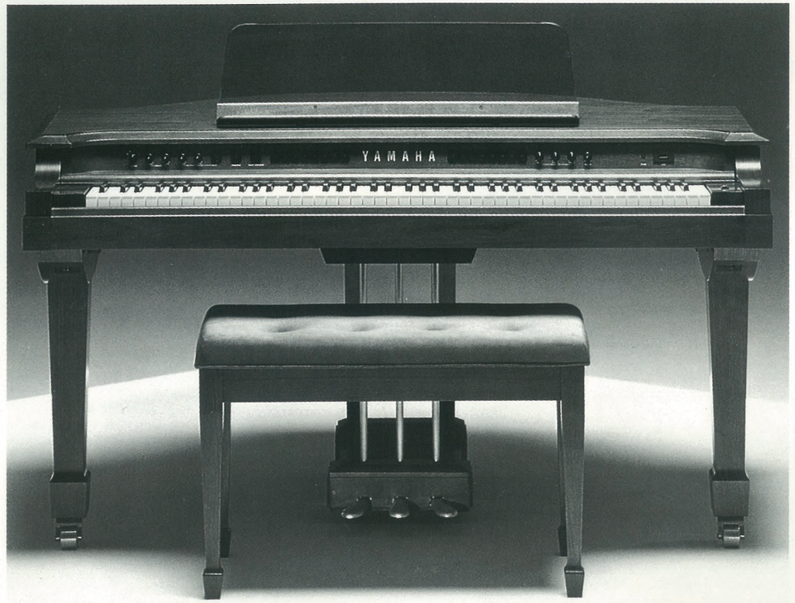
YAMAHA COMBO KEYBOARDS



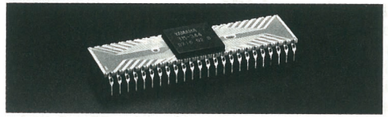
DIGITAL KEYBOARD GS1



The GS-1 digital keyboard is the beginning of a new generation in electronic keyboards. The GS-1 is an 88 key, 16 note polyphonic keyboard featuring sophisticated new Yamaha technology like FM tone generation, which permits creation of music waveforms nearly identical to those of acoustic instruments. Velocity/pressure sensitive keys also give you more creative flexibility with Initial Touch Response and After Touch Response, which allow you to vary the dynamics and tone coloration of the notes according to the velocity of key attack and the pressure applied to the keys. There are 32 voices preprogrammed and stored on magnetic cards which can be "read' by the GS-1 to reprogram the button-selectable voices.
All this creative potential has been made possible in the GS-1 thanks to Yamaha's advanced digital technology and unique musical sensitivity, for an exciting new generation of electronic keyboard performance.

Digital FM Tone Generator For Incredibly "Real" Sound

Yamaha has provided the GS-1 with a means of creating music waveforms with a truly natural harmonic spectrum—a digital frequency modulation tone generator. The latest digital technology has been applied in the GS-1, resulting in the ability to generate natural, irregular harmonic waveform structure, for voices that accurately imitate the sounds of acoustic instruments. This incredible musical realism just isn't possible with conventional synthesizer technology. Four digital FM tone generator channels are employed to produce each note played on the GS-1.



The Yamaha Voice Library System

The GS-1 comes with a library of preprogrammed magnetic cards, each with 32 different voices. This voice library, combined with the GS-1's digital FM tone generation technology and dual Touch Response capability gives you new musical scope. The GS-1 memory system lets you to preset up to 16 of the 32 voices provided on each voice card, for fast and simple voice selection during performance with the front panel Voice Selectors. A Program Lock switch protects the cards from accidental erasure, and battery back-up power prevents data erasure when main power to the instrument is switched off.



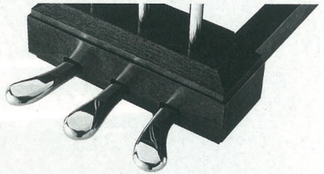
Dual Touch Response Functions

Velocity/pressure sensitive keys on the GS-1 give you two versatile means of controlling dynamics and tonality—Initial Touch Response and After Touch Response. Initial Touch Response lets you control the volume and tonal quality of each note played according to the speed with which you strike the keys. The dynamic range provided by Initial Touch Response is an impressive 96 dB, and a real wood keyboard contributes to superior action and response.
After Touch Response allows you to control volume and tonal quality of notes played according to the pressure applied to the keys. The effect is wide ranging, and since each note responds independently, a variety of expressions can be generated within an individual chord. The dynamic range available with After Touch Response is broad, and a convenient front panel Touch Response switch allows you to turn After Touch Response function on or off as desired. The Touch Response effect is different for each of the 32 available voices in order to provide the most effective Touch Response control capability for each individual sound.



Unique, Useful Effects

The GS-1 has a number of Effects which let you tailor the sound according to your own musical preferences. The Detune effect allows you to offset the pitch of one output channel in relation to the other for a "honky-tonk" piano effect.
Detune is switchable between Random Detune, varying the effect according to the order in which the keys are struck, and Static Detune, which generates a consistent Detune effect. In addition to this effect, Ensemble lets you create a multiple instrument accompaniment effect, and Tremolo and Vibrato are also provided. Convenient foot pedals let you control three effects with greater ease—Vibrato On/Off, Tremolo On/Off, and Damper.



Professional Output Standards

The GS-1 is compatible with professional output standards. Three phone jack connections are provided for Channels 1, 2 and Mixed Channel output, and Channel 1 and 2 output is also possible via balanced-output type XLR connectors. All output jacks meet professional specifications for PA and recording situations.



Standard Accessories

• Voice Card x 32 • Blank Voice Card x 8
• Card Holder • AC cord

Options

• BGS-1 Bench • FC-3A Foot Controller

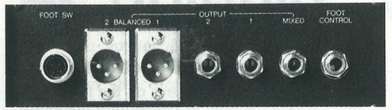
DIGITAL KEYBOARD GS 2



The GS-2 is a new digital keyboard based on the remarkable GS-1, and offering greater portability making ideal for road use. A 73 key, 16 note polyphonic synthesizer, the GS-2 features a 2-channel digital FM tone generator that creates incredibly natural, "acoustic" voices by generating an irregular harmonic spectrum. Also, the GS-2 Initial Touch Response feature provides exceptionally natural dynamic and tonal response according to key attack velocity. A real wood keyboard achieves superior response and key action, and the dynamic range available with the GS-2 is a wide 96 dB.

Another great GS-2 feature is the Yamaha Voice Library System. 32 preprogrammed voice cards give you a wide range of voices which can be loaded into the GS-2 memory and called with the front panel Voice Selectors. In addition, Tremolo, Vibrato and Ensemble Effects let you add a broad range of personal expression to your music.

Standard phone jacks are provided on the GS-2 for Channel 1, 2 and Mixed output, and balanced-output type XLR terminals are also provided for Channels 1 and 2. The GS-2 and GS-2 foot pedals come in a separately transportable unit for greater portability.



Standard Accessories

- **Voice Card x 32**
- **Card Holder**
- **Blank Voice Card x 8**
- **AC cord**

Options • **FC-3A foot controller**

DIGITAL KEYBOARDS

model	GS 1	GS 2
keyboard	88keys $A_{-1} \sim C_7$	73keys $E_0 \sim E_6$
simultaneous notes	up to 16	up to 16
tone generators	Digital FM Tone Generator 4 carry 4 modulation 8 EG	Digital FM Tone Generator 2 carry 2 modulation 4 EG
voice cards	32	32
controls	DETUNE SW (STATIC 2/1/OFF/RANDOM 1/2), VIBRATO (SPEED, DEPTH), TREMOLO (SPEED, DEPTH, SW), ENSEMBLE SW, TOUCH RESPONSE SW (after touch on/off), TONE SELECTORS (1~16), EQ (BASS, MIDDLE, TREBLE), VOLUME, CARD READER, STORE SW, PGM LOCK/UNLOCK SW, LINE OUT SW, PITCH	PITCH (TUNE, DETUNE), VIBRATO (SPEED, DEPTH), TREMOLO (SPEED, DEPTH, SW), ENSEMBLE SW, TONE SELECTORS (1~16), EQ (BASS, MIDDLE, TREBLE), VOLUME, PROGRAM (STORE SW, CARD READER), LINE OUT SW
pedal controls	VIBRATO (on/off), TREMOLO (on/off), DAMPER	VIBRATO (on/off), TREMOLO (on/off), DAMPER
audio jacks	MIXED OUT (0dB* 600 ohms), OUTPUT 1, 2 (0dB* 600 ohms), BALANCED OUT 1, 2 (−20dB* 600 ohms XLR), PHONES (8 ohms)	MIXED OUT (0dB* 600 ohms), OUTPUT 1, 2 (0dB* 600 ohms), BALANCED OUT 1, 2 (−20dB* 600 ohms XLR), PHONES (8 ohms)
control jacks	FOOT CONT (volume)	FOOT SW (vibrato, tremolo and damper pedal), FOOT CONTROL (volume)
dimensions W x H x D	150.0 x 82.6 x 83.2 cm 59" x 32-1/2" x 32-3/4"	128.3 x 82.4 x 64.1 cm 50-1/2" x 32-1/2" x 25-1/4"
weight	90 kg 198.4 lbs.	72 kg 158.7 lbs.
power source	AC 100/120/220/240 volts selectable	AC 100/120/220/240 volts selectable

*nominal, 0dB is referenced to 0.775 volts

ELECTRIC GRAND CP 80



In virtually all areas of music recording and performance, the CP-80 Electric Grand Piano has become the first choice of leading professional keyboard players throughout the world.
This remarkably portable piano can be easily transported to any performance location thereby eliminating the problem of unpredictable response, playability and sound in "provided" instruments. In addition, the CP-80 can be amplified to high power levels with no fear of feedback or "howling."
The only way to fully appreciate the outstanding sound and playability of these fine instruments, however, is through your own ears and fingertips.

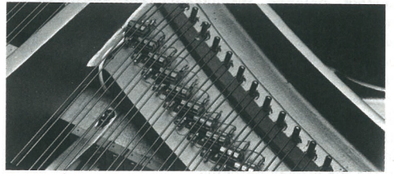
Touch Response Rivalling That of the Finest Grand Pianos

A piano's keys are the point of contact between the instrument and the musician. The way in which the keys and the overall instrument respond to the musician's touch largely determine a piano's "playability." Although the CP-80 Electric Grand Piano is essentially an electronic instrument, its sound is produced using strings, hammers and key actions almost exactly like those of an acoustic grand. This means you have full dynamic capability plus the smooth, natural response of a first-class grand piano.



Live Piano Sound with No Feedback

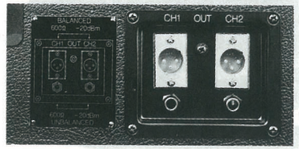
The CP-80 abounds with fine examples of superior Yamaha piano technology—the strings, frame, pin blocks, hammers and the entire action mechanism all represent the highest degree of precision and craftsmanship. The main difference between the CP-80 Electric Grand and conventional grand pianos is a special piezo-electric pickup system developed specifically for piano applications. A carefully aligned arrangement of these unique pickup elements ensures perfectly even response throughout the instrument's range, and their design effectively eliminates feedback—a major problem when miking acoustic pianos.



Electric Piano Control Versatility

The CP-80 Electric Grand features bass, middle and treble tone controls which permit creation of a broad range of tonal variations from round, mellow jazz sounds to crisp, clear classical effects. A Brilliance Level switch is also provided so you can match the piano's sound to the response of your amplifier. Another noteworthy feature is a stereo tremolo effect. The left and right channel outputs can be derived either from balanced XLR connectors or standard phone jacks. Accessory terminals are also provided for convenient insertion of outboard effects devices into the Electric Grand's preamplifier circuit.



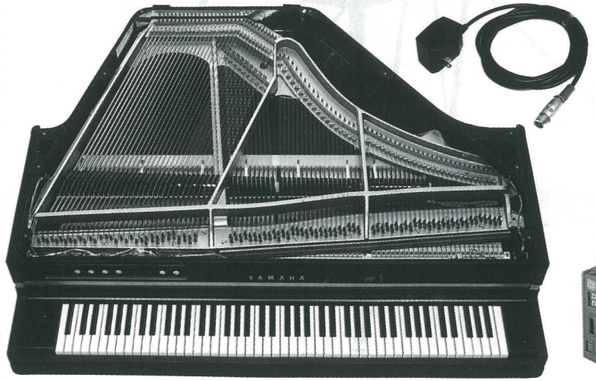


Easy Transportation and Storage

To facilitate transportation and storage, the CP-80 Electric Grand Piano can be easily disassembled into two main units—the frame section and the keyboard section. This convenient portability means you can easily take your grand piano with you, anywhere, so you don't have to continually adapt to different pianos at each new performance locations.
Since these revolutionary electric pianos have the strings, response and sound of a full acoustic grand, regular tuning is recommended in order to maintain optimum performance condition.

Standard Accessories

• Damper Pedal • Legs • AC Cord • AC Adaptor







ELECTRIC GRAND CP 70B



With a 73-key keyboard, the CP-70B is a convenient, compact version of the unmatched Yamaha electric grand—the CP-80. It offers extraordinary touch, fine response, and acoustic-piano playability in all respects. In fact, the CP-70B produces its unforgettable sound by striking piano strings with hammers—in exactly the same way as an acoustic grand piano. Naturally the Yamaha tradition of fine piano craftsmanship ensures the finest quality and performance in each and every part: the critical frame that maintains tension on the strings, the delicate key action, the important pin block. Furthermore, the special Yamaha system of piezo-electric pickups—one for each string—achieves stunning sound quality, perfect balance throughout the instrument's range, and exceptionally wide dynamic range with no chance of acoustic feedback. Independent bass, middle and treble controls permit a vast range of tonal variation, while a built-in stereo tremolo feature adds creative effects capability. Stereo outputs are provided, with balanced XLR and unbalanced phone plug connectors provided for each channel. Insert In/Out jacks are alos provided for effects patching.



Standard Accessories

• Damper Pedal • Legs • AC Cord • AC Adaptor

ELECTRIC GRAND PIANOS

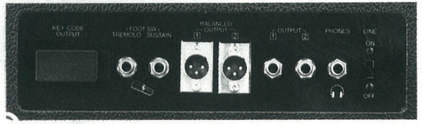
model	CP 80	CP 70B
keyboard	88keys $A_{-1} \sim C_7$	73keys $E_0 \sim E_6$
action	simillar to Yamaha Grand Pianos	simillar to Yamaha Grand Pianos
music wires	treble and mid range; 2 Yamaha Grand Piano strings per note bass range; specially developed single strings	treble and mid range; 2 Yamaha Grand Piano strings per note bass range; specially developed single strings
pickups	independent piezo pickup system	independent piezo pickup system
controls	VOLUME, BASS, MIDDLE, TREBLE, BRILLIANCE LEVEL SW, TREMOLO (SW, DEPTH, SPEED)	VOLUME, BASS, MIDDLE, TREBLE, TREMOLO (SW, DEPTH, SPEED)
audio jacks	PATCH IN (−20dB* 100k ohms), PATCH OUT (−20dB* 600 ohms), UNBALANCED OUT CH 1 & 2 (−20dB* 600 ohms), BALANCED OUT CH1 & 2 (−20dB* 600 ohms XLR)	PATCH IN (−20dB* 100k ohms), PATCH OUT (−20dB* 600 ohms), UNBALANCED OUT CH1 & 2 (−20dB* 600 ohms), BALANCED OUT CH1 & 2 (−20dB* 600 ohms XLR)
dimensions W x H x D	146.0 x 94.65 x 115.0 cm 57-1/2" x 37-1/4" x 45-1/4"	129.6 x 94.65 x 104.5 cm 51" x 37-1/4" x 41-1/8"
weight	142 kg 313 lbs.	130kg 286 lbs.
power source	AC adaptor	AC adaptor

*nominal, 0dB is referenced to 0.775 volts

ELECTRONIC PIANO CP 35



The CP-35 is a new 73-key electronic piano featuring a harmonic-rich pulse-wave sound source system. Individual sound sources are produced by mixing independently generated decay and attack waveforms. Each of the CP-35's channels offers a choice of four basic waveforms —A, B, C or D—as well as four tone filter selectors which can be combined to create literally thousands of tonal variations. Channel II additionally features 5th up and 8th up transpose switches which can be used to generate coupler effects by creating a 5th or octave or, by combining both switches, a 12th interval between the two channels. Four preset selectors are also provided which offer a variety of tones unattainable by combining the tone filters.



Other controls and effects include independent channel I and II pitch controls, independent 8-position decay selectors, stereo tremolo, two-band equalization and a built-in flanger.
Each CP-35 output channel is provided with a balanced XLR connector and an unbalanced 1/4" phone jack.

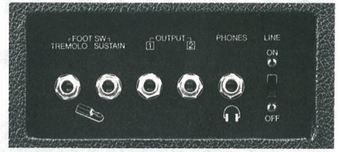
Standard Accessories

• FC-4 Foot Switch • AC Cord • Stand (formed of the two upper halves of the CP-35 case cover)

ELECTRONIC PIANO CP 25



The CP-25 is a 61-key version of the CP-35 with the same unique 2-channel harmonic-rich pulse-wave sound source system. Complex envelope structures are achieved by mixing separately generated attack and decay waveforms. An A, B, C or D WAVE selector offers a choice of four basic waveforms, while four combinable tone filter selectors offer an extensive spectrum of tonal variations. Particularly noteworthy is the addition of 5th and octave up transpose switches which permit the transposed channel II sound to be mixed with the normal channel I sound. There are also a number of flexible control features and effects including independent pitch controls for the two internally mixed sound sources, an 8-position decay time selector, stereo tremolo effect with corresponding two-channel output, two-band equalization and a built-in flanger.

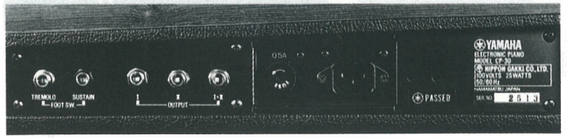


Standard Accessories

• FC-4 Foot Switch • AC Cord • Legs

ELECTRONIC PIANO CP 30





The CP-30 is a large-scale electronic piano featuring a full 76-key keyboard. Two-channel tone generators and panel controls offer an exceptionally broad range of tonal combinations. Each channel is independently equipped with piano 1, 2, 3 and harpsichord tone selectors in addition to pitch, decay, tremolo and other controls. By combining settings of the four tone selectors in each channel a total of 255 variations are possible.

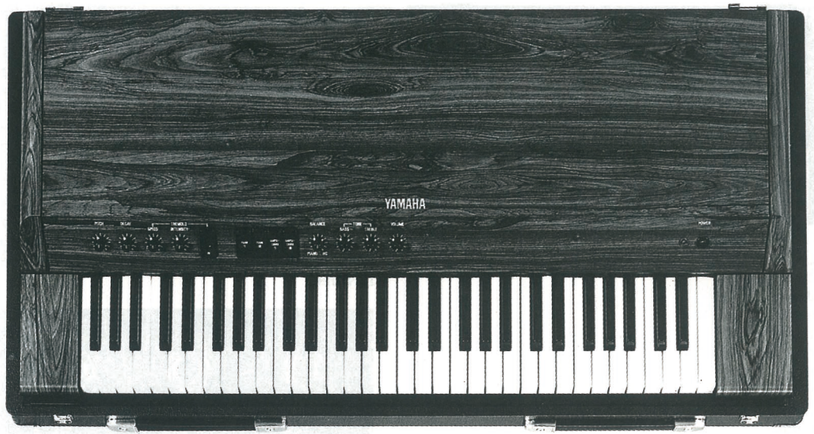
In order that the CP-30's two-channel tone generators and controls may be used to full advantage, each channel has an independent output. A mixed output is also provided for use with single-channel sound systems. The CP-30 also features a stereo tremolo effect that is effective when using the independent channel outputs.

The CP-30 keyboard features full touch response offering dynamic expression capability like that of an acoustic piano. An exceptionally convenient feature of the CP-30 is that its case doubles as a stand thereby minimizing weight and size for easy set up and transportation.

Standard Accessories

- **FC-4 Foot Switch • AC Cord**
- **Stand (formed of the two upper halves of the CP-30 case cover)**

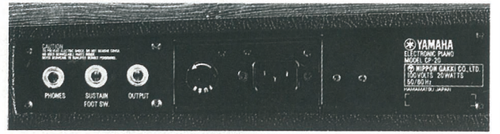
ELECTRONIC PIANO CP 20



This 61-key, compact electronic piano features Touch Response, permitting natural key-attack dynamics. 4 tone selectors, Piano 1, Piano 2, Harpsichord 1, and Harpsichord 2, can be used independently or mixed in any combination to provide a broad variety of basic sounds. A balance control is also provided that permits precise mixing of the piano and harpsichord voices, offering even greater sound creation versatility. Other sound controls include Pitch, Decay, Volume and Tone. An exciting, highly versatile stereo tremolo effect is also provided. A Headphone terminal facilitates private practice and monitoring, and a Sustain Foot Switch terminal permits piano-type foot control of the sustain on/off function.

Standard Accessories

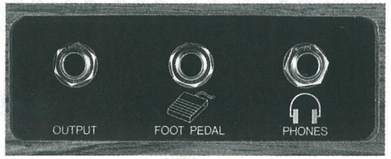
- **FC-4 Foot Switch • AC Cord • Case**
- **Legs**



ELECTRONIC PIANO CP 10



With 61 keys and a compact configuration, the CP-10 is Yamaha's "standard" electronic piano model. Tone selectors include a mellow Piano 1, bright Piano 2, a light Harpsichord 1 and a sparkling Harpsichord 2. These four sounds can be mixed as desired to create a broad variety of tonal effects. Another noteworthy feature is the inclusion of a five-band graphic equalizer system that lets you shape the overall sound to perfectly fit your musical requirements. A pleasant, pulsating tremolo effect and a piano-like sustain sound function can both be conveniently controlled via foot switches, and a headphone jack permits private monitoring or practice anywhere, anytime.



Standard Accessory
- **FC-5 foot switch**

Option
- **LC-10P Carrying Case**

ELECTRONIC PIANO CP 11



The CP-11 is a small, 61 key electronic piano that has all the features of the Yamaha CP-10 Electronic Piano plus Auto Accompaniment, offering 8 distinct rhythm patterns to choose from—March, Disco, Waltz, Rock, Tango, Swing, Rumba and Samba. These Auto Rhythms can be synchronized with Auto Bass Chords and Auto Arpeggio, providing easy, enjoyable music for the whole family. These three Auto Accompaniment features make it possible for you to sound like a whole band—ideal for live performances, home recording, music study or just plain fun.
The CP-11 offers 4 tone selectors—Piano 1, Piano 2, Harpsichord 1 and Harpsichord 2—that can be used individually or mixed in any combination. Sustain and Tremolo controls and a bass/treble equalizer let you shape the sound to create any desired effect, and an EG Mode switch lets you choose a piano-like or sustained organ-like volume envelope. A headphone jack is provided for private monitoring, and a built-in amplifier and speaker let you enjoy the CP-11 anywhere, anytime.



Standard Accessories
- **FC-5 Foot Switch**
- **Music Stand**

Option
- **SC-11 Soft Case**

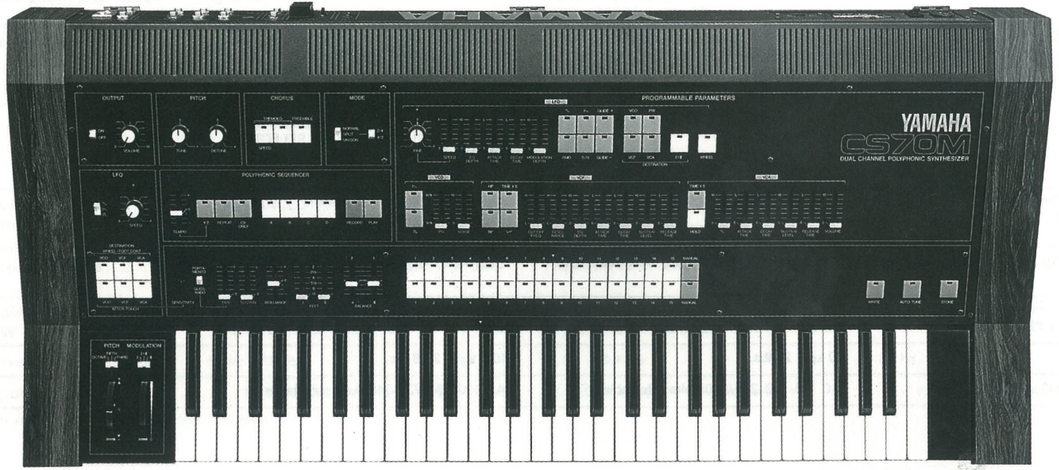
ELECTRONIC PIANOS

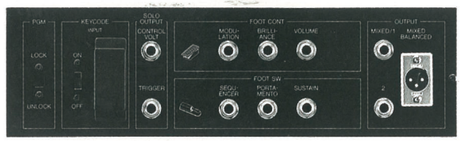
model	CP 35	CP 25	CP 30
keyboard	73keys $E_0 \sim E_6$	61keys $E_0 \sim E_5$	76keys $E_0 \sim G_6$
simultaneous notes	up to 16	DUAL MODE; up to 8 SINGLE MODE; up to 16	all keys
controls	PITCH (I, II), DECAY SW (I, II), TREMOLO (SPEED, DEPTH, SW), FLANGER SW, WAVE SW (I, II; A/B/C/D), FILTER SW (I, II; 1, 2, 3, 4), 5TH UP SW, 8TH UP SW, PRESETS (1, 2, 3, 4), BALANCE, EQ (BASS, TREBLE), VOLUME, LINE SW	MODE SW (DUAL/SINGLE), PITCH (I, II), DECAY SW (I, II), TREMOLO(SPEED, DEPTH, SW), FLANGER SW, WAVE SW (A/B/C/D), FILTER SW (1, 2, 3, 4), 5TH UP SW, 8TH UP SW, BALANCE, EQ (BASS, TREBLE), VOLUME, LINE SW	PITCH (I, II), DECAY (I, II), TREMOLO (SPEED, INTENSITY, I SW, II SW), TONE SELECTOR (I, II; PIANO 1, 2, 3, HARPSICHORD), BALANCE, TONE (BASS, TREBLE), VOLUME
audio jacks and monitor speaker	UNBALANCED OUT 1,2 (−20dB* 600 ohms), BALANCED OUT 1,2 (−20dB* 600 ohms XLR), PHONES (8 ohms)	OUTPUT 1,2 (−20dB* 600 ohms), PHONES (8 ohms)	OUTPUT I, II, I+II (−20dB* 600 ohms)
control jacks	TREMOLO FOOT SW, SUSTAIN FOOT SW, KEY CODE OUT	TREMOLO FOOT SW, SUSTAIN FOOT SW	TREMOLO FOOT SW, SUSTAIN FOOT SW
dimensions W x H x D	127.6 x 79.4 x 59.6 cm 50-1/4" x 31-1/4" x 23-7/16"	106.3 x 79.4 x 59.6 cm 41-13/16" x 31-1/4" x 23-7/16"	127.6 x 79.0 x 64.1 cm 50-1/4" x 31-1/8" x 25-1/4"
weight	50 kg 110 lbs.	41 kg 90.4 lbs.	54 kg 119 lbs.
power source	AC 110/120/220/240 volts selectable	AC 110/120/220/240 volts selectable	AC 110/120/220/240 volts selectable

*nominal, 0dB is referenced to 0.775 volts

CP 20	CP 10	CP 11
61keys $F_0 \sim F_5$	61keys $C_1 \sim C_6$	61keys $C_1 \sim C_6$
all keys	up to 8	up to 10 (AUTO ACCOMPANIMENT OFF)
PITCH, DECAY, TREMOLO (SPEED, INTENSITY, SW), TONE SELECTOR (PIANO 1, 2, HARPSICHORD 1,2), BALANCE, TONE (BASS, TREBLE), VOLUME	PITCH, TREMOLO (SPEED, SW), SUSTAIN SW, EQ (90,220,560,1400, 3500 Hz), TONE SELECTOR (PIANO 1, 2, HARPSICHORD 1,2), VOLUME	PITCH, TREMOLO (SPEED, SW), SUSTAIN (SW, EG MODE SW), AUTO ACCOMPANIMENT (RHYTHM SW; MARCH/ DISCO/WALTZ/ROCK/TANGO/SWING/ RHUMBA/SAMBA, RHYTHM START SW, KEY START SW, TEMPO, ARPEGGIO, BASS & CHORD, RHYTHM), TONE SELECTOR (PIANO 1, 2, HARPSICHORD 1, 2), EQ (BASS, TREBLE), VOLUME
OUTPUT (−20dB* 600 ohms), PHONES (8 ohms)	OUTPUT (−10dB* 600 ohms), PHONES (8 ohms)	OUTPUT (−10dB* 600 ohms), PHONES (8 ohms) MONITOR SPEAKER (5 watts rms)
SUSTAIN FOOT SW	TREMOLO FOOT SW, SUSTAIN FOOT SW	SUSTAIN FOOT SW
108.0 x 79.0 x 57.1 cm 42-1/2" x 31-1/8" x 22-1/2"	92.5 x 11.6 x 32.2 cm 36-3/8" x 4-5/8" x 12-5/8"	92.5 x 10.0 x 32.2 cm 36-3/8" x 3-15/16" x 12-5/8"
40.5 kg 89.3 lbs.	10 kg 22 lbs.	10.8 kg 23.8 lbs.
AC 110/120/220/240 volts selectable	AC 110/120/220/240 volts selectable	AC 110/130/220/240 volts selectable

DUAL CHANNEL POLYPHONIC SYNTHESIZER CS70M

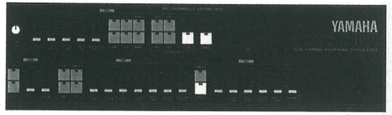




The CS-70M is a fully programmable synthesizer that is capable of instantaneous storage and loading of parameter programs. Furthermore, its 61-key keyboard offers 6-note polyphonic capability for extensive performance flexibility.
The CS-70M embodies the state-of-the-art in synthesizer technology, and represents the very top of the Yamaha line in performance synthesizers.

30 Voice, 39-Parameter Memory

For instant voice selection without the constant need for repatching, the CS-70M permits digital storage of all 39 voice parameters for each of 30 separate voices, divided into two banks of 15 voices each. Storage and loading of voices from memory is a simple one-touch operation that makes for extensive repatching capability even during live performance.
The sound from each of the two 15-voice memory banks can be mixed and balanced for a continuously variable dual-channel output.
Additionally, the CS-70M offers an "edit" mode which permits alteration of stored voices using the manual controls—a new feature that provides even greater performance flexibility.



Voice Library System

In addition to the internal memory, the CS-70M offers a unique magnetic data card system for unlimited sound storage. Each magnetic card "remembers" up to two voices, so that the sounds in the CS-70M's internal memory can be changed one at a time or all at once using a set of 15 data cards.

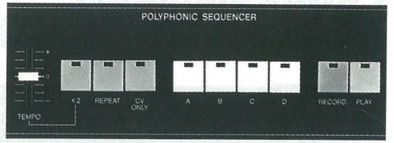


Programmable Keyboard Split System

When the CS-70M MODE switch is set to "split," the keyboard functions are divided to the left and right of the split marker located towards the center of the 61-note keyboard. The 2/4 switch permits two-note operation over the lower two octaves, and four-note operation over the upper three octaves—or vice versa. You can even program the split point yourself to more closely conform to your musical needs.

4-Bank Polyphonic Sequencer

The CS-70M's built-in polyphonic sequencer can memorize up to four different note/rhythm patterns—all with up to six-note polyphonic playback if required. This sequencer automatically memorizes the patterns *exactly* as you play them, so there's no need for tedious control settings. Whenever less than six-note harmony is being played by the sequencer, the remaining voices can be played manually.



Independent Non-Programmable LFO

In addition to the full-feature programmable low-frequency oscillator section, an independent LFO is provided which can be used to control the VCOs, VCFs or VCAs in three different ways: with the modulation wheel, via an optional foot pedal, or with the built-in keyboard after-touch sensitivity.



Standard Accessories

• AC cord • R6 Alkaline Battery x 2

Options

• FC-3A Foot Controller • FC-4 or FC-5 Foot Switch • LG-20 Keyboard Stand

PROGRAMMABLE MEMORY SYNTHESIZER CS 40M





This 44-key duophonic synthesizer permits internal memory storage of up to 20 different sound programs of 50 parameters each for instant recall during live performance. The CS-40M also includes a built-in tape interface that permits storage of programs on external cassette tape. Using this feature, you can build up an extensive sound library from which to choose appropriate voices for your musical needs. Internal memory features a battery backup system so programmed voices are not lost even if power to the unit is switched off.
The CS-40M is capable of simultaneous two-note output with high- and low-note priority.

Standard Accessories

• AC Cord • R6 Alkaline Battery x 2

Options

• FC-3A Foot Controller • FC-4 or FC-5 Foot Switch • LG-20 Keyboard Stand

PROGRAMMABLE MEMORY SYNTHESIZER CS 20M





8 programs of 32 parameters each can be stored in the internal memory of this compact 37-key synthesizer. Programs can be instantly recalled at any time by simply pressing the appropriate memory button for ultimately convenient voice selection during live performance. A built-in battery power backup system maintains stored programs even when the CS-20M is switched off. Programs stored in the synthesizer's memory can even be transferred to an external cassette tape recorder so you can compile an extensive library of voices. Both storage and loading of programs to and from cassette are simple pushbutton operations making the CS-20M a particularly easy-to-use, versatile performance synthesizer.

Standard Accessories

• AC Cord • R6 Alkaline Battery x 2

Options

• FC-3A Foot Controller
• FC-4 or FC-5 Foot Switch
• LG-20 Keyboard Stand

PROGRAMMABLE MEMORY SYNTHESIZERS

model	CS 70M
keyboard	61keys $C_1 \sim C_6$
simultaneous notes	up to 6
system	12VCO-12VCF-12VCA-24EG-2LFO-SEQUENCER-PROGRAMMER
voice mode	NORMAL (6 voice)/SPLIT (2 voice+4 voice or 4 voice+2 voice)/UNISON (1 voice)
programmer	15 programs x 2 channels PROGRAM SELECT SW (I, II; 1~15/MANUAL), WRITE SW, STORE SW, PGM LOCK/UNLOCK SW
programmable parameters	39 parameters **VCO:** WAVE (⋀ / ⊓), PW, NOISE, FEET (I, II; 2′/2-2/3′/4′/5-1/3′/8′/16′) **VCF:** CUT OFF FREQ, RESONANCE, EG DEPTH, HP SW, BP SW, EG (A, D, S, R, TIME x 5 SW, ⋁ SW) **VCA:** EG (A, D, S, R), VOLUME, TIME x 5 SW **PGM LFO:** SPEED, EG DEPTH, EG (A, D), MODULATION DEPTH, MODULATION FUNCTION SW (∿, ⋀ , S&H, GLIDE+, GLIDE−), RMO SW, DESTINATION SW (VCO, VCF, VCA, PW)
unprogrammable parameters	**PITCH:** TUNE, DETUNE **PGM LFO:** SPEED, FINE, I+II SW, WHEEL SW **VCA:** HOLD SW **UNPROGRAMMABLE LFO:** MODULATION FUNCTION SW (∿/ ⋀ / ⊓), SPEED, DESTINATION—WHEEL/FOOT CONT SW (VCO, VCF, VCA), AFTER TOUCH SW (VCO, VCF, VCA), AFTER TOUCH SENSITIVITY **OUTPUT:** ON/OFF SW, VOLUME **MODE:** NORMAL/SPLIT/UNISON SW, 2/4—4/2 SW, BALANCE (I-II, 2-4), BRILLIANCE, SUSTAIN, PORTAMENTO/GLISSANDO (SW, TIME), PITCH (OCTAVE/FIFTH/THIRD SW, WHEEL), MODULATION (I/I+II/II SW, WHEEL)
polyphonic sequencer	6 voice polyphonic BANK SW (A, B, C, D), RECORD SW, PLAY SW, TEMPO (LEVER, x 2 SW), REPEAT SW, CV ONLY SW
audio jacks	UNBALANCED OUT MIXED/1, 2 (−14dB* 600 ohms), BALANCED MIXED OUT (−20dB* 600 ohms), PHONES (8 ohms)
control jacks	FOOT CONTROLLER (VOLUME, BRILLIANCE, MODULATION), FOOT SW (SUSTAIN, PORTAMENTO, SEQUENCER), SOLO OUTPUT (CONTROL VOLT, TRIGGER), KEY CODE INPUT (with ON/OFF SW)
dimensions W x H x D	110.0 x 18.85 x 49.85 cm 43-1/4″ x 73-1/2″ x 19-1/2″
weight	28.8 kg 63.9 lbs.
power source	AC 110/120/220/240 volts selectable

*nominal, 0dB is referenced to 0.775 volts

CS 40M	CS 20M
44 keys $F_2 \sim C_6$	37keys $C_3 \sim C_6$
up to 2	1
4VCO-2VCF-2VCA-4EG-LFO-PROGRAMMER	2VCO-VCF-VCA-2EG-LFO-PROGRAMMER
NORMAL (2 voice)/UNISON	
20 programs PROGRAM SELECT SW (1~10/PANEL), BANK SELECT SW (M1/M2), WRITE SW, STORE SW, LOAD SW, PGM LOCK SW	8 programs PROGRAM SELECT SW (1~8/PANEL), WRITE SW, STORE SW, LOAD SW, PGM LOCK SW
50 parameters **VCO 1:** FEET (64′/32′/16′/8′/4′/2′), WAVE (⋀ / ⋀ / ⊓), MODULATION (FUNCTION SW; ∿/ ⋀ / ⋁ / ⊓ /S&H/EG+/EG−, DEPTH), PW, PWM (FUNCTION SW; ∿ /EG+/EG−, DEPTH) **VCO 2:** similar to VCO 1 **EG-VCO:** A, D, NORMAL/TIME x 5 SW **MIXER:** VCO 1, VCO 2, NOISE **VCF:** CUT OFF FREQ, RESONANCE, MODULATION (FUNCTION SW; ∿ / ⋀ / ⋁ / ⊓ /S&H, DEPTH), EG DEPTH, HP/BP/LP SW, KCV SW **EG-VCF:** A, D, S, R, ⋀ / ⋁ SW, NORMAL/TIME x 5 SW **VCA:** ∿ 1, ∿ 2, MODULATION (FUNCTION SW; ∿ / ⋀ / ⋁ / ⊓ , DEPTH) **EG-VCA:** A, D, S, R, NORMAL/TIME x 5 SW **LFO:** SPEED, SPEED DEPTH, EG VCO SW **RING MODULATOR:** SPEED, SPEED DEPTH, EG VCO SW, ON/OFF SW **OUTPUT:** POA ON/OFF SW	32 parameters **VCO 1:** FEET (64′/32′/16′/8′/4′/2′), WAVE (⋀ / ⋀ / ⊓), MODULATION (FUNCTION SW : ∿ / ⋀ / ⋁ / ⊓ /S&H/GL+/GL−, DEPTH), PW **VCO 2:** similar to VCO 1 **MIXER:** VCO 1, VCO 2, NOISE **VCF:** CUT OFF FREQ, RESONANCE, MODULATION (FUNCTION SW; ∿/ ⋀ / ⋁ / ⊓ /S&H, DEPTH), EG DEPTH, HP/BP/LP SW **EG, VCF:** A, D, S, R, ⋀ / ⋁ SW **VCA:** ∿ 1, MODULATION (FUNCTION SW; ∿ / ⋀ / ⋁ /S&H, DEPTH) **EG-VCA:** A, D, S, R **LFO:** SPEED
VCO 1, 2: PITCH **VCA:** INITIAL LEVEL **LFO:** TRIGGER SW (REPEAT/OFF) **OUTPUT:** VOLUME, PHONES **UNISON:** ON/OFF SW **BRILLIANCE:** LEVEL **PORTAMENTO:** TIME, PORTA/GLISS SW **SUSTAIN:** TIME, I/II SW **PITCH:** OCTAVE/FIFTH/THIRD SW, WHEEL **MODULATION:** VCO/VCO+VCF/VCF SW, WHEEL	**VCO 1, 2:** PITCH, PWM **VCF:** EG NORMAL/TIME x 5 SW **VCA:** EG NORMAL/TIME x 5 SW **GLIDE:** TIME **OUTPUT:** VOLUME, PHONES **PORTAMENTO:** TIME, PORTAMENTO/GLISSANDO SW **BRILLIANCE:** LEVEL **SUSTAIN:** TIME **PITCH:** OCTAVE/FIFTH/THIRD SW, WHEEL **MODULATION:** VCO/VCO+VCF/VCF SW, WHEEL
UNBALANCED MIXED OUT HIGH (−13dB* 600 ohms), UNBALANCED MIXED OUT LOW (−32dB* 600 ohms), BALANCED MIXED OUT (−16dB* 600 ohms), PHONES (8 ohms)	UNBALANCED MIXED OUT HIGH (−13dB* 600 ohms), UNBALANCED MIXED OUT LOW (−32dB* 600 ohms), BALANCED MIXED OUT (−16dB* 600 ohms), PHONES (8 ohms)
FOOT CONTROLLER (VOLUME, FILTER), FOOT SW (SUSTAIN, PORTAMENTO), VCF IN, VCA IN, CONTROL VOLT IN (1, 2), CONTROL VOLT OUT (1, 2) TRIGGER IN (1, 2), TRIGGER OUT (1, 2), PROGRAM (TO TAPE, FROM TAPE)	FOOT CONTROLLER (VOLUME), FOOT SW (SUSTAIN, PORTAMENTO), CONTROL VOLT (IN, OUT), TRIGGER (IN, OUT), PROGRAM (TO TAPE, FROM TAPE)
98.8 x 17.7 x 47.05 cm 38-7/8″ x 7″ x 18-1/2″	84.9 x 17.7 x 45.55 cm 33-3/8″ x 7″ x 17-7/8″
21 kg 46.3 lbs.	16 kg 35.3 lbs.
U.S. and Canadian models 120 volts General model 220—240 volts	U.S. and Canadian models 120 volts General model 220—240 volts

Yamaha Combo Keyboard Line Up



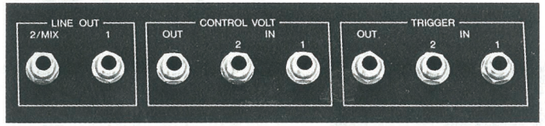




MONOPHONIC SYNTHESIZER CS 15D



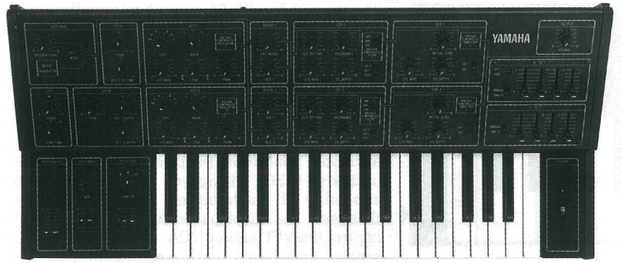
With its 29 preset voice buttons, the CS-15D 37-key monophonic synthesizer is ideal for real-time performance applications. The 29 voice buttons provide a useful range of preset sounds, and a 30th button transfers control to the front-panel manual controls. The voice selector buttons are divided into two channels—15 per channel—which can be mixed and balanced for a wide range of tonal variations. Independent two-channel outputs are also provided so stereo operation is possible. A pitch bend wheel, modulation wheel, sustain control, portamento lever and brilliance lever are located to the left of the keyboard for convenient operation during performance.



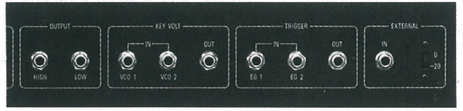
Options

• LG-10 Keyboard Stand • LC-15D Carrying Case

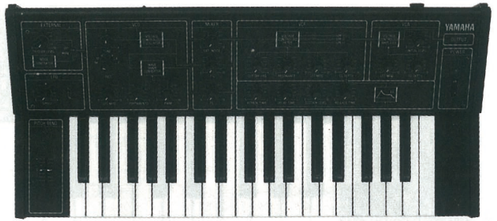
MONOPHONIC SYNTHESIZER CS 15



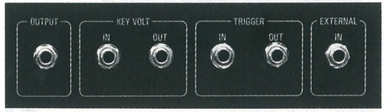
Featuring a 37-key keyboard and two VCOs, two VCFs, two VCAs, two EGs and an LFO the CS-15 is a particularly versatile monophonic synthesizer. All parameter controls as well as the control panel layout have been carefully chosen and engineered for the greatest possible ease and speed in operation. This sophisticated synthesizer also offers a number of advanced features like reverse-phase EG and switchable low-pass, band-pass or high-pass VCF operation.



MONOPHONIC SYNTHESIZER CS 5



The CS-5 is a compact, portable monophonic synthesizer with a full complement of synthesizer "building blocks"—VCO, VCF, VCA, EG and LFO—and a 37-key keyboard. In spite of its small size, the CS-5 offers several large-scale synthesizer features including LFO sawtooth, sine wave and random S/H modulation waveforms.
Additionally, the VCF can be switched for either low-pass, band-pass or high-pass operation.



MONOPHONIC SYNTHESIZER CS 01 *Producer Series*









SC-01 Soft Case



BC1 Breath Control Unit

The new 32-key CS-01 monophonic synthesizer is compact, lightweight, and runs either on batteries or with an AC adaptor for complete portability. An amplifier and monitor speaker are built-in, so you don't need any external equipment to get the best of the CS01 sound. The CS-01 offers a voltage controlled oscillator (VCO), voltage controlled filter (VCF), voltage controlled amplifier (VCA), envelope generator (EG), and low frequency oscillator (LFO), giving you the sound creation capability of much bigger, more complex synthesizers. The Envelope Generator can be used to control the VCF and/or VCA, making it possible to create time-based variations in tonality and volume envelope. LFO modulation, vibrato, wow-wow, and pluse width modulation are also possible with the CS-01, and easy to operate Pitch and Modulation Wheels give you pitch real-time control over pitch and modulation depth.
Another noteworthy feature of the CS-01 is the Breath Control, which allows you to control the VCF and VCA with breath pressure through a special mouth pipe connected to the synthesizer. A headphone jack offers private monitoring capability, and a strap attachment lets you play the CS-01 hanging from your shoulder—like a guitar. Overall, the CS-01 gives you great synthesizer versatility and sound with go-anywhere portability and convenience.

Standard Accessories
- **R6 Battery x 6**

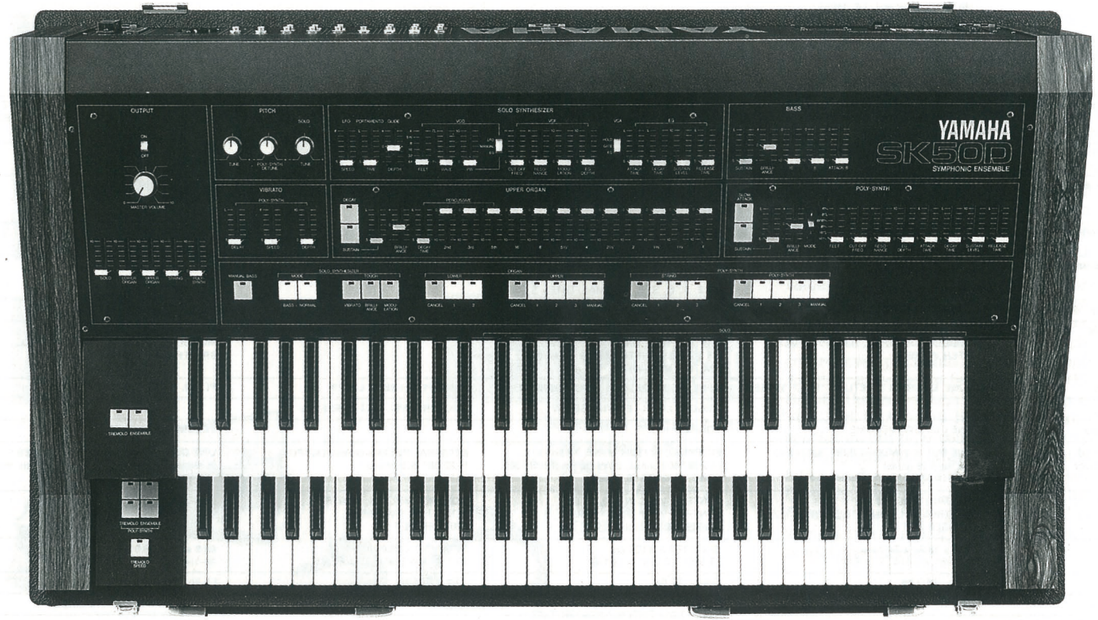
Options
- **PA-1 AC Adaptor**
- **SC-01 Soft Case**
- **BC1 Breath Control Unit**

MONOPHONIC SYNTHESIZERS

model	CS 15D	CS 15	CS 5	CS 01
keyboard	37keys $C_2 \sim C_5$ high note priority	37keys $C_3 \sim C_6$ high note priority	37keys $C_3 \sim C_6$ high note priority	32keys $F_2 \sim C_5$ high note priority
system	2VCO-2VCF-2VCA-4EG-LFO- PRESET MEMORY BANK	2VCO-2VCF-2VCA-2EG-LFO	VCO-VCF-VCA-EG-LFO	VCO-VCF-VCA-EG-LFO
voice selector	**CH 1**: CLARINET/OBOE/FLUTE/TUBA/ TROMBONE/HORN/TRUMPET/ WOOD BASS/CELLO/VIOLIN/CLAV/ HARPSICHORD/ XYLOPHONE/ COSMIC 1/2) **CH 2**: WOOD WIND 1/2/3/BRASS 1/2/3/4/ STRING 1/2/3/ PERCUSSIVE 1/2/3/ COSMIC 3/ MANUAL			
voltage controlled oscillator	FEET (32'/16'/8'/4'/2'), WAVE MIXER (⊓ ⊼), NOISE MIXER, PW	**VCO 1**: FEET (64'/32'/16'/8'/4'/2'), WAVE (⩓ / ⊼ / ⊓), LFO MOD, PW,PWM **VCO 2**: similar to VCO 1	FEET (64'/32'/16'/8'/4'/2') LFO MOD, PWM	PITCH, FEET (4'/8'/16'/32'/NOISE), WAVE (⩓ / ⊼ / ⊓ / ⊔ /PWM), PWM SPEED
mixer	MIX (CHANNEL 1-CHANNEL 2)	**MIXER 1**: EXT/NOISE, VCO 1 **MIXER 2**: VCO 1, VCO 2	EXT/NOISE, ⊼, ⊓	
voltage controlled filter	CUT OFF FREQ, RESONANCE, EG DEPTH, EG (A, D, S, R)	**VCF 1**: CUT OFF FREQ, RESONANCE, LFO MOD, EG DEPTH, HPF/BPF/LPF SW **VCF 2**: similar to VCF 1	CUT OFF FREQ, RESONANCE, LFO MOD, EG DEPTH	CUT OFF FREQ, RESONANCE SW, EG-DEPTH
voltage controlled amplifier	EG (A, D, S, R)	**VCA 1**: INITIAL LEVEL, LFO MOD, EG DEPTH, EG 1/2 SW **VCA 2**: similar to VCA 1	INITIAL LEVEL, LFO MOD, EG-DEPTH	EG DEPTH
envelope generator	see VCF and VCA	**EG 1**: A, D, S, R, NORMAL/TIME x 5 SW, EXT/KBD SW **EG 2**: A, D, S, R, NORMAL/TIME x 5 SW	A, D, S, R,	A, D, S, R
low frequency oscillators	SPEED, FUNCTION (⁓/ ⊓ /S&H/REPEAT)	SPEED, FUNCTION (⁓/ ⊼ /S&H)	SPEED, ⁓ / ⊼ /S&H SW	SPEED
effect controls	SUSTAIN, PORTAMENTO, BRILLIANCE, MODULATION WHEEL (VOC/VCF/VCA), PITCH WHEEL	GLIDE (TIME, VCO 1 DEPTH, VCO 2 DEPTH), PORTAMENTO, BRILLIANCE (LEVEL, VCF 1/1+2/2 SW), PITCH BEND (BENDER, LIMITER; N/M/W)	PORTAMENTO, PITCH BEND	GLISSANDO, PITCH BEND WHEEL, MODULATION (WHEEL, VCO/VCF SW), BREATH CONTROL (VCF, VCA)
pitch controls	TUNE, CHANNEL 2 DETUNE, PITCH WHEEL	TUNE, VCO 2 DETUNE, PITCH BEND LEVER	TUNE, PITCH BEND LEVER	PITCH, PITCH BEND WHEEL
external		TRIGGER LEVEL, EXT/NOISE SW	TRIGGER LEVEL, EXT/NOISE SW	
output controls	LINE OUT SW, VOLUME	VOLUME		VOLUME (POWER SW)
audio jacks and monitor speaker	LINE OUT 1, 2/MIX(−1.5dB* 600 ohms), PHONES (8 ohms)	EXTERNAL IN (330k ohms), HIGH OUT (+2dB* 600 ohms), LOW OUT (−18 dB* 600 ohms), PHONES (8 ohms)	EXTERNAL IN (390k ohms), OUTPUT (−22 dB* 600 ohms)	LINE OUT(−16dB* 10k ohms), PHONES (8 ohms), MONITOR SPEAKER (2 watts rms)
control jacks	CONTROL VOLT IN 1, 2, CONTROL VOLT OUT, TRIGGER IN 1, 2, TRIGGER OUT	CONTROL VOLT IN 1, 2, CONTROL VOLT OUT, TRIGGER IN 1, 2, TRIGGER OUT	CONTROL VOLT IN, CONTROL VOLT OUT, TRIGGER IN, TRIGGER OUT	BREATH CONTROL, DC-IN (9 volts)
dimensions W x H x D	85.4 x 13.43 x 34.7 cm 33-1/8" x 5-1/4" x 13-5/8"	75.4 x 17.4 x 33.25 cm 29-5/8" x 6-7/8" x 13-1/8"	64.1 x 15.7 x 29.0 cm 25-1/4" x 6-1/8" x 11-3/8"	48.9 x 3.6 x 16.0 cm 19-1/4" x 1-7/16" x 6-5/16"
weight	12 kg 26.5 lbs.	10 kg 22 lbs.	7 kg 15.4 lbs.	1.5 kg 3.3 lbs.
power source	AC 110/120/220/240 volts selectable	AC 110/120/220/240 volts selectable	AC 110/120/220/240 volts selectable	R6 battery x 6 or PA-1 AC adaptor

*nominal, 0dB is referenced to 0.775 volts

SYMPHONIC ENSEMBLE SK 50D



The Yamaha SK-50D Symphonic Ensemble effectively unites organ, strings, polyphonic synthesizer, solo synthesizer and bass in one great instrument, providing endless combinations of sounds with the versatility of control by two 61-key keyboards. This gives the multi-keyboardist access to the sounds that previously required several separate keyboards—all in one portable instrument.

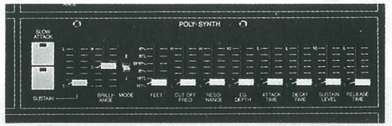
Stop-Lever Organ Section

The SK-50D organ section features a full range of stop levers from 1' to 16', percussion levers for 2nd, 3rd and 5th harmonics (with adjustable decay rate), and controls for overall sustain, brilliance and decay. In addition to the manual organ sound controls, three preset voice buttons are provided for the upper keyboard and two for the lower keyboard.



7-Note Polyphonic Synthesizer and Strings Section

The Poly-Synth is a 7-note polyphonic synthesizer with complete control of pitch, filter cutoff and resonance, envelope generator depth, a full ADSR, as well as sustain, slow attack and brilliance functions. A total of six preset voice selectors are provided in the poly-synth section: three for preset poly-synth voices and three for strings.



Solo Synthesizer Section

The solo synthesizer section is a monophonic synthesizer featuring a VCO, VCF, VCA, EG and LFO. Priority is given to broad expressive capability when playing solo lines with the incorporation of effects such as a number of LFO modulation possibilities and a touch response function that permits tonal variation according to keying pressure.



Standard Accessories

• AC Cord • FC-3A Foot Controller • Case • Legs

Options

• FC-4 or FC-5 Foot Switch • BP-2 Bass Pedal

Exclusive Bass Section

The SK-50D is equipped with an exclusive bass section that offers 16', 8' and attack 8' stop levers as well as sustain and brilliance controls. The bass section can be played either via the "manual bass" area of the lower keyboard or an optional bass pedal unit (BP-2).

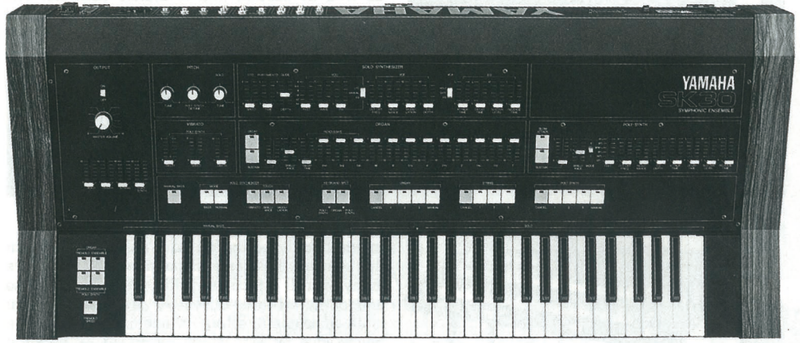


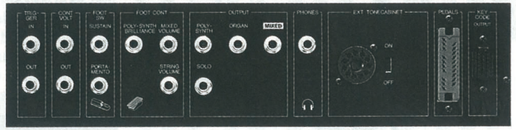
Improved Effects, Extra Functions

In addition to the many unique effects provided in the solo synthesizer section, the SK-50D offers many overall effects including ensemble, tremolo and delay vibrato. Ensemble produces a warm multi-instrument effect, tremolo is based on a phase-shift effect which produces a rotating speaker type sound, and delay vibrato adds realism to strings and many other voices. Foot control capability is also extensive with jacks for mixed, poly-synth and strings volume pedals, and footswitches for sustain and portamento control. An external tone cabinet connector permits direct connection to a rotating speaker unit.



SYMPHONIC ENSEMBLE SK 30





The Yamaha SK-30 combines organ, strings, polyphonic synthesizer and solo synthesizer in one versatile instrument, providing an endless assortment of sounds with the convenience of control by a single 61-key keyboard. Full manual sound control plus a total of nine preset voices and many effects offer extensive capability for creative musical expression.
The organ section has a full range of stop levers from 16' to 1', as well as 2nd, 3rd and 5th harmonic percussive levers with adjustable decay time.
The poly-synth section is a seven-note polyphonic synthesizer with complete filter and envelope generator controls for creation of an unlimited variety of sounds. And with unique touch response functions and a full complement of VCO, VCF, VCA, EG and LFO sections the solo synthesizer is perfect for expressive solo lines.
Another unique feature of the SK-30 is its keyboard split function. Using this function the keyboard can be divided into two areas via which different sound sections can be played for ensemble effects.

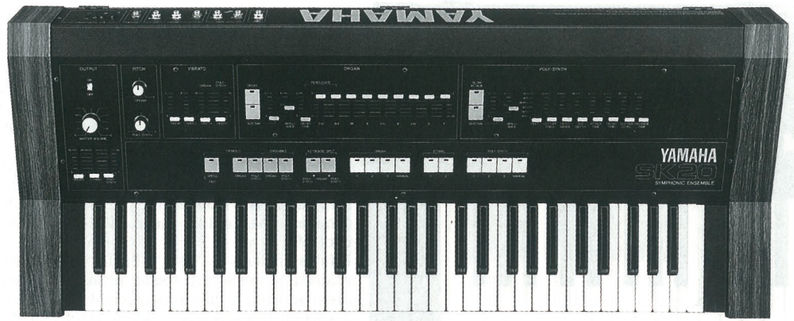
Standard Accessories

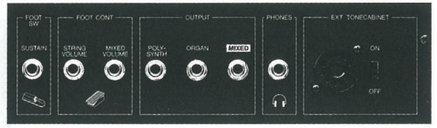
• AC Cord • FC-3A Foot Controller

Options

• FC-4 or FC-5 Foot Switch • BP-2 Bass Pedal • LG-20 Keyboard Stand • LC-30K Carrying Case

SYMPHONIC ENSEMBLE SK 20



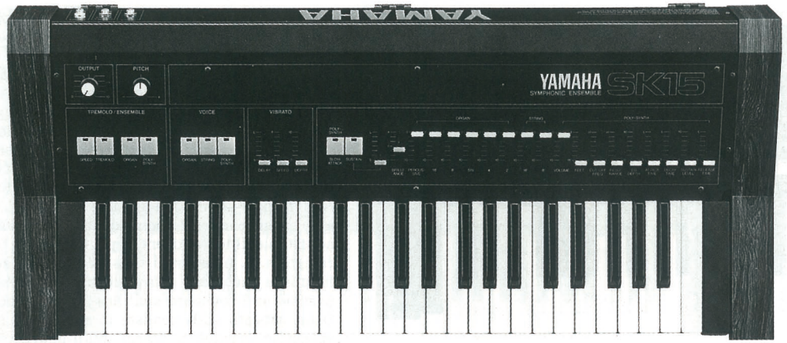


The SK-20 symphonic ensemble offers polyphonic organ, synthesizer and strings controlled via a 61-key keyboard. In addition to manual organ and poly-synth sound controls, three preset voice selectors are provided for organ, three for poly-synth, and two for strings. The organ section offers seven basic stop levers plus 2nd and 3rd harmonic percussive levers with adjustable decay time permitting extensive flexibility in organ sound creation. And the poly-synth section offers an exceptionally broad range of sound control with fully adjustable filter and envelope generator parameters. A number of versatile effects and functions including delay vibrato, ensemble, tremolo and keyboard split are also provided. Delay vibrato adds realism to string sounds, ensemble creates a warm multi-instrument effect and tremolo electronically recreates the sound of a rotating speaker system. The keyboard split function permits dividing the keyboard into two areas via which different sound sections can be played.

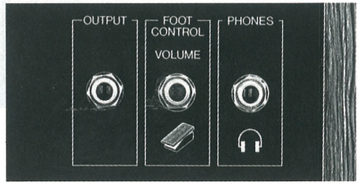
Options

• FC-3A Foot Controller • FC-4 or FC-5 Foot Switch • LG-20 Keyboard Stand • LC-20K Carrying Case

SYMPHONIC ENSEMBLE SK15



The SK-15 is the latest addition to the popular Yamaha symphonic ensemble lineup. In spite of its small 49-key keyboard, the SK-15 offers a remarkably extensive range of features and functions. This fully polyphonic keyboard features organ (sine-wave synthesis), strings and poly-synth sections, all comprising the highest-quality circuitry for rich, natural tonality.
The organ section sound is controlled by five stop levers and one percussive lever, the string section has two stop levers, and the poly-synth section offers a full range of VCF and EG controls.
Effects include a delay vibrato which adds realism to the string sound, ensemble which creates a warm multi-instrument effect, and a special tremolo effect which electronically creates the sound of a mechanical rotating speaker unit.



Options
- **FC-3A foot controller**
- **LC-15K Carrying Case**

SYMPHONIC ENSEMBLE SK10



The SK-10 is a compact 49-key symphonic ensemble that actually covers a full five octaves using an octave transpose switch. In addition, the keyboard offers eight-note polyphonic capability. Sound sections include organ with 8', 4' and 2' stop levers; strings with 8' and 4' stop levers; and brass with 8' and 4' stop levers. All these sections can be mixed to create virtually any tonal combination. The organ, strings and brass sections each have an independent ensemble switch which create a multi-instrument effect. Other effects include vibrato and selectable attack and sustain times.



Options
- **FC-3A Foot Controller • LG-10 Keyboard Stand • LC-10K Carrying Case**

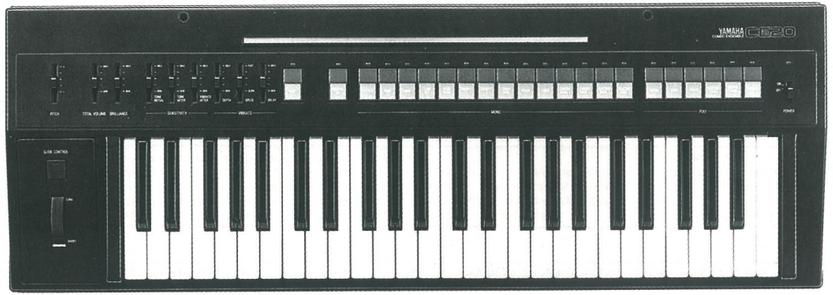
SYMPHONIC ENSEMBLES

model	SK 50D	SK 30
keyboard	upper: 61keys $C_1 \sim C_6$ lower: 61keys $C_1 \sim C_6$	61keys $C_1 \sim C_6$
simultaneous notes	up to 15	up to 15
organ	**UPPER ORGAN:** TONE SELECTORS (1/2/3/MANUAL/CANCEL), TONE LEVERS (16', 8', 5-1/3', 4', 2-2/3', 2', 1-3/5', 1-1/3', 1'), PERCUSSIVE (2nd, 3rd, 5th, DECAY TIME), BRILLIANCE, DECAY SW, SUSTAIN (SW, LEVER) **LOWER ORGAN:** TONE SELECTORS (ORGAN 1/2/CANCEL)	TONE SELECTORS (1/2/3/MANUAL/CANCEL), TONE LEVERS (16', 8', 5-1/3', 4', 2-2/3', 2', 1-3/5', 1-1/3', 1'), PERCUSSIVE (2nd, 3rd, 5th, DECAY TIME), BRILLIANCE, DECAY SW, SUSTAIN (SW, LEVER)
poly-synth	TONE SELECTORS (1/2/3/MANUAL/CANCEL), FEET (4'／8'⊓／BP／8'／16'⊓／16'／), VCF (CUT OFF FREQ, RESONANCE, EG DEPTH), EG (A, D, S, R), BRILLIANCE, SLOW ATTACK SW, SUSTAIN (SW, LEVER), MODE SW	TONE SELECTORS (1/2/3/MANUAL/CANCEL), FEET (4'／8'⊓／BP8'／8'／16'⊓／16'／), VCF (CUT OFF FREQ, RESONANCE, EG DEPTH), EG (A, D, S, R), BRILLIANCE, SLOW, ATTACK SW, SUSTAIN (SW, LEVER), MODE SW
string	TONE SELECTORS (1/2/3/CANCEL)	TONE SELECTORS (1/2/3/CANCEL)
brass		
solo synthesizer	monophonic, high note priority VCO-VCF-VCA-EG-LFO **VCO:** FEET (4'/5-1/3'/8'/16'/32'/64'), WAVE (／ - ⊓), PW (LEVER, LFO/MANUAL/EG SW) **VCF:** CUT OFF FREQ, RESONANCE, MODULATION, EG DEPTH **VCA:** HOLD/GATE/EG SW **EG:** A, D, S, R LFO (SPEED), PORTAMENTO (TIME), GLIDE (DEPTH), MANUAL BASS SW, MODE SW (BASS/NORMAL), TOUCH SW (VIBRATO, BRILLIANCE, MODULATION)	monophonic, high note priority VCO-VCF-VCA-EG-LFO **VCO:** FEET (4'/5-1/3'/8'/16'/32'/64'), WAVE (／ - ⊓), PW (LEVER, LFO/MANUAL/EG SW) **VCF:** CUT OFF FREQ, RESONANCE, MODULATION, EG DEPTH **VCA:** HOLD/GATE/EG SW **EG:** A, D, S, R LFO (SPEED), PORTAMENTO (TIME), GLIDE (DEPTH), MANUAL BASS SW, MODE SW (BASS/NORMAL), TOUCH SW (VIBRATO, BRILLIANCE, MODULATION)
bass	TONE LEVERS (16', 8', ATTACK 8') BRILLIANCE, SUSTAIN, MANUAL BASS SW (common with solo synthesizer)	
effect controls	VIBRATO POLY-SYNTH (DECAY, SPEED, DEPTH), TREMOLO/ ENSEMBLE SW (UPPER ORGAN, LOWER ORGAN, POLY-SYNTH) TREMOLO SPEED SW	VIBRATO POLY-SYNTH (DECAY, SPEED, DEPTH), TREMOLO/ ENSEMBLE SW (ORGAN, POLY-SYNTH), TREMOLO SPEED SW
keyboard split		split between F♯and G:▼marked KEYBOARD SPLIT SW (POLY-SYNTH/ORGAN, ORGAN/POLY-SYNTH)
pitch controls	TUNE, POLY-SYNTH DETUNE, SOLO TUNE	TUNE, POLY-SYNTH DETUNE, SOLO TUNE
output controls	ON/OFF SW, MASTER VOLUME, SPLIT VOLUME (SOLO, UPPER ORGAN, LOWER ORGAN, STRING, POLY-SYNTH), EXT TONECABINET SW	ON/OFF SW, MASTER VOLUME, SPLIT VOLUME (SOLO, ORGAN, STRING, POLY-SYNTH), EXT TONECABINET SW
audio jacks	MIXED OUT, POLY-SYNTH OUT, ORGAN OUT, SOLO OUT, BASS OUT(−10dB* 600 ohms), EXT TONECABINET (11 pins), PHONES (8 ohms)	MIXED OUT, POLY-SYNTH OUT, ORGAN OUT, SOLO OUT, BASS OUT(−10dB* 600 ohms), EXT TONECABINET (11 pins), PHONES (8 ohms)
control jacks	FOOT CONTROLLER (POLY-SYNTH BRILLIANCE, MIXED VOLUME, STRING VOLUME), FOOT SW (SUSTAIN, PORTAMENTO), CONTROL VOLT (IN, OUT), TRIGGER (IN, OUT), PEDALS, KEY CODE OUTPUT	FOOT CONTROLLER (POLY-SYNTH BRILLIANCE, MIXED VOLUME, STRING VOLUME), FOOT SW (SUSTAIN, PORTAMENTO), CONTROL VOLT (IN, OUT), TRIGGER (IN, OUT), PEDALS, KEY CODE OUTPUT
dimensions W x H x D	112.8 x 23.7 x 64.2 cm 44-3/8'' x 9-3/8'' x 25-1/4''	108.9 x 17.8 x 47.4 cm 42-3/4'' x 7'' x 18-3/4''
weight	48.2 kg 106.3 lbs.	22.0 kg 48.5 lbs.
power source	AC 110/120/220/240 volts selectable	AC 110/120/220/240 volts selectable

*nominal, 0dB is referenced to 0.775 volts

SK 20	SK 15	SK 10
61keys $C_1 \sim C_6$	49keys $C_2 \sim C_6$	49keys $C_2 \sim C_6$
up to 7 (KEYBOARD SPLIT ON ; up to 14)	up to 7	up to 8
TONE SELECTORS (1/2/3/MANUAL), TONE LEVERS (16', 8', 5-1/3', 4', 2-2/3', 2', 1'), PERCUSSIVE (2nd, 3rd, DECAY TIME), BRILLIANCE, DECAY SW, SUSTAIN (SW, LEVER)	TONE LEVERS (16', 8', 5-1/3', 4', 2'), PERCUSSIVE	TONE LEVERS (8', 4', 2')
TONE SELECTORS (1/2/3/MANUAL), FEET (4' ／/8' ⊓／BP8' ／/8' ／/16' ⊓／16' ／), VCF (CUT OFF FREQ, RESONANCE, EG DEPTH), EG (A, D, S, R), BRILLIANCE, SLOW ATTACK SW, SUSTAIN (SW, LEVER)	VOLUME, FEET (8'—16'), VCF (CUT OFF FREQ, RESONANCE, EG DEPTH), EG (A, D, S, R), SLOW ATTACK SW, VOICE SW (on/cancel)	
TONE SELECTORS (1/2)	TONE LEVERS (16'/8'), VOICE SW (on/cancel)	TONE LEVERS (8',4')
		TONE LEVERS (8',4')
VIBRATO (DECAY, SPEED, ORGAN DEPTH, POLY- SYNTH DEPTH), TREMOLO/ENSEMBLE SW (ORGAN, POLY-SYNTH), TREMOLO SPEED FAST SW	VIBRATO (DECAY, SPEED, DEPTH), TREMOLO/ENSEMBLE SW (ORGAN, POLY-SYNTH, TREMOLO, TREMOLO SPEED), SUSTAIN (SW, LEVER)	VIBRATO (SPEED, DEPTH), SLOW ATTACK SW, SUSTAIN SW (SHORT/ LONG), BRILLIANCE, ENSEMBLE SW (ORGAN, STRING, BRASS, SPEED)
Split between F♯and G:▼marked KEYBOARD SPLIT SW (POLY-SYNTH/ORGAN, ORGAN/POLY-SYNTH)		
ORGAN, POLY-SYNTH	PITCH	PITCH, TRANSPOSE SW (NORMAL/OCTAVE UP)
ON/OFF SW, MASTER VOLUME, SPLIT VOLUME (ORGAN, STRING, POLY-SYNTH), EXT TONECABINET SW	ON/OFF SW, MASTER VOLUME, SPLIT VOLUME (POLY-SYNTH), VOICE SW (ORGAN, STRING, POLY-SYNTH)	VOLUME
MIXED OUT, POLY-SYNTH OUT, ORGAN OUT (−10dB* 600 ohms), EXT TONECABINET (11 pins), PHONES (8 ohms)	OUTPUT (−10dB* 600 ohms), PHONES (8 ohms)	OUTPUT (−10dB* 600 ohms), PHONES (8 ohms)
FOOT CONTROLLER (MIXED VOLUME, STRING VOLUME), FOOT SW (SUSTAIN)	FOOT CONTROL (VOLUME)	FOOT CONTROLLER (VOLUME)
100.0 x 15.8 x 40.6 cm 39-1/4'' x 6-1/4'' x 15-3/4''	81.8 x 13.35 x 35.7 cm 32-3/16'' x 5-1/4'' x 14-1/16''	81.8 x 13.6 x 31.6 cm 32-1/4'' x 5-3/8'' x 12-1/2''
15.0 kg 33.1 lbs.	10.3 kg 22.7 lbs.	12.0 kg 26.5 lbs.
AC 110/120/220/240 volts selectable	AC 110/120/220/240 volts selectable	AC 110/120/220/240 volts selectable

COMBO ENSEMBLE CE 20



Standard Accessories • EP-1 Expression Pedal • FC-5 Foot Switch • Music Stand • Top Cover
Options • LC-20E Semi-Hard Case • LG-5 Stand (Carrying Case Attached)

model	CE 20
keyboard	49keys $C_2 \sim C_6$
simultaneous notes	MONO: 1 high note priority/POLY: up to 8
tone generator	Digital FM Tone Generator
tone selectors	**MONO**: PICCOLO, FLUTE, OBOE, CLARINET, SAXOPHONE, TRUMPET 1, 2, TROMBONE, VIOLIN, CELLO, CONTRABASS 1, 2, ELECTRIC BASS 1, 2 **POLY**: BRASS, HORN, ORGAN, ELECTRIC PIANO, HARPSICHORD, STRINGS
manual controls	PITCH, TOTAL VOLUME, BRILLIANCE, SLIDE CONTROL (SW, WHEEL ; MONO only)
preset controls	SENSITIVITY (TONE INITIAL, TONE AFTER, VIBRATO AFTER), VIBRATO (DEPTH, SPEED, DELAY), PRESET SW (preset/manual)
audio jacks	LINE OUT(−10dB* 600 ohms), PHONES (8 ohms)
control jacks	SUSTAIN, EXPRESSION
dimensions W x H x D	84.1 x 8.6 x 29.4 cm 33-1/8" x 3-3/8" x 11-9/16"
weight	9 kg 19.8 lbs.
power source	AC 110/130/220/240 volts selectable

*nominal, 0dB is referenced to 0.775 volts



The CE-20 Combo Ensemble is a new, compact 49-key electronic keyboard that combines polyphonic and monophonic voices in one versatile keyboard. A total of 20 preset voices are available—6 polyphonic and 14 monophonic—all created using digital FM tone generator technology for a wide range of extraordinarily "natural" sound. Unique Yamaha Touch Sensitivity functions are another tremendous feature of the CE-20. Tone Initial Sensitivity control lets you adjust the amount of dynamic and tonal variation that can be produced according to key attack velocity, Tone After Sensitivity control adjusts the dynamic and tonal variation that can be produced by varying pressure on the keys, and Vibrato After Sensitivity control adjusts the degree of vibrato effect added to the sound according to key pressure. No other keyboard in this class offers this type of extensive expressive versatility. Other useful effects include Slide, which creates a smooth, controllable glide between notes, and Ensemble, which gives you a rich multi-instrument accompaniment effect. Sustain On/Off and volume can both be controlled via foot controlers, and headphone jacks let you practice and play in private.

OPTIONAL ACCESSORIES



STAND LG-10



STAND LG-30



CARRYING CASE

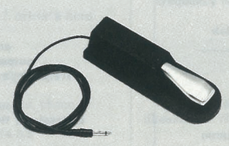
OPTION LIST

keyboards	legs	carrying cases	foot controller	foot switches (sustain pedals)	other accessories
GS 1	*	——	FC-3A	* (built in)	voice cards*, blank cards*, card case*, AC cord*
GS 2	*also junction as a lid	*	FC-3A	* (built in)	voice cards*, blank cards*, card case*, AC cord*
CP 80	*	*	——	* (damper pedal)	AC cord*
CP 70B	*	*	——	* (damper pedal)	AC cord*
CP 35	*also junction as a lid	*	——	FC-4*	AC cord*
CP 25	*	*	——	FC-4*	AC cord*
CP 30	*also junction as a lid	*	——	FC-4*	AC cord*
CP 20	*	*	——	FC-4*	——
CP 10	LG-10 /20/30	LC-10P	——	FC-5*	——
CP 11	LG-10 /20/30	SC-11	——	FC-5*	music stand*
CS 70M	LG-20	——	FC-3A	FC-4, FC-5	alkaline batteries*, blank cards, AC cord*
CS 40M	LG-20	——	FC-3A	FC-4, FC-5	alkaline batteries*, AC cord*
CS 20M	LG-20	——	FC-3A	FC-4, FC-5	alkaline batteries*, AC cord*
CS 15D	LG-10 /20/30	LC-15D	——	——	——
CS 15	——	——	——	——	——
CS 5	——	——	——	——	——
CS 01	——	SC-01	——	——	BC1 breath controller, PA-1 AC adaptor
SK 50D	*	*	FC-3A*	FC-4, FC-5	BP-2 Bass Pedal, AC cord*
SK 30	LG-20	LC-30K	FC-3A*	FC-4, FC-5	BP-2 Bass Pedal, AC cord*
SK 20	LG-20	LC-20K	FC-3A	FC-4, FC-5	——
SK 15	LG-10 /20/30	LC-15K	FC-3A	——	——
SK 10	LG-10 /20/30	LC-10K	FC-3A	——	——
CE 20	LG-5 with case	LC-20E	EP-1*	FC-5*	music stand*

*standard accessories



FOOT CONTROLLER FC-3A



FOOT SWITCH PEDAL FC-4



FOOT SWITCH PEDAL FC-5



BASS PEDAL KEYBOARD BP-2

Producer Series



MA10 HEADPHONE AMPLIFIER

output power	40mW into 8 ohms
noise level	−92dB equivalent input noise @ 0dB = 0.775 volts
controls	Volume, Master vol, Treble, Bass, Headphone Level, Monitor In 1, Monitor In 2, Aux In (L, R), Power Switch
connectors	Input; phone×1, Monitor In; phone×2, Monitor Out; phone×2, Aux In; pin×2, Line Out; pin×2, Head-phone Out; phone×2, DC In
dimensions; W×H×D	22.4×5.2×13.0 cm 8-1/4"×2"×5-1/8"
weight	500 g 15.6 oz.
power source	R6 battery×6 or PA-1 AC adaptor



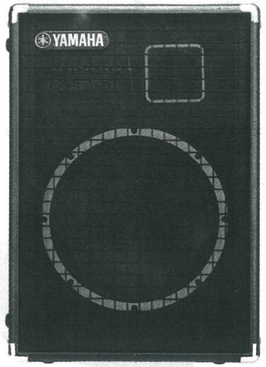
MM10 PORTABLE MIXER

connectors	Input; phone×4, Aux In; pin×2, Line Out; pin×1, PGM Out; phone×1
noise level	−110dB equivalent input noise @ 0dB = 0.775 volts, Rg = 150Ω, measured with −6dB/oct. filter at 12.47 kHz
frequency response	+0, −2dB 20 Hz to 20 kHz
channel controls	Volume, Pan Pot, Mic/Line Switch, Aux Vol, Master Vol
dimensions; W×H×D	22.4×5.2×13.0 cm 8-1/4"×2"×5-1/8"
weight	500 g 15.6 oz.
power source	6F22 battery×1 or PA-1 AC adaptor



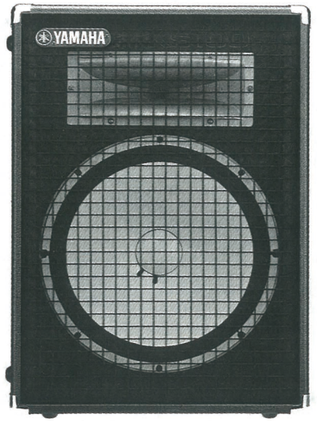
MH10 STEREO HEADPHONES

type	dynamic
diaphragm diameter	23 mm
impedance	40Ω
frequency response	20 Hz to 20 kHz
rated input	100mW
cord and plug	3m shield cord, stereo phone plug
weight	40 g 1.4 oz.



KS50 KEYBOARD AMPLIFIER

speakers	woofer; JA3066 12" (30 cm) 16 ohms×1 tweeter; JA0561 piezo type 16 ohms×1
enclosure	bass reflex type
output power	50 Wrms into 8 ohms
frequency response	+0, −3dB 20 Hz to 20 kHz
control	Volume
connectors	Input; phone×4, Line Out; phone×1
dimensions; W×H×D	40.2×58.2×29.2 cm 15-7/8"×22-7/8"×11-1/2"
weight	19.0 kg 41.9 lbs.
power source	AC 110/120/220/240 volts selectable



KS100 KEYBOARD AMPLIFIER

speakers	woofer; JA3803 15" (38 cm) 8 ohms×1 tweeter; JA4204A h.f. driver & horn 8 ohms×1
enclosure	bass reflex type
output power	100 Wrms into 8 ohms
frequency response	+0, −2dB 20 Hz to 20 kHz
control	Volume
connectors	Input; phone×4, Line Out; phone×1
dimensions; W×H×D	47.2×65.8×37.2 cm 18-5/8"×25-7/8"×14-5/8"
weight	34.2 kg 75.3 lbs.
power source	AC 110/120/220/240 volts selectable



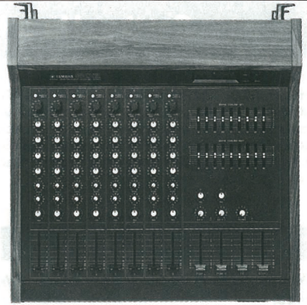
E1005 ANALOG DELAY

noise level	−110dB equivalent input noise @ 0dB = 0.775 volts, input Rg = 600 ohms, measured with −6dB/oct. filter at 12.47 kHz
frequency response	+1, −3dB 20 Hz to 20 kHz @ effect off
delay time	short range: 4msec to 9msec variable long range: 65msec to 400msec variable
modulation rate	0.5 Hz to 10 Hz
dimensions: W×H×D	39.6×9.5×21.3 cm 15-5/8"×3-3/4"×8-3/8"
weight	3.6 kg 7.94 lbs.
power source	AC 110/120/220/240 volts selectable



E1010 ANALOG DELAY

noise level	−100dB equivalent input noise @ 0dB = 0.775 volts, input Rg = 600 ohms, measured with −6dB/oct. filter at 12.47 kHz
frequency response	+1, −3dB 20 Hz to 20 kHz @ effect off
delay time	10msec range 3msec to 10msec 75msec range 25msec to 75msec 150msec range 50msec to 150msec 225msec range 75msec to 225msec 300msec range 100msec to 300msec
modulation rate	0.5 Hz to 10 Hz variable
dimensions: W×H×D	48.0×9.3×24.3 cm 19"×3-5/8"×9-1/2"
weight	4.5 kg 9.92 lbs.
power source	AC 110/120/220/240 volts selectable



MQ802 MIXING CONSOLE

connectors	Input A; XLR-3-31×8, Input B; phone×8, Aux In; phone×2 Sub In PGM; phone×2, Sub In FB; phone×1, Sub In Echo: phone×1 PGM Out; XLR-3-32×2 & phone×2 FB Out; phone×1, Echo Out Hi; phone×1, Echo Out Lo; phone×1 Headphones; stereo phone×1
noise level	−126dB equivalent input noise @ 0dB = 0.775 volts, input A, Rg = 150Ω, measured with −6dB/oct. filter at 12.47 kHz
frequency response	+1, −3dB 20 Hz to 20 kHz
channel controls	Fader, Input Level Switch, High EQ, Hi Mid EQ, Lo Mid EQ, Low EQ, FB Vol, Echo Vol, Pan Pot, Peak Indicator, Input A/B Switch
master controls	PGM Fader; L&R, FB Fader, Echo Fader, 9 Band Graphic EQ; L&R, Aux In Vol, Aux Pan, Bar Graph Meter; L&R, Meter Assign Switch, Phones Vol
dimensions; W×H×D	52.8×17.1×54.7 cm 20-3/4"×6-3/4"×21-1/2"
weight	13.0 kg 28.7 lbs.
power source	AC 110/120/220/240 volts selectable

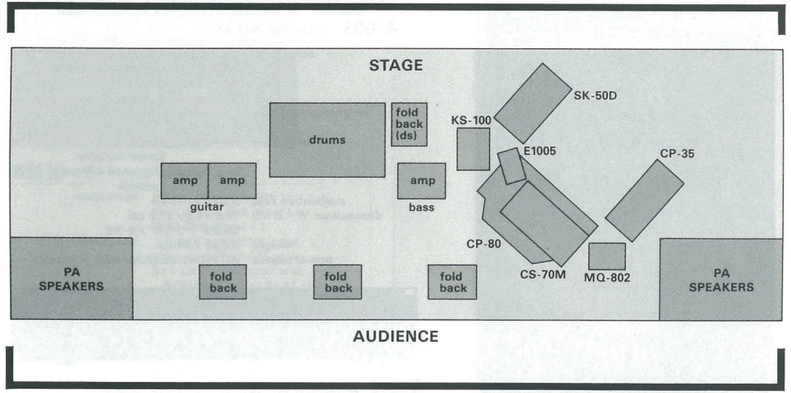
Setting Up a Keyboard System

The following is a useful guide in setting up a large-scale multi-keyboard system for live performance. The four main components of the example system are the Yamaha CP-80 electric grand piano, CS-70M programmable polyphonic synthesizer, CP-35 electric piano and SK-50D symphonic ensemble.

Stage Placement

A multi-keyboard system belongs at either side of the stage.

The first consideration in setting up a keyboard system on stage is that ample space is available to accomodate all the required equipment. The center of the stage should not be used, however, as this area is needed for the guitarists and vocalist to move around in. The keyboards should therefore be positioned either to the left or right side of the stage—preferably toward the rear of the stage. This position lets the keyboardist communicate easily with the other musicians, and angling the keyboards slightly toward the front of the stage also permits communication with the audience.
The most frequently used keyboard—in this case the CP-80 electric grand piano—should be at the center of the keyboard arrangement. In the example, a CS-70M programmable polyphonic synthesizer is placed on top of the CP-80, a CP-35 electric piano to the left, and an SK-50D symphonic ensemble to the right (as seen from the performer's position). Other equipment included in this keyboard system is an MQ802 8-channel stereo mixer for obtaining appropriate level and tonal balance between the four keyboards, a KS100 keyboard amplifier used exclusively as the keyboardist's monitor, and an E1005 analog delay unit for overall echo and reverb effects.



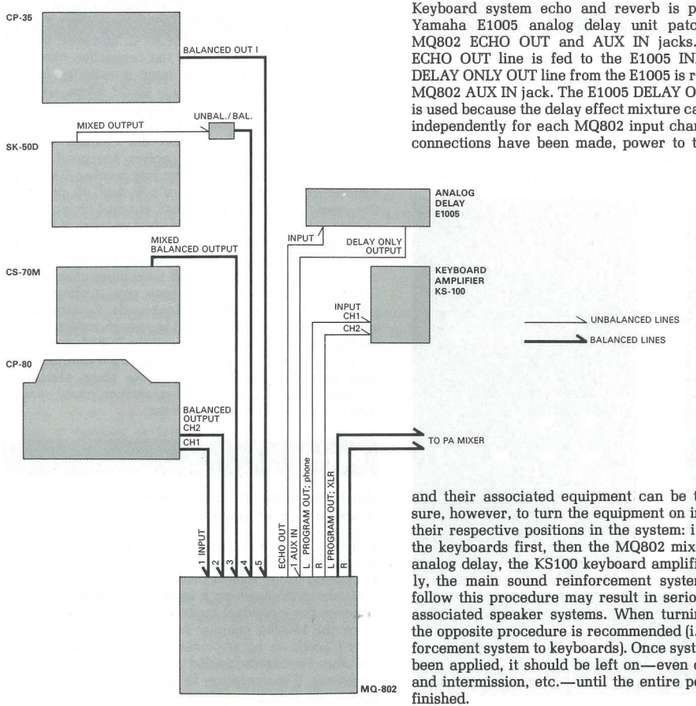
Naturally, each individual keyboardist will have his own preferred system. The equipment and arrangement shown here are intended as a reference around which to build individual systems with their respective equipment complement.

Connections

Once the keyboards themselves have been properly set up, they should be connected to the appropriate inputs of the keyboard mixer via any effects units to be used, and the mixer connected to peripheral equipment such as the analog delay unit and monitor amplifier/speaker.

For small audiences of about 100 people, the four keyboards can be connected directly to the inputs of the KS100 keyboard amplifier without using a separate mixer or PA system. The setup shown here, however, is intended for use with large audiences requiring high-power sound reinforcement. In this case, it is recommended that the entire keyboard system be mixed prior to being sent to the main sound reinforcement system. Therefore, the KS100 keyboard amplifier is used solely as a monitor for the keyboardist. In connecting the output of each keyboard to the respective mixer inputs, it is preferable to use balanced lines as these offer higher resistance to induced noise in long cable runs. In some situations, space restrictions may

require that the mixer be located some distance from the keyboards, thereby making balanced lines a necessity. The CP-80, CP-35 and CS-70M both feature balanced outputs (XLR-3-32 connectors) which may be sent directly to the MQ802's balanced channel inputs (XLR-3-31 connectors). The SK50D, however, only have unbalanced 1/4" phone plug outputs which, although directly connectable to the MQ802 unbalanced inputs, should be converted to balanced operation as close as possible to the keyboard outputs in order to minimize system noise. Conversion from unbalanced to balanced lines can be accomplished using either transformer or active balancing units. The CP-80 and CP-35 have two output channels to accomodate its stereo tremolo feature. To maintain stereo tremolo capability, the two output channels should be connected to independent inputs on the MQ802 mixer. This means a total of five MQ802 channel inputs are occupied by the keyboards.
The mixed keyboard signal is sent to the main sound reinforcement system via the MQ802 L and R PGM OUT jacks. The MQ802 PGM OUT lines have both balanced XLR-3-32 connectors and unbalanced phone jacks (connected in parallel). Since the main sound reinforcement mixer is generally a considerable distance from the stage, the balanced lines should be used. The remaining unbalanced L and R PGM OUT phone jacks are used to send the keyboard program signal to the keyboardist's monitor—the KS100 keyboard amplifier. Unbalanced lines are fine for this type of monitor application, and, since the KS100 inputs are unbalanced phone jacks, this connection is quick and convenient. Headphones can also be connected to the MQ802 for private keyboard monitoring.
The MQ802 has FB OUT (Foldback Out) jacks that can be used to feed a stage monitor system, but using the unbalanced PGM OUT lines for monitoring, as we have done here, leaves the foldback circuit free to use with effects such as echo, etc. In addition, using the PGM OUT lines for monitoring means that the keyboardist hears basically the same mix that is sent to the main sound reinforcement mixer and to the audience.

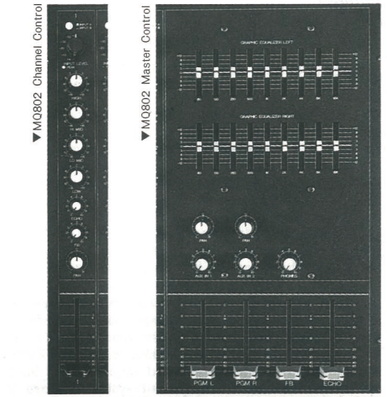


Keyboard system echo and reverb is provided by a Yamaha E1005 analog delay unit patched into the MQ802 ECHO OUT and AUX IN jacks. The MQ802 ECHO OUT line is fed to the E1005 INPUT, and the DELAY ONLY OUT line from the E1005 is returned to the MQ802 AUX IN jack. The E1005 DELAY ONLY OUT line is used because the delay effect mixture can be adjusted independently for each MQ802 input channel. Once all connections have been made, power to the keyboards and their associated equipment can be turned on. Be sure, however, to turn the equipment on in the order of their respective positions in the system: i.e. turn on all the keyboards first, then the MQ802 mixer, the E1005 analog delay, the KS100 keyboard amplifier, and finally, the main sound reinforcement system. Failure to follow this procedure may result in serious damage to associated speaker systems. When turning power off, the opposite procedure is recommended (i.e. sound reinforcement system to keyboards). Once system power has been applied, it should be left on—even during breaks and intermission, etc.—until the entire performance is finished.

Level Matching

The most essential element in achieving a well-balanced sound.

Initially, set the KS100 keyboad monitor amplifier volume control to about 0.5 or 1 on the scale and set the individual keyboard volume controls to their maximum level. At this stage, the keyboard channels of the main sound reinforcement mixer should be set for zero output.



▲MQ802 Bar Graph Meter

Since the nominal output level of Yamaha keyboards is −20 dB (77.5 mV rms), the MQ802 input level selectors should initially be set at −20. If, however, playing any of the keyboards causes the respective channel's peak indicator to light, the input sensitivity fo that channel should be lowened to −10 dB. Then, with the MQ802 PGM fader set at 6 (−6 dB), the channel faders set at −∞, and the keyboard volume controls set at their maximum position, raise the channel 1 input fader while playing the respective keyboard. If the master section bar-graph meter just reaches 0 dB level somewhere between the fader's 6 And 30 positions, the input level setting for that channel is ok. If the master section bar-graph meter just reaches 0 dB level at a higher fader position, the input level is too low and the input level selector should be set to −35. This process should be repeated for all used input channels.
Finally, set all input channel pan pots to their center positions and play all the keyboards simultaneously while watching the fluorescent bar graph peak meters in the MQ802 master section. Adjust the PGM fader so that the meters read no higher than 0 dB. This completes the level matching process. The above steps should be followed carefully to ensure maximum sound quality with minimum noise and distortion.

Mixing

An independent mixer operator makes for a smooth performance.

Increase the volume of the KS100 keyboard amplifier to a suitable monitoring level and add any required tonal compensation or effects using the four-band equalizer and echo controls on each input of the MQ802. Balance between the individual keyboards can then be adjusted using the MQ802 channel faders. If a particular keyboard needs to be emphasised, decrease the level of the other keyboards in order to avoid distortion. In some situations, it is necessary to alter the balance between keyboards during a performance. In cases like this, an independent mixer operator is desireable so the keyboardist can concentrate more fully on the music.
The main sound reinforcement system keyboard channels can now be set up. Always keep in mind that the foldback monitor sound will be somewhat different from the sound heard by the audience. Be sure to check with the sound reinforcement operator when adjusting the dual-channel 9-band graphic equalizer built into the MQ802 master section. It is also a good idea to have someone play the keyboards while you check the sound yourself from the audience area.

Panning

The keyboard signals should be grouped before sent to the sound reinforcement system.

The last stage in setting up this type of keyboard system is to distribute the individual keyboard signals to the MQ802 L and R PGM OUT lines using the input channel pan pots. Since most sound reinforcement systems are basically monaural, stereo distribution is generally not possible so the pan pots can be set at their center positions. However, the keyboard signals can be grouped according to their main functions: e.g. the CP-80 and CP-35, used primarily for chording and rhythm backup, can be sent only to PGM OUT L by setting the appropriate pan pots fully to the L position; and the SK-50D and CS-70M, used primarily for melody and lead lines, can be sent exclusively to PGM OUT R. This allows the sound reinforcement mixer operator to adjust the balance between these two keyboard groups during the performance, according to the type of music being played.
Another possibility is to send the CP-35, CS-70M, SK-50D and CP-80 channel 1 signals to PGM OUT L, and the CP-80 channel 2 only to PGM OUT R. When the CP-80 stereo tremolo feature is used, the sound reinforcement operator can instantly switch the keyboard channels for stereo tremolo sound.

Glossary of Keyboard Terms. Additions

A.D.S.R
These initials stand for Attack time, Decay time, Sustain level and Release time. These are envelope generator parameters which may control variations in the tonality and/or volume of a sound.

After Touch
A function that permits controlling the depth of certain effects according to the pressure placed on a key or keys *after* the key has been initially pressed. This feature is offered in the Yamaha GS-1, CS-70M, and CE-20. The Touch function provided in the Yamaha SK-50D and SK-30 is the same as described above.

Attack/Attack Time
This refers to the speed whith wich a sound reaches maximum volume after a key has been pressed. Percussion instruments, for example, have a sharp (fast) attack while wind instruments have a slower attack.

Balanced
A three-wire signal transmission system in which one wire carries the "hot" audio signal, another carries the "cold" audio signal, and the third is ground. This system is much more resistant to induced noise than unbalanced lines, and should be used for critical applications, particularly if long signal lines are involved. Balanced outputs with XLR type connectors are provided on the Yamaha GS-1, GS-2, CP-80, CP-70B, CP-35, CS-70M, CS-40M and CS-20M.

Brilliance
This control emphasizes high-frequency harmonics thereby adding brightness to a sound.

Chorus
An effect which creates a multiple-instrument sound. Both the Tremolo and Ensemble effects provided in the Yamaha CS70M can be considered chorus effects.

Cutoff Freq.
The cutoff frequency of a low-pass filter is the frequency above which sound is attenuated (only sound below the cutoff frequency is "passed"). In a high-pass filter, the cutoff frequency is that below which sound is attenuated (only sound above the cutoff frequency is passed). The cutoff frequency control provided in a synthesizer's VCF section permits varying the filter's cutoff frequency thereby attenuating or passing certain harmonic overtones. This allows control over timbre.

Damper Pedal
A foot pedal provided on Yamaha electric grand pianos. Pressing this pedal deactivates the string damper permitting the strings to continue sounding even after the keys have been released.
The sustain pedal provided on electronic pianos produces a similar effect.

Decay/Decay Time
Decay is the decrease in the volume of a sound after initial attack (initial rise). Decay time is the length of time it takes for the initial attack level to decay to sustain level. The decay of a sound after a key has been released is termed "release." The decay control on an electronic piano affects both decay and release.

Delay Vibrato
An effect in which vibrato is applied gradually to a sound once a key is pressed. Delay vibrato is provided on the Yamaha SK-50D, SK-30, SK-20, SK-15 and CE-20.

Detune
A control which permits slight variations in the pitch of one sound source in relation to another. The detune controls provided on electric pianos, synthesizers and symphonic ensembles are used to displace the pitch of a two-channel sound source to create a warm chorus effect.

Digital FM Tone Generator
A totally new sound source for electronic keyboards developed through advanced Yamaha digital technology. A special frequency modulation system permits production of source sounds with random (irregular) harmonic structure, making it possible to accurately synthesize acoustic-instrument sounds. The Yamaha GS-1, GS-2 and CE-20 electronic keyboards employ this sophisticated sound source.

Duophonic
The capability of some synthesizers to output two notes simultaneously. The Yamaha CS-40M is a douphonic synthesizer with high-*and* low-note priority.

Dynamic Range
The level difference between the softest and loudest sounds an instrument can produce. Yamaha combo keyboards and electric grand pianos have an extremely wide dynamic range and therefore should by used with amplifiers having appropriate dynamic range reproduction capability. The Yamaha keyboard amplifiers feature wider dynamic range reproduction capability than conventional instrument amplifiers and are ideal for use with electronic keyboards.

Edit
A function provided in the CS-70M programmable polyphonic synthesizer. This function makes it possible to quickly and easily alter or "edit" voices you have previously stored in the synthesizer's memory banks using the programmable parameter controls. Control panel settings at the time of edit mode entry become the basic settings from which editing will be performed.

EG (Envelope Generator)
The variation in the volume of a sound from the time it begins to the time it ends is called its envelope. The EG is a means of artificially producing a volume envelope for any given basic sound. EG parameters include attack time, decay time, sustain level and release time. The envelope produced by the EG can be used to control the VCF and VCO as well as the volume of the sound (VCA).

External In
An input provided on the Yamaha CS-5 and CS-15. The sounds of other instruments fed either directly or via microphone to this input can be varied using the synthesizer's VCF, VCA, etc.

Feet (')
A switch which shifts the overall pitch of a keyboard either up or down by octaves. The range of a keyboard is usually specified in reference to 8'. The transpose switch provided on the SK10 can be considered a two-stage feet switch.

Glide
An effect in which the proper pitch of a note is reached by "gliding" smoothly from an upper or lower tone when a key is pressed. This is a type of automatic pitch bend, and is provided in the Yamaha CS-70M, CS-20M, CS-15, SK-50D and SK-30. More complex glides can be produced in synthesizers such as the CS-40M which offers two EGs that can be used to control VCO pitch.

Glissando
This is an effect and a playing technique in which one note "glides" up or down to another in chromatic steps. Automatic glissando functions are provided on the Yamaha CS-70M, CS-40M and CS-20M.

Graphic Equalizer
An extremely flexible type of tone control. The frequency spectrum is divided into a number of "bands," the level of each of which is controlled by a linear potentiometer. The arrangement of linear controls permits visual verification of overall response. The Yamaha CP-10 is provided with a five-band graphic equalizer.

Initial Touch
The capability to control the dynamics or volume of the sound by varying key "attack" (i.e., the pressure or speed of the initial key attack). This function is available in the Yamaha GS-1, GS-2 and CE-20 electronic keyboards. The Touch Response feature of the Yamaha electric grands and electronic pianos is also a type of initial touch.

Keyboard Split
A function provided on the Yamaha CS-70M, SK-30 and SK-20 which divides the keyboard into two sections on which different sounds can be played.

Load
A switch used to recall a program recorded on magnetic card or tape back into the synthesizer's memory (CS-70M, CS-40M and CS-20M).

LFO (Low Frequency Oscillator)
This oscillator produces a slow-speed (variable) waveform which determines the "rate" or speed of effects such as vibrato, tremolo, etc.

Modulation
Refers to the use of one signal to control another.

Phase Shift
An effect in which the sound of a rotating speaker is produced electronically. This type of effect is created by the Tremolo function provided in the Yamaha SK-50D, SK-30, SK-20 and CS-70M.

Pitch Bend
This is an effect in which the pitch of a note is varied with timing appropriate to the music being played, and is one of the most characteristic of synthesizer effects.

Polyphonic
Refers to any synthesizer which is capable of outputting three or more notes simultaneously. The Yamaha CS-70M is a 6-voice polyphonic synthesizer. The CP series or SK series keyboards are other examples.

Portamento
This is an effect and a playing technique in which one note glides up or down to another smoothly (no chromatic steps). Automatic portamento is provided in Yamaha synthesizers and symphonic ensembles.

Program to Tape/Program from Tape
An interface which permits transferral of a synthesizer's memory contents either to or from an external tape recorder.

Programmable Memory Synthesizer
A synthesizer capable of storing "sounds" or the settings of its parameter controls in a built-in digital memory. The Yamaha CS-70M can store up to 30 different "sounds," the CS-40M up to 20 and the CS-20M up to 8. This is an indispensable feature for live performance situations where virtually no time is available to completely alter all the synthesizer's control settings manually.

Pulse Waveform /Pulse Width
A pulse waveform, also known as a rectangular wave, has only odd hamonics (3rd, 5th, 7th, etc.) and is useful for synthesizing woodwind instrument sounds. In many synthesizers, a pulse width control is provided which is used to vary the width of the positive half of each pulse wave cycle.

PWM (Pulse Width Modulation)
An effect in which pulse wave pulse width is varied by a control signal from an LFO. The resultant sound is somewhat similar to that of a phase shift effect.

Phone Jack/Phone Plug
A standard connector used almost exclusively for unbalanced signal lines. Phone jack inputs/outputs are provided on Yamaha combo keyboards and other combo-type electronic instruments.

Release/Release Time
Release determines what happens to a sound after a key has been released. The time it take for a sound to decay after a key has been released is controlled by a Release Time control. An electronic piano's sustain pedal can be considered as a simple release time on/off switch.

Resonance
A synthesizer control which controls the amplitude of a response peak at the VCF's cutoff frequency. By setting the resonance at a relatively high level and controlling the cutoff frequency of the VCF using either an LFO (Low Frequency Oscillator) or EG (Envelope Generator), a "wah-wah" effect can be created.

RMO (Ring Modulator)
An effect in which one frequency is multiplied with another frequency producing the sum and difference frequencies as output. This destroys the normal overtone structure of the original sounds permitting creation of a number of unique effects including bell-like sounds.

S/H (Sample and Hold)
A synthesizer function which samples the instantaneous level of a varying signal and holds that level until the next sampling time. By feeding a random signal to the S/H section and using its output to control the pitch of a VCO, the synthesizer will generate a stream of random notes, the speed of which is determined by the S/H sampling period.

Sawtooth Wave
A waveform having only both odd and even harmonic overtones (2nd, 3rd, 4th, etc.). Sawtooth waves are ideal for synthesizing string instrument sounds, and are often used as a modulation control signal.

Sequencer
A special synthesizer accessory (sometimes a built-in feature) which can be programmed with any desired sequence of notes of any duration. The Yamaha CS-70M features a built-in polyphonic sequencer which is capable of memorizing sequences incorporating up to 6-note chords.

Sine Wave
A waveform corresponding to "pure" tones having no harmonic overtones. In a synthesizer, sine waves are more often used for modulation of sounds than as a sound source.

Slide
An effect in which the pitch of a note "slides" smoothly up or down to that of a subsequently played note. Same as Portamento. Slide is featured in the CE-20.

Store
A switch provided on the Yamaha CS-40M and CS-20M which permits transferral of the contents of the synthesizer's digital memory, to magnetic tape.

Sustain Level
A synthesizer control which determines the continuous sound level while a key is pressed, after initial attack and decay functions have ended. A section of the synthesizer's envelope generator.

Touch Response
The type of keyboard response found on an acoustic piano: i.e. the loudness of the sound is determined by the velocity at which the keys are depressed—a type of Initial Touch. The Yamaha CP-35, CP-30, CP-25 and CP-20 all have this feature despite the fact that they are electronic instruments. The GS-1 Touch Response, however, is an "After Touch" function.

Tremolo
An effect characterized by periodic variations in the loudness of a sound. The effect created by a rotating speaker is also considered to be a form of tremolo.

Triangular Wave
A waveform having comparatively few harmonic overtones. Used as a sound source, this waveform produces smooth or pure-sounding tones.

Trigger
Used in synthesizers and some other electronic keyboards, the trigger is a control signal that informs an EG (Envelope Generator) that a key has been pressed or released thereby permitting control of the timing and shape of the sound's volume envelope.

Unbalanced
This generally refers to a simple two-wire signal transmission system in which one wire carries the "hot" audio signal and the other, usually in the form of a braided or foil shield surrounding the hot wire, is ground (cold). Connectors for unbalanced inputs and outputs are almost always 1/4" phone plugs and jacks.

VCA (Voltage Controlled Amplifier)
This synthesizer section is used to create variations in the volume of a sound. The volume or "gain" of the amplifier is varied by applying an appropriate control voltage—usually from an envelope generator.

VCF (Voltage Controlled Filter)
A synthesizer section which effects changes in the tonality or timbre of sounds generated by a VCO (Voltage Controlled Oscillator). The VCF is basically a low-pass filter (sometimes high-pass), the cutoff frequency of which can be varied by applying an appropriate control voltage.

VCO (Voltage Controlled Oscillator)
This is a synthesizer's sound source. It determines both the basic waveform and pitch of the audio signal. The waveform and pitch generated by a VCO can be varied by applying appropriate control voltages. Possible VCO waveforms include sawtooth waves, triangular waves, square (rectangular) waves, and sometimes sine waves.

Vibrato
An effect characterized by periodic variations in the pitch of a sound. A vibrato effect is created when the LFO (Low Frequency Oscillator) output is used to modulate the pitch of the VCO.

Write
A button found on the CS-70M, CS-40M and CS-20M synthesizers which causes the front-panel control settings to be stored or "written" into the synthesizer's digital memory.

XLR Connector
A type of input/output connector used primarily for balanced signal lines. Its main features are excellent durability and reliability so XLR connectors are often found in professional quality sound reinforcement and recording equipment. Four types of XLR connector are available: male jack, female jack, male plug and female plug.

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