dynamic range preserved.

So don't just use the Finalizer as an auto-pilot. Use your ears and enjoy all the power of the algorithm by applying the right amount of processing.

Static or Snapshot automation is established by using the Scene memories in the 02R, but automation may be taken one step further by recording parameter movements locked to timecode.

As an 02R owner you have definitely already gotten addicted to dynamic movement of much more than faders. TC UNIT•Y is probably the first processor outside a computer that will allow you to efficiently include effect parameters to the list of dynamic controls. The extra processing power needed to provide parameter gliding is obtained by using a double processor hardware solution in combination with custom circuitry.

UNIT•Y parameters on faders are dynamically automatable, while parameters on rotary knobs are changed by changing presets.

Working principles

Most 02R users follow a basic pattern when working with Automix. Typically a static, basic mix is established with the correct routing, EQ, effects, faders etc. This basic mix is then stored to a Scene memory and used as a reference for the dynamic automation. To add a 2dB trim to the lead vocal, the basic Scene is recalled, trimmed and stored again to off-set the level for the entire song.

Recommended procedure for using dynamic automation with UNIT•Y:

1. Turn off the "Automix Enable" option (Automix page).
2. Establish a basic mix. Routing, Levels, Pan, Eq, Effects etc.
3. Store UNIT•Y settings to presets (UNIT•Y main page).
4. Store the basic mix to a Scene Memory.
5. Enable Automix and create a New Mix. (Automix page).
6. Reference the new mix to the Scene Memory you just created. (Automix page).
7. Start timecode and record fader movements.
8. Record UNIT•Y changes like you're used to by pressing "Select" buttons.

Back-up of UNIT•Y settings

1. Connect 02R MIDI I/O to Sequencer or MIDI recorder.
2. Start Sequencer or recorder.
3. On the UNIT•Y main page, press "DMP".
4. Verify that data is received on the Sequencer or recorder.

Restore of UNIT•Y settings

1. Go to UNIT•Y main page.
2. Playback UNIT•Y data.
3. Screen shows data being received.

A Utility page is provided to perform these functions:

- Display of UNIT•Y software revision and Serial number.
- UNIT•Y self diagnostics test.
- Entering License codes for software modules.
- Invoking other special functions.
- Clearing the UNIT•Y Preset RAM and reverting to factory Presets.

Getting to the Utility page

You probably don't need to access the Utility page on a daily basis, but it may be entered from the Main page by typing Preset name "UTILITY" or "@@" and pressing "DMP". If you wish to go here often, you can name a preset like that for easy access.

License Codes and Reference Codes

To access different software options, you have to enter a License code in the Command display and then press ENTER. To get a license code, you may be asked about your Reference code. This code is found on the Utility page within the brackets succeeding the name of the software module you require. The Status display will verify the process.

Card Status

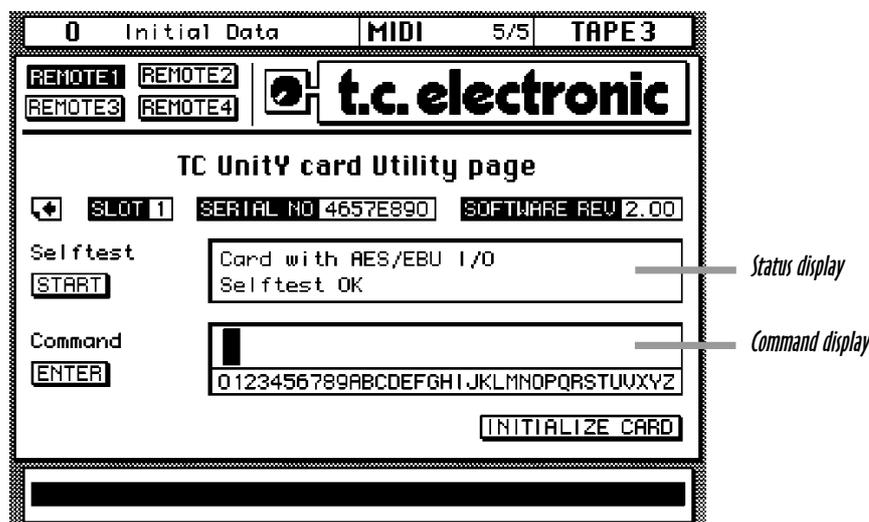
To see a license and configuration status of the selected UNIT•Y card, write "STATUS" or "ST" in the Command line, and press ENTER.

ADAT and TDIF format

If you use the ADAT/TDIF DIO extension card, the Utility page is used to set-up format type, format conversion etc. Refer to the papers included with the card.

Special functions

New special commands may be issued from the Utility page. In that case, they will be described on the TC web-site.



UNIT•Y cards with AES/EBU input/output option

An 8 channel AES/EBU digital input/output option may be bought with the UNIT•Y card, or added later on. The industry standard of digital audio transmission, AES3, normally referred to as AES/EBU, is found on most professional audio equipment. Two channels of up to 24 bit audio is transmitted over one balanced cable. XLR type of connectors are specified.

On the AES/EBU extension of the UNIT•Y card, space has prevented us from utilizing 8 XLR connectors. Instead we have used a 25-pin SubD connector of the same type and with the same pin assignment as on Yamaha's single slot AES/EBU card, but the electrical format is true AES/EBU with all inputs and outputs being transformer balanced. The robust AES/EBU signal may be transmitted over a long distance and travel through patch-bays etc, but the timing reference signal should be kept separately.

If you use an AES/EBU router or mechanical patch-bay, you might consider making your own multiway cable with the terminations you need. For AES/EBU signals, relatively thin and cheap twisted pair computer cable with a common screen is a good solution. If you use twisted pair cable with 90-120 Ω impedance, the results are normally better than with more expensive AES/EBU cable.

Remember to observe the twisting for pair identification.

Pin assignment, AES/EBU 25-pin SubD connector

Pin number	Assignment	Cable pair number
1	Input 1/2 +	1
2	Input 3/4 +	2
3	Input 5/6 +	3
4	Input 7/8 +	4
5	Output 1/2 +	5
6	Output 3/4 +	6
7	Output 5/6 +	7
8	Output 7/8 +	8
9, 11	No connection	
10, 12, 13	Common	
14	Input 1/2 -	1
15	Input 3/4 -	2
16	Input 5/6 -	3
17	Input 7/8 -	4
18	Output 1/2 -	5
19	Output 3/4 -	6
20	Output 5/6 -	7
21	Output 7/8 -	8
22, 23, 24	Common	
25	Common	Shield

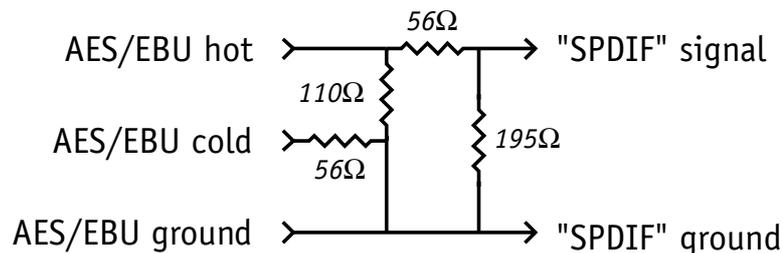
On most consumer equipment, SPDIF or IEC 958 is used instead of AES/EBU. With some limitations, that type of signal can often be interfaced to the UNIT•Y card, if you follow the guidelines given below.

UNIT•Y output to SPDIF input

Some SPDIF equipment may reject a signal because the Status Bits are set according to the AES/EBU specification, but in most cases Pro status is accepted, and a signal may be transferred.

To get the most reliable interface, the noise immunity of the electrical interface should be maximized. Drive level and impedance is higher with the AES/EBU interface, so the best solution is to use a resistor network as shown below to match both parameters.

On some equipment, an SPDIF input processes 16 bits, on other 20 or 24 bits. When driving SPDIF inputs, you should know how much data is being looked at, and set the 02R output dither accordingly.



Connecting AES/EBU outputs to SPDIF cables and inputs

SPDIF output to UNIT•Y input.

Unless your SPDIF transmitter uses the 4 aux data bits for something else than audio, the problem from going SPDIF to AES/EBU is typically electrical.

The best solution is to use an active balanced digital line driver close to the SPDIF output, and 110 ohm cable onwards, but for short term setups, you may get by more easily:

A 75 ohm cable with a RCA phono type of connector in one end directly to the UNIT•Y input. Because of the low level and unbalanced output signal, the cable should be kept short (less than around 5 meter). At the UNIT•Y input, cold is connected to common.

The ADAT/TDIF DIO Option

The extension board is equipped with two ADAT optical connectors and one 25-pin SubD type of connector as used with Tascam TDIF signals.

The ADAT/TDIF card is capable of running one of four different I/O configurations:

- 1) "Input: ADAT, Output: ADAT"
- 2) "Input: ADAT, Output: TDIF"
- 3) "Input: TDIF, Output: ADAT"
- 4) "Input: TDIF, Output: TDIF"

The Utility page is used to define which one of the four I/O configurations you want to utilize:

- Choose "Input: ADAT, Output: ADAT" by writing "IOAA" and press Enter.
- Choose "Input: ADAT, Output: TDIF" by writing "IOAT" and press Enter.
- Choose "Input: TDIF, Output: ADAT" by writing "IOTA" and press Enter.
- Choose "Input: TDIF, Output: TDIF" by writing "IOTT" and press Enter.

IO Status

To check the status of your I/O card you write "IOST" and press Enter.

The following messages can be displayed:

"IO ERROR" - The I/O card is detected but there is a problem with the communication

"NO IO" - You have no I/O card on your UNIT•Y card.

"AES" - You have an AES/EBU I/O card connected to your UNIT•Y card.

"TDIF/ADAT" - You have a TDIF ADAT I/O card connected to your UNIT•Y card.

Line 2 shows the current I/O configuration:

- 1) "IOAA" - You have the "Input: ADAT, Output: ADAT" configuration.
- 2) "IOAT" - You have the "Input: ADAT, Output: TDIF" configuration.
- 3) "IOTA" - You have the "Input: TDIF, Output: ADAT" configuration.
- 4) "IOTT" - You have the "Input: TDIF, Output: TDIF" configuration.

02R software

Software to control the 02R and the interaction between the UNIT•Y card and the console reside in the two EPROM's on the 02R Main board (described on page 6).

UNIT•Y software

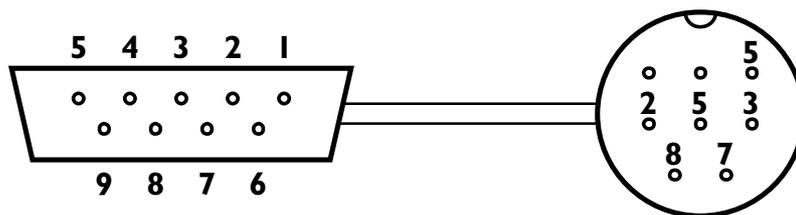
The algorithms on the card are passed by the host processor to the signal processor, both on the UNIT•Y card. DSP and host code reside in Flash RAM on the card. When new algorithms are added, the Flash can be updated via a simple upload program running on a Mac or a PC.

Upload program and application software may be downloaded free of charge from the TC web-site, or you can obtain it from your dealer. Remember to consult the Read Me file included in the software package before commencing. We also recommend you to back-up all presets as described on page 18 before uploading any software.

If you have a **Mac**, a normal Mac serial cable is connected from one of the serial ports on the computer (printer or modem) to the identical connector on the back of the 02R. Turn off AppleTalk, if you use the printer port, and run the Mac upload program. Data is uploaded to the UnitY card no matter what screen you look at on the 02R. You will see an alert box counting on the console when data is being received.

The procedure take less than 1 minute. Afterwards new software is ready to use on the UNIT•Y card. If you have more UNIT•Y cards on the console, the procedure needs to be repeated.

If you have a **PC**, a 9-pin to Mini DIN cable has to be made first:



9-PIN SUBD (PC)

8-PIN MINI DIN (02R)

Connect the cable to a Com port and run the PC upload program. Data is uploaded to the UnitY card no matter what screen you look at on the 02R. You will see an alert box counting on the console when data is being received.

The procedure take less than 1 minute. Afterwards new software is ready to use on the UNIT•Y card. If you have more UNIT•Y cards on the console, the procedure needs to be repeated.

For 02R users upgrading from V1, a brief summary of new functions are provided. To obtain a complete new V2 Owners Manual, please consult your Yamaha dealer. Page numbers refer to the relevant sections in the 02R V2 Owner's Manual.

1. Display Page Numbering

Display pages are numbered for easy identification. See "Display" on page 20 of the User's Guide.

2. 24-bit Recording

Using two recorder tracks per channel, high-resolution digital audio can be recorded at the maximum word length of 24 bits. See "24-bit Recording" on page 204 of the User's Guide.

3. Surround Pan

The 02R Surround Pan function supports 2+2, 3+1, and 3+2+1 surround modes, making it ideal for sophisticated surround sound production. See "Surround Pan" on page 63 of the User's Guide.

4. Automix Functions

Edit Out End Mode

In the automix End mode, faders remain at the same position regardless of subsequent fader events. See "Fader Edit & Edit Out Modes" on page 146 of the User's Guide.

Off-line Editing Enhancements

Automix events can be copied or moved, and levels can be trimmed.

Timecode addresses can be captured on-the-fly, and new events inserted at the captured points. The Locate function provides a speedy way to locate events in a complex automix. See "Event Edit (Scene/Lib.)" on page 155 and "Event Edit (CH ON, PAN, FADER)" on page 156.

MIDI Clock

Automix can be referenced to an external MIDI Clock. See "Using MIDI Clock" on page 142.

MTC

MTC can be received via the MIDI IN or MTC IN connector. See "Using MIDI Timecode (MTC)" on page 141 of the User's Guide.

Timecode Offset

By specifying an offset, automix events can be moved backwards or forwards relative to the incoming timecode. See "Offset" on page 145 of the User's Guide.

5. Aux Out Select—Aux or Bus

Bus outs can be assigned individually to the analog aux send outputs, providing analog bus outputs. See "Aux Output Select" on page 203 of the User's Guide.

6. Bus Out Pairs

Bus outs can be paired. See “Pairing Channels” on page 184 of the User’s Guide.

7. Cascade Message Link

When several 02Rs are cascaded together, the master 02R can control a number of functions of the slave 02Rs via MIDI. See “MIDI Link” on page 232 of the User’s Guide.

8. Communications Speed

The communications speed settings have been moved to the UTILITY 4/4 (Battery Check) page. See “Communication Speed” on page 214 of the User’s Guide.

9. Cue Send Dim Level Control

The Cue Dim control sets the level to which cue outputs are dimmed when talkback is engaged. See “Solo” on page 196 of the User’s Guide.

10. Channel Delay On/Off Parameter on View Page

The Channel Delay function can be turned on or off from the View page. See “View” on page 44.

11. Fader Start

When the Fader Start preference is checked, a MIDI Note On message is transmitted when channel faders are raised from infinity (∞). “Fader Start” on page 163 and “Preferences” on page 198 of the User’s Guide.

12. Initial Data—Faders Nominal or Minimum

A preference can be set so that recalling scene memory 0 causes all channel faders to move to either the nominal or minimum position, the latter being the default. Aux and bus master faders move to the nominal (0.0 dB) position regardless of this preference. See “Initial Data and UNDO Memory” on page 129 and “Preferences” on page 198 of the User’s Guide.

13. Input Patching

The Input Patching function allows you to select the signal sources for MIC/LINE channels 1 to 24 and TAPE channels 1 to 16. Bus outs can be patched though to the TAPE channels for bus out monitoring and subgrouping. See “Input Patching” on page 206 of the User’s Guide.

14. MIDI Control Changes

MIDI Control Change messages can be used to remotely control 02R mix parameters, including faders, ON buttons, EQ, and pan. See “MIDI Control Change Assign” on page 164 of the User’s Guide. A Parameter to Control Change Table is provided on page 256 of the User’s Guide.

15. MIDI Remote

The MIDI Remote function can be used to control other MIDI equipment from the 02R. See “MIDI Remote” on page 165 of the User’s Guide.

16. Mix Scene and Library Program Clear Function

Individual mix scenes and library programs can be cleared using the Clear function.

- Channel programs—page 49 of the User’s Guide.
- EQ programs—page 56 of the User’s Guide.
- Dynamics programs—page 88 of the User’s Guide.
- Effects programs—page 110 of the User’s Guide.
- Mix scenes—page 132 of the User’s Guide.

17. MS Decoding

MIC or TAPE channels configured as stereo pairs can be used to decode signals derived using MS microphone techniques. See “MS Decoding” on page 186 of the User’s Guide.

18. Pairing

When channel pairs are released using the [SEL] buttons, a confirmation dialog box appears. See “Pairing Channels” on page 184 of the User’s Guide.

In addition to the PAIR 2/2 page, aux sends can be paired using the SELECTED CHANNEL AUX buttons. See “Pairing Channels” on page 184 of the User’s Guide.

Aux sends and bus outputs can be paired using the input channel [SEL] buttons 1 to 14 when the MIDI Remote page BUS/AUX Master is selected. See “BUS/AUX Master” on page 167.

19. Phase & Attenuation Control for Paired Channels

The Phase and Attenuation functions of stereo input channels 17 to 24, and MIC/LINE or TAPE channels configured as stereo pairs, are not linked and can be adjusted independently. See “Phase and Attenuation” on page 32 of the User’s Guide.

20. Preferences

The Mix Update Confirmation, REC Recall Safe Fader, and Fader Flip Recall Safe preferences have moved to the new SETUP 4/4 page (Preferences 2), and several new options have been added to the SETUP 3/4 page (Preferences 1) and SETUP 4/4 page (Preferences 2). See “Preferences” on page 198 of the User’s Guide.

New preferences on the SETUP 3/4 page (Preferences 1) are:

- Auto WORD CLOCK Display
- Insert Tx bulk Wait
- CR Level to MB02
- Pre EQ Direct Out
- Initial Data Nominal
- Fader Start
- Force SUB Boot

New preferences on the SETUP 4/4 page (Preferences 2) are:

- Touch Sense Select
- Auto EQ Edit In
- Restore Last Edit Ch
- Surround X, Y Edit
- Surround CSR Edit
- Surround SWF Edit
- Link Surround Master
- Auto Inc. TC Capture
- Compact Automix Bulk
- Compact Scene Bulk
- Tx 02R link Message
- Rx 02R Link Message

21. Routing Independence for Paired Channels

Input channels configured as a stereo pair can be routed individually. See “Routing” on page 39.

22. Scene Memories

The number of scene memories has been expanded from 64 to 96.

The number of the scene memory that was stored or recalled last can be displayed by pressing the scene memory increment and decrement buttons together. See “What are Scene Memories?” on page 128 of the User’s Guide.

23. Scene Memory to Program Change Table

A Scene Memory to Program Change Table is provided on page 255 of the User’s Guide.

24. Slot Output Select

Bus outs, aux sends, channel direct outs, and the stereo output can be assigned individually to the YGDAI digital outputs. See “Slot Output Select” on page 194 of the User’s Guide.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to a different outlet from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The user may find the following booklet, prepared by the Federal Communications Commission, helpful:

"How to identify and Resolve Radio/TV interference Problems."

This booklet is available from the US. Government Printing Office, Washington DC, 20402, Stock No. 004-000-0034-4.

Caution:

You are cautioned that any change or modifications not expressly approved in this manual could void your authority to operate this equipment. This equipment has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class B digital devices.

For the customers in Canada:

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Caution:

Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

TC Electronic A/S, Sindalsvej 34, 8240 Risskov, Denmark, hereby declares on own responsibility that following product:

UNIT•Y Dual Engine Signal Processing Card

That is covered by this certificate and marked with CE-label conforms with following standards:

- | | |
|------------|--|
| EN 60065 | Safety requirements for mains operated Electronic and related apparatus for household and similar general use. |
| EN 55103-1 | Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use.
Part 1: Emission. |
| EN 55103-2 | Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use.
Part 2: Immunity. |

With reference to regulations in following directives: 73/23/EEC, 89/336/EEC

Issued in Risskov, August 17th 1998

Anders Fauerskov
Managing Director

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

ADVARSEL! Lithiumbatteri. Eksplosionsfare ved fejlagtig håndtering. Skal erstattes af batteri af samme fabrikat og type. Lever det brugte batteri tilbage til leverandøren.

WARNING: Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av tillverkaren. Kassera anvent batteri enligt fabrikantens instruktion.

VAROITUS: Paristo voi rajahtaa, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan valmistajan suositteluun tyypun. Havita käytetty paristo valmistajan ohjeiden mukaisesti.

Nr	Titel	Algorithm	Decay or Gain	Source	Description
1	UnitY Hall	Reverb	Med	General	Medium Hall, moderate pitch modulation
2	UnitY Hall Sml	Reverb	Short	General	Small Generic Hall
3	UnitY Hall Lrg	Reverb	Long	General	Large Hall, moderate pitch modulation
4	Living Room	Reverb	Short	VoiceUn-corr	Dark, domestic ambience
5	Steel Plate	Reverb	Med	Gtr, Horn, Inst	Steel plate emulate
6	Gold Plate	Reverb	Med	Voice, Keyb	Gold plate emulate
7	Rich Plate	Reverb	Med	Drums, Keyb	Bright plate,pitch modulation
8	Spring Reverb	Reverb	Med	Gtr, Harp	Spring verb emulate
9	1982 Digiverb	Reverb	Med	Vintage	Bright verb,pitch modulation
10	InTheAir Ambi	Reverb	Short	VocalGtr	Ambience, pitch modulation
11	Soft Room	Reverb	Short	Gtr, Sax	Slap Room go Left
12	Man In a Box	Reverb	X Short	Vocal,Inst.	Tight space
13	Walk In Closet	Reverb	Short	Kick, Snare	Tight, dark space
14	Clos Mic'd	Reverb	Short	Piano, Gtr	Flutter echoes
15	Small Bedroom	Reverb	Short	Voice	Domestic ambience
16	Wood Backwall	Reverb	Med	Vocal, Gtr, Keyb	Live room
17	Empty Club	Reverb	Med	General	Live room
18	Warm Studio	Reverb	Med	Vocal, Kick	Dark, live room
19	Big Dark Cloud	Reverb	Long	Effect	Dark effect sustain
20	LeadVoc Del	Delay		Vocal, Gtr	Nearly mono delay
21	TheKing Del	Delay		Vocal, Harp, Gtr	Mono R&R delay
22	120bpm:4 Del	Delay		General	120bpm mono delay
23	120bpm:3 Del	Delay		General	120bpm mono delay
24	Wide Del	Delay		Gtr, Keyb	Wide spread delay
25	2TapDelay	Delay	Repeat	General	Wide spread repeat
26	Phone Del	Delay		Vocal, Effect	Spread filter delay
27	Tape Del	Delay		Vocal, Harp, Gtr	Mellow delay
28	Ping Pongs	Delay		Effect	Ping-pong delay
29	Slap & LongDly	Delay	Repeat	Effect	Repeat delays
30	2Voice DblTrk	PChange		Vocal, Inst	2 voice harmony
31	4Voice DblTrk	PChange		Vocal, Inst	4 voice harmony
32	6Voice DblTrk	PChange		Vocal, Inst	6 voice harmony
33	Heavy DTune	PChange		Gtr, Keyb	6 voice de-tune
34	OutOfTune	PChange		Effect	6 voice heavy de-tune
35	Wide Chorus	Chorus		Gtr, Keyb	General purpose chorus
36	Chorus Gtr	Chorus		Gtr, Bass, Keyb	General purpose chorus
37	Instant Karma	Chorus		Keyb, Gtr, Sax Bass	Chorus spread
38	Top Over Flange	Chorus		Gtr, Bass	Flanger.
39	Wah-Wah Flange	Chorus		Gtr	Resonance-Flanger.
40	Phaser Light	Phaser		Mix, Gtr	Phaser. Feed direct through engine.

Nr	Titel	Algorithm	Gain	Source	Description
41	Phaser Med	Phaser		Mix, Gtr	Phaser. Feed direct through engine
42	Phaser Heavy	Phaser		Mix, Gtr	Deep Phaser. Feed direct through engine
43	Phaser Sgt.P	Phaser		Gtr, Keyb	Fast phaser. Feed direct through engine
44	SloWistlePhase	Phaser		Effect, Mix	Resonance-Phaser. Feed direct through engine
45	De-Ess Shelve	De-Ess		Vocal, Horn	De-ess, shelving
46	De-Ess Broad	De-Ess		Vocal, Horn	De-ess, wide bell
47	De-Ess Narrow	De-Ess		Vocal, Horn	De-ess, narrow bell
48	De-Phone	De-Ess		Vocal,Horn	De-honk, narrow
49	De-Wow	De-Ess		Vocal	De-body, narrow
50	CD PreMaster	Finalizer	+ 1.5dB @-20dBFS	Main mix	Subtle pre-master processing suitable for rock & pop
51	CD Master	Finalizer	+ 4.8dB @-20dBFS	Main mix	Combined compressor and limiter suitable for rock & pop
52	Mix Pilot	Finalizer	+ 6.8dB@-20dBFS	Main mix,choir	Mix assistance with final limiter suitable for live broadcast and music
53	Classical	Finalizer	+ 2.8dB@-20dBFS	Main mix	Dynamic processing suitable for classical music
54	Analog Saturate	Finalizer	+ 7.4dB@-20dBFS	Main mix,vocal	Analog tape saturation emulate with roll-off at hi freq/hi level
55	Commercial	Finalizer	+ 12.0dB @-20dBFS	Main mix,vocal	Agressive processing for loudness - not fidelity
56	Speak Record	Finalizer	+ 6.4dB @-20dBFS	Voice	Spectral shaping of voice recording, low delay
57	Post Limit	Finalizer	0.0dB@-20dBFS	Main mix	Limiting only. Suitable for post production. Adjust output fader to comply with your environment
58	Music Limit	Finalizer	0.0dB@-20dBFS	Main mix	Limiting only. Suitable for music production. Adjust output fader to comply with your environment
59	MultiBand Exp	Finalizer	0.0dB	Main mix, location, recordings	Multiband noise removal. Adjust threshold to suit material
60	Reserved				
61	Reserved				
62	Reserved				
63	Reserved				
64	Reserved				

Nr	Titel	Algorithm	Decay or Gain	Source	Description
65	Reserved				
66	Reserved				
67	Reserved				
68	Reserved				
69	Reserved				
70	Reserved				
71	Reserved				
72	Reserved				
73	Reserved				
74	Reserved				
75	Reserved				
76	Reserved				
77	Reserved				
78	Reserved				
79	Reserved				
80	Reserved				
81	Reserved				
82	Reserved				
83	Reserved				
84	Reserved				
85	Reserved				
86	Reserved				
87	Reserved				
88	Reserved				
89	Reserved				
90	Reserved				
91	Reserved				
92	Reserved				
93	Reserved				
94	Reserved				
95	Reserved				
96	Reserved				
97	Reserved				
98	Reserved				
99	Reserved				
100	5.1 Front Mic	Reverb	Short	Multich.applic.	Mellow room. Use with 101 in rear
101	5.1 Back Mic	Reverb	Medium	Multich.applic.	Mellow room. Use with 100 in front
102	5.1CloseAmbFrnt	Reverb	Short	Multich.applic.	Domestic room. Use with 103 in rear
103	5.1CloseAmbBack	Reverb	Medium	Multich.applic.	Domestic room. Use with 102 in front
104	5.1PodiumFront	Reverb	Medium	Multich.applic.	Bright room. Use with 105 in rear
105	5.1PodiumBack	Reverb	Medium	Multich.applic.	Bright room. Use with 104 in front

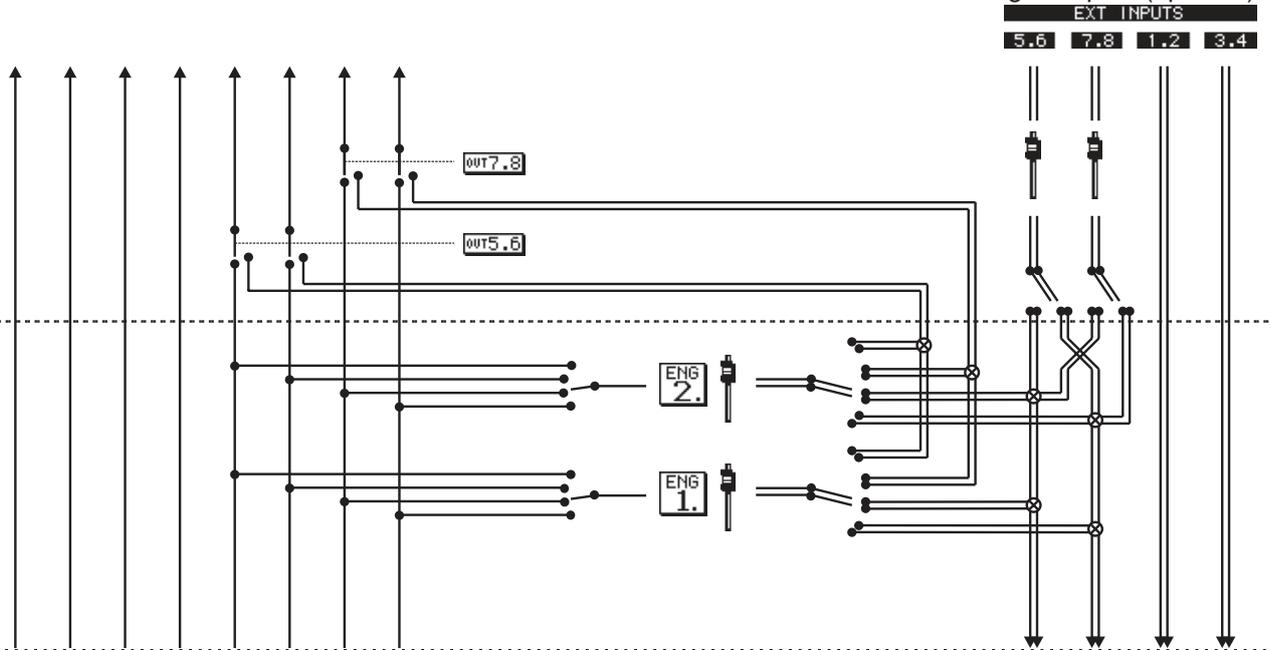
Nr	Titel	Algorithm	Decay or Gain	Source	Description
106	5.1RealRoomFrnt	Reverb	Medium	Multich.applic.	Ambience. Use with 107 in rear
107	5.1RealRoomBack	Reverb	Medium	Multich.applic.	Ambience. Use with 106 in front
108	5.1Studio Front	Reverb	Short	Multich. applic.	Wood studio. Use with 109 in rear
109	5.1Studio Back	Reverb	Medium	Multich. applic.	Wood studio. Use with 108 in front
110	5.1MdRoom Front	Reverb	Short	Multich. applic.	Hard surface front. Use with 111 in rear
111	5.1MdRoom Back	Reverb	Medium	Multich. applic.	Diffused rear. Use with 110 in front
112	5.1LectureFront	Reverb	Medium	Multich. applic.	Hard surface front. Use with 113 in rear
113	5.1LectureBack	Reverb	Medium	Multich. applic.	Diffused rear. Use with 112 in front
114	5.1 On Stage	Reverb	Medium	Multich. applic.	Front reflexions. Use with 115 in back
115	5.1 In Back	Reverb	Large	Multich. applic.	Diffused field. Use with 114 in front
116	5.1LgRoom Front	Reverb	Medium	Multich. applic.	Hard surface front. Use with 117 in rear
117	5.1LgRoom Back	Reverb	Large	Multich.applic.	Diffused field. Use with 116 in front
118	5.1 FrontOffHall	Reverb	Large	Multich. applic.	Diffuse bright front. Use with 119 in rear
119	5.1 BackOffHall	Reverb	Large	Multich. applic.	Diffuse dark rear. Use with 118 in front
120	5.1 Arena Front	Reverb	Large	Multich. applic.	Diffuse bright front. Use with 121 in rear
121	5.1 Arena Back	Reverb	Large	Multich.applic.	Diffuse bright rear. Use with 120 in front
122	5.1 Hall Front	Reverb	Large	Multich. applic.	Diffuse dark front. Use with 123 in rear
123	5.1 Hall Back	Reverb	Large	Multich.applic.	Diffuse slap rear. Use with 122 in front
124	5.1Church Front	Reverb	Large	Multich. applic.	Diffuse dark front. Use with 125 in rear
125	5.1Church Back	Reverb	X Large	Multich. applic.	Diffuse dark rear. Use with 124 in front
126	SmlRoomAmbience	Reverb	Short	Post	Dark domestic room
127	NaturalRoomAmb	Reverb	Short	Gtr	Ambience
128	The New Beetle	Reverb	Short	Post	Tight reflexions
129	Short Nonlinear	Reverb	Short	Drum	Bright sudden stop
130	Short ZipSplat	Reverb	Short	Gtr	Flutter echoes
131	Piano Room	Reverb	Short	Piano, Gtr	Subtle ambience
132	Studio Booth	Reverb	Short	Post, vocal	Subtle spread
133	With a Mic	Reverb	Short	Post, Gtr	Boomy ambience
134	ToiletPaperRoll	Reverb	Short	Post, vocal	Comb filter ambience
135	Air Verb	Reverb	Short	Vocal, Gtr	Subtle air
136	Gtr Ambience	Reverb	Medium	Gtr	Dark ambience
137	ModernDrumRoom	Reverb	Medium	Drum	Bright room
138	SlapGuitarRoom	Reverb	Medium	Gtr, Harp	Slap reverb
139	SmoothSaxHall	Reverb	Medium	Horn	Slap sustain
140	BriteVocalPlate	Reverb	Medium	Vocal	Bright ambience
141	The Live Room	Reverb	Medium	Vocal, Choir	Bright ambience
142	Big Drum Room	Reverb	Medium	Drum	Dark studio, distant
143	Warm Studio	Reverb	Medium	Drum, Piano	Dark studio, close
144	Living Room	Reverb	Medium	Post	Bright domestic room
145	SemiBrightRoom	Reverb	Medium	Vocal	Hard surface room
146	Big Mens Room	Reverb	Medium	Vocal	Hard surface room

Nr	Titel	Algorithm	Decay or Gain	Source	Description
147	Garage Like	Reverb	Medium	Vocal	Hard surface room
148	Medium Theatre	Reverb	Medium	Post, Drum	Diffused room
149	Store Room	Reverb	Medium	Vocal, Gtr	Slap ambience
150	Sml Warm Hall	Reverb	Medium	Gtr, Horn	Slap hall
151	Medium Plate	Reverb	Long	Drum	Diffused plate
152	Crypty	Reverb	Long	Effect	Psycho reverb
153	Square Hall	Reverb	Long	Vocal	Bright hall
154	Queezinart Verb	Reverb	Long	Vocal	Bright slap hall
155	Town Hall	Reverb	Long	Drum, Horn, Gtr, Keyb	Dark wide hall
156	Bright Hall	Reverb	Long	Vocal	Hard surface hall
157	Big Hanger	Reverb	Long	Vocal, Effect	Bright sustain
158	Cathedral Like	Reverb	Long	Choir, Vocal	Slap sustain
159	Acoustic Rain	Reverb	Long	Vocal	Subtle sustain
160	SustainVerb	Reverb	Long	Effect, Keyb	Diffused sustain
161	Large Arena	Reverb	Long	Post	Diffused sustain
162	Subway Tunnel	Reverb	Long	Post	Hard surface tunnel
163	ScareVerb	Reverb	X Long	Effect	Psycho sustain
164	Density Wash	Reverb	X Long	Effect	Sustain effect
165	FastFlit Delays	Delay	Repeat	Vocal, Gtr	Random repeats
166	Craft Work Echo	Delay	Repeat	Vocal, Gtr	Random repeats
167	Ratt-A-Tatt	Delay	Repeat	Effect	Full pattern repeat
168	Triplets PanDly	Delay		Vocal, Keyb	LCR delay
169	Vocal Delays	Delay		Vocal	Mono density delay
170	80ms Tape Slap	Delay		Vocal, Harp	Mellow stereo slap
171	Long Dreamdelay	Delay	Repeat	Vocal, Harp, Gtr	Mellow tape repeats
172	Vox Quintuplets	Delay		Effect	Stereo flutter
173	Short Quad Slap	Delay		Effect	Stereo flutter
174	FitzDrum Dly 1	Delay	Repeat	Effect	Psycho repeat
175	105bpm:4 Del	Delay		General	105 bpm mono delay
176	105bpm:3 Del	Delay		General	105 bpm mono delay
177	BB's Slapback	Delay		Effect	Stereo flutter
178	3Plus a Thinner	Delay	Sustain	Effect	Delay + thin sustain
179	5.1 Echo Front	Delay	Repeat	Multich.applic.	Twirl delays. Use with 180 in rear
180	5.1 Echo Back	Delay	Repeat	Multich.applic.	Twirl delays. Use with 179 in front
181	5.1 Crowd Front	Delay		Multich.applic.	Add density. Use with 182 in rear
182	5.1 Crowd Back	Delay		Multich.applic.	Add density. Use with 181 in front
183	Throaty Flange	Chorus		Gtr, Bass	Flanger
184	Fastwash Flange	Chorus		Gtr, Keyb	Rotator
185	FullSweepFlange	Chorus		Gtr, Keyb	Slow Flanger
186	DeepCrossFlange	Chorus		Gtr, Keyb	Slow Flanger

Nr	Titel	Algorithm	Decay or Gain	Source	Description
187	FishTail Flange	Chorus		Gtr	Chorus-Flanger
188	Squeezer Flange	Chorus		Effect, Gtr	Hi-Q flange
189	Baker Chorus	Chorus		Sax, Gtr, Keyb	Deep chorus
190	Tunnel Chorus	Chorus		Effect	Metal effect
191	Subtle Phase	Phaser		Gtr, Keyb	Phaser-panner
192	SoftTremPhase	Phaser		Gtr, Keyb	Rotator. Feed direct through engine
193	MediumDeepPhase	Phaser		Effect	Phaser.
194	CountrymanPhase	Phaser		Gtr, Keyb	Subtle Phaser.
195	InverserPhase	Phaser		Effect, Gtr	Robot reso-phaser. Feed direct through engine
196	EnglishPhase	Phaser		Gtr	Subtle Phaser-panner. Feed direct through engine
197	Molasses Phase	Phaser		Gtr, Keyb	Slow phaser. Feed direct through engine
198	Fast WaterPhase	Phaser		Effect, Gtr	Fast Phaser-rotator. Feed direct through engine
199	Hyperfast Phase	Phaser		Effect	Silly phaser. Feed direct through engine

Digital Outputs (optional)

Digital Inputs (optional)



I/O Option

UnitY DSP Section

02R Bus / Slot I/O

	1	2	3	4	5	6	7	8
	BUS1	BUS2	BUS3	BUS4	BUS5	BUS6	BUS7	BUS8
	AUX1	AUX2	AUX3	AUX4	AUX5	AUX6	AUX7	AUX8
					InsL	InsR	AUX1	AUX2
	ST L	ST R						
SLOT1 only:	CH 1	CH 2	CH 3	CH 4	CH 5	CH 6	CH 7	CH 8
SLOT2 only:	CH 9	CH10	CH11	CH12	CH13	CH14	CH15	CH16

SLOT × OUTPUT CHANNEL

DIGITAL I/O 3/5 Slot Output Select

SLOT3 / SLOT4	INT ANALOG	ST LR	21,22	No Connection
Ext Rt				
SLOT3 / SLOT4	INT ANALOG	ST LR	RET LR	No Connection
Ins LR + Ext Rt				
SLOT1	Ext Rt			CH 5,6 CH 7,8 CH 1,2 CH 3,4
(tape inputs)				
SLOT2	Ext Rt			13,14 15,16 9,10 11,12
(tape inputs)				
SLOT3	Ext Rt	CARD SLOT 3		CH 5,6 CH 7,8 CH 1,2 CH 3,4
(mic inputs)				
SLOT4	Ext Rt	CARD SLOT 4		13,14 13,14 9,10 11,12
(mic inputs)				
All Slots	Ext Rt			
Ins LR	see note		RET LR	

SLOT + Routing mode 02R Bus Returns

TC UnitY Routing

PC to 02R Serial Cable

Connector front view

