XT-24 INTELOCATOR

AMPEX MM1200 VERSION

TECHNICAL MANUAL

XT-24 INTELOCATOR - INFORMATION INDEX

THE AUDIO KINETICS XT-24 INTELOCATOR

This is the first INTELigent autoLOCATOR made possible by microprocessor technology. It has a programmed capacity to learn a particular tape plus transport behaviour pattern, and subsequently optimise the locate sequence.

FEATURES

* Intelligence
* Interfaces with Ampex MM1200 and ATR 100/104
* Utilises two separate counters, master and intelocate, both operating in minutes and seconds
* Four pre or immediate load memories
* Inches per second speedometer for vari-speed reference
* Full standard tape transport remotes with LED indication
* Leverwheel numerics for faster location point entry with physical memory
* High accuracy of ± 2 seconds over 30 minutes of tape at 15 ips
* Automatic compensation for HI/LO speed change - 7½/15 or 15/30 ips operation available by one switch
* Automatic master count freeze display - for logging - on tape runout

The XT 24 consists of two units, an attractive small calculator style control unit and a compact logic computer unit 'brain' housed within the multitrack tape machine. An 8 metre minature multicore cable links the two units.

FEATURES DESCRIPTION

The unique intelligence feature of the XT 24 results in the fastest search action possible with no overshoot, it is best described by the intelocation process :

When any search function is initiated for the first time, the following sequence occurs :

    A) The display converts from real time position to a reducing countdown to the selected location point

    B) The transport wind button LEDs will indicate direction of tape, regardless of wind mode

    C) Near the location point the machine will enter a momentary slow-down phase to check the available deceleration. At this time the display will convert to GO - L or GO - 0 or GO - 1 (or 2, 3, 4) depending upon the location point selected. The hyphen between GO and the designated point will flash proportionately with tape speed.

    D) The programme now continues to search using the newly derived deceleration figure, typically speeding up again until the correct point on the tape is reached to allow constant firm deceleration to a standstill at the location point.

E) At the conclusion of the search, the newly derived figure is stored for re-use on subsequent searches to this location.

On any repeat of this search, the above sequence will be repeated. However the computer will now have optimised the point where initial deceleration should begin. In other words it has learnt the behaviour pattern of that section of the particular reel of tape with the given tape transport.

Such optimum data is stored in the computer until :

A) The tape is wound off the machine at high speed
B) The power is switched off from the locator
C) The RESET button is depressed on the control unit

Note the data will not be lost if the tape is removed from the guides for editing.

The XT 24 can intelocate to any of six aim points comprising four memories, intelocate zero and the leverwheels setting. In addition cyclic sequences can be programmed between any two of the six aim points. The programming procedure is explained in the 'Operation' section.

The XT 24 has two completely separate counters; one is the master tape timer normally with zero reference at the beginning of the tape, the other is the intelocate counter with a resetable zero enabling cyclic programming to be referenced to a local zero without affecting the master counter. Note that the XT 24 will only permit the entry of an intelocate zero 'downstream' from the master zero e.g. where the master count is zero or positive. Any attempt to enter an intelocate zero point prior to the master zero point will be rejected by the computer which will indicate that it has sensed an illegal command by displaying the message 'HUH ?'

Four memory presets are provided which can be pre-loaded via the leverwheels or directly loaded with the current tape position. Theoretically, using a microprocessor, a large number of memories could be provided. We chose four as the maximum number a normal human being can remember under session conditions. In excess of four memories would result in the memory figure having to be logged thus negating the function.

The inches per second speedometer display i.e. 15.3" enables accurate logging in order that the precise speed can be achieved again on a subsequent recording session.

OPERATION OF XT 24 INTELOCATOR

We suggest that the full facilities of the XT 24 are best explained by a description of its use.

Initial Recording Session

When the machine is switched on the XT 24 initiates the RESET condition as follows :

3.

a) All transport characteristic memories are set to worst case deceleration
b) Master and Intelocate counters are set to zero
c) The four locate memories are set to zero
d) Cycle and Re-cycle programmes are set between intelocate zero and the leverwheel settings.

The lacing of a new reel of tape automatically enables the two counters. If reference tones are recorded at the beginning of the tape, it is useful to re-zero both counters after the tones using MASTER . SET . ZERO.

Assuming the first take is not satisfactory, tape can be conserved by simply depressing the ZERO button; the machine will then intelocate to the zero position and stop, learning that part of the tape in the process. Simple logging of the real time read-outs at the beginning of good takes will enable the engineer to review any take quickly, by setting the minutes and seconds figure into the leverwheels and depressing the LEVER button. The machine will then accurately intelocate to the beginning of the desired take.

At the end of the session the tape should be spooled off the machine tails out, the locator counter will freeze automatically and display the master count. This figure should be logged on the tape box.

Overdubbing

The previously recorded tape is re-laced on to the machine tails out. We assume a previous final readout of 32' 35". By setting 32' 35" into the leverwheels and using the sequence MASTER . SET . LEVER these figures are loaded into the master counter. In other words the master counter is defined at the end of the reel, rather than zeroed at the beginning. This eliminates the need to re-spool the tape to zero in order to make use of the logged master count figures from the original recording session.

Assume that the first take to be worked on is at 7'30". By setting the lever-wheels to 7'30" and depressing LEVER the machine will intelocate to the beginnning of that take. At this point we suggest using SET . ZERO which will load the intelocate zero into the display. The take is then played through, stopping at the end. The display now reads 3' 00". By loading 3' 00" into the leverwheels, the take has its lower limit 0' 00" and its upper limit 3' 00" defined for the CYCLE process. By depressing CYCLE the machine will spool back to the beginning of the take, play it through automatically (to 3' 00") and then rewind to 0' 00" and stop. If the artist or engineer wish to hear the take many times, before attempting an overdub, use of the RECYCLE button will play the take over and over until some other function is selected.

When the artist is ready to record, simultaneous depression of RECORD + CYCLE will cause the machine to record on the selected track up to 3' 00," rewind to 0' 00," automatically play the take back to you, rewind to the beginning and stop. This is fine for straight through overdubbing. However

4.

Let us assume a problem vocal overdub at the chorus section. Using CYCLE play through the take again, at the beginning of the problem area press SET . 1 and at the end of the section press SET . 2. Memories 1 and 2 are now loaded with absolute points on tape (ie Master count figures) at the beginning and end of the first chorus. Now the CYCLE facility should be re-programmed using SET . CYCLE . 1 . 2. You have not lost the beginning and end of the main take which are still 0' 00" and 3' 00", you have merely re-assigned the CYCLE programme to where it is most needed. By using RECYCLE the machine will play through the chorus continuously until the artist is happy to record. The RECORD . CYCLE facility can then be used just for the chorus. This process can be repeated for the second chorus merely by updating SET .1 and SET . 2.

Please note that multiple memories are not necessary. We provide four but doubt that 3 and 4 will be used frequently. The CYCLE/RECYCLE facility can be reprogrammed between any of the four memories, zero and or leverwheels.

Having completed the overdubs, by using SET . CYCLE . ZERO . LEVER, the take can be finally reviewed simply.

By using SET . ZERO at the beginning of the take, we replaced the master count with the intelocate count in the display. To find the next title or take, it is necessary to restore the master count to the display. This is done by using SET . MASTER. Consequently the logged minutes and seconds figure for the next take can be set into the leverwheels and found directly by using LEVER.

Should vari-speed be required whilst overdubbing, a reference readout is available in ips, displayed be depressing SET and PLAY together. This can be logged enabling exact duplication of the vari-speed setting easily.

Mixing

The use of the XT 24 for mixing is the same as for overdubbing without the use of record. It is likely that RECYCLE will be more frequently used allowing the engineer to concentrate on the console/sounds rather than tape position. The advantages of always working to a local zero, are important, as the engineer knows at a glance his correct tape position, without mental arithmetic.

SUMMARY OF BUTTON FUNCTIONS AND OPERATION

One button sequence

MASTER   Master count displayed for 1.5 seconds - designed for
                check on master count whilst using the intelocate count,
                without having to load the master count into the display.
ZERO   Machine intelocates to intelocate zero
LEVER   Machine intelocates to leverwheel settings
1 (or 2, 3, 4) Machine intelocates to memory 1 (or 2, 3, 4)

5.

CYCLE   Assume XT 24 programmed to cycle between memories
               3 and 4 where memory 3 is a higher real time figure than
               memory 4. The machine will intelocate to memory 4, play
               through to memory 3, rewind to memory 4 and stop.

RECYCLE   As cycle except programme is repeated until cancelled by
               any other transport command function.

Two Button Sequences

All multiple button sequences should be entered one button at a time
otherwise the entry will confuse the computer and the display will show 'HUH ?'

SET.MASTER   Enters the master count figure into the intelocate counter
SET.ZERO   Zeroes the intelocate counter
SET.LEVER   Enters leverwheel settings into the intelocate counter
SET.1 (2, 3, 4) Enters master count figure, at split second of entry, into
               memory 1 (or 2, 3, 4).

Three Button Sequences

MASTER.SET.ZERO   Re-zeroes both master and intelocate counters
MASTER.SET.LEVER   Enters leverwheel settings into both master and
                      intelocate counters, altering master zero
                      reference.
MASTER.SET.1 (2, 3, 4) Enters leverwheel settings directly into memory
                      1 (or 2, 3, 4). Entries relate to master count only.

Four Button Sequences

SET.CYCLE.ZERO (or LEVER or 1, 2, 3, 4). LEVER (or ZERO or 1, 2, 3, 4)
SET.RECYCLE.ZERO (or LEVER or 1, 2, 3, 4). LEVER (or ZERO or 1, 2, 3, 4)

Note CYCLE and RECYCLE share the same programming. Also they can be
programmed whilst the XT 24 is making an unrelated search operation, or
even performing a different CYCLE or RECYCLE sequence.

Simultaneous Two Button Sequences

Unlike any other operation of the XT 24 the following sequences are only valid
when both buttons are depressed momentarily simultaneously. Either button
may be depressed first.

PLAY + RECORD   Normal record mode entered
CYCLE + RECORD   Machine intelocates to lower parameter (1) enters
                     record to upper parameter (2) rewinds to (1) plays
                     to (2) rewinds to (1) and stops
RECYCLE + RECORD   Machine intelocates to (1) records to (2) rewinds to
                     (1) plays to (2) rewinds to (1) plays to (2) until
                     cancelled by another transport command
SET + PLAY   Varispeed reference display in inches per second.
                     Note if SET is depressed first, existing transport
                     or intelocation function remains undisturbed

	Speed display is cancelled by pressing any XT 24 button
STOP + 1 (or 2, 3, 4)	Temporary memory 1 (or 2, 3, 4) recall to display whilst buttons are held down
STOP + RECORD	Button LED and all display segment check for 1.5 seconds

Special Facilities

TILT	Re-stabilises computer if affected by external influence, e.g. unsuppressed mains pulse.
RESET	Causes all computer memories to be reset including intelligence and customer cyclic and memory programming. It need only be used if a machine/locator interface fault occurs, but it may be used on loading a new tape, as a quick alternative to MASTER . SET . ZERO

7.

Installation Instructions for the XT-24 Intelocator in use with the Ampex ATR 100/104

On the left underside of the ATR transport there is the cage containing the logic electronics. Protruding from the right of this cage is a P.C. The top connector links to the transport controls. The lower connector is for the autolocator. Simply plug in the interface cable supplied so that the cable leads off in the same direction as the top connector, eg. to the rear of the machine.

Note

If transport stops after using XT-24 play command to exit record, change C19 on transport control P.C. (Front card) from 2.2mf. to 0.1 mf.
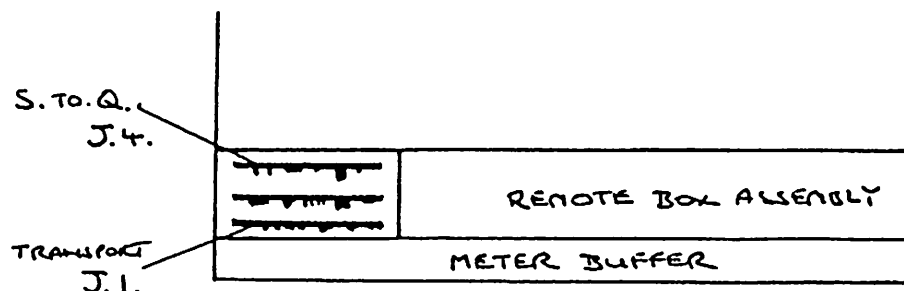
INSTALLATION INSTRUCTIONS FOR THE XT-24 INTELOCATOR WITH THE
AMPEX MM 1200

1. Remove the Left Hand Side Panel from the MM1200

2. Remove the Remote Track Control Box Assembly from the MM 1200

3. Remove the Transport Control, Capstan Servo and Search-To-Cue PC cards from the Transport Control Assembly (Front left of machine under lid).

4. Remove the 4 rear mounting screws securing the Transport Control Assembly (PC Card Cage) to the deck casting.

    NOTE that access to the lower 2 securing screws is from within the deck assembly, and that these 2 lower screws double as cable harness clamps.

5. With the Meter panel fully extended, the P.C.Card Cage may now be rotated down into the area normally occupied by the Control Box Assembly. Transport control and Search-To-Cue edge connectors J1 and J4 will now be accessible from the left of the machine.

6. The supplied machine interconnect cable may now be introduced into the chasis of the machine through any convenient aperture; unless it is proposed to remote the Ampex Timer Display and Searh-To-Cue in addition to the XT-24, a convenient method is as follows :-

    Remove from the accessory panel on the rear of the MM 1200 the Accessory Socket together with attached sub-panel. This termination is used to extend the Ampex Timer Readout and Search-To-Cue function and is otherwise unused. Tape of this socket. Introduce the XT-24 cable through this aperture leading through with the existing harness to terminate on the edge connectors of the P.C.Card Cage.

S. TO. Q.
J. 4.

TRANSPORT
J. 1.

REMOTE BOX ASSEMBLY

METER BUFFER

7. Connect the 17 required cores of the interconnect cable in parallel with the existing connections to J1 and J4 as shown below:-

J1	2	Red/Blue
	10	White/Blue
	11	Blue
	14	Yellow/Red
	20	Brown
	21	Yellow/Blue
	23	Red/Black
	25	Red/Brown
	26	Green/Red
	K	Orange
	W	Red
	Z	White/Red
	DD	Violet
	EE	Pink
	FF	Turquoise
J4	21	Orange/Blue
	22	Blue/Black

8. Re-assembly is a reversal of steps 1-5

9. Confirm that the mains voltage is indicated correctly on the exterior of the XT-24 Brain unit. If incorrect the mains tappings on the transformer inside the Brain may be adjusted as follows :-

115 vac working : remove any link 2/3 and then add links 1/3, 2/4.
230 vac. working : remove any links 1/3, 2/4 and then add link 2/3.

10. Connect the Brain to the mains a.c. outlet.

11. Switch off the MM1200 and connect the machine interconnect cable to the Brain.

12. Connect the XT-24 Controller to the Brain.

13. Switch on the MM 1200 - A relay in the XT-24 senses presence of +27v in the MM1200 and applies power to the XT-24.

NOTE this safeguard does not allow power to be applied to the XT-24 unless connected to the MM 1200 which is important when using sensitive computer circuitry. Consequently an ON/OFF switch is not required.

9.

ADJUSTMENTS TO THE XT-24 INTELOCATOR

No. set-up is normally required, since a thorough checkout is made at the factory; however, after prolonged use the following one adjustment may be deemed necessary.

Speed Readout/Adjustment

Engage PLAY mode, and simultaneously depress PLAY and SET on the XT-24 Controller. The display will now show current tape speed until any further button is depressed at the XT-24 Controller.

Normally a 1% accuracy is maintained by this readout, settling to final accuracy some 5-6 minutes after switch on.

AUDIO KINETICS do not recommend re-calibration of this readout, since it has been set against a crystal standard during manufacture; it may however, be adjusted as follows :

   Remove the Brain cover and adjust trimmer RV1 on the computer
   board (The lower of the two boards) until the desired reading is
   achieved.

   ON NO ACCOUNT DISTURB THE SETTINGS OF RV2 and RV3

TROUBLE SHOOTING THE XT-24 INTELOCATOR

General

The engineer should be aware of the three 5 volt monolithic regulators in the equipment; U18 and U19 on the computer board and U11 on the controller sub-board.

At commencement of any fault finding, confirm the presence of +5 volts from the two regulators in the computer with the controller and interface board first disconnected and then re-connected.

Repair or replace PSU components as necessary.

THEN

A - Computer Board Check

1. Disconnect controller and interface board
2. Jumper J1-12 to J1-11 (RESET N.C. to GROUND)
3. Check $\overline{RST}$ signal (U7-40) low for $\frac{1}{2}$ second approximately at switch on, then high; if this condition is not satisfied, probable U15 or U17 fault.
4. Check for an approx 1 KHz waveform at U13-18; if not present, probable U15 fault.
5. Check for narrow (20-50μ Sec) pulses at approx 1 KHz repetition rate present at U13-7/8/9; isolated failure at any pin indicates probable U13 fault; total absence indicates probable clock or program fault. If O.K. go to step 7.
6. Check for 1 MHz square wave at U8-10, U7-3/36/37; partial failure indicates U17 fault; total failure indicates U16 fault.
7. Check that U12-2 thro' U12-7 are high; any failure indicates U12 or program fault.
8. If no faults remain at this stage, the computer board is probably functional.

B - Controller Checkout

1. Remove jumper added in step A2, and reconnect controller to computer unit.
2. Check that pressing 'RESET' on the controller causes U7-40 on computer board to go low until button released; failure indicates cable or computer U14 fault.
3. Check that pressing "TILT" on controller causes computer U14-3 to go low until button released; failure indicates cable or computer U14 fault.
4. If no characters are displayed at all, check for function of +5 volt regulator within controller (U11) or cable fault not delivering 10 volts unregulated to the regulator. If O.K. suspect U9 or U10 (character drivers).
5. If display present with some missing or additional segments :-
   a) Same segment missing from each character indicates cable fault carrying appropriate data, or LED driver fault U5/U6/U7/U8
   b) Segment differences between characters indicate LED failure within the display chips.
   NOTE :- RECORD and STOP simultaneously depressed is programmed to illuminate every button and display LED in the controller.

B - Controller Checkout continued

6. Suspected button or leverwheel malfunction :-

   a) Check for narrow (20-50μ sec) pulses at controller J1-1/2/14; some waveform degradation is tolerable; isolated failure indicates cable fault. ·

   b) Check that by operating tens of minutes of leverwheels from 0-9 causes an identifiable change to the waveforms on J1-8/9/10/16; any failure indicates leverwheel or U3/U4 fault.

   c) Check that operating single minutes leverwheel from 0-9 causes an identifiable change to the waveform on J1-3/13/14/15; any failure indicates leverwheel or U1/U2 fault.

   d) Check that operating each button as indicated in TABLE 1 causes an identifiable change in the waveform on the indicated J1 pin. Failure indicates button or defined chip fault.

TABLE 1

BUTTON	CHIP INVOLVED	SIGNAL NAME	J1 PIN
PLAY ZERO	U1	PB0	3
STOP LEVER		PB1	13
RECORD MEM.1	U2	PB2	14
FORWARD MEM.2		PB3	15
REWIND MEM.3	U3	PB4	16
EDIT (M.D) MEM.4		PB5	8
CYCLE MASTER	U4	PB6	9
RECYCLE SET		PB7	10

7. Any remaining fault is probably in the machine interface board (AK 2404 or 5) or in the cable to the machine.

C - Machine Interface Board - Ampex MM1200

The board functions may be split into three categories; input, output and interrupt.

1. INPUT

Signals from the PLAY, STOP, RECORD, FWD and RWD indicator busses in the MM1200 arrive on-board via Ribbon connectors 27, 29, 33, 37, 41 and are applied to resistive dividers R1/2, R3/4, R5/6, R7/8 and R9/10.

Approximately 4 volts of signal is developed across the lower half of each divider when the mode is inactive, falling to zero when the mode is active. These attenuated signals are applied via Ribbon connectors 30, 32, 34, 36 and 38 to high impedance input pins PB0 through PB4 on the computer board.

Other status information presented to the computer includes end-of-tape status and machine speed selection. These signals arrive via Ribbon 1 and 5 and pass through isolation diodes D1, D2 to pull-up resistors at pins 1, 13 of U4, a resistor network.

The resultant 0-5 volt signals are passed to inputs 11 and 3 of U6, a CMOS AOI chip configured to selectively pass either these runout and speed signals or another two status signals; Range and Override Detect (See 'output' section for description of Override Detect).

Range is at a zero level when set to handle a machine operating at $7\frac{1}{2}/15$ ips, and a 5v level when set for a 15/30 ips machine. U6, the AOI chip, passes the selected pair of signals, as detailed above, via inverter/buffers U2-11/10 and U2-9/8 and Ribbon connectors 26, 28 to TTL inputs PA6, PA7 on the computer board. The command signal to U6 to select the appropriate signal pair comes from control output CA2 on the computer board, via Ribbon 14 to pins 2, 12 of U6. U8-2/1 inverts the command signal and applies this to pins 4, 10 of U6.

Two TTL level inputs remain to be covered; these are the DIRECTION and TACH signals. Resistive pull-ups at the input points of these signals (Ribbon 35, 31) optimise signal characteristics after passing down the machine connector cable. The DIRECTION signal is inverted by U2-1/2 and applied as count up/count down control to counter U5. After re-inversion in U2-3/4 and pull-up treatment to ensure a 0-5v signal swing, the signal passes via Ribbon 42 to high impedance input PB6 on the computer board.

The TACH signal after inversion in U2-5/6 is applied as the clock signal to U5. A signal at 1/8 TACH rate is fed from U5 with pull-up to ensure 0-5v level via Ribbon 44 to high impedance input PB7 on the computer board.

C.Machine Interface Board - Ampex MM1200 continued

2. OUTPUT

Via Ribbon 12, 16, 18, 20, 22, 24, computer board outputs PA0 through PA5 may individually or in combination go active low, causing inverter outputs of U9 CMOS, to drive open-collector TTL inverter U10 active low, thus requesting action of the MM1200 via Ribbon 3, 11, 15, 19, 23, 25. These commands are inhibited during an END OF TAPE situation or during OVERRIDE DETECT.

Override Detect

AOI chip U7, with inverters in U8 and D3, 4, 6, 7, 8 resolves command contention problems as follows :-

The XT-24 is designed to drop out of any search, cycle or transport requesting mode, upon detection of a command not originating within the computer. Assume that an MM1200 mode button of the Ampex SEARCH-TO-CUE accessory requests a RWD function by pulling down the RWD command lines at some time when the XT-24 is not requesting this mode. At this time PA4 inactive high will be priming one input (pin 3) of AOI chip U7. The low-going external request will be transferred via D3 to inverter U8-5/4 which will complete the AND pattern at U7-4 and generate a low at U7-15, which may be monitored by the computer via the U6 selector circuitry.

3. INTERRUPTS

To conserve the limited processing time available in any real time microcomputer system, the program does not routinely examine the state of the mode every so often; rather it expects the interface circuit to tell it that a status change has occurred, and only then updates its internal status memory by looking at the tally inputs. Parity trees U1, U3 achieve this 'excuse me' or INTERRUPT function.

Examining the interface diagram it will be noted that U1 monitors DIRECTION, DIVIDED TACH, STOP and RECORD tallies. U1-4 will change state when any one of these inputs changes. This causes rapid status updates by the following reasoning :

a) Neither WIND modes nor PLAY mode needs monitoring since DIVIDED TACH changes for every $\frac{1}{2}$ inch of tape motion.
b) Theoretically the argument in a) could be extended to RECORD; however the XT-24 is capable of interfacing to machines other than the MM1200 where such rapid motion indications are not available, and in order rapidly to signal a change from PLAY to RECORD the RECORD tally is monitored.

C. - Machine Interface Board - Ampex MM1200 continued

Interrupts continued

c) During a WIND to STOP transition, the STOP tally does not appear until the 1200 has sensed a change in direction, so monitoring DIRECTION alone should be sufficient to update STOP tally status. However, as in case b) the XT-24 can be interfaced to machines employing similar logic but whose direction sensing is not synchronous with timer information, and for this reason the STOP status is monitored.

Pulse Forming

U1-4 is connected directly to U1-1 and via delay network R12/C3 to U1-2. U1-3 normally low then pulses high for a few microseconds at each transition of U1-4 and is applied via Ribbon 46 to interrupt input CB1 on the computer board. Similar arguments hold for U3.

AUDIO KINETICS (UK) LTD

XT-24 AMPEX MACHINE CABLE   1100/1200 Version

25 Way D Series Socket Connector - 4 Metres of 25 Way Minature Cable - Pre-Tinned ends.

D Connector Socket		Function	104 MRA	Edge Conn.
1	Red	Runout ?	CL	J1-W
2	Blue	Speed ?	_P	J1-11
3	-			
4	-			
5	-			
6	-			
7	Brown	Lift :	L	J1-20
8	Mauve	Stop ?	S	J1-DD
9	Orange	Record ?	N	J1-K
10	Pink	Forward ?	T	J1-EE
11	Turquoise	Rewind ?	U	J1-FF
12	-			
13	Red/Blue	M/C 28v	C	J1-2
14	Green/Red	Play :	J	J1-26
15	Yellow/Red	Ground	A	J1-14
16	White /Red	Forward :	F	J1-Z
17	Red/Black	Stop :	E	J1-23
18	Red/Brown	Rewind :	H	J1-25
19	Yellow/Blue	Record :	K	J1-21
20	White/Blue	Play ?	V	J1-10
21	Blue/Black	Tach ?	CK	J4-22 *
22	Orange/Blue	Direction ?	CP	J4-21 *
23	-			
24	-			
25	-			

? = Tally to XT
: = Command from XT

AUDIO KINETICS (UK) LTD

XT-24 AMPEX ATR 100/104 MACHINE CABLE

25 Way D Series Socket   -   3 Metres of 25 Way Miniature Cable.
                              -   28 Way P.C. Connector.

D Socket		28 Way P.C.	Function
1	RED	4	Runout ?
2	BLUE	M	Speed ?
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	BROWN	D	Lift :
8	VIOLET	6	Stop ?
9	ORANGE	B	Rec ?
10	PINK	V	Forward ?
11	TURQUOISE	18	Rewind ?
12	-	-	-
13	RED/BLUE	20	+ 20 v
14	GREEN/RED	16	Play
15	YELLOW/RED	U	Ground (O v)
16	WHITE/RED	22	Forward :
17	RED/BLACK	12	Stop :
18	RED/BROWN	21	Rewind :
19	YELLOW/BLUE	3	Record :
20	WHITE/BLUE	2	Play ?
21	BLUE/BLACK	N	Tach ?
22	ORANGE/BLUE	L	Direction ?
23	-	-	-
24	-	-	-
25	-	-	-

?   =   Tally to XT
:   =   Command from XT

Assembly Notes

1. Sleeve stripped back multicore before attaching to P.C. Connector.

2. Sleeve all terminations to 28 Way P.C. Connector leading cable in from A end. Allow a little slack on multicores.

3. Tie wrap cable to P.C. Connectors through hole at A end of connector.

4. Whilst looking at the face of the D Socket Connector with the cable towards the floor, assemble the connector into the shroud so that pins 1 - 13 (the longer row of pins) are on the left.

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XT-24 CONTROLLER CABLE - ISSUE TWO - 17-7-78

25 Way D Series Plug Connector - 8 Metres of 20 Way Multicore Cable -
20 Way Jermyn Red Plug (Strain Relief Grommet and 1 Sleeve)

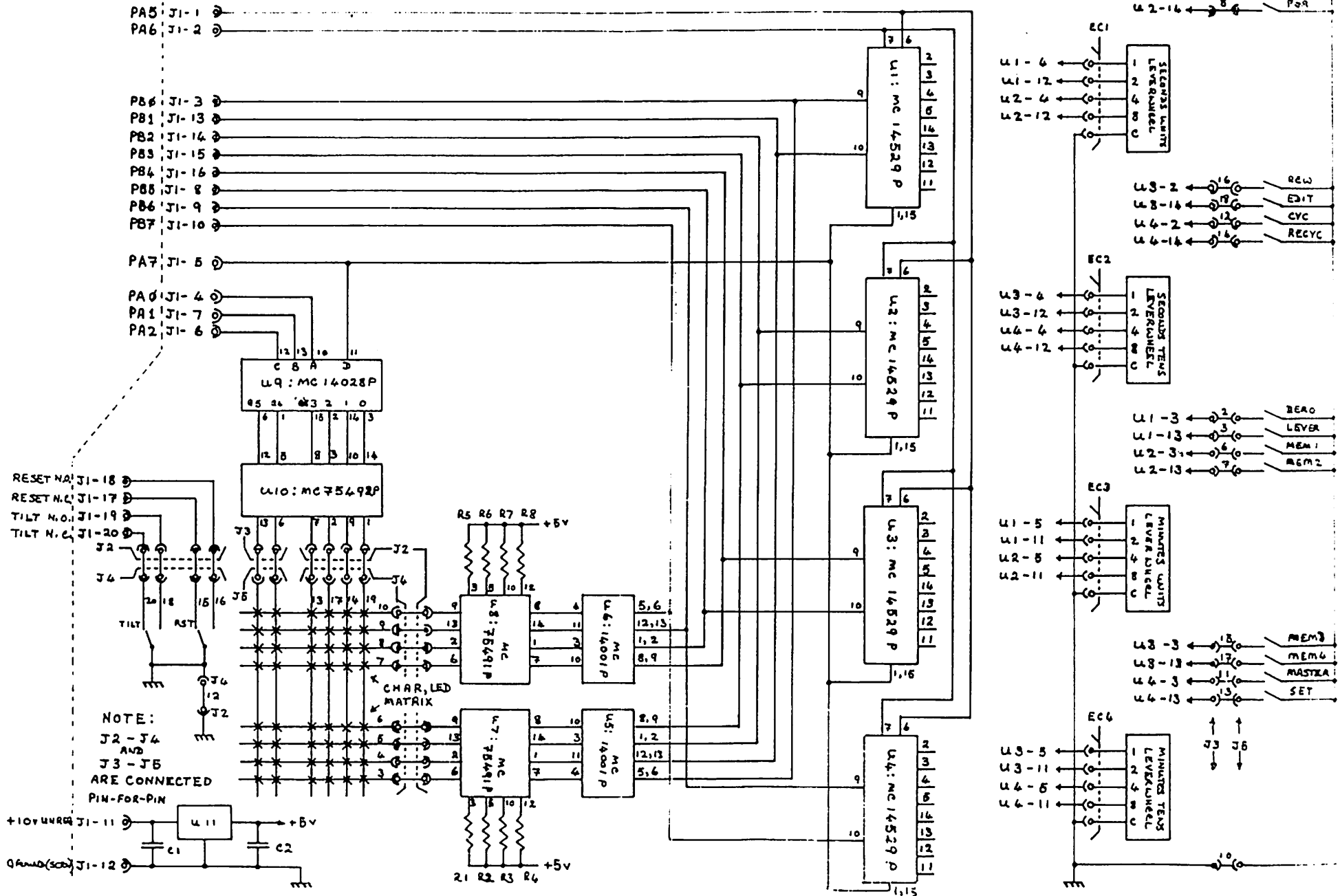| D Connector Plug		Jermyn Plug	Core Function
1	RED	5	PA 7
2	BLUE	1	PA 5
3	-	-	(PA 3)
4	GREEN	7	PA 1
5	-	-	-
6	YELLOW	10	PB 7
7	WHITE	8	PB 5
8	BLACK	15	PB 3
9	BROWN	13	PB 1
10	-	-	-
11	SCREEN	12	GROUND
12	VIOLET	17	RESET N.C
13	ORANGE	11	+10 V. UNREG.
14	PINK	2	PA 6
15	-	-	(PA 4)
16	TURQUOISE	6	PA 2
17	GREY	4	PA 0
18	-	-	-
19	RED/BLUE	9	PB 6
20	GREEN/RED	16	PB 4
21	YELLOW/RED	14	PB 2
22	WHITE/RED	3	PB 0
23	RED/BLACK	18	RESET N.O.
24	RED/BROWN	19	TILT N.O.
25	YELLOW/BLUE	20	TILT N.C.

Assembly Notes

1. A strain relief grommet should be threaded onto the cable before attaching
    the Jermyn 20 Way connector. The relief sleeve towards the centre of the
    cable.

2. The screen connection to the D Plug should be made with a length of 7/.2
    cable and NOT directly to the pin.

3. Leave 3" of the cores showing before the connection to the Jermyn Plug.
    i.e. strip back cable 3½" Use Sleeve where cores leave overall sheathing.

TAKE CARE on 2 & 3 when connecting the screens to the link wire.   If the
screen is twisted tight around the multicores burning can result when the
twisted screen is tinned.   This can be avoided by untwisting the screen as it
leaves the sheathing AFTER the original twisting.

4. Whilst looking at the face of the connector with the cable towards the
    floor, assemble the D connector into the shroud so that pins 1 - 13 (the
    longer row of pins) are on the left.

PA5 J1-1
PA6 J1-2

PB0 J1-3
PB1 J1-13
PB2 J1-14
PB3 J1-15
PB4 J1-16
PB5 J1-8
PB6 J1-9
PB7 J1-10

PA7 J1-5

PA0 J1-4
PA1 J1-7
PA2 J1-6

U1: MC 14529 P
U2: MC 14529 P
U3: MC 14529 P
U4: MC 14529 P

C B A D
U9: MC 14028P
Q5 Q4 Q3 2 1 0

U10: MC 75492P

RESET N.O. J1-18
RESET N.C. J1-17
TILT N.O. J1-19
TILT N.C. J1-20

J2
J4
J3
J5
TILT
RST

R5 R6 R7 R8 +5V

U8: 75491P
U6: 14001P
U7: 75491P
U5: 14001P

CHAR, LED MATRIX

NOTE:
J2 - J4
AND
J3 - J5
ARE CONNECTED
PIN-FOR-PIN

+10V UNREG J1-11
U11
+5V
C1
C2
GND (SCR) J1-12

R1 R2 R3 R4 +5V

U1-2 — PLAY
U1-16 — STOP
U2-2 — REC
U2-16 — PGR

EC1
SECONDS UNITS LEVEL WHEEL
U1-4
U1-12
U2-4
U2-12
1 2 4 8 C

U3-2 — REW
U3-16 — EDIT
U4-2 — CYC
U4-14 — RECYC

EC2
SECONDS TENS LEVEL WHEEL
U3-4
U3-12
U4-4
U4-12
1 2 4 8 C

U1-3 — ZERO
U1-13 — LEVER
U2-3 — MEM 1
U2-13 — MEM 2

EC3
MINUTES UNITS LEVEL WHEEL
U1-5
U1-11
U2-5
U2-11
1 2 4 8 C

U3-3 — MEM 3
U3-13 — MEM 4
U4-3 — MASTER
U4-13 — SET

EC4
MINUTES TENS LEVEL WHEEL
U3-5
U3-11
U4-5
U4-11
1 2 4 8 C

J3 J6