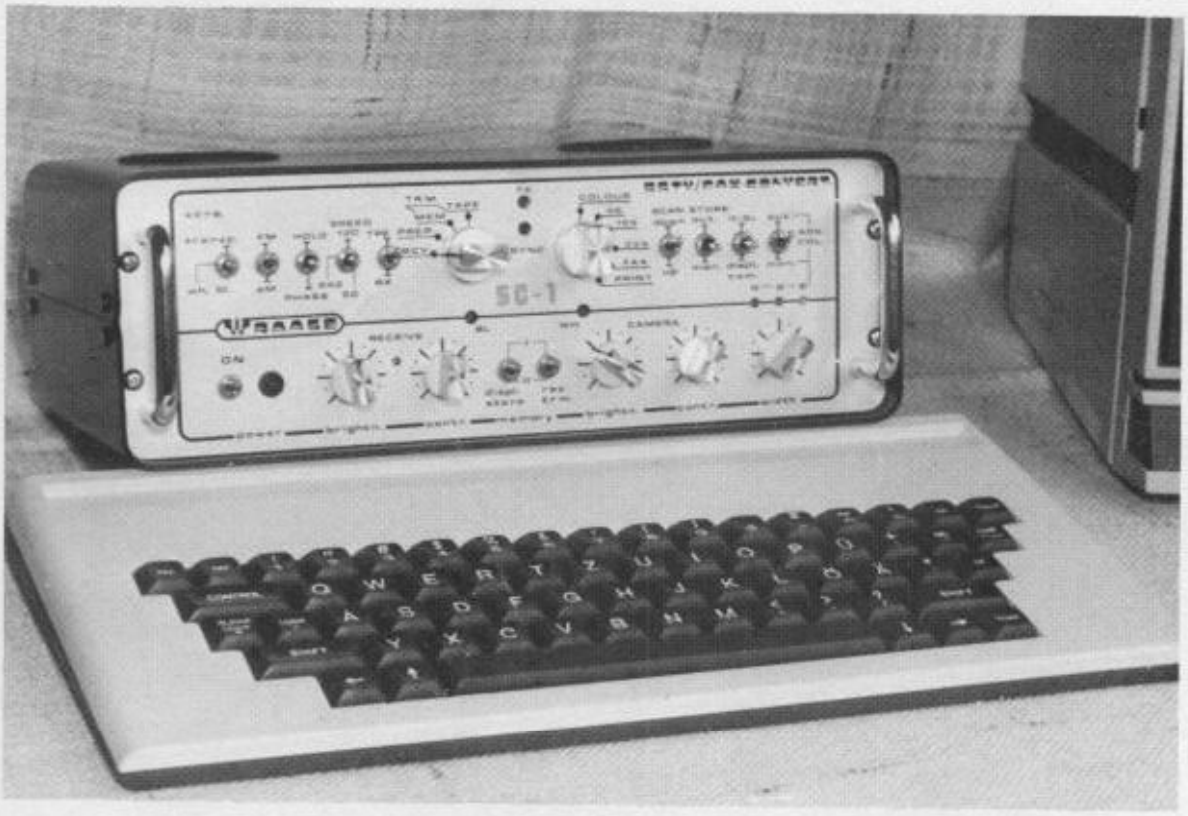
INTRODUCING THE PORTABLE WRAASE SC-1 "DUAL MODE" SSTV/FAX CONVERTER

A COMPLETE UNIVERSAL DIGITAL VISUAL COMMUNICATION SYSTEM FOR RADIO OR LANDLINE TRANSMISSIONS AT A VERY COMPETITIVE PRICE!



The newest in a fine line of quality high-resolution state of the art digital television converter equipment imported directly from Germany. This "complete" video system offers 128x128 second, 258x128 16 second, 256x256 32 second black & white SSTV receive or transmit capability or exceptional frame sequential (RGB), line sequential "true" 256x256 hi-resolution color with up to 6 B/W pictures storage memories! Special BLACK/WHITE/SYNC LED's ensure perfect "on frequency" alignment. A great "automatic" frame grab circuit provides ease of loading, colorflash and "motion" SSTV pictures! In the Fax Mode, the SC-1 will receive 60, 90, 120, 240, 360 and 480 line per minute rates (automatic phasing on 300 HZ. Start signals such as GOES, METEOSAT or WEFAX) of selectable AM/FM facsimile pictures and transmits at the 240 line rate! Pictures stored in memory can be cross-moded for retransmission. While other systems are still experimenting with 8 or 16 grey levels, the WRAASE SC-1 displays, on your screen 64 actual levels! This makes for excellent detailed photographs ideal for landline conference calling. The small and rugged construction (12x4x7 inches) along with a protected 13.8 VDC required power supply terminal makes the SC-1 the world's "first" universal mobile SSTV/FAX converter And, as if that isn't enough, we have an optional (128x128x16 shade) hardcopy internal printer interface, a neat little video light pen and a fantastic multi-colored graphics keyboard generator. "Why settle for anything less?"

THE PRICE Just $1295.00 (U.S.)

Includes Interface Cables and Complete English Version Manual & Schematics

SPECIAL "FAX ONLY" UNIT

FX655A $895.00

(Prices do not include small customs fee)

SEND $5.00 FOR SPECIAL "FAX INFORMATION PACKAGE"

"Serviced And Distributed In The U.S.A. By"

INTERNATIONAL SALES & MARKETING

A Division of QCD Publications, Inc.

804 Jefferson Avenue
Lowden, Iowa 52255
(319) 944-5421

THIS SC-1 is equipped with a new COLOR-SYNC-SYSTEM for the line-sequential color mode.

A 1ms long 2300Hz pulse at the beginning of each RED line is used to synchronize the color sequence. Thus, even on strong interference (QRM), the color will not change during reception of a color frame.

When receiving line sequential color from a station that does not have the color-sync-system (SC-422A or early SC-1's) the COLOR-SYNC of your SC-1 m u s t be switched off by setting the switch on the rear panel to the down position.

This new model SC-1 has a high resolution color-mode, in which both memory banks are switched together for 256 lines in color. Transmission or reception of one high-resolution color frame takes 48 seconds.

To activate the high-res.-color-mode set switch (14) to the "GrSC" position while switch (17) is in the "colour" position.

INSTALLATION / PREPARATION FOR USE

Recommendations for installation

1. Avoid placing the SC-1 in direct sunlight, high temperature, dusty and humid places.
2. The rear panel of the unit functions also as heatsink: The temperature there will usually become relatively worm. The unit should be placed in a location that has adequate space to permit free air circulation along the rear panel and through the cabinet openings.
3. Place the unit so that the controls and switches can easily be handled.

Power supply

The SC-1 requires 13,8V DC at 1,6A (12,6 ... 15V). It has built-in voltage-regulators and a protection-circuit against false polarisation of the power supply voltage.

Before connecting the power supply cable, make sure that the "power on" switch on the front panel of the SC-1 is switched off. After power supply connection to the "13,8V DC" jacks on the rear panel is made, the red power indicator LED (2) on the front panel should light, indicating the right polarisation. If this is true, you may raise the "power"-switch to the "ON" position.

CABLING TO A RADIO STATION

To connect the SC-1 to a radio station use the shielded twin cable furnished. The DIN-plug should be plugged into the rear panel jack marked "RX/TX". Connect the "TX" marked end in parallel with the microphone (threat it into the microphone plug or use the phone-patch input) and the other end to an audio output of the receiver (speaker or headphone jack). Make sure the cable "braid" or "ground shield" is connected to ground side of receiver audio output.

RX/TX - jack pins are assigned as follows:

PIN 1	audio output to transmitter
PIN 2	ground (shield) receiver & transmitter
PIN 3	audio input from receiver

(pins 4 & 5 are not used)

CONNECTING A TV MONITOR (BLACK & WHITE)

It is recommended to use a professional VIDEO MONITOR for picture display because of its high picture quality and performance, its shield against rf radiation and its safety in operation.

To connect the SC-1 to a MONITOR use a coaxial cable with BNC-plug (not furnished) between the "MONITOR" jack on the rear panel of the SC-1 and the video input of TV monitor. A 75 Ohm termination is recommended for sharpest pictures.

CONNECTING A TV CAMERA

A tv camera or other video source may be connected to the SC-1 via a coaxial cable with BNC plugs (not furnished). Plug one end of cable into rear panel jack marked "CAMERA". The other end of cable goes to video source. Video input voltage should be in the range of 1 to $2V_{p-p}$.

CONNECTING A TAPE RECORDER

If it is desired to use a tape recorder with the SC-1 to record and transmit pictures or other audio, connect the tape recorder in/out jacks to the "TAPE" jack on rear panel of the SC-1 as shown in Fig.1.

Pins are assigned as follows:

PIN 1 record line, audio to tape recorder (L)

PIN 2 ground (shield), common

PIN 3 audio input to SC-1 from tape. (L)

For recording and play-back of faksimile pictures a stereo tape recorder is required because it is necessary to record a synchrotone on the other track in order to overcome speed variations of the tape recorder:

PIN 4 synchrotone 2400Hz to tape (R)

PIN 5 snychrotone from tape to SC-1 (R)

It is <u>not</u> possible to transmit fax-pictures from tape via the radio.

Many tape recorders are equipped with a common play/record DIN-jack with the above pinning. Such recorders can easily be cabled to the SC-1 by a standard DIN cable.

As usual with any audio installation, care must be taken to prevent ground loops and noise or rf pickup caused by improper lead dress or improper equipment grounding.

For best results use best available cassette material and a recorder with speed variations of less than 0,2%.

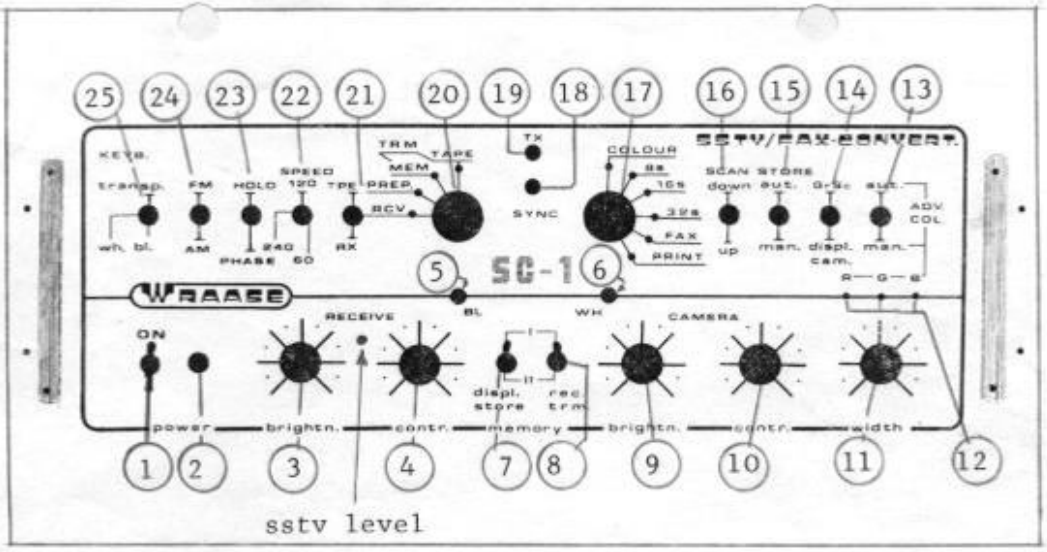
CONNECTING A COLOR MONITOR

For color sstv operation a RGB-COLOR-MONITOR or TV-set with "SCART-INPUT" ("PERITEL-JACK") is required.
Most modern color tv sets are equipped with the 21-pin "SCART-JACK" which allows the tv set to be used as RBG-MONITOR.

Connect the scart-plug on the rgb-cable furnished to the scart-jack on the rear panel of the tv set and the DIN-plug on the other end to the "RBG"-jack on rear panel of SC-1.

RGB-jack pin assignment:

PIN 1 +12V switching voltage
PIN 2 GROUND (shield), common
PIN 3 green video + sync
PIN 4 blue video + sync
PIN 5 red video + sync



CONTROL FUNCTIONS

(1) "power ON " POWER SWITCH

Turns on power to the SC-1 and optional Keyboard and lightpen when attached.

(2) RED LED POWER SUPPLY POLARISATION CONTROL LAMP

Lights up when power is supplied with proper polarisation.

(3) "RECEIVE brightness"

(4) "RECEIVE contrast"

(5) "BL" LED BLACK LEVEL INDICATOR LED
Lights up when the input-signal reaches the lowest digitization level "black" (000000).

(6) "WH" LED WHITE LEVEL INDICATOR LED
Lights up when the input signal reaches the highest digital value of "white" (111111).

(7) "memory I/II displ. store" MEMORY SELECT SWITCH concerning display on monitor and frame grab function

(8) "memory I/II rec. trm." MEMORY SELECT SWITCH concerning SSTV/FAX-receiving and transmitting

(9) "CAMERA brightness"

(10) "CAMERA contrast"

(11) "width"

HORIZONTAL WIDTH CONTROL FOR SSTV & FAX RECEPTION.

(12) "R - G - B"

Indicate the memory-segment being in use (red, green or blue in the color mode).

(13) "ADVANCE COLOR"

2 functions:

(a) switches from one memory to the other in the sequence: red, green, blue each time the toggle is lowered into the "man."-position.

In the up-position "aut." automatic switching in the r-g-b-sequence from line to line takes place for line-sequential color transmission and reception.

(b) In the RECEIVE FAX mode lowering the toggle will START reception.

(14) "GREYSCALE" "display Camera"

(middle position = off)

In the "dipl. cam." position a real-time digitally processed picture from camera will be displayed. This position is used for setting camera focus and field of view and during adjustment of contrast and brightness controls (9/10) before storing a picture in memory. While being in the "dipl. cam." position a possible transmission from memory or tape will not be affected.

In the "GrSc" position the internal greyscale testpattern is available for storage in memory (Storage will be activated by switch "STORE").

(15) "STORE"

(This switch is only active in the PREPARE and TRM MEM positions of the selector (20).

Selects automatic or manual framegrabbing. By lowering the toggle switch into the "man." position a picture from camera will be frozen.
When the toggle is placed in "aut." position a new picture from TV camera is grabbed automatically at start of each SSTV frame.

(16) "SCAN up-down"

Selects the scanning direction: top to bottom or vice-versa when receiving or transmitting.

Normally the "down" position is used, only when receiving FAX- pictures upside-down the scanning direction can be reversed by lowering the toggle switch.

(17) SCAN SELECTOR (6 positions)

Selects between
(a) SSTV COLOUR
(b) 8 sec SSTV 128x128 pixels
(c) 16 sec SSTV 256x128 pixels
(d) 32 sec SSTV 256x256 pixels
(e) FAX 256x256 pixels
(f) PRINTING (only operational if printer interface board PI-1 is installed)

(18) "SYNC" LED

Tuning aid for incoming SSTV signal. LED should flicker continuously in a 15 Hz rhythm.

(19) "TX" LED

TRANSMIT MEMORY INDICATOR
Indicates that the mode switch (20) is in the "TRANSMIT MEMORY" position.

(20) MODE SWITCH
4 positions

Selects mode and source of video

"RCV" = RECEIVE: Writes incoming SSTV or FAX-video from receiver or tape into the memory selected by switch (8) and (13). The transmitter-line is open, i.e. voice transmission is possible.

Received audio may be recorded on tape.

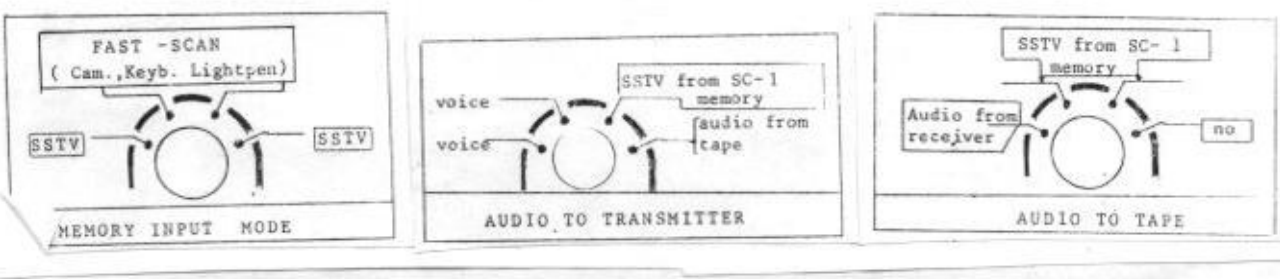
"PREPARE" : In this position a fast-scan picture from camera can be stored in the memory selected by switch (7) and (13). Also titling with the KEYBOARD or LIGHTPEN is possible.
The contens of the selected memory is outputted to the "tape"-jack as a slow-scan-tv or fax-signal,as selected by switch(17),but not to the transmitter-jack. Therefore voice transmission is possible.

The "PREPARE" position can also be used to hold a just received picture in memory.

"TRM MEM" TRANSMIT MEMORY : Transmits contens of the memory selected by switch (8) and (13).
This position is equal to the "PREPARE" position except that the SSTV or FAX signal produced by the SC-1 is fed to the transmitter input.

"TRM TAPE" TRANSMIT TAPE : Transmits directly from tape recorder and writes the picture being transmitted into the memory selected by switch (8) and (13).

The different functions of the MODE SWITCH are illustrated below:



(21) "RCV RX - TAPE " Selects SSTV/FAX input source:

RX= RECEIVER or TAPE RECORDER

Note: During FAX-transmission this switch has to be in position "RX".

(22) "SPEED" Selects the speed when receiving FAX-signals.

240, 120 or 60 lines per minute

(23) "HOLD - PHASE" For phasing a FAX-picture the toggle has to be hold in the "PHASE" position as long as the picture has moved into the correct horizontal position.

Moving the toggle to "HOLD" will freeze the received picture in memory.

When being in the "PRINT" mode, the "HOLD"-position is used to start printing.

(24) "FM - AM" Selects AM or FM demodulation.
On SSTV only FM is used.
When decoding weather-satellite signals, AM demodulation has to be selected.

(25) "KEYB." KEYBOARD SWITCH (only operational if optional keyboard interface board is installed)

"trans." : = free-standing white characters ("transparent")

"wh." : = White characters with black background field

"bl." : = Black characters with white background field

"SSTV LEVEL" Through an opening in the front panel the sstv output level control can be reached by a small screwdriver.

ADJUSTMENT OF TV MONITOR

For proper adjustment of the tv monitor it is favourable to store a greyscale.

This is achieved as follows:

Put MODE SWITCH (20) to position: "PREP."

Put SCAN SELECTOR (17) to position: 8s or 16s or 32s

Put switch (14) to position: "GrSc."

lower the "STORE" switch once to the "man." - position.

Adjust the brightness and the contrast controls of the TV monitor so that all 16 shades are visible.
Once adjusted there is no need to reset the TV monitor's controls during operation.

OPERATION

RECEIVING SSTV PICTURES

MODE-SWITCH (20) : "RCV"
RX - TAPE (21) : "RX"
AM - FM (24) : "FM"
HOLD (23) : middle position
GrSc-displ.c.(14): middle position

Set the SCAN-MODE-SELECTOR (17) for period of 8 second, 16 second, 32 second or colour depending on the rate of SSTV picture received.

Select the desired memory-block by switches (7) and (8).

As the receiver is tuned in to the station the pitch of the audio will change. Tune the receiver carefully until the SYNC-INDICATOR-LED (18) is flickering continuously in a 15Hz rhythm (8 Hz on 16s & 32 s SSTV).

You may retain a picture in memory at any time by switching to another memory or by moving switch (23) to "HOLD".

The received audio is at the same time available at the "TAPE"-jack on the rear panel for tape recording.

The "RECEIVE brightness (3) and contrast (4) controls are adjusted so that the BLACK (5) and WHITE (6) indicator LEDs are both slightly starting to flicker during reception of the SSTV signal. Once these controls are properly set, only minor adjustments are ever required on SSTV reception. A completely different setting may be necessary when receiving AM-FAX.

SSTV transmissions from 50Hz countries have a 16 2/3 Hz line rate instead of 15 Hz in 60 Hz countries. To overcome this difference in line length adjust the "width" control (11) so that the received picture just fills the raster area.

Receiving colour sstv

Colour SSTV can be received in the frame-sequential or in the line-sequential mode.
In the frame-sequential mode the red, green and blue colour information is transmitted as 3 individual SSTV-frames. Depending on the propagation conditions one transmits 2 or 3 frames each colour in the sequence red, green, blue.

Put the SCAN-MODE-SWITCH (17) to "COLOUR" position and activate the red memory by pushing the "ADV.COL."-toggle (13) until the red LED lights up (12R). After you have received one good red frame switch over to the green memory (12G) and after having received the green information switch to the blue memory (12B). As soon as you have stored the complete colour picture raise switch (23) to the "HOLD" position. You may store a second colour picture in the second memory-block by changing the position of the "memory" switch (8).

In the line-sequential mode the colour information is transmitted alternatingly line by line. Switching between the colour memories is performed completely automatically.
The line-sequential mode is also known as "single-frame" colour mode, because during the process of writing into memory from the first line on the picture appeares in the correct colours.

To activate the line-sequential colour mode , raise switch (13) "ADV.COL." to the "aut." position with the SCAN-MODE-SWITCH (17) being in the "COLOUR" position.

Colour synchronization takes place when the vertical syncpulse occurs. When starting line-sequential colour reception you may receive wrong colours.This is normal. Wait until the next vertical syncpulse is received which synchronizes your SC-1 to the colour sequence of the transmitting station.

On noisy signals colour synchronization may be lost during the reception of a colour picture. This can be corrected by switching switch (23) into position "HOLD" and back to the middle position (several times, if necessary), but it is easier to wait for the next vertical syncpulse and receive the next colour frame in correct colours.

RECEIVING FAKSIMILE PICTURES

Put the MODE-SWITCHES (20 and 21) to "RCV RX" and the SCAN-SELECTOR (17) to "FAX". Check that the switches (23) and (14) are both in the middle position.

Select the FM or AM demodulation depending on the modulation of the signal you are receiving. Satellite picture transmissions require AM-demodulation, short-wave and VLF - transmissions mostly use FM. Have your receiver in "USB"-position and tune in the station so that the "sync"-LED (18) does not light at all during reception.

When receiving AM-FAX,f.e. from satellites, the audio input level to the SC-1 should be $1V_{p-p}$. Note, that variations of the receiver's volume will cause variations of the contrast. Therefore keep the level constant.

Set the "SPEED" switch (22) according to the speed of the transmitting station and START reception by pushing down the "ADV COL"-toggle (13).

Adjust the "RECEIVE brightness and contrast" controls (3&4), so that both the BLACK-LED (5) and the WHITE-LED (6) are just slightly starting to flicker during reception.

Adjust the "width"-control (11), so that the incoming lines just horizontally fill the raster area. If you wish to stretch the picture horizontally, you may turn the "width" control further clockwise. This will cause a vertical compression at the same time because only every second line is written into memory.
If even more vertical compression is needed you may switch to a lower speed (22) or raise switch (13) to the "aut" position.

FAX-signals with a 300Hz start-tone will phase automatically after the start-tone has been received. Other signals have to be phased manually by holding the toggle of switch (23) in the "PHASE" position until the lines have moved into the correct horizontal position (for slight adjustment just tip the toggle).

TAPE RECORDING FAX-SIGNALS

The SC-1 offers different methods for tape recording fax-pictures.
First, the fax-signal may be recorded live during reception.
The second method is to write the picture first into memory and then transmit the contens of memory to tape either in FAX or in 32s-SSTV.

Recording FAX requires a stereo tape recorder because a 2400 Hz synchrotone generated in the SC-1,has to be recorded beside the picture-signal.
When playing back from tape the synchrotone synchronizes the fax-clocks in order to overcome speed variations of the tape (sw.21 in position "TPE").

To record a picture from memory set the MODE-SWITCH (20) to "PREP." and the SCAN-SELECTOR (17) to "FAX" or"32s". Switch (21) has to be in "RX"-position.

STORING PICTURES FROM A CAMERA OR OTHER VIDEO SOURCE

Before a fast-scan picture from a TV camera or other video source can be transmitted in slow-scan-TV, it has to be stored in one of the memories of the SC-1.

Preparing storage

Before storing a fast-scan picture an accurate setting of the "CAMERA brightness" (9) and "contrast" (10) controls is necessary:

Set switch (14) to "display camera".

Turn the "brightness" control counterclockwise so that black saturation is just reached in the dark areas of the picture : LED (5) "BL" is just slightly starting to light .

Turn the "contrast" control (10) clockwise so that white saturation is just reached in the bright areas of the picture :LED (6) "WH" is just slightly starting to light .

When the adjustments are completed set switch (14) back to the middle position.

Picture Grabbing

To grab a picture into memory from a TV camera or other video source set the MODE SWITCH (20) to "PREP." position.
Select the desired resolution of 8, 16 or 32s by switch (17).
Lowering the "STORE"-switch to the "man" position will freeze the picture in memory.

At the top of the picture in memory a small greyscale will be displayed and transmitted. It helps to judge the picture quality. If the camera and the SC-1 had been properly adjusted before freezing, the most bright and the most dark value of the greyscale should be present in the picture. If not, a new frame should be grabbed with a different setting of the "CAMERA brightn" and "contrast" controls (9 & 10).

If the "STORE" switch (15) is set to "aut." position a new picture is grabbed from TV camera automatically at start of each SSTV frame.

Storing a colour picture

For storing a colour picture, a black & white camera and colour filters are used.

KODAK WRATTEN GELATIN FILTERS:

red	No. 25
green	No. 58
blue	No. 47

Set the SCAN-MODE switch (17) to "colour" and select the "red"-memory by the "ADV. COL."-switch (13).
Having the red filter in front of the camera lens first adjust the "brightness" (9) and "contrast" (10) controls as described above -with switch(14) in "displ. cam" position. Then put (14) back to the middle position.

Lowering the "STORE"-switch to "man."-position will freeze the red frame and at the same time automatic switching to the green memory takes place. Then put the green filter in front of the camera lens, freeze and change to the blue filter and freeze again.

You may store another colour picture in the other memory using the same procedure.

TRANSMITTING FROM MEMORY

Select the memory you want to transmit by switch (8) "rec./trm." and set the MODE control (20) to "TRM MEM". SSTV or FAX will then be transmitted as selected by the SCAN-MODE SWITCH (17).
As a convenience a white cursor bar appears in the tv picture showing which part of the picture is currently being transmitted.

The TRANSMIT MEMORY MODE is indicated by the LED (19) "TX".

Transmit level control

The amplitude of the SSTV/FAX signal from memory that appears at "TX" jack can be adjusted by a small screwdriver through the front panel opening located between the RECEIVE "contrast" and "brightness" controls.
It should be adjusted to avoid overdriving the transmitter.

Frame grabbing during transmission from memory

During sstv transmission from memory it is possible to grab a new picture into the memory selected by switch (7) "dipl./store".

As there are separate memory-select-switches for the "store"-function (sw.7) and the "transmit"-function)sw. 8) it is possible to load one memory while transmitting from the other memory.

Transmitting colour sstv from memory

With the SCAN-MODE-SWITCH (17) in the "colour" position one can transmit either in the frame-sequential or the line-sequential system.

In the frame-sequential system 2 or 3 frames of each colour are transmitted in the sequence: red-green-blue.
The operator has to switch from one colour to the other by lowering the "ADV. COL." switch (13) to the "man." position while watching the transmit--cursor.

The line-sequential system works completely automatically when the "ADV. COL." switch (13) is in the "aut." position.

As colour synchronization on the receiving end is carried out by the vertical sync-pulse, make sure that you start your transmission with the cursor bar in the bottom position just before it jumps to the top.

Storing a new colour picture is not possible during transmission. D'ont forget to set the "ADV. COL." switch (13) back to the middle-position before storing a new picture from camera.

Transmitting FAX from memory

With the SCAN-MODE-SWITCH (17) in the "FAX" position the SC-1 will transmit a FM-modulated faksimile signal with 240 lines per minute and a total of 256 lines. As FAX-machines use a larger number of lines the picture may look compressed when recorded on paper. To avoid this you may set switch (13) to "aut." position which causes every line to be transmitted three times.

NOTE: When transmitting FAX the RX-TAPE-SELECT-SWITCH (21) must be in the RX - position

The picture to be transmitted in FAX has to be grabbed into memory in the "32s"-position of the SCAN-MODE-SWITCH (17).

NOTE: When transmitting from memory the SSTV signal generated by the SC-1 is at the same time fed into the SSTV demodulation circuit which causes the tuning aid LED "sync" (18) to flicker, showing that proper sync-pulses are transmitted.

TRANSMITTING FROM TAPE

Set the MODE-SWITCH (20) to "TRM TAPE", start the tape recorder and the SSTV or other audio signal recorded on tape will be transmitted. You will also be able to monitor the transmitted pictures on your TV monitor. Adjust the volume control of tape recorder so as not to overdrive the transmitter.

Note: It is not possible to transmit FAX-signals from tape because of speed unstability of normal tape recorders.

CONNECTING AND USING THE PAL -CAMERA-INTERFACE CI-1

The PAL-INTERFACE-MODULE"CI-1" converts a PAL color video signal into separate red, green, blue components. An additional pc-board installed in the SC-1 provides automatic loading of the 3 color components into the appropriate memories.

The "CI-1" is supplied with 12V DC power via the separate power supply unit (220V AC input).

The PAL-video-signal is fed into the "CI-1" via the BNC-jack. The DIN-plug from the "CI-1" must be connected with the additional DIN-jack located under the "RGB"-jack on the rear panel of the SC-1.

Before using the "CI-1" disconnect any other video-source (b&w camera) from the "CAMERA"-jack on the rear panel of the SC-1.

Set switch (17) to "COLOUR" and switch (14) to "displ. cam". Select the green-signal by switch (13) and adjust Contrast and Brightness for best picture quality (the monitor will only show a black&white picture during this adjustment).

After you have finished the adjustments, set switch (14) back to the middle position (or up-position if storing of a high-resolution picture is desired).

The colour picture will be stored automatically, if the toggle of switch (15) is snapped down once.
There should be no fast motion in the picture to be stored, otherwise an offset between the 3 colors will be visible.

If the toggle of switch (15) is hold down a little longer, only one memory will be loaded. Thus it is also possible to load the red, the green and the blue memory one by one.

PRINTER INTERFACE PI-1

INSTALLATION

To install the printer-interface remove the top cover of the SC-1 and plug the 11-pin connector-strip of the printer-interface into the female connector jack on the main board so that the printer-interface fits into the left rear corner. The Nylon-standoff is snapped into the hole in the main board. On early SC-1 -models this mounting hole was not provided. If you own such a unit you will have to drill it for proper mounting (diameter 4,7 mm).
Take pin 1 of U47 out of the socket and make a solder connection to the black wire from PI-1 (leave pin 1 with the black wire connected to it outside the socket).

Connect the pink wire to the upper terminal (PIa) and the grey wire to the lower terminal (PIb) on the vertical pc-board close to the front panel.

Plug the 16-pin DIL-PLUG of the printer-cable into the socket on the top of the printer-interface so that the cable-outlet of the plug is in the direction to the front panel. Feed the flat cable in a curve through the slot in the rear panel .

OPERATION

The PRINTER-INTERFACE PI-1 is designed for operation with the printer

GP-250X of SEIKOSHA .

It will not operate with other printers.

Any picture being in one of the memories of the SC-1 can be printed. Maximum definition of the print-out is 128 lines with 120 picture elements each and 16 levels of grey. As the lines in memory contain 128 pixels the last 8 pixels will not be printed.

Set switch (17) to "PRINT"-position and switch (20) to "PREP."
Initialize the printer (switch power on or -if it was on- switch it off and on again).
To start printing raise switch (23) to "HOLD"-position.
Printing can be stopped by putting (23) back to the middle position.

Proper operation of the printer and the printer-interface is indicated by the = on the end of each printing-line.

When improper printing occurs (f.e. characters are printed) switch (23) has to be set to the middle position and the printer must be initialized by switching power off and on again. After this,printing can be started again by raising switch (23).