YAMAHA

MCS2

MIDI CONTROL STATION
STATION DE COMMANDE MIDI
MIDI-STEUERPULT

OWNER'S MANUAL
MANUEL D'UTILISATION
BEDIENUNGSANLEITUNG

ABOUT THIS MANUAL

Thank you for purchasing the MCS2 MIDI Control Station. The MCS2 MIDI Control Station gives you unlimited control over any MIDI device, and can be used in any number of ways, depending on your needs and imagination. This manual will explain how to operate the MCS2, and give some example of how it can be used. In order to understand the MCS2 and take full advantage of its many capabilities, please read through this manual in order and try out the examples.

CONTENTS

INTRODUCTION

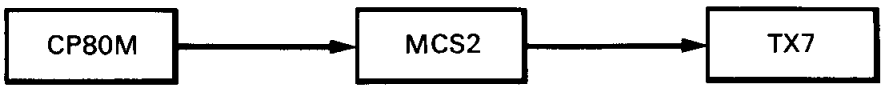
The MCS2 has 12 controllers which can be used to send any type of MIDI control message. When used with a MIDI keyboard such as the CP60M/70M/80M or pf70/80, the MCS2 gives you the MIDI functions you need to control connected tone generators, rhythm machines and sequencers. In addition, it can merge the input from the two MIDI IN jacks and add it to its own MIDI output. A large backlit LCD assures clear readout even in dim light. The MCS2 is the same width as the QX21 Digital Sequence Recorder and TX7 FM Expander, for easy stacking.

Here are some ways to connect the MCS2 and examples of how it can be used.

Controlling Pitch Bend, Modulation Wheel and Foot Controller:

The pf80 will accept Pitch Bend, Modulation Wheel and Foot Controller data, but does not have these controllers built-in. You can use the MCS2 controllers to affect the pf80.

Controlling Program Change, Portamento On/Off and Volume:



You can use the MCS2 Program Change switches to select voices on the TX7, and use a Foot Controller and Foot Switch plugged into the MCS2 to control the TX7 volume and turn Portamento on and off.

These are only a few of the ways the MCS2 can be used to give you complete MIDI control. Please read this manual carefully to learn the full extent of its capabilities.

STOP!

If you are a little unsure about your knowledge of MIDI, go and read p.25 "What's Hexadecimal" and p.27, "What's MIDI."

PRECAUTIONS

LOCATION

Avoid placing the MCS2 in direct sunlight or close to a source of heat. Also, avoid locations in which the device is likely to be subjected to vibration, excessive dust, cold or moisture.

HANDLING

Avoid applying excessive force to the switches. Avoid dropping or rough handling. While the internal circuitry is of reliable integrated circuit design, the MCS2 should be treated with care.

POWER CORD

Always grip the plug directly when removing it from an AC receptacle. Removing the plug from the AC receptacle by pulling the cord can result in damage to the cord, and possibly a short circuit. It is also a good idea to disconnect the MCS2 from the AC receptacle if you don't plan to use it for an extended period of time.

CLEANING

Use only a mild detergent on a cloth, and dry with a soft cloth. Never use solvents (such as benzine or thinner) since they can melt or discolor the finish.

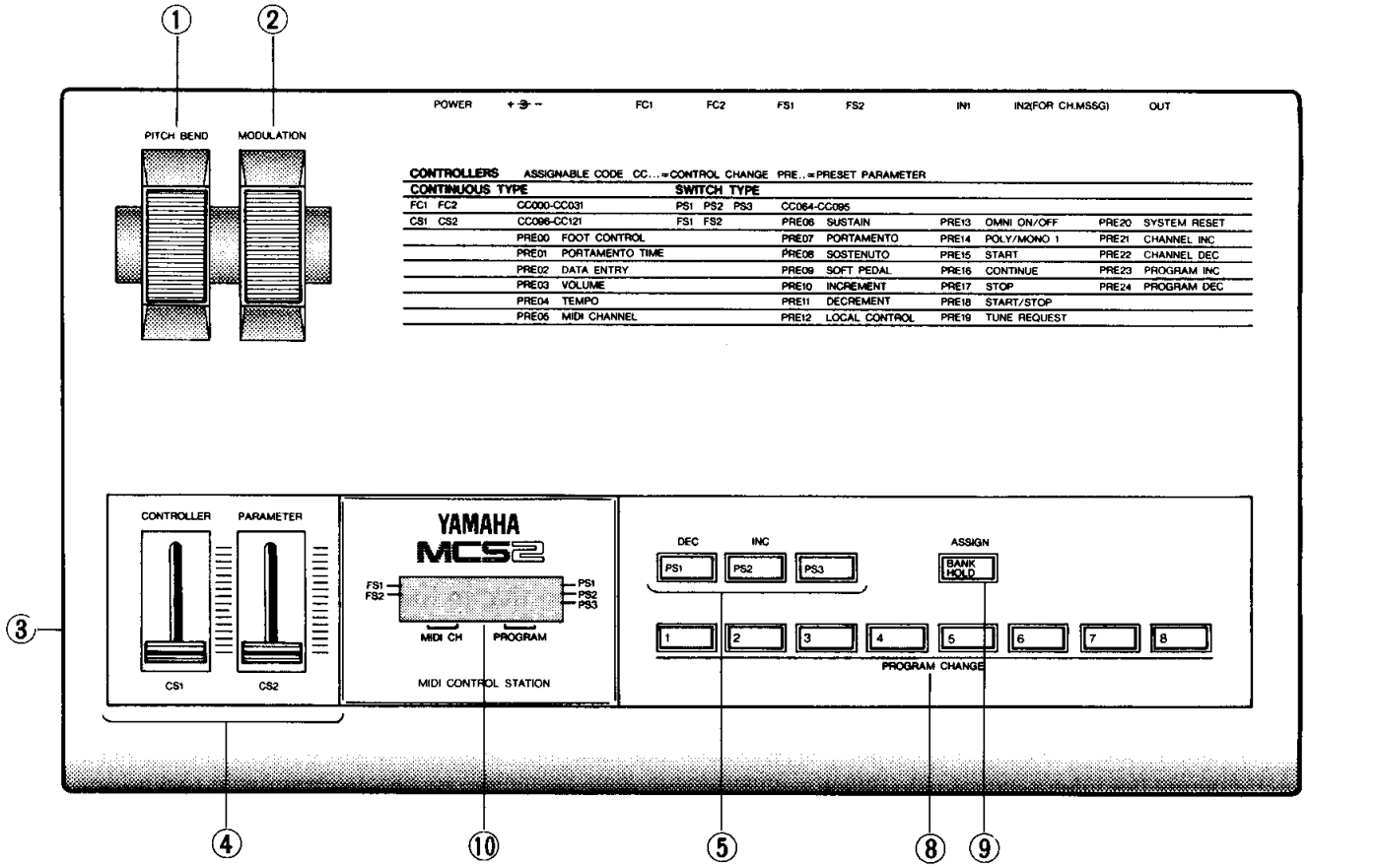
ELECTRICAL STORMS (LIGHTNING)

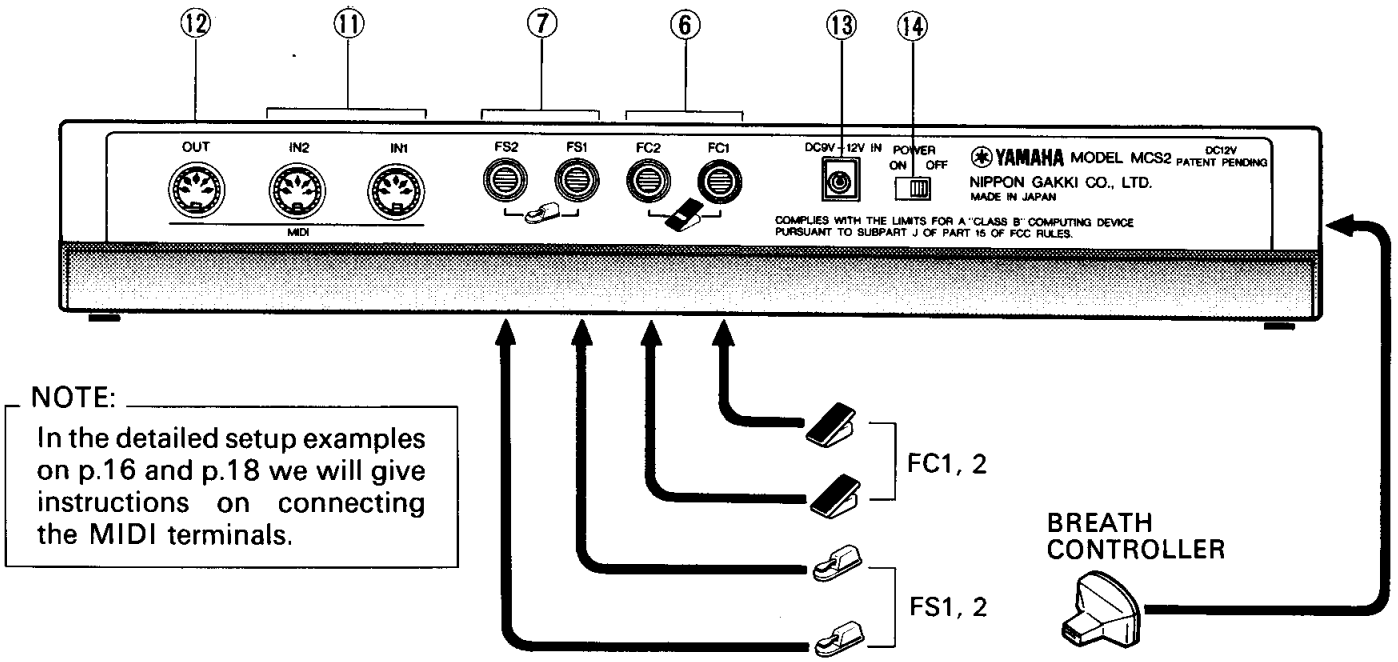
Computer circuitry, including that in the MCS2, is sensitive to voltage spikes. For this reason, the MCS2 should be turned off and unplugged from the AC receptacle in the event of an electrical storm. This precaution will avoid the chance that a high voltage spike caused by lightning will damage the device.

ELECTROMAGNETIC FIELDS

Computer circuitry is also sensitive to electromagnetic radiation. Television sets, as well as radio receivers, transmitters and transceivers, and wireless microphone systems and intercom system are all potential sources of such radiation, and should be kept as far away as possible.

FRONT/REAR PANEL





NOTE:

In the detailed setup examples on p.16 and p.18 we will give instructions on connecting the MIDI terminals.

FRONT PANEL

The MCS2 has 3 fixed controllers who's function cannot be changed

① Pitch Bend
② Modulation
③ Breath controller jack (Use Yamaha BS1 Breath Controller)

and 9 assignable controllers which you can assign to send any type of MIDI control message.

④ Continuous Slider 1 and 2 (CS1, CS2)
⑤ Push Switch 1, 2 and 3 (PS1, PS2, PS3)
⑥ Foot Controller jack 1 and 2 (FC1, FC2)
(Use Yamaha FC7 Foot Controller)
⑦ Foot Switch jack 1 and 2 (FS1, FS2)
(Use Yamaha FC4/FC5 Foot Switch)

⑧ Program Change

The MCS2 has 8 Program Change switches. Pressing these will send MIDI Program Change messages 1-64 (8 banks of 8 = 64).

⑨ Bank Hold

Press this switch to enter Bank Hold mode, where you can select programs in groups of 8. Pressing and holding this switch will take you to ASSIGN mode.

⑩ LCD

A 5-character Liquid Crystal Display, backlit for high visibility. In PLAY mode it displays the MIDI channel and the most recently sent program change. In ASSIGN mode it alternately displays the controller and its assignment.

REAR PANEL

⑪ MIDI IN 1, 2

The MCS2 has two MIDI inputs. Messages received here are merged (mixed) with the MIDI messages generated by the MCS2 itself and sent from MIDI OUT. To avoid conflicting signals (such as two different Timing Clocks), MIDI IN 2 will accept only Channel Messages, ie. all) System Messages are filtered out. (MIDI IN 2 will, however, accept Active Clock messages $FE.)

⑫ MIDI OUT

The messages from MIDI IN 1 and 2 are combined with the messages from the MCS2 itself, and sent from this jack.

⑬ DC9V-12V IN

Use the AC adaptor included with the MCS2.

⑭ POWER SWITCH

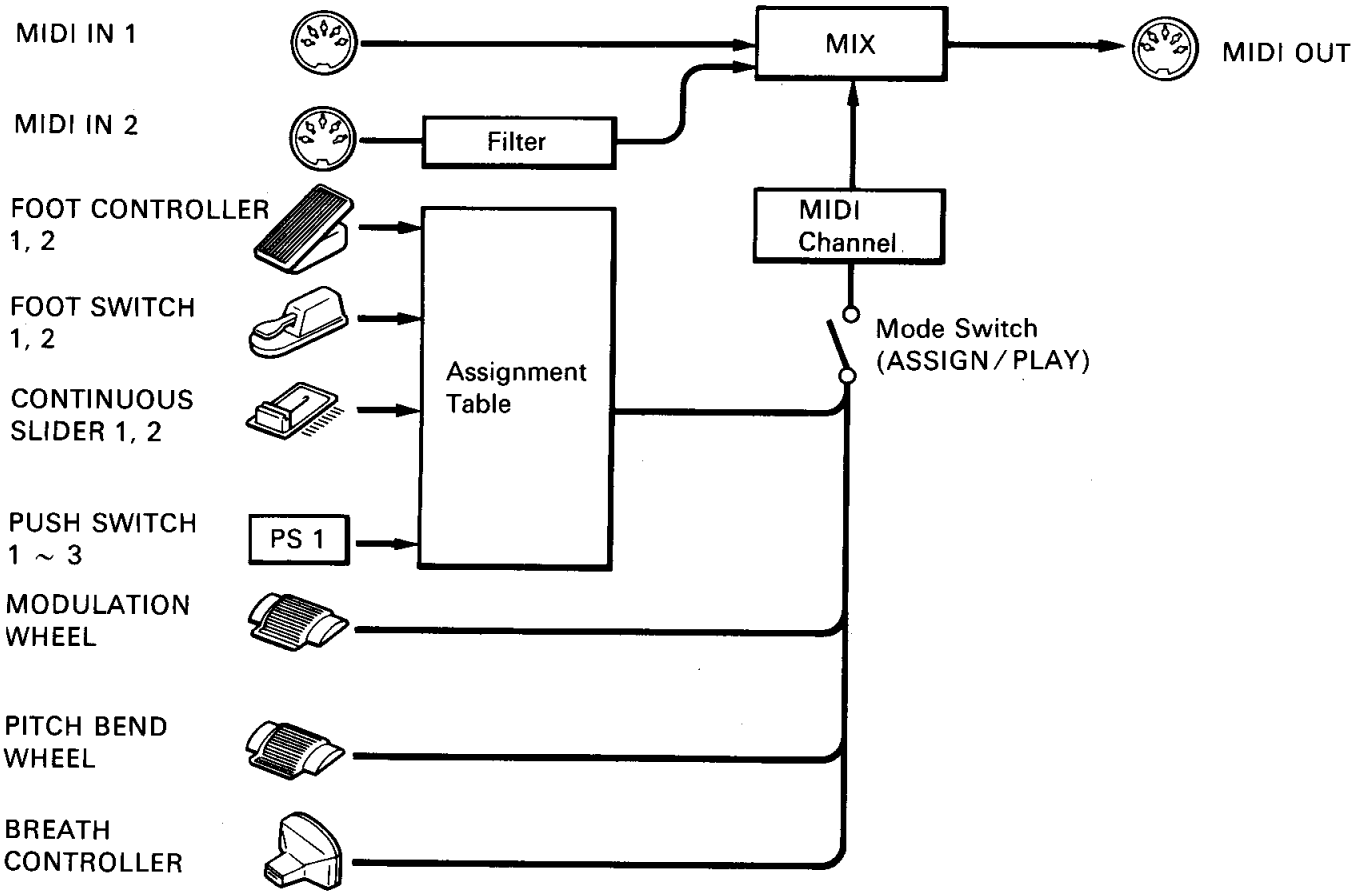
When you turn the MCS2 on, it will be in PLAY mode.

HOW DOES THE MCS2 WORK?

The MCS2 has two modes of operation.

PLAY Mode — In PLAY mode, the 3 fixed controllers will send MIDI Pitch Bend, Modulation and Breath Controller messages. The 9 assignable controllers will send the MIDI message that you assigned for each controller.

ASSIGN Mode — In ASSIGN mode, CS1 is used to select the controller you want to assign, and CS2 or PS1 /PS2 (DEC / INE) are used to select the assignment for that controller. You can also set the MIDI channel on which the MCS2 will transmit its control messages. In ASSIGN mode, controllers will not send MIDI messages to the outside.



Filter : System Messages are filtered out (see MIDI Terminals p.5).

Assignment Table : You can set the function of each controller.

Mix : The two MIDI inputs are combined with the MCS2's signals.

MIDI Channel : Sets the channel number for MCS2 controller messages.

OPERATION

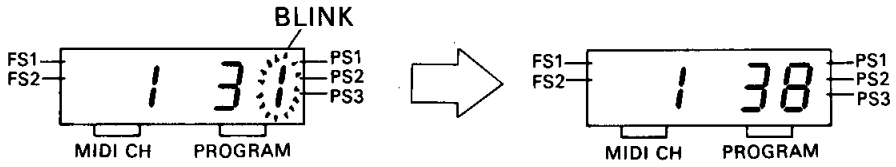
The MCS2 has two modes of operation; PLAY mode, in which you will normally use it, and ASSIGN mode, in which you can assign controllers to send any type of MIDI control message you want. When you turn the MCS2 on, it will be in PLAY mode.

PLAY mode

In this mode, moving a controller will send the MIDI message which has been assigned to it.
The LCD will show the MIDI channel number that the MCS2 is transmitting on and the Program Change number that was last selected.

Program Change

You can use the Program Change switches 1-8 to send MIDI Program Change messages 1-64. The Program Changes are in 8 banks of 8. First select the bank. Press a Program Change switch and the selected bank number will appear in the left place of the LCD Program display. The right place will begin blinking. When you press another Program Change switch, the display will stop flashing and the selected MIDI program Change message will be sent.



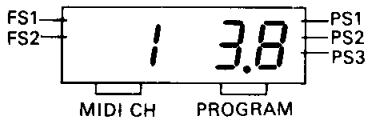
The LCD will show 11-88, corresponding to Program Changes 1-64.

BANK 1		BANK 2		BANK 3		BANK 4		BANK 5		BANK 6		BANK 7		BANK 8	
DIS-PLAY	NO.	DIS-PLAY	NO.	DIS-PLAY	NO	DIS-PLAY	NO.	DIS-PLAY	NO.	DIS-PLAY	NO	DIS-PLAY	NO.	DIS-PLAY	NO
11	1	21	9	31	17	41	25	51	33	61	41	71	49	81	57
12	2	22	10	32	18	42	26	52	34	62	42	72	50	82	58
13	3	23	11	33	19	43	27	53	35	63	43	73	51	83	59
14	4	24	12	34	20	44	28	54	36	64	44	74	52	84	60
15	5	25	13	35	21	45	29	55	37	65	45	75	53	85	61
16	6	26	14	36	22	46	30	56	38	66	46	76	54	86	62
17	7	27	15	37	23	47	31	57	39	67	47	77	55	87	63
18	8	28	16	38	24	48	32	58	40	68	48	78	56	88	64

Different devices react in different ways to Program Change messages. For example, the DX7 will select Internal Voices 1-32 for Program Changes 1-32 (display 11-48), and will select Cartridge Voices 1-32 for Program Changes 33-64 (display 51-88). See the owner's manual for each device.

Bank Hold

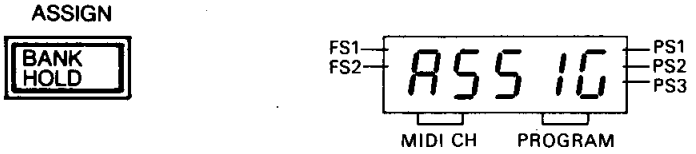
As explained above, selecting a Program Change requires pressing two buttons. If you simply want to select programs from a certain bank of 8, there is a simpler way. Press and release [BANK HOLD]. (Don't hold it down or you will enter ASSIGN mode.) The LCD will show a decimal point in the Program display, indicating you are Bank Hold mode.



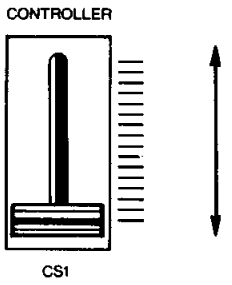
When in this mode, Program Change switches 1-8 will instantly select programs in the current bank. The bank number will stay the same, ie. Bank Hold. Pressing [BANK HOLD] again will return to the usual method of selecting programs. (When you turn the power on, Bank Hold will be off.)

ASSIGN mode

To enter ASSIGN mode, press and hold the [BANK HOLD] switch for about one second. The LCD will show "ASSIG." In ASSIGN mode, moving a controller will not send any MIDI messages, as you see from the block diagram on p.6.



ASSIGN mode is where you assign the controllers to send whatever MIDI control message you like. Use the CS1 slider to select the controller you want to assign, and use the CS2 slider and / or [INC] / [DEC] switches to select the assignment for that controller.
As you move CS1, the LCD will show the various controllers.



DISPLAY	CONTROLLER
FS2=	Foot Switch 2
FS1=	Foot Switch 1
PS3=	Push Switch 3
PS2=	Push Switch 2
PS1=	Push Switch 1
CS2=	Continuous Slider 2
CS2=	Continuous Slider 1
FC2=	Foot Controller 2
FC1=	Foot Controller 1
CH=	MIDI Channel

NOTE:

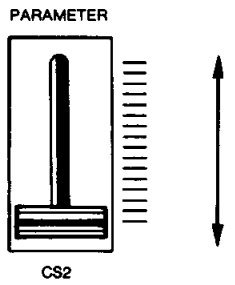
When shipped, the MCS2 controllers will be assigned as shown on p.24. You can set the MCS2 memory to this condition by using the INITIALIZATION function explained on p.24.

MIDI CHANNEL

You can select the MIDI channel on which the MCS2 will send all its messages. The selected channel number will be displayed in PLAY mode (see p.7). Move CS2 to select MIDI channels 1-16. Be sure that the receiving device is either receiving this channel or is set to OMNI ON.

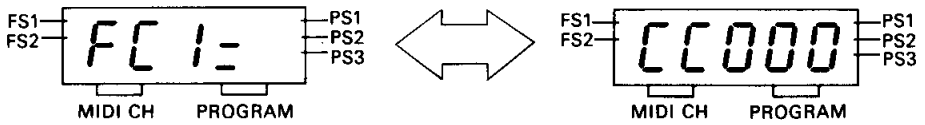
CONTINUOUS TYPE CONTROLLERS

The Foot Controllers and Continuous Sliders are continuous type controllers, and can be assigned to send MIDI Control Changes 0-31, 96-121, or Preset Parameters PRE00-PRE05. If you have selected a Continuous Controller, CS2 or [DEC] / [INC] will move through the choices CC000-CC031, CC096-121, PRE00-PRE05.



DISPLAY	ASSIGNMENT
PrE05 : PrE00	PRESET PARAMETER
CC121 : CC096 CC031 : CC000	MIDI CONTROL CHANGE

The LCD will alternately show the controller and its assignment.



Control Changes CC000-CC031, CC096-CC121

You can assign a Continuous Controller to be any one of the following.

MIDI CONTROL NO.	MIDI MESSAGE
001	Modulation Wheel
002	Breath Controller
004	Foot Controller
005	Portamento Time
006	Data Entry Slider
007	Main Volume
:	
031	
096	Data Increment
097	Data Decrement
:	
121	

Note:

Control numbers not listed are undefined, and may be used in future MIDI devices.

For an explanation of how these messages will affect the receiving device, see the owner's manual for that device.

Preset Parameters PRE00-PRE05

The most frequently used Continuous Control functions have been preset for easy assignment. These are listed in the front panel of the MCS2.

PRE00 Foot Control:
This sends Foot Control messages (MIDI Control Change 04).

PRE01 Portamento Time:
This sends Portamento Time messages (MIDI Control Change 05).

PRE02 Data Entry:
This sends Data Entry messages (MIDI Control Change 06).

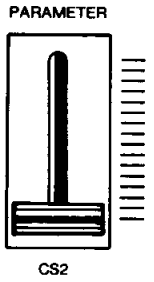
PRE03 Volume:
This sends Volume messages (MIDI Control Change 07).

PRE04 Tempo:
This is NOT a MIDI Control Change. When this has been assigned to a continuous controller, the MCS2 will send MIDI Timing Clock messages at a rate determined by the position of the controller. This means you can control the tempo of a MIDI rhythm machine or sequencer by moving a MCS2 Continuous Slider or Foot Controller.

PPE05 MIDI Channel:
This is NOT a MIDI Control Change. It allows you to use a continous controller to set the MCS2 transmission channel. For example if CS2 has been assigned to PRE05 and you move CS2 while in PLAY mode, you will see the MIDI Channel display change from 1-16.

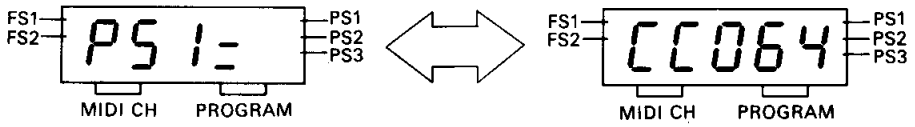
SWITCH TYPE CONTROLLERS

The Push Switches 1-3 and Foot Switches 1 and 2 are switch type controllers, and can be assigned to send MIDI Control Changes 64-95 or Proset Parameters PRE06-PRE24. If you have selected a switch type controller, CS2 or [DEC] / [INC] will move through the choices CC064-CC095 and PRE06-PRE24.



DISPLAY	ASSIGNMENT
PrE24 : PrE06	PRESET PARAMETER
CC095 : CC064	MIDI CONTROL CHANGE

The LCD will alternately show the controller and its assignment.



Control Changes CC064-CC095

You can assign a switch type controller to be any one of the following.

MIDI CONTROL NO.	MIDI MESSAGE
064	Sustain
065	Portamento
066	Sostenuto
067	Soft
:	
095	

Note:

Control numbers not listed are undefined, and may be used in future MIDI devices.

For an explanation of how these messages will affect the receiving device, see the owner's manual for that device.

Preset Parameters PRE06-PRE24

The most frequently used switch type functions have been preset for easy assignment. These are listed in the front panel of the MCS2.

PRE06 Sustain:
When the switch is pressed, a Sustain On message is sent, and when it is released, a Sustain Off message is sent (MIDI Control Change 64).

PRE07 Portamento:
When the switch is pressed, a Portamento On message is sent, and when it is released, a Sustain Off message is sent (MIDI Control Change 65).

PRE08 Sostenuto:
When the switch is pressed, a Sostenuto On message is sent, and when it is released, a Sostenuto Off message is sent (MIDI Control Change 66).

PRE09 Soft Pedal:
When the switch is pressed, a Soft Pedal On message is sent, and when it is released, a Soft Pedal Off message is sent (MIDI Control Change 67).

PRE10 Increment:
When the switch is pressed, a Data Increment message is sent (MIDI Control Change 96).

PRE11 Decrement:
When the switch is pressed, a Data Decrement message is sent (MIDI Control Change 97).

PRE12 Local Control:
Each time this switch is pressed it will alternate between sending a Local Control On and a Local Control Off message (MIDI Control Change 122). See note on p.14.

PRE13 Omni On / Off:
Each time this switch is pressed it will alternate between sending an Omni On and an Omni Off message (MIDI Control Changes 125 and 124). See note on p.14.

PRE14 Poly / Mono 1:
Each time this switch is pressed it will alternate between sending a Poly On and an Mono On message (MIDI Control Changes 127 and 126). See note on p.14.

PRE15 Start:
When the switch is pressed, a Start message is sent (MIDI System message).

PRE16 Continue:
When the switch is pressed, a Continue message is sent (MIDI System message).

PRE17 Stop:
When the switch is pressed, a Stop message is sent (MIDI System message).

PRE18 Start / Stop:
Each time this switch is pressed it will alternate between sending a Start and Stop message. See note on p14.

PRE19 Tune Request:
When the switch is pressed, a Tune Request message is sent (MIDI System message).

PRE20 System Reset:
When the switch is pressed, a System Reset message is sent (MIDI System message).

PRE21 Channel Inc:
This does NOT produce a MIDI message. Each time the switch is pressed, the transmission channel of the MCS2 moves up by one.

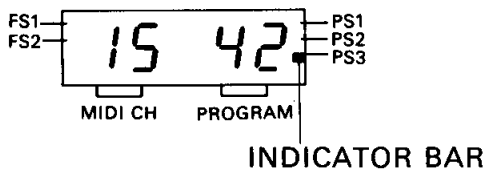
PRE22 Channel Dec:
This does NOT produce a MIDI message. Each time the switch is pressed, the transmission channel of the MCS2 moves down by one.

PRE23 Program Inc:
When the switch is pressed, the current program is incremented by one and a Program Change message is sent. When the program number gets to 88, pressing the switch will have no more effect.

PRE24 Program Dec:
When the switch is pressed, the current program is decremented by one and a Program Change message is sent. When the program number gets to 11, pressing the switch will have no more effect.

NOTE:

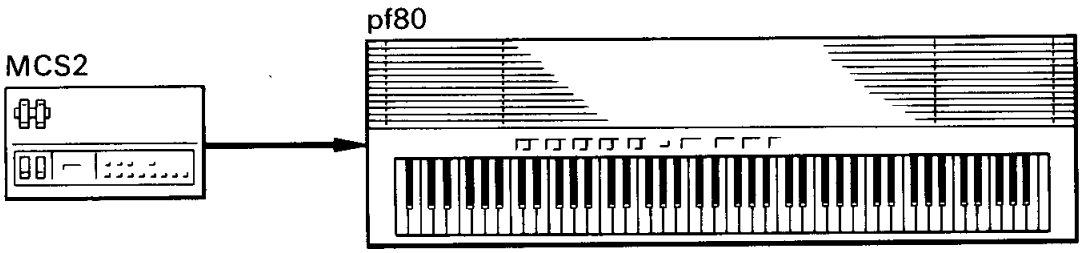
When a switch type controller has been assigned to a Preset Parameter with an on/off action (PRE12, 13, 14, 18), a bar will appear in the LCD to indicate an ON condition.



If a switch type controller is turned on (causing the indicator bar to appear) and then re-assigned, the indicator bar will remain on.

APPLICATIONS

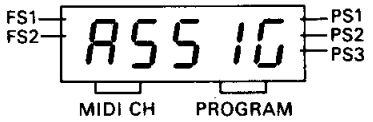
EXAMPLE SETUP A (MCS2 + pf80)



Here is an example showing how the MCS2 can be used to add MIDI control to a keyboard. The pf80 receives and transmits MIDI, but does not have Pitch Bend or Modulation wheels. Also, though the pf80 has variable tremolo depth and speed, these cannot be changed in realtime from the pf80 front panel. We will set up the MCS2 to control these functions. As shown above, connect the MIDI OUT of the MCS2 to the MIDI IN of the pf80.

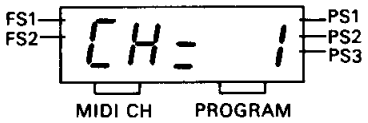
Enter ASSIGN mode

To enter ASSIGN mode, press and hold down [BANK HOLD] until the LCD shows "ASSIG".



MIDI channel

The MCS2 MIDI channel (shown in the LCD) must match the reception channel of the pf80 (see the pf owner's manual). Move CSI down to the bottom and the LCD will show "CH = -n" with "n" being the MCS2 MIDI channel. Move CS2 until "n" matches the reception channel of the pf80.



Controller assignments

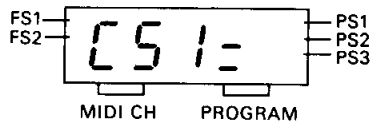
We will assign CS1 and CS2 to control the pf80 tremolo depth and speed. In the back of the pf80 owner's manual, there is a MIDI Implementation Chart showing what types of message it sends and receives.

We read that the pf80 recognizes Control Changes 1 and 4 as tremolo depth and speed. So, we want to assign the controller as shown in the Controller Assign Table below. (The pf80 MIDI Implementation Chart also tells us that for these messages to be recognized, the pf80 switch F1 or F2 must be on.)

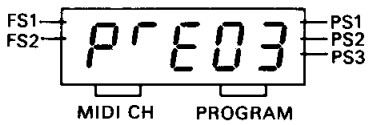
CS1 = Control Change 1 (Tremolo depth)
CS2 = Control Change 4 (Tremolo speed)

Select the controller

Move CS1 until the LCD shows "CS1 =".

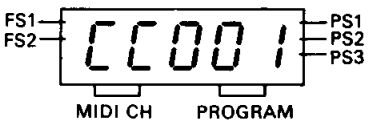


As long as you are moving CS1, the LCD will show the selected controller, but once you stop moving it, the LCD will begin to alternate between showing the controller and its current assignment (in the initial setting, PRE03).



Assign the controller

Move CS2 (or press [DEC] [INC]) until the LCD shows "CC001".

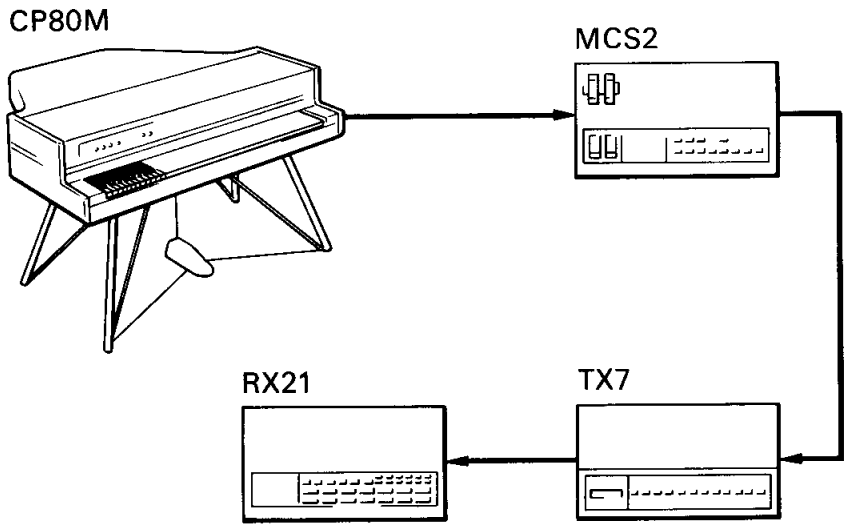


As we explained above, once you stop moving it, the LCD will begin to alternate between showing the controller and its current assigment. Easy, wasn't it? You have just assigned CS1 to send Control Change 1. In the same way, assign CS2 to Control Change 4. Move CS1 to select "CS2 =" and assign it to "CC004".

Try it out

To try it out, go back to PLAY mode by pressing [BANK HOLD]. (Controllers will not send messages while in ASSIGN mode.) Make sure the pf80 switch F1 or F2 is on, and change the tremolo depth and speed by moving CS1 and CS2. Moving the Pitch Bend wheel will also affect the pf80.

EXAMPLE SETUP B (MCS2 + CP80M + TX7 + RX21)



Here we will explain how to use the MCS2 to control a tone generator and rhythm machine. The CP80M sends Note On/Off and Sustain On/Off messages. These are received at the MCS2 MIDI IN 2 and sent out from MCS2 MIDI OUT along with the messages the MCS2 itself produces. The Note On/Off messages from the CP will play the TX7, and we can add additional controller messages from the MCS2. To make things even more interesting, we will connect a RX21 Rhythm Programmer and control it with Tempo and Start/Stop messages from the MCS2. Connect everything as shown in the above diagram. (Be sure to connect TX7 MIDI THRU to RX21 MIDI IN.)

CONTROLLER	INITIAL SETTING		USER SETTING	
	ASSIGNMENT	MIDI MESSAGE	ASSIGNMENT	MIDI MESSAGE
FS2	PRE07	Portamento	–	–
FS1	PRE06	Sustain	PRE07	Stop
PS3	PRE14	Poly/Mono	PRE17	Continue
PS2	PRE23	Program Inc	PRE16	Start
PS1	PRE24	Program Dec	PRE15	Portamento
CS2	PRE01	Portamento Time	PRE04	Tempo
CS1	PRE03	Volume	PRE01	Portamento Time
FC2	PRE03	Volume	–	–
FC1	PRE00	Foot Controller	–	–
MIDI CH	1		1	MIDI Channel 1

Assignments

Set the MCS2 to the user assignments shown in the table at left as you learned how in example A (p. 16).

Assignment	Function
PS3	Stop the RX21.
PS2	Continue from where you stopped.
PS1	Start the RX21 from the beginning.
FS1	A footswitch connected to FS1 will turn the TX7 portamento on and off.
CS2	The CS2 will control the tempo of the RX21.
CS1	The CS1 will be used to send Portamento Time messages to the TX7.
MIDI Channel	The CP80M transmission channel is fixed at 1, which means the TX7 will have to be set to receive channel 1. Therefore the control messages we send must also be on channel 1.

Setup

Make sure the TX7 is set to accept channel 1 (or is set to OMNI ON) and CMB is showing in the TX7 display. Set the RX21 to external clock. (See the TX7 and RX21 owner's manuals.) Turn the CP80M MIDI ON and SPLIT OFF.

Controlling the RX21

When you press PS1 the RX21 will begin play. Move CS2 to change the tempo of the RX21. PS3 will stop the RX21, PS2 will continue from the stopping point and PS1 will start again from the beginning.

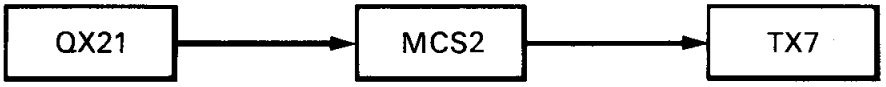
Controlling the TX7

Playing the CP80M will sound the TX7. A footswitch plugged into FS1 will turn portamento on and off, and CS1 will change the portamento depending on the Pitch Bend Range and Modulation Wheel Sensitivity settings of the TX7. You can select TX7 voices by pressing Program Change switches 1-8.

Many variations on the above are possible. The next chapter "Ideas and Suggestions" will give additional setups and settings you will want to experiment with.

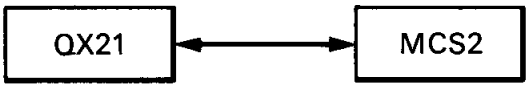
IDEAS AND SUGGESTIONS

Add effects during sequence playback



During playback of a recorded sequence, you can route the sequencer output through the MCS2. This will let you add Pitch Bending and other effects to the performance.

Record effects to sequencer

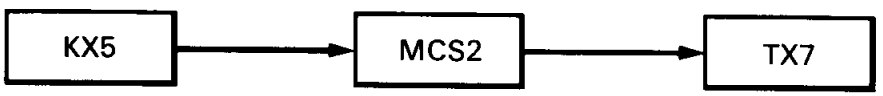


In a variation of the above, you can use the MCS2 to add control messages to an already recorded sequence. Play the notes first and add Program Changes and Volume Control afterwards!
Make sure that the QX21 Echo Back is OFF.
(Otherwise, you will cause a MIDI feedback loop.)

Control MIDI effectors

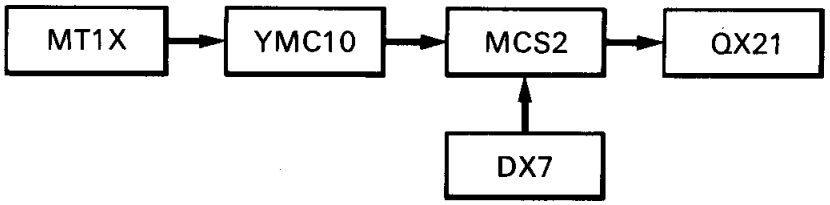
If you have a MIDI-equipped effector such as the D1500 digital delay, you can switch D1500 memories from a MCS2 placed conveniently on top of your keyboard.

Foot controllers for shoulder keyboards



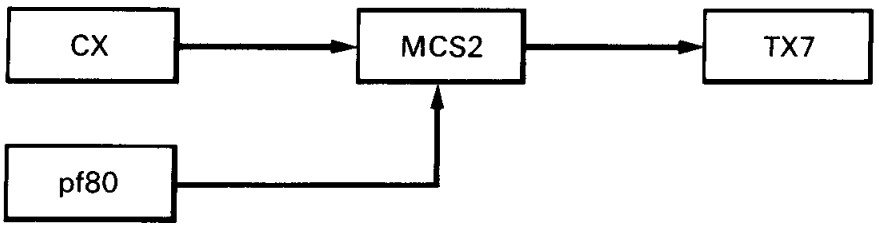
The KX5 shoulder-type keyboard has no footswitch jacks. By sending the KX5 MIDI output through the MCS2, you can use footswitches and foot controllers plugged into the MCS2.

Recording with tape sync



In the above system; a sequencer is recording in synchronization with the MT1X multi-track recorder. A FSK sync signal recorded on track 1 of the MT1X is converted into MIDI Tempo messages which control the sequencer tempo. By using the MCS2 to merge data from the DX7 synthesizer with tempo data from the YMC10, you can overdub a sequence while playing back in sync with the tape. Connect the output of the YMC10 to MCS2 MIDI IN 1 so that System Messages will get through. (Timing Clock, Start Continue and Stop are MIDI System Messages. See the MIDI format table on p.29)
Set the QX21 to External Clock.

Confirming voice edits



You can use the YRM-103 DX7 Voicing Program for the CX Music Computer to edit voices in the TX7 FM Expander. However, the TX7 has no keyboard, so it's difficult to hear what you are editing. By merging data from the CX and pf80 (or any MIDI keyboard), you can play the sounds while editing them. Connect the output of the CX to MCS2 MIDI IN 1 so that System Messages will get through. (Voice data parameters are MIDI System Exclusive Messages. See the MIDI format table on p.29)

SPECIFICATIONS

Modes	PLAY MODE ASSIGN MODE		
Controllers	Pitch Bend Wheel Modulation Wheel Continuous Slider Push Switch Program Select Switch	 x 2 x 3 x 8	 CS1, CS2 PS1-3 1-8
Terminals	Breath Controller Foot Controller Foot Switch MIDI IN MIDI OUT DC Power Input	 x 2 x 2 x 2	
Display	7 segment 5 character backlit LCD		
Power consumption	3 W		
Dimensions (W x H x D)	350 x 53.7 x 202.5 mm (13-3/4" x 2-1/8" x 7-15/16")		
Weight	1.3 kg (2 lbs. 14 oz)		

ADDITIONAL INFORMATION

INITIALIZATION

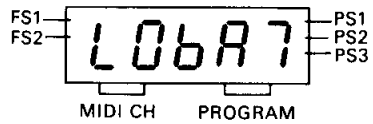
By turning on the MCS2 while holding down PS1 and Program Change switch 1, you can initialize the memory to the following setting.

CONTROL-LER	ASSIGN-MENT	MIDI MESSAGE	CONTROL-LER	ASSIGN-MENT	MIDI MESSAGE
FS2	PRE07	Portamento	CS2	PRE01	Portamento Time
FS1	PRE06	Sustain	CS1	PRE03	Volume
PS3	PRE14	Poly/Mono	FC2	PRE03	Volume
PS2	PRE23	Program Inc	FC1	PRE00	Foot Controller
PS1	PRE24	Program Dec	MIDI CH	1	MIDI Channel

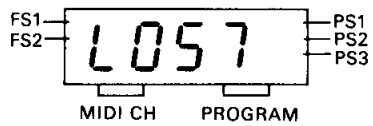
The LCD will show "LOST", indicating that the previous memory has been lost.

ERROR MESSAGES

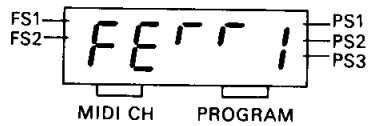
If something unexpected happens, one of the following error messages will be displayed.



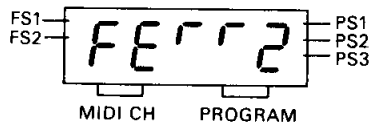
Low Battery Voltage:
The backup battery is low. Contact your Yamaha dealer for replacement.



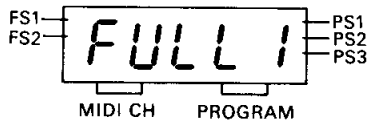
The contents of the memory have been lost, ie. memory has been initialized or backup battery is low.



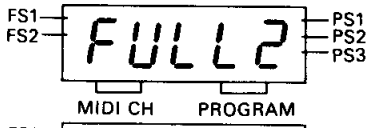
Framing Error:
Data was incorrectly received at MIDI IN 1.



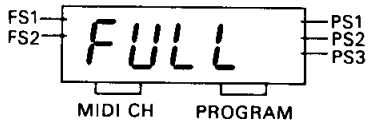
Framing Error:
Data was incorrectly received at MIDI IN 2.



Buffer overflow at MIDI IN 1.



Buffer overflow at MIDI IN 2.



Buffer overflow at MIDI OUT.

NOTE:

The last 5 error messages may also be displayed if you have connected MIDI cables to cause a feedback loop.

WHAT'S HEXADECIMAL

The Hexadecimal System

When dealing with computers, it is often convenient to use the Hexadecimal numbering system (often abbreviated "Hex"). The way of counting that we use everyday is called the decimal system, because it has ten numerals, 0 through 9, and is based on the number ten. The Hexadecimal system uses sixteen numerals. This is a number system based on the number sixteen, with sixteen numerals. Since we only have numerals 0 to 9, we will use letters of the alphabet, like this.

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F (Hex "F" = Decimal "15")

Then, when we want to go beyond F, we move one place to the left and start with 0 again.

8, 9, A, B, C, E, D, F, 10, 11, ... 19, 1A, 1B, 1C, 1D, 1E, 1F, 20, 21, ...

(So as not to confuse hexadecimal and decimal numbers, a dollar sign "$" is often put in front of hex numbers. Eg. $AD)

Hexadecimal/ Decimal Conversion

Here is an example of how to convert a hex number into decimal.

HEX	3		D	
DECIMAL	$16^1 \times 3$	+	$16^0 \times 13$	= 61

For your convenience, a Decimal / Hexadecimal / Binary conversion table is included on the next page. (Binary numbers represent the actual electronic on/off pulses inside the computer.)
The next sections "What's MIDI " and "MIDI Format Table" will use Hexadecimal numbers.

BINARY, DECIMAL AND HEXADECIMAL CONVERSION

Binary	Decimal	Hex.	Binary	Decimal	Hex.	Binary	Decimal	Hex.	Binary	Decimal	Hex.
00000000	0	0	01000000	64	40	10000000	128	80	11000000	192	C0
00000001	1	1	01000001	65	41	10000001	129	81	11000001	193	C1
00000010	2	2	01000010	66	42	10000010	130	82	11000010	194	C2
00000011	3	3	01000011	67	43	10000011	131	83	11000011	195	C3
00000100	4	4	01000100	68	44	10000100	132	84	11000100	196	C4
00000101	5	5	01000101	69	45	10000101	133	85	11000101	197	C5
00000110	6	6	01000110	70	46	10000110	134	86	11000110	198	C6
00000111	7	7	01000111	71	47	10000111	135	87	11000111	199	C7
00001000	8	8	01001000	72	48	10001000	136	88	11001000	200	C8
00001001	9	9	01001001	73	49	10001001	137	89	11001001	201	C9
00001010	10	A	01001010	74	4A	10001010	138	8A	11001010	202	CA
00001011	11	B	01001011	75	4B	10001011	139	8B	11001011	203	CB
00001100	12	C	01001100	76	4C	10001100	140	8C	11001100	204	CC
00001101	13	D	01001101	77	4D	10001101	141	8D	11001101	205	CD
00001110	14	E	01001110	78	4E	10001110	142	8E	11001110	206	CE
00001111	15	F	01001111	79	4F	10001111	143	8F	11001111	207	CF
00010000	16	10	01010000	80	50	10010000	144	90	11010000	208	C0
00010001	17	11	01010001	81	51	10010001	145	91	11010001	209	D1
00010010	18	12	01010010	82	52	10010010	146	92	11010010	210	D2
00010011	19	13	01010011	83	53	10010011	147	93	11010011	211	D3
00010100	20	14	01010100	84	54	10010100	148	94	11010100	212	D4
00010101	21	15	01010101	85	55	10010101	149	95	11010101	213	D5
00010110	22	16	01010110	86	56	10010110	150	96	11010110	214	D6
00010111	23	17	01010111	87	57	10010111	151	97	11010111	215	D7
00011000	24	18	01011000	88	58	10011000	152	98	11011000	216	D8
00011001	25	19	01011001	89	59	10011001	153	99	11011001	217	D9
00011010	26	1A	01011010	90	5A	10011010	154	9A	11011010	218	DA
00011011	27	1B	01011011	91	5B	10011011	155	9B	11011011	219	DB
00011100	28	1C	01011100	92	5C	10011100	156	9C	11011100	220	DC
00011101	29	1D	01011101	93	5D	10011101	157	9D	11011101	221	CD
00011110	30	1E	01011110	94	5E	10011110	158	9E	11011110	222	DE
00011111	31	1F	01011111	95	5F	10011111	159	9F	11011111	223	DF
00100000	32	20	01100000	96	60	10100000	160	A0	11100000	224	E0
00100001	33	21	01100001	97	61	10100001	161	A1	11100001	225	E1
00100010	34	22	01100010	98	62	10100010	162	A2	11100010	226	E2
00100011	35	23	01100011	99	63	10100011	163	A3	11100011	227	E3
00100100	36	24	01100100	100	64	10100100	164	A4	11100100	228	E4
00100101	37	25	01100101	101	65	10100101	165	A5	11100101	229	E5
00100110	38	26	01100110	102	66	10100110	166	A6	11100110	230	E6
00100111	39	27	01100111	103	67	10100111	167	A7	11100111	231	E7
00101000	40	28	01101000	104	68	10101000	168	A8	11101000	232	E8
00101001	41	29	01101001	105	69	10101001	169	A9	11101001	233	E9
00101010	42	2A	01101010	106	6A	10101010	170	AA	11101010	234	EA
00101011	43	2B	01101011	107	6B	10101011	171	AB	11101011	235	EB
00101100	44	2C	01101100	108	6C	10101100	172	AC	11101100	236	EC
00101101	45	2D	01101101	109	6D	10101101	173	AD	11101101	237	ED
00101110	46	2E	01101110	110	6E	10101110	174	AE	11101110	238	EE
00101111	47	2F	01101111	111	6F	10101111	175	AF	11101111	239	EF
00110000	48	30	01110000	112	70	10110000	176	B0	11110000	240	F0
00110001	49	31	01110001	113	71	10110001	177	B1	11110001	241	F1
00110010	50	32	01110010	114	72	10110010	178	B2	11110010	242	F2
00110011	51	33	01110011	115	73	10110011	179	B3	11110011	243	F3
00110100	52	34	01110100	116	74	10110100	180	B4	11110100	244	F4
00110101	53	35	01110101	117	75	10110101	181	B5	11110101	245	F5
00110110	54	36	01110110	118	76	10110110	182	B6	11110110	246	F6
00110111	55	37	01110111	119	77	10110111	183	B7	11110111	247	F7
00111000	56	38	01111000	120	78	10111000	184	B8	11111000	248	F8
00111001	57	39	01111001	121	79	10111001	185	B9	11111001	249	F9
00111010	58	3A	01111010	122	7A	10111010	186	BA	11111010	250	FA
00111011	59	3B	01111011	123	7B	10111011	187	BB	11111011	251	FB
00111100	60	3C	01111100	124	7C	10111100	188	BC	11111100	252	FC
00111101	61	3D	01111101	125	7D	10111101	189	BD	11111101	253	FD
00111110	62	3E	01111110	126	7E	10111110	190	BE	11111110	254	FE
00111111	63	3F	01111111	127	7F	10111111	191	BF	11111111	255	FF

WHAT'S MIDI?

Musical Instrument Digital Interface (MIDI) is a way for keyboards, synthesizers, sequencers, rhythm machines, and computers to communicate with each other. Devices that have a MIDI jack can be connected together to send and receive information. Since most musical instrument manufacturers have agreed on MIDI, you can connect devices of various manufacturers.

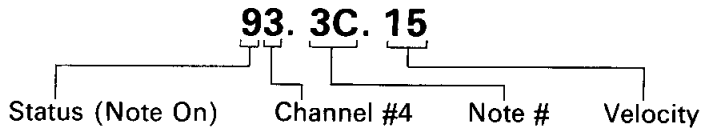
Each piece of information is called a MIDI MESSAGE. Each MIDI message is made up of 1 to 3 bytes (numbers); a Status Byte and 0,1 or 2 Data Bytes.

The typical MIDI message is in the following form:

Sn. xx. yy

S= Status (8-E)
n= Channel number (0-F indicates channel 1-16)
xx= First data byte (00-7F)
yy= Second data byte (00-7F)

Let's look at a sample 3-byte MIDI message.



For example, if a DX7 synthesizer receives this message, it does the following.

1. Checks the channel number to see if it is acceptable. If the DX7 has been set to receive that channel, it goes on to the next step. If not, the message is ignored. In the example above, the channel number is 4. (We count 0-F as 1 to 16.)

2. Checks the status. In this case, the status is Note On, so the DX7 knows to expect two more data bytes; note number (what note) and velocity (how hard it was hit).

3. Reads the data bytes and produces the correct note with the correct velocity.
   (Keep in mind that all this takes a very short time. It takes about 1/1000 of a second to send a MIDI message. To us, it seems as though sound is produced at the same time the key is pressed.)

Some MIDI messages have only two bytes: a status byte and a data byte. For example,

C3. 05

is a Program Change message on channel 4, telling the receiving device to switch to program number 6.

MIDI messages with a status byte from F0 to FF have no channel number. They are called System messages, and are received by all devices regardless of their channel setting.

For an explanation of each type of message, see the MIDI Format Table on p.29.

MIDI FORMAT TABLE

			Message	Status Byte	First Data Byte (xx)	Second Data Byte (yy)
CHANNEL MESSAGE			Note Off	8n	Note Number	Velocity
			Note On	9n	"	"
			Polyphonic Aftertouch	An	"	Pressure
			Control Change	Bn	(Control Number) 01 Modulation Wheel 02 Breath Controller 04 Foot Controller 05 Portamento Time 06 Data Entry Slider 07 Main Volume 40 Sustain 41 Portamento 42 Sostenuto 43 Soft 60 Data Increment 61 Data Decrement 7A Local 7B All Note Off 7C Omni Off 7D Omni On 7E Mono On 7F Poly On	 Data " " " " " 00: Off 7F: On 7F 7F 00: Off, 7F:On 00 00 00 00–0A(Number of channels) 00
			Program Change	Cn	Program number	
			Channel Aftertouch	Dn	Pressure	
			Pitch Wheel	En	LSB	MSB
SYSTEM MESSAGE	COMMON MESSAGE		System Exclusive	F0	Mfgr. ID code	(???)
				F1		
			Song Position Pointer	F2	LSB	MSB
			Song Select	F3	Song number	
				F4, F5		
			Tune Request	F6		
			End Of Exclusive	F7		
	REALTIME MESSAGE		Timing Clock	F8		
				F9		
			Start	FA		
			Continue	FB		
			Stop	FC		
				FD		
			Active Sensing	FE		
			System Reset	FF		

NOTE:

All numbers are in Hexadecimal. The MCS2 uses Decimal numbers, so use the conversion table on p.26 when making assignments.

8n Note Off:

The note number indicates which key was released, and velocity indicates how quickly it was released. Very few keyboards have Release Velocity Sensitivity. (The Sequential Circuits Prophet T8 is one.) Most other keyboards (such as the Yamaha DX series) send a Note On message with a velocity of 0 to indicate a Note Off.

9n Note On:

The note number indicates which key was pressed, and velocity indicates how hard it was hit. On keyboards which do not have a velocity sensitive keyboard (such as the DX21), a medium value of 40 is sent. A Note On message with a velocity of 0 is the same as a Note Off message.

An Polyphonic Aftertouch:

The note number indicates which key is being pressed, and pressure indicates how hard that key is being pressed. (Ie. each key can send independent aftertouch messages.) Of all Yamaha keyboards, only the DX1 is able to send (and react to) this message.

Bn Control Change:

The control number indicates which controller is being moved, and the data indicates the position of the controller. In this chart, control changes 01 – 07 are "continuous controllers" (slider or wheel-type controllers.) They carry data in the range of 00–7F.
Control changes 40–43 are on/off switch-type controllers, and carry data of either 0 or 7F.
Control changes 7A–7F are a special type of control change called Mode Messages, and usually carry a fixed data byte. They tell the receiving tone generator how to behave. The way in which these messages are interpreted will depend on the device. (See the MIDI Implementation Chart for your tone generator or synthesizer.)

Cn Program Change:

This tells the receiving device to switch programs (memories).

Dn Channel Aftertouch:

Also called "Common Aftertouch", this is found on the DX7.

En Pitch Wheel:

To provide finer resolution, this data is sent in two bytes, first the Least Significant Byte (LSB) and then the Most Significant Byte (MSB). Yamaha tone generators and synthesizers ignore the LSB.

F0 System Exclusive:

After F0 must come an identification number which has been assigned to each manufacturer. Yamaha's number is 43. What comes between this message and F7 (End of Exclusive) is completely up to each manufacturer (but each byte must be between 0 and 7F). Yamaha uses System Exclusive messages to transmit voice data, sequence data, rhythm pattern data, bulk memory data of all kinds, and many other useful things. See the System Exclusive format chart for your device.

F7 End Of Exclusive (EOX)

This marks the end of a System Exclusive message.

F2, F3, F8, FA, FB, FC, FF

Song Position Pointer, Song Select, Timing Clock, Start, Stop, Continue, System Reset are all for controlling sequencers and rhythm machines. See the MIDI Implementation Chart for your device.

FE Active Sensing

If there are no MIDI messages that have to be sent, one of these is sent every 300 msec just to let the receiving devices know that there is still someone out there. If there have not been any MIDI messages for a long time (like 1/2 a second), the receiving device assumes that some error has taken place (eg. a MIDI cable was pulled out by mistake) and will stop all notes.

F1, F4, F5, F9, FD

These are unused, and reserved for future expansion.

MCS2 CONTROLLER ASSIGN FORM

Here are some blank forms for you to write down your own settings.

The Initialized setting is shown an the separately included controller assignment card.

SET NAME			USER NAME		
CONTROLLER	ASSIGNMENT	MIDI MESSAGE	CONTROLLER	ASSIGNMENT	MIDI MESSAGE
FS2			CS2		
FS1			CS1		
PS3			FC2		
PS2			FC1		
PS1			MIDI CH		

SET NAME			USER NAME		
CONTROLLER	ASSIGNMENT	MIDI MESSAGE	CONTROLLER	ASSIGNMENT	MIDI MESSAGE
FS2			CS2		
FS1			CS1		
PS3			FC2		
PS2			FC1		
PS1			MIDI CH		

SET NAME			USER NAME		
CONTROLLER	ASSIGNMENT	MIDI MESSAGE	CONTROLLER	ASSIGNMENT	MIDI MESSAGE
FS2			CS2		
FS1			CS1		
PS3			FC2		
PS2			FC1		
PS1			MIDI CH		

SET NAME			USER NAME		
CONTROLLER	ASSIGNMENT	MIDI MESSAGE	CONTROLLER	ASSIGNMENT	MIDI MESSAGE
FS2			CS2		
FS1			CS1		
PS3			FC2		
PS2			FC1		
PS1			MIDI CH		

[MIDI Control Station] Date : 9/25, 1985

Model MCS2 MIDI Implementation Chart Version : 1.0

Function ...	Transmitted	Recognized MIDI IN1, IN2	Remarks
Basic Default	1 - 16 X	all channel	X memorized
Basic Changed	1 - 16	x x	
Mode Default	x	x x	
Mode Messages	OMNIon,OMNIoff POLY,MONO	OMNIon,OMNIoff POLY,MONO	
Note Number : True voice	x XXXXXXXXXXXXXX	0 - 127	
Velocity Note ON	x	o o	
Velocity Note OFF	x	o o	
After Touch Key's	x	o o	
After Touch Ch's	x	o o	
Pitch Bender	o XX	o o	XX 7 bit reso.
Control Change 0 - 121	o	o o	
Prog Change : True #	o 0 - 63 XXXXXXXXXXXXXX	0-127 o o	
System Exclusive	x	o x	all
System Common : Song Pos	x	o x	
System Common : Song Sel	x	o x	
System Common : Tune	o	o x	
System Real Time : Clock	o	o x	
System Real Time : Commands	o	o x	
Aux Mes- sages : Local ON/OFF	o	o o	
Aux Mes- sages : All Notes OFF	x	x x	
Aux Mes- sages : Active Sense	o	o o	
Aux Mes- sages : Reset	o	o x	
Notes	Received messages from MIDI IN1 and MIDI IN2 are only bypassed to MIDI OUT.		

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO o : Yes

Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO x : No

FCC INFORMATION (USA)

While the following statements are provided to comply with FCC Regulations in the United States, the corrective measures listed below are applicable worldwide.

This series of Yamaha professional music equipment uses frequencies that appear in the radio frequency range and if installed in the immediate proximity of some types of audio or video devices (within three meters), interference may occur. This series of Yamaha combo equipment have been type tested and found to comply with the specifications set for a class 8 computing device in accordance with those specifications listed in subpart J of part 15 of the FCC rules. These rules are designed to provide a reasonable measure of protection against such interference. However, this does not guarantee that interference will not occur. If your professional music equipment should be suspected of causing interference with other electronic devices, verification can be made by turning your combo equipment off and on. If the interference continues when your equipment is off, the equipment is not the source of interference. If your equipment does appear to be the source of the interference, you should try to correct the situation by using one or more of the following measures:

Relocate either the equipment or the electronic device that is being affected by the interference. Utilize power outlets for the professional music equipment and the device being affected that are on different branch (circuit breaker or fuse) circuits, or install AC line filters.

In the case of radio or TV interference, relocate the antenna or, if the antenna lead-in is 300 ohm ribbon lead, change the lead-in the co-axial type cable.
If these corrective measures do not produce satisfactory results, please contact your authorized Yamaha professional products dealer for suggestions and/or corrective measures.
If you cannot locate a franchised Yamaha professional products dealer in your general area contact the professional products Service Department, Yamaha International, 6600 Orangethorpe Ave., Buena Park, CA 90620, U.S.A.

If for any reason, you should need additional information relating to radio or TV interference, you may find a booklet prepared by the Federal Communications Commission helpful:
"How to Identify and Resolve Radio -- TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington D.C. 20402 -- Stock No. 004-000-00345-4.

SERVICE

The MCS2 is supported by Yamaha's worldwide network of factory trained and qualified dealer service personnel. In the event of a problem, contact your nearest Yamaha dealer.

YAMAHA

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Pariston saa vaihtaa ainoastaan alan ammattimies.

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Explosionsfara vid felaktig hantering.

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